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Tapping Attachments.....	50	Welders, Electric Spot.....	266
Tapping Chucks.....	50-55	Welders, Pneumatic Flue.....	259
Tapping Machines.....	51	Welders, Roller Type.....	259
Taps, Boiler.....	18	Welding and Cutting Outfits, Oxy- Acetylene.....	190, 191
Taps, Machine Screw.....	15	Wheels, Grinding.....	170
Taps, Nuts.....	15	Whitney Angle Shears, Notchers and Benders.....	139, 140
Taps, Machinists' Hand.....	14	Whitney Ball Bearing Portable Punches.....	150, 151
Taps, Patch Bolt.....	18	Whitney Lever Punches.....	149-152
Taps, Pipe.....	16	Wire Gauge Drills.....	9
Taps, Staybolt.....	16, 17	Wrenches, Box.....	39
Tap Wrenches.....	20	Wrenches, Bridge Builders Ratchet.....	42
Telltale Drills.....	10	Wrenches, Car Double Head.....	40
Test Pumps, Boiler.....	87	Wrenches, Engineers.....	38, 39, 40
Threading Machines, Hand.....	31	Wrenches, Pipe.....	36, 37
Threading Machines, Power.....	267	Wrenches, Portable Electric Socket.....	175
Threading Tools, Lathe.....	61	Wrenches, Ratchet Socket.....	42
Timber Braces.....	189	Wrenches, Reamer.....	20
Tire Bending Rolls.....	141	Wrenches, Reversible Ratchet.....	42
Tire Upsetters.....	141	Wrenches, "S".....	41
Toledo Pipe Threading Tools.....	33, 34	Wrenches, Structural.....	98
Toledo Power Drives.....	35	Wrenches, Tap.....	20
Tongs.....	98	Wrenches, Vanadium.....	39
Tool Holders, Lathe.....	58, 63	Wright Chain Hoists.....	208-211
Toolmakers "C" Clamps.....	68	Wright Trolleys.....	213
Tool Post Grinders.....	164, 165, 166	Y	
Tools, Beading.....	86	Yoke Riveters, Pneumatic.....	185
Tool Stands.....	195	Yost, Vises.....	45
Tool Steels.....	269		

TAPER SHANK DRILLS
High Speed and Carbon Steel



General Specifications

Diam. Inches	Decimal Equiv.	Taper Shank		Overall Length, In.		List Price, Each	
		Carbon Steel	High Speed Steel	Carbon Steel	High Speed Steel	Carbon Steel	High Speed Steel
1/16	.1250	1	1	5 1/8	5 1/8	\$0.45	\$0.90
1/16	.1562	1	1	5 3/8	5 3/8	.45	.90
1/16	.1875	1	1	5 3/4	5 3/4	.50	.90
1/8	.2187	1	1	6	6	.55	1.00
1/8	.2500	1	1	6 1/8	6 1/8	.60	1.10
1/8	.2812	1	1	6 1/4	6 1/4	.65	1.20
1/8	.3125	1	1	6 3/8	6 3/8	.70	1.30
1/8	.3437	1	1	6 3/4	6 3/4	.75	1.40
1/4	.3750	1	1	6 3/4	6 3/4	.80	1.50
1/4	.4062	1	1	7	7	.90	1.65
1/4	.4375	1	1	7 1/8	7 1/8	1.00	1.75
1/4	.4687	1	1	7 1/4	7 1/4	1.10	1.90
1/4	.5000	1	2*	7 3/8	8 1/4	1.20	2.00
1/4	.5312	1	2*	7 3/4	8 3/4	1.30	2.15
1/4	.5625	1	2*	8 1/4	8 3/4	1.40	2.25
1/4	.5937	2	2	8 3/4	8 3/4	1.50	2.40
1/4	.6250	2	2	8 3/4	8 3/4	1.60	2.50
1/4	.6562	2	2	9	9	1.70	2.75
1/4	.6875	2	2	9 1/4	9 1/4	1.80	3.00
1/4	.7187	2	2	9 1/2	9 1/2	1.90	3.25
1/4	.7500	2	2	9 3/4	9 3/4	2.00	3.50
1/4	.7812	2	2	9 7/8	9 7/8	2.10	3.75
1/4	.8125	2	3*	10	10 3/4	2.20	4.00
1/4	.8437	2	3*	10	10 3/4	2.40	4.40
1/4	.8750	2	3*	10	10 3/4	2.60	4.75
1/4	.9062	2	3*	10	10 3/4	2.80	5.15
1/4	.9375	3	3	10 3/4	10 3/4	3.00	5.50
1/4	.9687	3	3	11	11	3.25	5.90
1/2	1.0000	3	3	11	11	3.50	6.25
1/2	1.0312	3	3	11 1/8	11 1/8	3.75	6.75
1/2	1.0625	3	3	11 1/4	11 1/4	4.00	7.25
1/2	1.0937	3	4*	11 1/2	12 1/2	4.25	7.75
1/2	1.1250	3	4*	11 3/4	12 3/4	4.50	8.25
1/2	1.1562	3	4*	11 7/8	12 7/8	4.75	8.90
1/2	1.1875	3	4*	12	13	5.00	9.50
1/2	1.2187	3	4*	12 1/8	13 1/8	5.25	10.15
1/2	1.2500	3	4*	12 1/4	13 1/4	5.50	10.75
1/2	1.2812	4	4	14 1/8	14 1/8	5.75	11.50
1/2	1.3125	4	4	14 1/4	14 1/4	6.00	12.25
1/2	1.3437	4	4	14 1/2	14 1/2	6.25	13.00
1/2	1.3750	4	4	14 3/4	14 3/4	6.50	13.75
1/2	1.4062	4	4	14 3/8	14 3/8	7.00	14.65
1/2	1.4375	4	4	14 3/4	14 3/4	7.50	15.50
1/2	1.4687	4	4	14 7/8	14 7/8	8.00	16.40
1/2	1.5000	4	4	15	15	8.50	17.25
1/2	1.5312	4	5*	15	16 3/8	9.00	18.15
1/2	1.5625	4	5*	15 1/8	16 3/8	9.50	19.00
1/2	1.5937	4	5*	15 1/4	16 3/8	10.00	20.00
1/2	1.6250	4	5*	15 3/8	17	10.50	21.00
1/2	1.6562	4	5*	15 3/4	17 1/8	11.00	22.00
1/2	1.6875	4	5*	15 7/8	17 1/8	11.50	23.00
1/2	1.7187	4	5*	16 1/8	17 1/8	12.00	24.00
1/2	1.7500	4	5*	16 1/4	17 3/8	12.50	25.00
1/2	1.7812	4	5*	16 1/2	17 3/8	13.25	26.25
1/2	1.8125	4	5*	16 3/4	17 3/8	14.00	27.50
1/2	1.8437	4	5*	16 3/4	17 3/8	14.75	28.75
1/2	1.8750	4	5*	16 7/8	17 3/8	15.50	30.00
1/2	1.9062	4	5*	16 7/8	17 3/8	16.25	31.25
1/2	1.9375	4	5*	16 3/4	17 3/8	17.00	32.50
1/2	1.9687	4	5*	16 3/4	17 3/8	17.75	33.75
2	2.0000	4	5*	16 3/8	17 3/8	18.50	35.00
2	2.0312	5	5	17 3/8	17 3/8	19.25	36.25
2	2.0625	5	5	17 3/8	17 3/8	20.00	37.50
2	2.0937	5	5	17 3/8	17 3/8	20.75	38.75
2	2.1250	5	5	17 3/8	17 3/8	21.50	40.00
2	2.1562	5	5	17 3/8	17 3/8	22.25	41.25
2	2.1875	5	5	17 3/8	17 3/8	23.00	42.50
2	2.2500	5	5	17 3/8	17 3/8	23.75	43.75
2	2.3125	5	5	17 3/8	17 3/8	24.50	45.00
2	2.3750	5	5	17 3/8	17 3/8	26.00	50.00
2	2.4375	5	5	17 3/8	17 3/8	27.50	55.00
2	2.5000	5	5	18 3/4	18 3/4	29.00	60.00
2	2.5625	5	5	18 3/4	18 3/4	30.50	65.00
2	2.6250	5	5	19 1/2	19 1/2	32.00	70.00
2	2.6875	5	5	19 1/2	19 1/2	34.00	75.00
2	2.7500	5	5	20 3/8	20 3/8	36.00	80.00
2	2.8125	5	5	20 3/8	20 3/8	38.00	85.00
2	2.8750	5	5	21 1/8	21 1/8	40.50	90.00
2	2.9375	5	5	21 1/8	21 1/8	43.00	95.00
3	3.0000	5	5	21 3/4	21 3/4	45.50	100.00
3	3.0000	5	5	21 3/4	21 3/4	48.00	105.00

*Can be supplied with next size smaller shank, when specified, at same price.

STRAIGHT SHANK DRILLS JOBBER'S OR SHORT SERIES

High Speed and Carbon Steel



Dia. Inches	Dec. Equiv.	List Price Per Dozen		Length Overall Inches	Dia. Inches	Dec. Equiv.	List Price Per Dozen		Length Overall Inches
		Carbon Steel	High Speed Steel				Carbon Steel	High Speed Steel	
1/16	.0312	\$1.50	.....	1 1/2	17/64	.2656	\$3.50	\$9.10	4 1/2
1/8	.0469	1.55	.....	1 3/4	9/32	.2812	3.80	9.10	4 3/4
3/16	.0625	1.60	\$5.70	2 1/2	19/64	.2969	4.00	10.50	4 3/4
1/4	.0781	1.65	5.70	2 3/4	5/16	.3125	4.35	10.50	4 3/4
5/16	.0937	1.70	5.70	2 3/4	11/32	.3281	4.70	12.00	4 3/4
3/8	.1094	1.75	5.90	2 3/4	13/32	.3437	5.05	12.00	4 3/4
7/16	.1250	1.80	5.90	3	29/64	.3594	5.50	13.50	4 3/4
1/2	.1406	1.85	6.10	3 1/2	3/8	.3750	6.00	13.50	5
9/16	.1562	1.90	6.10	3 1/2	25/32	.3906	6.50	15.00	5 1/2
5/8	.1719	2.00	6.30	3 3/4	17/16	.4062	7.00	15.00	5 1/2
11/16	.1875	2.25	6.30	3 3/4	27/32	.4219	7.75	17.00	5 3/4
3/4	.2031	2.50	7.00	3 3/4	7/8	.4375	8.50	17.00	5 3/4
13/16	.2187	2.75	7.00	3 3/4	23/16	.4531	9.25	18.75	5 3/4
7/8	.2344	3.00	7.35	3 3/4	15/8	.4687	10.00	18.75	5 3/4
15/16	.2500	3.25	7.35	4	31/16	.4844	11.00	20.00	5 3/4
					1/2	.5000	12.00	20.00	6

STRAIGHT SHANK DRILLS—LONG SERIES

High Speed and Carbon Steel



Made in sizes from 1/8" to 2" inclusive, varying by 64ths to 1 1/4", by 32nds to 1 1/2" and by 16ths to 2". Prices and specifications same as for corresponding sizes of Taper Shank Drills.

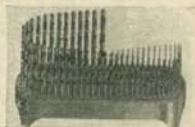
STRAIGHT SHANK DRILLS IN SETS



Set No. 6



Set No. 18



Set No. 8

Set	CONSISTING OF	List Price
No. 6	S. S. Carbon Jobbers, 1/16" to 1/2" by 32nds, on maple block.....	\$ 9.50
No. 5A	S. S. Carbon Jobbers, 1/16" to 1/2" by 64ths, on maple block.....	15.00
No. 5	S. S. Carbon Jobbers, 1/16" to 1/2" by 64ths, on metal stand.....	16.00
No. 9	S. S. Wire Gauge Carbon, alternate sizes Nos 1 to 59, on maple block.....	8.50
No. 8A	S. S. Wire Gauge Carbon, Nos. 1 to 60, on maple block.....	13.35
No. 8	S. S. Wire Gauge Carbon, Nos. 1 to 60, on metal stand.....	14.35
No. 7	S. S. Wire Gauge Carbon, Nos. 1 to 60 and Carbon Jobbers, 1/4" to 3/4", by 32nds, on maple block.....	15.75
No. 18	Breast Drill Set 1/4" to 1/4" by 64ths, the Carbon Jobbers Drill.....	1.60

We can furnish all other standard types of drills, including Wire Gauge, Bit-Stock, Blacksmiths, Ratchet Shank, Three Fluted Oil Tube, Straight Fluted Graham Shank, Wood Boring, Machine Bits, Millimeter Sizes, Countersinks and Center Drills. The Taper Shank, Jobbers, Wire Gauge Bit Stock Brace Drills and Machine Bits can be supplied in sets consisting of one drill each of various sizes. Left hand Drills and other special types can be furnished to order.

FOR OTHER SMALL TOOLS

We have endeavored to give brief description and essential specifications of only the leading tools in each line. If you desire any equipment which is not listed here we will be glad to receive your inquiry—which will have our prompt attention.

STRAIGHT SHANK TWIST DRILLS
WIRE GAUGE SIZES
 High Speed and Carbon Steel



Wire Gauge No.	Dec. Equiv.	List Price Per Dozen		Length Overall Inches	Wire Gauge No.	Dec. Equiv.	List Price Per Dozen		Length Overall Inches
		Carbon Steel	High Speed Steel				Carbon Steel	High Speed Steel	
1	.2280	\$2.75	\$7.00	4	41	.0960	\$1.70	\$5.70	2 5/8
2	.2210	2.75	7.00	3 1/8	42	.0935	1.70	5.70	2 5/8
3	.2130	2.75	7.00	3 1/8	43	.0890	1.70	5.70	2 3/4
4	.2090	2.75	7.00	3 1/8	44	.0860	1.70	5.70	2 3/4
5	.2055	2.75	7.00	3 1/8	45	.0820	1.70	5.70	2 3/4
6	.2040	2.50	7.00	3 1/8	46	.0810	1.65	5.70	2 3/4
7	.2010	2.50	7.00	3 1/8	47	.0785	1.65	5.70	2 3/4
8	.1990	2.50	7.00	3 1/8	48	.0760	1.65	5.70	2 3/4
9	.1960	2.50	7.00	3 1/8	49	.0730	1.65	5.70	2 3/4
10	.1935	2.50	7.00	3 1/8	50	.0700	1.65	5.70	1 1/2
11	.1910	2.25	6.30	3 1/8	51	.0670	1.60	5.70	1 1/2
12	.1890	2.25	6.30	3 1/8	52	.0635	1.60	5.70	1 1/2
13	.1850	2.25	6.30	3 1/8	53	.0595	1.60	5.70	1 1/2
14	.1820	2.25	6.30	3 1/8	54	.0550	1.60	5.70	1 1/2
15	.1800	2.25	6.30	3 1/8	55	.0520	1.60	5.70	1 1/2
16	.1770	2.00	6.30	3 1/8	56	.0465	1.55	5.70	1 1/2
17	.1730	2.00	6.30	3 1/8	57	.0430	1.55	5.70	1 1/2
18	.1695	2.00	6.30	3 1/8	58	.0420	1.55	5.70	1 1/2
19	.1660	2.00	6.30	3 1/8	59	.0410	1.55	5.70	1 1/2
20	.1610	2.00	6.30	3 1/8	60	.0400	1.55	5.70	1 1/2
21	.1590	1.90	6.10	3 1/8	61	.0390	1.50	5.70	1 1/2
22	.1570	1.90	6.10	3 1/8	62	.0380	1.50	5.70	1 1/2
23	.1540	1.90	6.10	3 1/8	63	.0370	1.50	5.70	1 1/2
24	.1520	1.90	6.10	3 1/8	64	.0360	1.50	5.70	1 1/2
25	.1495	1.90	6.10	3 1/8	65	.0350	1.50	5.70	1 1/2
26	.1470	1.80	6.10	2 1/8	66	.0330	1.50	5.70	1 1/2
27	.1440	1.80	6.10	2 1/8	67	.0320	1.50	5.70	1 1/2
28	.1405	1.80	6.10	2 1/8	68	.0310	1.50	5.70	1 1/2
29	.1360	1.80	6.10	2 1/8	69	.0292	1.50	5.70	1 1/2
30	.1285	1.80	6.10	2 1/8	70	.0280	1.50	5.70	1 1/2
31	.1200	1.75	5.90	2 1/8	71	.0260	1.50	5.70	1 1/2
32	.1160	1.75	5.90	2 1/8	72	.0250	1.50	5.70	1 1/2
33	.1130	1.75	5.90	2 1/8	73	.0240	1.50	5.70	1 1/2
34	.1110	1.75	5.90	2 1/8	74	.0225	1.50	5.70	1 1/2
35	.1100	1.75	5.90	2 1/8	75	.0210	1.50	5.70	1 1/2
36	.1065	1.75	5.90	2 1/8	76	.0200	1.50	5.70	1 1/2
37	.1040	1.75	5.90	2 1/8	77	.0180	1.50	5.70	1 1/2
38	.1015	1.75	5.90	2 1/8	78	.0160	1.50	5.70	1 1/2
39	.0995	1.75	5.90	2 1/8	79	.0145	1.50	5.70	1 1/2
40	.0980	1.75	5.90	2 1/8	80	.0135	1.50	5.70	1 1/2

In ordering, be sure to state whether High Speed or Carbon Steel Drills are wanted. Carbon Drills will be furnished unless otherwise specified.

LETTER SIZES
 High Speed and Carbon Steel



Letter Sizes	Decimal Equivalent	List Price per Doz.		Overall Length Inches	Letter Sizes	Decimal Equivalent	List Price per Doz.		Overall Length Inches
		Carbon Steel	High Speed Steel				Carbon Steel	High Speed Steel	
A	.2340	\$3.00	\$7.35	3 1/8	N	.3020	\$4.25	\$10.50	4 1/4
B	.2380	3.05	7.35	3 1/8	O	.3160	4.40	10.50	4 1/4
C	.2420	3.10	7.35	3 1/8	P	.3230	4.60	12.00	4 3/8
D	.2460	3.15	7.35	3 1/8	Q	.3320	4.75	12.00	4 3/8
E	.2500	3.25	7.35	3 1/8	R	.3390	5.00	12.00	4 3/8
F	.2570	3.35	9.10	4 1/4	S	.3480	5.15	13.50	4 3/8
G	.2610	3.45	9.10	4 1/4	T	.3580	5.30	13.50	4 3/8
H	.2650	3.55	9.10	4 1/4	U	.3680	5.50	13.50	5
I	.2720	3.65	9.10	4 1/4	V	.3770	6.00	13.50	5 1/8
J	.2770	3.70	9.10	4 1/4	W	.3860	6.50	15.00	5 1/8
K	.2810	3.80	9.10	4 1/4	X	.3970	6.75	15.00	5 1/4
L	.2900	3.90	10.50	4 1/4	Y	.4040	7.00	15.00	5 1/4
M	.2950	4.00	10.50	4 1/4	Z	.4130	7.25	17.00	5 3/4

In ordering, specify whether carbon or high speed steel drills are wanted. Unless otherwise specified carbon steel drills will be furnished.

For Net Prices See Supplement

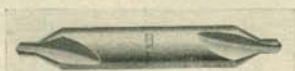
BLACKSMITHS DRILLS



Coes Drills				Silver and Deming Drills		
3/8" Shank—Short Series				1/2" Shank—Short Series		
Dia. Inches	Length Inches	List Price		Length Inches	List Price	
		Carbon Steel	High Speed Steel		Carbon Steel	High Speed Steel
1/8	4 7/8	\$0.50		4 7/8	\$0.45	
1/8	5 1/4	.55		5 1/4	.45	
1/8	5 1/2	.60		5 1/2	.50	
1/8	5 3/4	.65		5 3/4	.55	
1/8	6	.70		6	.60	
1/8	6	.75		6	.65	
1/8	6	.80		6	.70	
1/8	6	.85		6	.75	
1/8	6	.90		6	.80	
1/8	6	.95		6	.85	
1/8	6	1.00		6	.90	
1/8	6	1.05		6	.95	
1/8	6	1.10	\$1.85	6	1.00	\$1.75
1/8	6	1.15	1.95	6	1.05	1.90
1/8	6	1.20	2.05	6	1.10	2.05
1/8	6	1.25	2.20	6	1.20	2.20
1/8	6	1.30	2.30	6	1.30	2.30
1/8	6	1.40	2.40	6	1.40	2.40
1/8	6	1.50	2.50	6	1.50	2.50
1/8	6	1.60	2.65	6	1.60	2.65
1/8	6	1.70	2.75	6	1.70	2.75
1/8	6	1.80	2.90	6	1.80	2.90
1/8	6	1.90	3.00	6	1.90	3.00
1/8	6	2.00	3.15	6	2.00	3.15
1/8	6	2.10	3.30	6	2.10	3.30
1/8	6	2.20	3.50	6	2.20	3.50
1/8	6	2.30	3.70	6	2.30	3.70
1/8	6	2.40	3.90	6	2.40	3.90
1	6	2.50	4.10	6	2.50	4.10
1 1/8	6	2.60	4.30	6	2.60	
1 1/8	6	2.70	4.50	6	2.70	
1 1/8	6	2.80	4.75	6	2.80	
1 1/8	6	2.90	5.00	6	2.90	
1 1/8	6	3.00	5.25	6	3.00	
1 1/8	6	3.10	5.50	6	3.10	
1 1/8	6	3.20	5.80	6	3.20	
1 1/8	6	3.30	6.10	6	3.30	
1 1/8	6	3.60		6	3.60	
1 1/8	6	3.90		6	3.90	
1 1/8	6	4.20		6	4.20	
1 1/8	6	4.50		6	4.50	

COMBINED DRILLS AND COUNTERSINKS

Both drill ends of these tools are of the same diameter. The included angle of the countersink is 60°. Sizes designated by J and M have bodies with flattened side for set screw types of chucks.



Size No.	Diam. of Drills Inches	Diam. of Body Inches	List Price per Dozen		Size No.	Diam. of Drills Inches	Diam. of Body Inches	List Price per Dozen	
			Carbon Steel	High Speed Steel				Carbon Steel	High Speed Steel
A-1	No. 57	1/8	\$2.00	\$6.00	F-1	5/16	7/16	\$3.50	\$ 9.00
C-1	No. 55	11/64	2.25	6.00	F-2	5/16	7/16	3.50	9.00
C-2		11/64	2.25	6.00	J-1	9/16	1 1/8	4.60	12.00
D-1	No. 49	11/64	2.50	6.00	J-2	9/16	1 1/8	4.60	12.00
D-2	No. 45	11/64	2.50	6.00	J-3	11/16	1 1/8	5.00	12.00
E-1		.301	2.75	6.00	J-4	15/16	1 1/8	5.00	12.00
E-2		.301	2.75	6.00	M-1	7/8	1 1/8	7.25	18.00
					M-2	9/8	1 1/8	7.25	18.00

TELL-TALE DRILLS

For Drilling Tell-Tale Holes in Staybolts



Dia. Inches	List Price Per Dozen		Length Flute, Inches	Length Overall, Inches
	Carbon	High Speed		
3/8	\$2.25	\$6.30	1 3/4	3 1/4
1/2	2.75	7.00	1 3/4	3 3/4

For Net Prices See Supplement

SQUARE SHANK RATCHET DRILLS



Furnished either with No. 1 or No. 2 Square Taper Ratchet Shank.
 No. 1 Shank— $\frac{3}{8}$ " square at small end by $\frac{5}{8}$ " square at large end by $1\frac{1}{2}$ " long.
 No. 2 Shank— $\frac{1}{2}$ " square at small end by $\frac{3}{4}$ " square at large end by $1\frac{3}{4}$ " long.
 No. 1 Shank furnished unless otherwise specified up to $1\frac{1}{2}$ " inclusive; larger 2" shank.

Dia. Inches	Dec. Equiv.	List Price Each		Length Over-all Inches	Dia. Inches	Dec. Equiv.	List Price Each		Length Over-all Inches
		Car-bon Steel	High Speed Steel				Car-bon Steel	High Speed Steel	
$\frac{1}{8}$	.1250	\$0.90	.....	4 $\frac{1}{2}$	$\frac{3}{16}$	.9687	\$2.40	\$5.25	8
$\frac{3}{16}$	.1562	.95	.....	4 $\frac{1}{2}$	1	1.0000	2.55	5.50	8 $\frac{1}{2}$
$\frac{1}{4}$	.1875	.95	.....	4 $\frac{1}{2}$	1 $\frac{1}{16}$	1.0312	2.70	5.75	8 $\frac{1}{2}$
$\frac{5}{16}$	.2187	1.00	.....	5	1 $\frac{1}{8}$	1.0625	2.85	6.00	9
$\frac{3}{8}$	.2500	1.00	.....	5	1 $\frac{3}{16}$	1.0937	3.00	6.30	9
$\frac{7}{16}$	.2812	1.05	.....	5	1 $\frac{1}{2}$	1.1250	3.10	6.70	9
$\frac{1}{2}$	.3125	1.10	.....	5	1 $\frac{5}{16}$	1.1562	3.25	7.00	9
$\frac{9}{16}$	.3437	1.15	.....	5	1 $\frac{3}{8}$	1.1875	3.35	7.30	9
$\frac{5}{8}$	.3750	1.20	.....	6	1 $\frac{7}{16}$	1.2187	3.50	7.60	9
$\frac{11}{16}$	.4062	1.25	.....	6 $\frac{1}{4}$	1 $\frac{1}{2}$	1.2500	3.65	7.90	9
$\frac{3}{4}$	.4375	1.25	.....	6 $\frac{1}{4}$	1 $\frac{9}{16}$	1.2812	3.75	8.25	9
$\frac{13}{16}$	.4687	1.30	.....	6 $\frac{1}{4}$	1 $\frac{5}{8}$	1.3125	3.90	8.60	9
$\frac{7}{8}$	.5000	1.30	\$2.90	6 $\frac{1}{2}$	1 $\frac{3}{4}$	1.3437	4.05	9.00	9
$\frac{15}{16}$	.5312	1.35	2.95	6 $\frac{1}{2}$	1 $\frac{7}{8}$	1.3750	4.20	9.40	9
$\frac{17}{16}$	.5625	1.35	3.00	6 $\frac{1}{2}$	1 $\frac{15}{16}$	1.4062	4.35	9.80	9
$\frac{19}{16}$	.5937	1.40	3.10	6 $\frac{1}{2}$	1 $\frac{1}{8}$	1.4375	4.50	10.20	9
$\frac{21}{16}$	.6250	1.40	3.20	6 $\frac{1}{2}$	1 $\frac{1}{4}$	1.4687	4.65	10.60	9
$\frac{23}{16}$	.6562	1.45	3.30	6 $\frac{1}{2}$	1 $\frac{3}{8}$	1.5000	4.80	11.00	9
$\frac{25}{16}$	.6875	1.45	3.40	6 $\frac{1}{2}$	1 $\frac{1}{2}$	1.5625	5.10	.....	9 $\frac{1}{4}$
$\frac{27}{16}$	.7187	1.50	3.50	6 $\frac{1}{2}$	1 $\frac{5}{8}$	1.6250	5.40	.....	9 $\frac{1}{4}$
$\frac{29}{16}$	.7500	1.55	3.65	6 $\frac{1}{2}$	1 $\frac{3}{4}$	1.6875	5.75	.....	9 $\frac{1}{4}$
$\frac{31}{16}$	.7812	1.65	3.80	6 $\frac{3}{4}$	1 $\frac{7}{8}$	1.7500	6.10	.....	9 $\frac{1}{2}$
$\frac{33}{16}$	.8125	1.75	4.00	7	1 $\frac{15}{16}$	1.8125	6.50	.....	9 $\frac{1}{2}$
$\frac{35}{16}$	.8437	1.90	4.20	7	1 $\frac{7}{8}$	1.8750	6.90	.....	9 $\frac{3}{4}$
$\frac{37}{16}$	.8750	2.05	4.50	7 $\frac{1}{4}$	1 $\frac{15}{8}$	1.9375	7.30	.....	10
$\frac{39}{16}$	.9062	2.20	4.70	7 $\frac{1}{2}$	2	2.0000	7.75	.....	10
$\frac{41}{16}$	.9375	2.30	5.00	8					

TRACK BITS
High Speed Steel



No. 504 Flat Beaded



No. 505 Flat with Round Slabbed Shanks

No. 504 fitting Flat Drill Chucks on Paulus, New Style Paulus, Buda, Girder and Heavy Track Drilling Machines.

Thickness of bits $\frac{1}{2}$ in. to $\frac{15}{16}$ in. is $\frac{1}{4}$ in. No. 1 Bead.
 Thickness of bits $\frac{15}{16}$ in. to $1\frac{1}{4}$ in. is $\frac{3}{8}$ in. No. 2 Bead.
 No. 505 fitting chucks on Paulus, Buda, Harvey, Francis Reed & Co's.
 Nos. 18 and 19, Duntley and Sheffield Car Co's. Track Drilling Machines.
 Thickness of bits $\frac{1}{2}$ in. to $\frac{15}{16}$ in. is $\frac{1}{4}$ in.
 Thickness of bits $\frac{7}{8}$ in. to $1\frac{1}{8}$ in. is $\frac{3}{8}$ in.
 Shanks are $2\frac{1}{4}$ inches long and $\frac{1}{4}$ in. in diameter.

Size Inches	Length Inches	Price Each	Size Inches	Length Inches	Price Each
$\frac{1}{2}$	6 $\frac{1}{4}$	\$0.95	$\frac{15}{16}$	6 $\frac{1}{4}$	\$1.50
$\frac{5}{8}$	6 $\frac{1}{4}$	1.00	1	6 $\frac{1}{4}$	1.55
$\frac{3}{4}$	6 $\frac{1}{4}$	1.05	1 $\frac{1}{8}$	6 $\frac{1}{4}$	1.65
$\frac{7}{8}$	6 $\frac{1}{4}$	1.10	1 $\frac{1}{4}$	6 $\frac{1}{4}$	1.75
$\frac{15}{16}$	6 $\frac{1}{4}$	1.20	1 $\frac{3}{8}$	6 $\frac{1}{4}$	1.85
$\frac{1}{2}$	6 $\frac{1}{4}$	1.30	1 $\frac{1}{2}$	6 $\frac{1}{4}$	1.95
$\frac{3}{4}$	6 $\frac{1}{4}$	1.40	1 $\frac{5}{8}$	6 $\frac{1}{4}$	2.55

DRILL SLEEVES AND SOCKETS

Extension Sleeves for Taper Shank Drills



Size No.	Morse Taper of Hole	Morse Taper of Shank	List Price Each	Size No.	Morse Taper of Hole	Morse Taper of Shank	List Price Each
1 to 2	No. 1	No. 2	\$2.00	3 to 4	No. 3	No. 4	\$ 3.20
1 to 3	No. 1	No. 3	2.50	3 to 5	No. 3	No. 5	4.80
1 to 4	No. 1	No. 4	3.20	4 to 3	No. 4	No. 3	4.80
1 to 5	No. 1	No. 5	4.80	4 to 4	No. 4	No. 4	4.80
2 to 3	No. 2	No. 3	2.50	4 to 5	No. 4	No. 5	4.80
2 to 4	No. 2	No. 4	3.20	4 to 6	No. 4	No. 6	12.00
2 to 5	No. 2	No. 5	4.80	5 to 4	No. 5	No. 4	12.00
3 to 2	No. 3	No. 2	3.20	5 to 5	No. 5	No. 5	12.00
3 to 3	No. 3	No. 3	3.20	5 to 6	No. 5	No. 6	12.00

Taper Drill Sleeves for Taper Shank Drills



Size No.	Morse Taper of Hole	Morse Taper Outside	List Price, Each	Size No.	Morse Taper of Hole	Morse Taper Outside	List Price, Each
1 to 2	No. 1	No. 2	\$1.80	2 to 5	No. 2	No. 5	\$ 4.40
1 to 3	No. 1	No. 3	2.40	3 to 4	No. 3	No. 4	3.00
1 to 4	No. 1	No. 4	3.00	3 to 5	No. 3	No. 5	4.40
1 to 5	No. 1	No. 5	4.40	4 to 5	No. 4	No. 5	4.40
2 to 3	No. 2	No. 3	2.40	4 to 6	No. 4	No. 6	10.00
2 to 4	No. 2	No. 4	3.00	5 to 6	No. 5	No. 6	10.00

Unfinished Drill Sockets for Taper Shank Drills



These sockets have Morse taper holes, but shanks are left unfinished for machining to any desired shape or size required by the user.

Size No.	Morse Taper of Hole	Diameter of Shank Inches	Length Overall Inches	List Price Each
1	No. 1	$1\frac{1}{8}$	$6\frac{1}{4}$	\$1.20
2	No. 2	$1\frac{1}{4}$	$7\frac{1}{2}$	1.80
3	No. 3	$1\frac{3}{8}$	$9\frac{1}{4}$	2.50
4	No. 4	$1\frac{1}{2}$	$11\frac{1}{2}$	4.00
5	No. 5	$2\frac{1}{2}$	15	7.50
6	No. 6	3	18	14.00

Drill Drifts



Plain Type



Armstrong Safety Type

For removing drills and other taper shank tools from sleeves and sockets. The Armstrong Safety Type leaves one hand free to support the tool, preventing it from falling and eliminating the danger of injury to the operator's foot or damage to the tool itself. The plain drifts and the blades of the Safety Type are of drop forged steel, finished and hardened.

Size No.	For Morse Tapers	Weight Each Lbs.	List Price Each	Size No.	For Morse Tapers	Weight Each Lbs.	List Price Each
1	No. 1	$\frac{1}{8}$	\$0.30	1-A	Nos. 1 and 2	$1\frac{1}{2}$	\$3.00
2	No. 2	$\frac{3}{4}$	.35	2-A	Nos. 2 and 3	$2\frac{1}{2}$	3.75
3	No. 3	$\frac{1}{2}$	.40	3-A	Nos. 3 and 4	$3\frac{3}{4}$	5.25
4	Nos. 4, 5 and 6	1	.50	4-A	Nos. 4, 5 and 6	6	6.75

DRILL SLEEVES AND SOCKETS

"Use-Em-Up" Drill Sleeves for Taper Shank Drills

The "Use-Em-Up" Drill Sleeves and Sockets save you money by reclaiming all of the drills you have discarded because of twisted or broken tangs.



Simply grind a flat on one side of the shank to fit the flattened hole in the "Use-Em-Up" Sleeve or Socket, and your drill is ready for use again.

Made in both Sleeve and Socket types. The illustration above shows the Sleeve type, which is furnished in the following sizes:

General Specifications

Size No.	Morse Taper of Hole	Morse Taper Outside	List Price, Each	Size No.	Morse Taper of Hole	Morse Taper Outside	List Price, Each
1 to 2	No. 1	No. 2	\$1.80	2 to 5	No. 2	No. 5	\$ 4.40
1 to 3	No. 1	No. 3	2.40	3 to 4	No. 3	No. 4	3.00
1 to 4	No. 1	No. 4	3.00	3 to 5	No. 3	No. 5	4.40
1 to 5	No. 1	No. 5	4.40	4 to 5	No. 4	No. 5	4.40
2 to 3	No. 2	No. 3	2.40	4 to 6	No. 4	No. 6	10.00
2 to 4	No. 2	No. 4	3.00	5 to 6	No. 5	No. 6	10.00

"Use-Em-Up" Drill Sockets for Taper Shank Drills

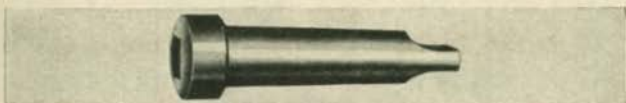


This is the "Use-Em-Up" Socket, having a flat-sided taper hole similar to the Sleeve type above. Made in the following sizes.

General Specifications

Size No.	Morse Taper of Hole	Morse Taper of Shank	List Price Each	Size No.	Morse Taper of Hole	Morse Taper of Shank	List Price Each
1 to 2	No. 1	No. 2	\$2.00	3 to 4	No. 3	No. 4	\$3.20
1 to 3	No. 1	No. 3	2.50	3 to 5	No. 3	No. 5	4.80
1 to 4	No. 1	No. 4	3.20	4 to 3	No. 4	No. 3	4.80
1 to 5	No. 1	No. 5	4.80	4 to 4	No. 4	No. 4	4.80
2 to 2	No. 2	No. 2	2.50	4 to 5	No. 4	No. 5	4.80
2 to 3	No. 2	No. 3	2.50	4 to 6	No. 4	No. 6	12.00
2 to 4	No. 2	No. 4	3.20	5 to 4	No. 5	No. 4	12.00
2 to 5	No. 2	No. 5	4.80	5 to 5	No. 5	No. 5	12.00
3 to 2	No. 3	No. 2	3.20	5 to 6	No. 5	No. 6	12.00
3 to 3	No. 3	No. 3	3.20				

Drill Sockets for Square Taper Shank Drills



General Specifications

Size No.	Square Taper Hole	Morse Taper of Shank	List Price Each	Size No.	Square Taper Hole	Morse Taper of Shank	List Price Each
1	Bit Stock	No. 1	\$1.50	3 1/2	No. 1	No. 4	\$2.65
2	No. 1	No. 2	1.90	4	No. 2	No. 4	2.65
3	No. 1	No. 3	2.25	5	No. 2	No. 5	3.75

Size No. 1 takes Bit Stock Drills with square taper shank measuring 3/8" square at small end by 3/8" square at large end by 1 1/4".

Blacksmiths' Drill Sockets



These blacksmiths' drill sockets hold blacksmiths' drills from 1/8" to 1 1/2", with 1/2" and 3/4" round shanks.

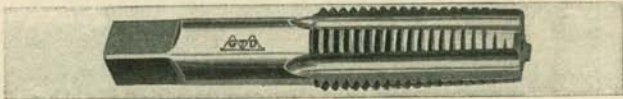
With Morse Taper Shank

With Square Taper Shank

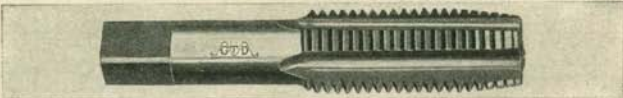
Size No.	Diameter Hole Inches	Morse Taper of Shank	List Price Each	Size No.	Diameter Hole Inches	Square Taper of Shank	List Price Each
02	1/8	No. 2	\$2.25	0	1/8	No. 1	\$1.90
03	1/8	No. 3	2.65	01	1/8	No. 2	2.25
04	1/8	No. 4	3.00				
003	3/8	No. 3	2.65	00	3/8	No. 1	1.90
004	3/8	No. 4	3.00	001	3/8	No. 2	2.25

See page 11 for dimensions of No. 1 and No. 2 Square Taper Shanks.

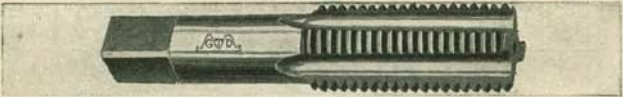
MACHINISTS' HAND TAPS



Taper



Plug



Bottoming

Diam. of Tap Inches	Price			Number of Threads to the Inch				USF Threads also Furnished
	Each	Per Set	Each High Speed Steel	Standard Pitches				
				USS	SAE Std.	Whit. Std.	BSF	
1/16	\$0.50	\$1.50	.....	64	.....	60	.....	72
5/64	.45	1.35	.....	60	.....	..	.....	72
3/32	.40	1.20	.....	50	.....	48	.....	48
7/64	.40	1.20	.....	48	.....	.....	.....	..
1/8	.35	1.05	.....	40	.....	40	.....	32
5/64	.35	1.05	.....	40	.....	.....	.....	..
3/32	.35	1.05	.....	36	.....	32	.....	32
11/64	.35	1.05	.....	32	.....	.....	.....	..
3/16	.40	1.20	.....	24	.....	24	.....	32
13/64	.40	1.20	.....	24	.....	24	.....	..
7/32	.45	1.35	.....	24	.....	24	.....	32
15/64	.45	1.35	.....	24	.....	24	.....	..
1/4	.45	1.35	\$.85	20	28	20	26	24, 27, 32
5/16	.50	1.50	.95	18	24	18	22	20, 27, 32
3/8	.55	1.65	1.10	16	24	16	20	20, 27
7/16	.60	1.80	1.30	14	20	14	18	24, 27
1/2	.70	2.10	1.55	13	20	12	16	12, 24, 27
9/16	.80	2.40	1.85	12	18	12	16	27
5/8	.90	2.70	2.20	11	18	11	14	12, 27
11/16	1.05	3.15	2.60	11	16	11	14	.....
3/4	1.20	3.60	3.10	10	16	10	12	12, 27
13/16	1.40	4.20	.....	10	.....	10	12	.....
7/8	1.60	4.80	4.30	9	14, 18*	9	11	12, 27
15/16	1.80	5.40	.....	9	.....	9	.....	.....
1	2.00	6.00	5.75	8	14	8	10	12, 27
1 1/8	2.25	6.75	7.45	7	12	7	9	.....
1 1/4	2.60	7.80	9.55	7	12	7	9	.....
1 3/8	3.00	9.00	11.95	6	12	6	8	.....
1 1/2	3.50	10.50	14.75	6	12	6	8	.....
1 5/8	4.20	12.60	.....	5 1/2	..	5	.....	.....
1 3/4	5.00	15.00	.....	5	.....	5	.....	.....
1 7/8	5.80	17.40	.....	5	.....	4 1/2	.....	.....
2	6.70	20.10	.....	4 1/2	.....	4 1/2	.....	.....
2 1/8	8.00	24.00	.....	4 1/2	.....	4 1/2	.....	.....
2 1/4	9.20	27.60	.....	4 1/2	.....	4	.....	.....
2 3/8	10.50	31.50	.....	4	.....	4	.....	.....
2 1/2	11.50	34.50	.....	4	.....	4	.....	.....

*Standard Spark Plug Size.

Orders for hand taps to and including 3/8" will be filled with taps having shanks full diameter of thread. Taps 7/16" and larger will be furnished with shanks size of bottom of thread.

We will furnish at regular prices 3/8" hand taps with shanks size of bottom of thread. High speed steel hand taps are regularly furnished in USS and SAE standard pitches only. All other high speed steel hand taps are special and subject to special prices.

USS threads furnished unless otherwise ordered.

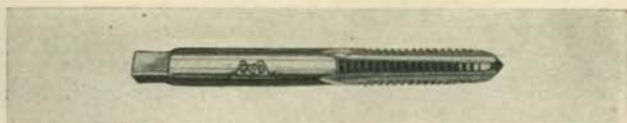
SAE and Whitworth Standard threads furnished at regular prices if specified.

Sizes, lengths and threads not listed are subject to special prices.

Left hand taps are special.

MACHINE SCREW TAPS

A. S. M. E. Standard



When so ordered, these Taps will be furnished in sets of Taper, Plug and Bottoming Taps, like Hand Taps.

Unless otherwise specified, machine screw taps up to and including No. 6 will be furnished with three flutes; No. 7 and larger with four flutes.

Plug style furnished unless otherwise specified.

Sizes, lengths and threads not listed are subject to special prices.

Left Hand Taps are special.

General Specifications

Screw Gauge No.	Basic Outside Diameter Inches	List Price		No. of Threads per Inch		Length of Thread Inches	Length Over All Inches
		Each	Per Dozen	Standard	Also Furnished		
0	.060	\$0.50	\$6.00	80		$\frac{3}{8}$	$1\frac{3}{8}$
1	.073	.50	6.00	72	56, 64	$\frac{7}{16}$	$1\frac{11}{16}$
2	.086	.45	5.40	64	56	$\frac{1}{2}$	$1\frac{3}{4}$
3	.099	.40	4.80	56	48	$\frac{5}{16}$	$1\frac{13}{16}$
4	.112	.40	4.80	48	32, 36, 40	$\frac{3}{8}$	$1\frac{7}{8}$
5	.125	.35	4.20	44	36, 40	$\frac{11}{16}$	$1\frac{15}{16}$
6	.138	.35	4.20	40	32, 36	$\frac{3}{4}$	2
7	.151	.35	4.20	36	30, 32	$\frac{13}{16}$	$2\frac{1}{16}$
8	.164	.35	4.20	36	30, 32, 40	$\frac{7}{8}$	$2\frac{1}{8}$
9	.177	.35	4.20	32	24, 30	$\frac{15}{16}$	$2\frac{1}{4}$
10	.190	.40	4.80	30	24, 28, 32	$\frac{15}{16}$	$2\frac{3}{8}$
12	.216	.45	5.40	28	24, 32	1	$2\frac{3}{8}$
14	.242	.45	5.40	24	20	1	$2\frac{1}{2}$
16	.268	.45	5.40	22	18, 20	$1\frac{1}{16}$	$2\frac{1}{2}$
18	.294	.50	6.00	20	18	$1\frac{1}{8}$	$2\frac{25}{32}$
20	.320	.50	6.00	20	16, 18	$1\frac{1}{8}$	$2\frac{25}{32}$

NUT TAPS

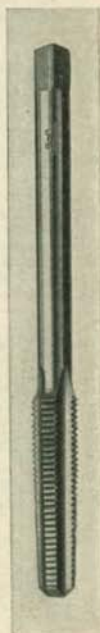
United States Standard form of thread furnished in all cases unless otherwise specified.

Sizes, lengths and threads not listed are subject to special prices.

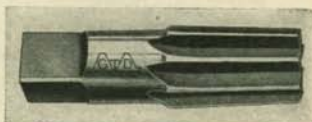
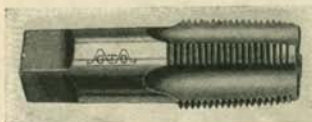
Left Hand Taps are special.

General Specifications

Diam. of Tap Inches	List Price Each	No. of Threads per Inch			Length of Threads Inches	Length Over All Inches
		U. S. Std.	S. A. E. Std.	Whitworth Std.		
$\frac{3}{16}$	\$ 0.60	24, 32	..	24	$1\frac{1}{4}$	$4\frac{1}{2}$
$\frac{1}{4}$	.60	20	28	20	$1\frac{1}{8}$	5
$\frac{5}{16}$	.70	18	24	18	$1\frac{1}{4}$	$5\frac{1}{2}$
$\frac{3}{8}$	.80	16	24	16	$2\frac{1}{16}$	6
$\frac{7}{16}$	.90	14	20	14	$2\frac{1}{8}$	$6\frac{1}{2}$
$\frac{1}{2}$	1.00	13	20	12	$2\frac{3}{4}$	7
$\frac{5}{8}$	1.15	12	18	12	$2\frac{3}{4}$	$7\frac{1}{2}$
$\frac{3}{4}$	1.35	11	18	11	3	8
$\frac{7}{8}$	1.60	11	16	11	3	$8\frac{1}{2}$
$1\frac{1}{8}$	1.85	10	16	10	$3\frac{1}{4}$	9
$1\frac{1}{4}$	2.15	10	..	10	$3\frac{1}{4}$	$9\frac{1}{2}$
$1\frac{3}{8}$	2.45	9	14, 18	9	$3\frac{3}{8}$	10
$1\frac{1}{2}$	2.80	9	..	9	$3\frac{3}{8}$	$10\frac{1}{2}$
1	3.15	8	14	8	$4\frac{1}{16}$	11
$1\frac{1}{4}$	3.70	7	12	7	$4\frac{1}{16}$	$11\frac{1}{2}$
$1\frac{3}{8}$	4.50	7	12	7	$4\frac{1}{16}$	12
$1\frac{1}{2}$	5.50	6	12	6	$5\frac{3}{8}$	$12\frac{1}{2}$
$1\frac{3}{4}$	6.75	6	12	6	$5\frac{3}{8}$	13
$1\frac{7}{8}$	8.00	$5\frac{1}{2}$	..	5	$5\frac{1}{2}$	$13\frac{1}{2}$
$1\frac{3}{4}$	9.25	5	..	5	$5\frac{1}{2}$	14
$1\frac{7}{8}$	10.75	5	..	$4\frac{1}{2}$	$6\frac{1}{8}$	$14\frac{1}{2}$
2	12.25	$4\frac{1}{2}$	..	$4\frac{1}{2}$	$6\frac{1}{8}$	15
$2\frac{1}{8}$	14.00	$4\frac{1}{2}$	..	$4\frac{1}{2}$	$6\frac{1}{8}$	$15\frac{1}{2}$
$2\frac{1}{4}$	15.75	$4\frac{1}{2}$	..	4	$6\frac{1}{8}$	16
$2\frac{3}{8}$	17.75	4	..	4	$6\frac{1}{8}$	$16\frac{1}{2}$
$2\frac{1}{2}$	20.00	4	..	4	$6\frac{1}{8}$	17



PIPE TAPS AND REAMERS.



American (Briggs) standard right hand taper pipe threads are furnished unless otherwise specified. British (Whitworth) standard furnished at regular prices. Both are machine relieved.

High speed steel pipe taps will be regularly furnished in American (Briggs) standard taper, right hand only. All other high speed steel pipe taps are special and subject to special prices.

Right and left hand carbon pipe taps are furnished at the same list, but take different discounts.

Straight (plug) pipe taps will be furnished at regular prices.

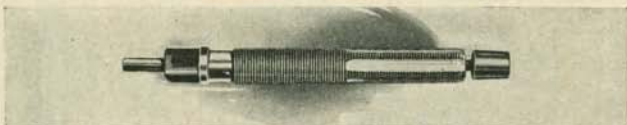
General Specifications

Pipe Size Inches	List Price Each Tap		*List Price Reamers	Number of Threads to the Inch		Length of Thread Inches	Length Overall Inches
	Carbon Steel	High Speed Steel	Carbon Steel	American (Briggs) Std.	Brit. Std.		
3/8	\$ 1.00	\$ 1.10	\$ 1.00	27	28	3/4	2 3/8
1/2	1.20	1.50	1.20	18	19	1 1/16	2 1/16
3/4	1.60	1.95	1.60	18	19	1 1/16	2 9/16
1	2.00	3.10	2.00	14	14	1 3/8	3 1/8
1 1/8	2.80				14	1 3/8	3 3/8
1 1/4	2.80	4.40	2.80	14	14	1 3/8	3 3/4
1 1/2	4.40				14	1 3/8	3 1/2
1 3/4	4.40	7.80	4.40	11 1/2	11	1 3/4	3 3/4
2	5.00	12.10	5.00	11 1/2	11	1 3/4	4
2 1/4	6.60	16.60	6.60	11 1/2	11	1 3/4	4 1/4
2 1/2	8.00				11	1 3/4	4 3/8
3	10.00	27.25	10.00	11 1/2	11	1 3/4	4 1/2
4	12.00				11	2 1/8	5

*Reamers regularly furnished in Carbon Steel only. High Speed Reamers only made to special order at special prices.

All pipe taps and pipe reamers 1/8" to 1" inclusive are packed ten to the carton 1 1/4" and up are packed one to the carton.

SPINDLE STAYBOLT TAPS



All taps have 12 threads per inch and can be furnished in either United States Standard form or V form of thread.

United States Standard form of thread furnished unless otherwise specified.

Taps shorter than 8 inches will be charged as if 8 inches long, and fractions of an inch in length will be charged as a full extra inch.

Spindle Staybolt Taps having the following proportions are considered standard and are furnished unless otherwise specified.

	Old Standard	New Standard
Length Overall.....	7 5/8"	12"
Length of Fluted Thread.....	3 1/4"	4"
Length of Unfluted Thread.....	2 3/4"	6"
Diameter of Spindle.....	3/8"	3/8"
Length of Spindle.....	11"	15 3/8"

General Specifications

Diameter of Tap	List Price			Diameter of Tap	List Price		
	For Taps 7 5/8" Long Each	For Taps 12" Long	Per Inch for Other Lengths		For Taps 7 5/8" Long Each	For Taps 12" Long	Per Inch for Other Lengths
3/8"	\$ 8.00	\$12.00	\$ 1.00	1 3/16"	\$10.80	\$16.20	\$ 1.35
1/2"	8.40	12.60	1.05	1 3/4"	11.20	16.80	1.40
3/4"	8.80	13.20	1.10	1 5/8"	11.60	17.20	1.45
1"	9.20	13.80	1.15	1 3/8"	12.00	17.40	1.50
1 1/8"	9.60	14.40	1.20	1 7/8"	12.40	18.00	1.55
1 1/4"	10.00	15.00	1.25	1 1/2"	12.80	18.60	1.60
1 1/2"	10.40	15.60	1.30			19.20	

New Standard Taps 12" long furnished unless otherwise specified.

STAYBOLT TAPS

Our Staybolt Taps have relieved threads and are of special temper to give best results on this class of work. They have approximately equal proportions of shank, thread and reamer as per table below. The diameter given is that of the thread at its straight part.

Carried in stock in 20" and 24" lengths only and with 12-V threads per inch.

They are furnished with 12-V threads per inch unless otherwise specified, but will be supplied when so ordered with 12-US or Whitworth Threads at same prices.

Other lengths and pitches, and taps of other than regular proportions are considered special and are furnished to order. If special taps are wanted, furnish blue-print or inform us of diameter, pitch and form of thread, length of shank, thread and reamer portions, and overall length.

Regular Proportions

Length Overall, Inches	A Square End, Inches	B Shank, Inches	C Straight Thread, Inches	D Taper Thread, Inches	E Reamer, Inches
20	1	6	11½	6	5½
24	1	8	2	7	6

General Specifications

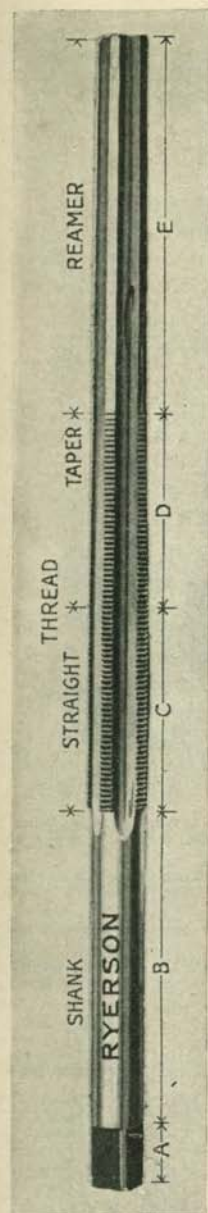
Diameter of Tap, Inches	List Price Each	
	20-inches Length	24-inches Length
1½	\$ 8.00	\$ 9.60
9/16	8.00	9.60
5/8	8.00	9.60
11/16	8.00	9.60
3/4	8.00	9.60
13/16	8.00	9.60
7/8	9.00	10.80
15/16	10.00	12.00
1	11.00	13.20
11/16	12.00	14.40
1 1/8	13.00	15.60
1 1/16	14.00	16.80
1 1/4	15.00	18.00
1 5/16	16.00	19.20
1 3/8	17.00	20.40
1 7/16	18.00	21.60
1 1/2	19.00	22.80

In ordering, be sure to state whether 20-inch or 24-inch length is required.

Many other types and styles of staybolt taps can be furnished on short notice. These consist of such types as the radial staybolt taps and button head radial staybolt taps. These are only made to order.

When submitting your requirements send blue print or sketch showing the dimensions as indicated in the above illustration.

For Net Prices See Supplement



PATCH BOLT TAPS

These are short taps, made especially for boiler work. They have a taper of $\frac{3}{4}$ " per foot to insure a steam-tight fit for the bolt, the nominal diameter being measured $\frac{5}{8}$ " from the large end of the thread.



All sizes have 12 threads per inch and can be supplied with V-form or United States Standard form of Thread.

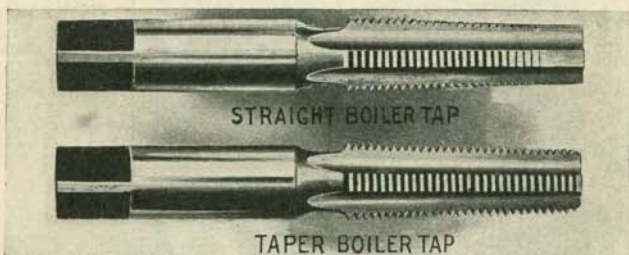
12-V thread taps furnished unless otherwise specified.

Sizes, lengths and threads not listed are subject to special prices.

General Specifications

Diameter of Tap Inches	List Price Each	Length Overall Inches	Diameter of Tap Inches	List Price Each	Length Overall Inches
$\frac{3}{2}$	\$1.00	3	$\frac{15}{16}$	\$2.40	$3\frac{1}{4}$
$\frac{6}{16}$	1.10	3	1	2.80	$3\frac{1}{2}$
$\frac{5}{8}$	1.25	3	$1\frac{1}{16}$	2.90	$3\frac{1}{2}$
$\frac{11}{16}$	1.45	3	$1\frac{1}{8}$	3.00	$3\frac{1}{2}$
$\frac{3}{4}$	1.70	$3\frac{1}{4}$	$1\frac{3}{16}$	3.15	$3\frac{1}{2}$
$\frac{13}{16}$	1.95	$3\frac{3}{4}$	$1\frac{1}{4}$	3.35	$3\frac{1}{2}$
$\frac{7}{8}$	2.25	$3\frac{1}{4}$			

STRAIGHT AND TAPER BOILER TAPS



Taper Boiler Taps are similar to the Patch Bolt Taps above, but are of longer length. They have a taper of $\frac{3}{4}$ " per foot, and the nominal diameter is measured $\frac{5}{8}$ " from the large end of the thread.

Straight Boiler Taps have a tapered reamer point which can be used to size the hole and the threads are slightly chamfered back of the point, but the full thread is straight, without taper.

All taps have 12 threads to the inch and can be furnished with either United States Standard form or V form of thread.

12-V Thread taps furnished unless otherwise specified. In ordering specify whether Straight or Taper taps are wanted. Sizes, lengths and threads not listed are subject to special prices.

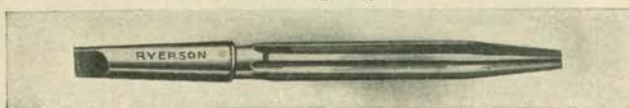
Left hand taps are special.

General Specifications

Diameter of Taps Inches	List Price Each	Length Overall Inches	Diameter of Tap Inches	List Price Each	Length Overall Inches
$\frac{1}{2}$	\$1.05	$4\frac{1}{4}$	$\frac{15}{16}$	\$3.85	7
$\frac{9}{16}$	1.25	$4\frac{5}{8}$	$1\frac{1}{4}$	4.05	$7\frac{1}{8}$
$\frac{5}{8}$	1.40	5	$1\frac{3}{8}$	4.35	$7\frac{1}{4}$
$\frac{11}{16}$	1.60	$5\frac{1}{4}$	$1\frac{3}{8}$	4.70	$7\frac{3}{8}$
$\frac{3}{4}$	1.95	$5\frac{1}{2}$	$1\frac{7}{16}$	5.30	$7\frac{1}{2}$
$\frac{13}{16}$	2.25	$5\frac{3}{4}$	$1\frac{1}{2}$	5.50	$7\frac{5}{8}$
$\frac{7}{8}$	2.50	6	$1\frac{5}{8}$	5.80	$7\frac{3}{4}$
$\frac{15}{16}$	2.80	$6\frac{1}{4}$	$1\frac{3}{4}$	6.10	$7\frac{7}{8}$
1	3.35	$6\frac{1}{2}$	$1\frac{7}{8}$	6.40	8
$1\frac{1}{16}$	3.50	$6\frac{3}{4}$	2	6.70	8
$1\frac{1}{8}$	3.65	$6\frac{7}{8}$			

TAPER SHANK BRIDGE AND BOILER REAMERS

Carbon and High Speed Steel



Straight Flute Type



Spiral Flute Type

These are five-fluted reamers with standard Morse Taper Shanks for use in pneumatic or electric drills. They are intended particularly for boiler, bridge, ship and structural work, and have an abrupt taper on the end to facilitate entering holes to be reamed.

The High Speed Reamers are recommended in the Spiral Flute type, as the special grinding of the flutes provides free clearance for chips and prevents choking. The Carbon Steel reamers are ordinarily desired in the Straight Flute type, and will be so furnished unless otherwise specified.

Both Carbon and High Speed reamers can be supplied, when so ordered, with a square shank instead of Morse taper shank, in the Straight Flute type only.

General Specifications

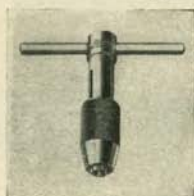
Size Full Diam. Inches	Diam. at Point Inches	LIST PRICE EACH			Morse Taper Shank No.	Length of Tapered Part Inches	Length of Flutes Inches	Length Overall, Inches
		Carbon Steel		High Speed Straight or Spiral Flutes				
		Straight Flutes	Spiral Flutes					
1/4	1/8	\$2.30	\$2.75	\$3.00	1	1 1/2	3 3/8	6 3/4
5/16	3/16	2.35	2.80	3.25	1	1 1/2	3 3/4	6 3/4
3/8	1/4	2.40	2.90	3.25	1	1 1/2	3 3/4	6 3/4
7/16	5/16	2.45	2.95	3.50	1	2	4	7 1/4
1/2	3/8	2.50	3.00	3.50	1	2	4	7 1/4
5/8	1/2	2.55	3.05	3.75	2	2	4 3/8	8 1/4
3/4	3/4	2.60	3.10	3.75	2	2	4 3/8	8 1/4
7/8	7/8	2.65	3.20	4.00	2	2 1/2	5 1/8	9
1	1	2.75	3.30	4.00	2	2 1/2	5 1/8	9
1 1/8	1 1/8	2.90	3.50	4.25	2	2 1/2	5 1/8	9
1 1/4	1 1/4	3.05	3.65	4.50	2	2 1/2	6 1/8	10
1 1/2	1 1/2	3.20	3.85	4.75	3	3 1/2	7 1/8	11 3/4
1 3/4	1 3/4	3.35	4.00	5.00	3	3 1/2	7 3/8	12
2	2	3.50	4.20	5.30	3	3 1/2	7 3/8	12
2 1/8	2 1/8	3.75	4.50	5.70	3	3 1/2	7 3/8	12
2 1/4	2 1/4	4.00	4.80	6.00	3	3 1/2	7 3/8	12
2 1/2	2 1/2	4.25	5.10	6.50	3	3 1/2	7 3/8	12
2 3/4	2 3/4	4.50	5.40	7.00	3	3 1/2	7 3/8	12
3	3	4.75	5.70	7.50	3	3 1/2	7 3/8	12
3 1/4	3 1/4	5.00	6.00	8.00	3	3 1/2	7 3/8	12
3 1/2	3 1/2	5.50	6.60	8.75	4	3 1/2	7 3/8	13
3 3/4	3 3/4	6.00	7.20	9.50	4	3 1/2	7 3/8	13
4	4	6.50	7.80	10.50	4	3 1/2	7 3/8	13
4 1/4	4 1/4	7.00	8.40	12.00	4	3 1/2	7 3/8	13
4 1/2	4 1/2	8.00	9.60	14.00	4	3 1/2	7 3/8	13

In ordering, be sure to state whether Carbon or High Speed reamers are wanted, and whether with Straight or Spiral Flutes. CARBON STEEL reamers with STRAIGHT FLUTES will be furnished unless otherwise specified.

ADJUSTABLE TAP AND REAMER WRENCHES



No. 00-7 Drop Forged Wrenches



T-Handle Wrench

These tap wrenches are compact, simple, and very strong. The jaws are made of tool steel carefully hardened and tempered. They will not break or get out of line. Wrenches No. 0 to 7 are solid steel drop forgings, practically unbreakable. Each tap wrench is carefully polished and the body has a fine mottled finish. The larger sizes Nos. 7½ to 22 have malleable iron bodies and steel tubing handles. They will be found very strong and yet light enough to handle easily. Nos. 338 and 339 are "T" Wrenches similar to Nos. 329 and 333 except they have ratchet handles.

General Specifications

No.	Capacity (Tap Sizes)			Length	Weight	List Price
	Hand	Mach. Screw	Pipe			
00	1/8" to 1/8"	0 to 13		5"	1 1/2 oz.	\$1.75
0	1/8" to 1/8"	0 to 18		7"	4 oz.	2.00
4	1/8" to 1/8"	0 to 24		9"	7 oz.	3.00
5	1/8" to 1/8"	10 to 30	1/8"	11"	12 oz.	3.50
6	1/8" to 1/8"	14 to 30	1/8" to 1/8"	15"	2 lbs.	4.00
7	3/8" to 1"	15 to 30	1/8" to 1/8"	19"	3 1/2 lbs.	5.00
7 1/2	3/8" to 1 1/2"		1/8" to 1 1/2"	31"	4 1/2 lbs.	6.50
8	3/8" to 1 1/2"		3/8" to 1"	40"	8 lbs.	8.00
22	1" to 2 3/8"	22 to 30	1" to 2"	55"	12 lbs.	15.00
329	1/8" to 1/8"	0 to 18		2 1/2"	3 oz.	.75
333	1/8" to 1/8"	12 to 30		3 3/8"	8 oz.	1.25
338	1/8" to 1/8"	0 to 18		4"	6 oz.	1.50
339	1/8" to 1/8"	12 to 30		4 3/8"	11 oz.	2.50

SOLID SQUARE BOLT DIES AND SOLID HEXAGON RE-THREADING DIES



Bolt Die

Solid square bolt dies are regularly furnished with U. S. S. threads. These dies have 2 1/2 to 3 threads chamfer on the front face and 1 to 1 1/2 on the rear face. Sizes and dimensions not listed below are subject to special prices. Left hand dies are special.



Re-Threader

The solid hexagon re-threading dies are used for repair work for dressing over bruised or rusty threads. They have approximately one thread chamfer on both front and rear face. They can be used in bit brace sockets, ratchets or monkey-wrenches, and are accurate, durable, and will give satisfactory service. U. S. S. threads are furnished unless otherwise specified.

General Specifications

Square Bolt Dies

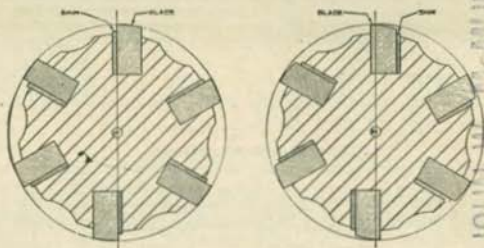
Hex. Re-Threading Dies

Cutting Size Inch	Size of Square Inch	Threads to Inch	Thick-ness, Inch	List Price	Cutting Size Inch	Thread to Inch		Across Flats Inch	List Price
						USS	SAE Std.		
1/4	2 1/2	20	1/2	\$1.80	1/4	20	28	1 1/2	\$0.70
1/2	2 1/2	18	1/2	1.80	1/2	18	24	1 1/2	.80
3/4	2 1/2	16	1/2	1.80	3/4	16	24	1 1/2	.90
7/8	2 1/2	14	1/2	1.80	7/8	14	20	1 1/2	1.00
1 1/8	2 1/2	13	3/4	1.80	1 1/8	14	20	1 1/2	1.10
1 1/4	2 1/2	12	3/4	1.90	1 1/4	12, 13	20	1 1/2	1.20
1 1/2	2 1/2	11	3/4	2.00	1 1/2	12	18	1 1/2	1.40
1 3/4	2 1/2	11	3/4	2.10	1 3/4	11	18	1 1/2	1.60
2	2 1/2	10	3/4	2.20	2	11	16	1 1/2	1.80
2 1/4	2 1/2	10	3/4	2.30	2 1/4	11	16	1 1/2	2.10
2 1/2	2 1/2	9	3/4	2.40	2 1/2	11	16	1 1/2	2.40
2 3/4	2 1/2	9	3/4	2.55	2 3/4	10	16	1 1/2	2.80
3	2 1/2	8	1	2.70	3	9	14, 18	1 1/2	3.20
3 1/4	2 1/2	7	1	3.00	3 1/4	8	14	1 1/2	3.60
3 1/2	2 1/2	7	1	3.30	3 1/2	8	12	2	4.00
3 3/4	2 1/2	6	1	3.60	3 3/4	7	12	2 1/2	4.00
4	2 1/2	5 1/2	1	3.90	4	7	12	2 3/4	4.00
4 1/4	2 1/2	5	1 1/4	4.20	4 1/4	6	12	2 3/4	4.00
4 1/2	2 1/2	5	1 1/2	5.40	4 1/2	6	12	2 3/4	4.00
4 3/4	2 1/2	5	1 1/2	6.50	4 3/4	6	12	2 3/4	4.00
5	2 1/2	4 1/2	2	7.50	5	6	12	2 3/4	4.00

For Net Prices See Supplement

REAMRITE REAMERS

Eccentric Relief



Eccentric Relief Principle

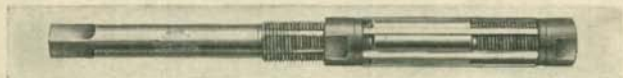
The patented design of the "Reamrite" Reamer, cross-section drawing shown above, has made eccentrically relieved reamers available to shops and mechanics everywhere at ordinary prices. The slots in the body are made slightly wider than the blades—just wide enough so that steel shims will fit snugly beside the blades.

When the reamer is to be ground or sharpened the shims are put in front of the blades. In this position, the periphery or top of the blades is concentric with the axis of the reamer body. After sharpening, the shims are put behind, thus forcing the blades forward and ahead of center, giving the desirable eccentric relief.

Simply shifting the shims makes it possible to do this work in any cylindrical cutter and reamer grinder and even in a lathe with electric tool post grinder. Complete instructions for grinding, including size charts for each type and size of reamer, are packed with every tool.

All "Reamrite" Reamers are adjustable, and have float rings between the binding nuts and the ends of the blades. This eliminates the tendency of the nut to burr by direct contact with the blade edge. The ring acts as an equalizer, distributing the pressure of the binding nut over the several blades, where, without it, undue pressure might be exerted on certain blades as the nut followed its thread lead in being tightened.

Hand Adjustable Reamers No. 1128



"Reamrite" Hand Adjustable Reamers have a wide range of adjustment. Each one overlaps the next larger or smaller size, so that any hole within the low limits of the smallest reamer and the top limits of the largest can be reamed.

General Specifications

Size	Price Each	Diameter Inches	Range of Adjustment Inches	Length Overall Inches	Length of Blade Inches	Price Blades per Set	Price Extra Nuts or Rings
AA	\$4.00	$\frac{7}{16}$	$\frac{15}{32}$ — $\frac{15}{32}$	$5\frac{1}{2}$	$1\frac{41}{64}$	\$1.20	\$0.30
A	4.50	$\frac{1}{2}$	$\frac{15}{32}$ — $\frac{17}{32}$	$5\frac{1}{2}$	$1\frac{41}{64}$	1.20	.30
B	4.50	$\frac{9}{16}$	$\frac{17}{32}$ — $\frac{19}{32}$	6	$1\frac{41}{64}$	1.80	.30
C	4.75	$\frac{5}{8}$	$\frac{19}{32}$ — $\frac{21}{32}$	$6\frac{1}{2}$	$2\frac{1}{32}$	1.80	.30
D	4.75	$\frac{11}{16}$	$\frac{21}{32}$ — $\frac{23}{32}$	7	$2\frac{1}{32}$	1.80	.30
E	5.00	$\frac{3}{4}$	$\frac{23}{32}$ — $\frac{25}{32}$	$7\frac{3}{4}$	$2\frac{25}{32}$	2.10	.35
F	5.00	$\frac{13}{16}$	$\frac{25}{32}$ — $\frac{27}{32}$	$8\frac{3}{8}$	$2\frac{25}{32}$	2.10	.35
G	5.50	$\frac{7}{8}$	$\frac{27}{32}$ — $\frac{15}{16}$	9	$2\frac{27}{32}$	2.40	.40
H	5.80	1	$\frac{15}{16}$ — $\frac{11}{16}$	$9\frac{3}{4}$	$3\frac{3}{8}$	2.40	.40
I	7.00	$1\frac{1}{8}$	$\frac{15}{16}$ — $\frac{13}{16}$	$10\frac{3}{8}$	$3\frac{3}{8}$	2.70	.45
J	8.00	$1\frac{1}{4}$	$\frac{15}{16}$ — $\frac{11}{16}$	$11\frac{3}{8}$	$3\frac{13}{32}$	2.70	.45
K	10.00	$1\frac{3}{8}$	$\frac{11}{16}$ — $\frac{11}{16}$	$12\frac{3}{8}$	$3\frac{13}{32}$	3.30	.50

New blades are furnished ground to size except on top or cutting edge. Blades should be assembled in reamer body and ground to desired size, thus insuring against any inaccuracy. Shims will be furnished with blades when requested, without extra charge.

Reamrite Hand Adjustable Reamers in Set

Each set is packed in oiled and polished hardwood box with hinges and clasp.

With one of these sets you can ream holes of any diameter from the lowest capacity of the smallest reamer to the highest capacity of the largest.

Set Number	List Price
R8 8 Reamers A to H inclusive, $\frac{15}{32}$ " to $\frac{11}{16}$ "	\$39.80
R11 11 Reamers A to K inclusive, $\frac{15}{32}$ " to $\frac{11}{16}$ "	64.80

For Net Prices See Supplement

JOHN W. McMURRAY
 ENGINEERING LIBRARY
 BOOKS NOT FOR SALE

HAND REAMERS



Sets of these reamers are listed on page 23.

Hand Reamers with threaded ends, and all sizes not shown in the following list are special and subject to special prices.

General Specifications

Diam. Inches	List Price Each		Length Overall Inches	Length of Flute Inches	Diam. Inches	List Price Each		Length Overall Inches	Length of Flute Inches
	Carbon Steel	High Speed Steel				Carbon Steel	High Speed Steel		
1/8	1.00	3.00	3	1 1/2	61/64	3.55	10.50	10 11/16	5 11/32
9/64	1.10	3.25	3 1/4	1 5/8	31/32	3.55	10.50	10 7/8	5 11/32
5/32	1.10	3.25	3 1/4	1 5/8	43/64	3.70	10.50	10 7/8	5 7/16
11/64	1.20	3.25	3 1/2	1 3/4	1	3.70	10.50	10 7/8	5 7/16
3/16	1.20	3.25	3 1/2	1 3/4	1 1/32	3.85	11.50	11 1/8	5 7/16
13/64	1.30	3.50	3 3/4	1 5/8	1 1/16	4.00	11.50	11 1/4	5 9/16
7/32	1.30	3.50	3 3/4	1 5/8	1 1/8	4.15	12.75	11 3/8	5 23/32
15/64	1.40	3.50	4	2	1 1/8	4.30	12.75	11 3/8	5 13/16
1/4	1.40	3.50	4	2	1 1/2	4.45	14.25	11 13/16	5 29/32
17/64	1.45	3.75	4 1/4	2 1/4	1 3/16	4.60	14.25	12	6
9/32	1.45	3.75	4 1/4	2 1/4	1 1/2	4.75	15.75	12 1/8	6 1/16
19/64	1.50	3.75	4 1/2	2 3/4	1 3/4	4.90	15.75	12 1/4	6 1/8
5/16	1.50	3.75	4 1/2	2 3/4	1 3/2	5.05	17.25	12 11/32	6 11/64
21/64	1.55	4.25	4 3/4	2 3/8	1 5/16	5.20	17.25	12 7/16	6 7/32
11/32	1.55	4.25	4 3/4	2 3/8	1 11/32	5.40	18.75	12 17/32	6 17/64
23/64	1.60	4.25	5	2 1/2	1 3/8	5.60	18.75	12 5/8	6 5/16
3/8	1.60	4.25	5	2 1/2	1 13/32	5.80	20.50	12 23/32	6 23/64
25/64	1.70	4.75	5 1/4	2 5/8	1 7/16	6.00	20.50	12 13/16	6 13/32
13/32	1.70	4.75	5 1/4	2 5/8	1 5/8	6.20	22.25	12 29/32	6 29/64
27/64	1.75	4.75	5 1/2	2 3/4	1 1/2	6.40	22.25	13	6 1/2
7/16	1.75	4.75	5 1/2	2 3/4	1 13/32	6.60	24.00	13	6 1/2
29/64	1.85	5.25	5 3/4	2 3/8	1 9/16	6.80	24.00	13	6 1/2
15/32	1.85	5.25	5 3/4	2 3/8	1 19/32	7.00	25.75	13	6 1/2
31/64	1.90	5.25	6	3	1 3/8	7.20	25.75	13	6 1/2
1/2	1.90	5.25	6	3	1 21/32	7.40	27.50	13 1/8	6 3/4
23/32	1.95	5.75	6 1/4	3 1/8	1 11/16	7.60	27.50	13 1/2	6 3/4
17/32	1.95	5.75	6 1/4	3 1/8	1 23/32	7.80	29.50	13 1/2	6 3/4
25/32	2.00	5.75	6 1/2	3 1/4	1 3/4	8.00	29.50	13 1/2	6 3/4
9/16	2.00	5.75	6 1/2	3 1/4	1 25/32	8.20	31.50	13 1/2	6 3/4
27/32	2.10	6.25	6 3/4	3 3/8	1 15/16	8.40	31.50	13 1/2	6 3/4
13/16	2.10	6.25	6 3/4	3 3/8	1 27/32	8.60	33.50	13 1/2	6 3/4
29/32	2.20	6.25	7	3 1/2	1 5/8	8.80	33.50	14	7
5/8	2.20	6.25	7	3 1/2	1 23/32	9.00	35.75	14	7
11/16	2.30	6.75	7 1/4	3 3/4	1 13/16	9.20	35.75	14	7
25/32	2.30	6.75	7 1/4	3 3/4	1 21/32	9.40	38.00	14	7
43/64	2.40	6.75	7 1/2	3 23/32	2	9.60	38.00	14	7
11/16	2.40	6.75	7 1/2	3 23/32	2 1/16	10.00	40.75	14 1/2	7 1/4
15/16	2.50	7.25	8 1/8	4 1/16	2 1/8	10.40	43.50	14 1/2	7 1/4
23/32	2.50	7.25	8 1/8	4 1/16	2 1/4	10.80	46.25	15	7 1/2
47/64	2.60	7.25	8 3/8	4 1/8	2 1/2	11.30	49.00	15	7 1/2
3/4	2.60	7.25	8 3/8	4 1/8	2 5/8	11.80	51.75	15	7 1/2
25/32	2.70	7.75	8 23/32	4 23/64	2 3/8	12.30	55.00	15	7 1/2
29/32	2.70	7.75	8 23/32	4 23/64	2 1/2	12.80	58.25	15 1/2	7 3/4
31/64	2.80	7.75	9 1/16	4 13/32	2 1/2	13.40	61.50	15 1/2	7 3/4
13/16	2.80	7.75	9 1/16	4 13/32	2 5/8	14.00	64.75	15 1/2	7 3/4
29/32	2.95	8.50	9 3/8	4 11/16	2 3/8	14.60	68.00	16	8
25/32	2.95	8.50	9 3/8	4 11/16	2 1/2	15.40	71.25	16	8
53/64	3.10	8.50	9 11/16	4 27/32	2 3/4	16.20	74.50	16	8
7/8	3.10	8.50	9 11/16	4 27/32	2 13/16	17.00	77.75	16 1/2	8 1/4
57/64	3.25	9.50	10 3/8	5 1/4	2 3/8	17.80	81.00	16 1/2	8 1/4
29/32	3.25	9.50	10 3/8	5 1/4	2 15/16	18.60	84.25	16 1/2	8 1/4
59/64	3.40	9.50	10 1/4	5 1/8	3	19.40	87.50	16 1/2	8 1/4
13/16	3.40	9.50	10 1/4	5 1/8					

IMMEDIATE STEEL

Bars, Shapes, Plates, Sheets, Bolts and Nuts, Rivets, and a hundred and one other steel products are carried in stock for immediate shipment from the nearest Ryerson plant. A wire, phone call or letter will start the steel on its way.

SOLID HAND REAMERS IN SETS



Three sets containing different size assortments put up in hardwood cases can be furnished. These reamers are made of good quality carbon steel.

General Specifications

No. 401	9 sizes	1/4" to 3/4" by 16ths	\$20.00
No. 402	13 sizes	3/4" to 1" by 16ths	33.00
No. 403	8 sizes	1 1/8" to 1 1/2" by 16ths	44.00

TAPER PIN REAMERS



Taper 1/4-inch per foot. All sizes, dimensions and styles not listed are special and therefore subject to special prices.

General Specifications

Number	List Price Each		Diameter Large End Inches	Diameter Small End Inches	Length Overall Inches	Length of Flute Inches
	Straight Flutes	Spiral Flutes				
000	\$1.50	.....	.130	.101	2	1 3/4
00	1.35	.....	.145	.114	2 1/4	1 1/2
0	1.00	.....	.161	.127	2 3/4	1 3/8
1	1.00	\$1.20	.182	.146	3	1 1/4
2	1.25	1.50	.204	.162	3 1/2	2 1/4
3	1.50	1.80	.230	.183	4	2 1/2
4	1.75	2.10	.260	.208	4 1/2	3
5	2.00	2.40	.303	.240	5	3 3/4
6	2.25	2.70	.355	.279	6	4 1/2
7	2.50	3.00	.425	.331	6 3/4	5 1/4
8	3.00	3.60	.507	.398	8	6 1/2
9	3.50	4.20	.610	.482	9	7
10	4.50	5.40	.727	.581	11 1/4	8 1/4
11	6.00	7.20	.878	.706	13 1/2	10
12	7.50	9.00	1.050	.842	16	12
13	9.00	10.80	1.259	1.009	18 1/4	14
14	11.00	13.20	1.542	1.250		

TAPER PIN REAMERS IN SETS

No. 1420 (6 Sizes)	Nos. 0 to 5	Straight Spiral	\$ 9.50 11.25
No. 142 (11 Sizes)	Nos. 0 to 10	Straight Spiral	26.50 30.00



SPIRAL FLUTED TAPER REAMER



With Bit Brace Shank



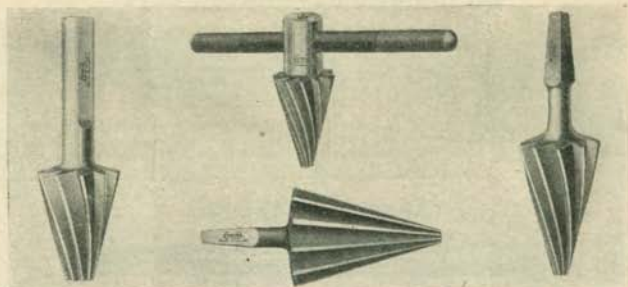
With Square Shank

Reamers listed are approximately 1/4" larger at the largest cutting diameter than the nominal size. The point of each reamer will enter the hole reamed by the next smaller size. Specify the required style of shank in order.

General Specifications

Nominal Size, In.	List Price	Nominal Size, In.	List Price
1/8	\$0.60	3/8	\$1.75
1/16	.60	15/16	2.00
1/4	.60	1	2.25
3/16	.60	1 1/16	2.50
5/16	.65	1 1/8	2.85
7/16	.70	1 1/4	3.20
1/2	.75	1 3/8	3.55
5/8	.80	1 1/2	3.90
3/4	.95	1 5/8	4.25
7/8	1.10	1 3/4	4.60
1 1/8	1.25	1 7/8	5.00
1 1/4	1.50		

BURRING REAMERS



No. 243

No. 246
No. 1 and 2

No. 241, 2, 21-2, 4

These reamers are used for removing burrs from pipe caused in cutting, and for countersinking. They are made of the finest steel and can be applied to various kinds of material.

General Specifications Spiral Fluted Burring Reamers

Order by this No.	List Price, Each		Style of Shank	Capacity Pipe Inches
	Carbon	High Speed		
241	\$1.00	.....	Bit Brace	1/8 to 1/2
242	1.25	.....	Bit Brace	1/8 to 1
242 1/2	1.50	.....	Bit Brace	1/4 to 1 1/4
243	1.50	.....	1/2 Round	1/4 to 1 1/4
*243 1/2	1.50	\$3.70	Round	1/4 to 1 1/4
244	3.00	.....	Bit Brace	1/4 to 2
246	4.00	.....	T Handle	1/4 to 2

Straight Flute Burring Reamers

1	\$1.50	Bit Brace	1/4 to 1 1/4
2	3.00	Bit Brace	1/4 to 2

*For use in portable electric drills.

REPAIRMAN'S TAPER REAMERS



Automobile repairmen, blacksmiths, electricians, plumbers, machinists and many others find these reamers useful for enlarging holes in any kind of material.

General Specifications

No.	Diameter		Length		Weight	List Price Each
	At Large End	At Point	Over-all	Reamer Part		
5	1 1/2"	1/2"	5 1/2"	3 1/2"	2 oz.	\$0.80
6	1"	3/8"	6 1/2"	4 1/2"	5 oz.	1.60

COUNTERSINKS

For tire bolts (54°) and wood screws (82°). These countersinks are stocked in three styles of shank. Bit Brace, 1/2" Round and 1/4" Round. Order by number.



General Specifications

Number			List Price Each	Size Cut	
Bit Brace Shank	1/2" Round Shank	1/4" Round Shank		Diameter Inches	Angle Degrees
501	502	503	\$0.80	5/8"	54°
504	505	506	.80	5/8"	82°
507	508	509	1.05	3/4"	54°
511	512	513	1.05	3/4"	82°

CENTER REAMERS



These reamers are regularly furnished with 60° inclusive angles. Carbon Steel Center Reamers having 72° or 82° inclusive angle will be furnished at regular list and discount. High Speed Steel Center Reamers are regularly furnished with 60° or 72° inclusive angle.

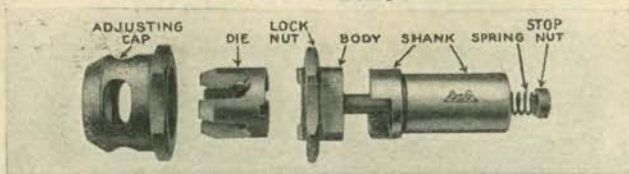
All sizes, dimensions and styles not listed are special and subject to special prices.

General Specifications

No.	Size Cut Inches	List Price		Diameter Shanks, Inches
		Carbon Steel	High Speed Steel	
535	1/4	\$0.30	\$1.00	1/8
536	3/8	.35	1.50	1/4
537	1/2	.40	2.00	3/8
538	5/8	.65	2.75	1/2
539	3/4	.85	3.50	5/8

For Net Prices See Supplement

ACORN DIES



Die and Regular Holder showing relationship of parts

These dies are simple, compact, capable of unusually fine adjustment, easy to resharpen, and can be run at high speed. Four different types of holders are furnished for it, and by selecting the proper type of holder it can be used on all makes of machines, drill presses, lathes, hand or automatic screw machines, turret lathes, bolt cutters, etc. It functions equally well on fixed or rotating spindles.

The "Acorn" Die in general design, is somewhat like a spring die, but its prongs or lands being shorter, wider and thicker, are free from the twisting action which frequently affects the operation of a spring die. The ends of the lands are accurately ground on a bevel to fit the solid adjusting cap, which is similarly ground on its inner face. The die is driven by lugs on the holder which fit two slots in its base. Die base and seat are both ground accurately so there is no chance of the die tilting out of alignment or "rocking" on its seat. The base of the cap is threaded and screws onto the holder. The adjustment is governed by screwing the cap more or less tightly onto the holder, thus drawing down on the lands of the die. The proper adjustment is maintained by a lock-nut. The function of the various parts will be clear if the attached illustration is studied. Different size shanks on the holders are, of course, provided to care for various conditions. Four types of holders are furnished, our regular type, two releasing-types and an adapter, by which these Dies can be used with existing round die holders. All holders are very carefully made of the best material and heat treated.

All "Acorn" Die blanks of a given size are uniform, which makes it possible to remove dies for sharpening or to change dies, and when the new or sharpened die is in place, the machine is ready for threading again without even checking setup, etc.

The illustration at the right shows the ease with which an "Acorn" Die can be sharpened. Anyone who has ever tried to sharpen a Round Die will appreciate this feature. A thin emery wheel, beveled on one side is recommended. A folder giving complete grinding instructions is included with shipment or will be furnished on request.



How to Hold Die

DIE HOLDERS

All "Acorn" Die Holders are furnished in a variety of shank sizes, so that it is possible to obtain a holder for any ordinary purpose. For most automatic screw machines and other machines which provide for automatically reversing the die or rod when the required length of thread has been cut, we recommend the regular holder. The adapter may be used in any round die holder. For Hand Screw Machines we recommend our releasing holder, as its use will avoid stripped threads or broken dies.

A special holder for Brown & Sharpe Machines can also be furnished. Prices of all holders and additional die data furnished on request.

Acorn Dies

No. of Die	Price Each	Capacity			Diam. Blank Inches	Length Inches
		Machine Screw	Fractional	Pipe		
0	\$2.40	0-5	1/16" - 1/8"	..	3/8	7/16
1	2.20	4-14	1/8" - 1/4"	..	5/8	19/32
2	2.60	14-24	1/4" - 3/8"	..	7/8	21/32
3	3.00	24-30	3/8" - 5/8"	1/8" - 1/4"	1 1/4	111/32
4	4.00	..	5/8" - 1"	3/8" - 3/4"	1 3/4	125/32
5	6.50	..	1 1/16" - 1 1/4"	1"	2 5/16	127/32

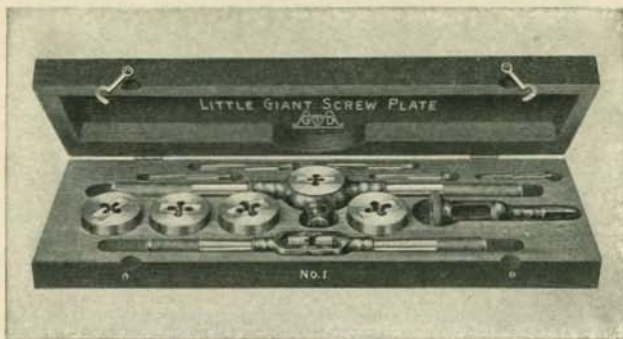
Details and prices of Holders—all types—and additional data covering these Dies, their use, prices, etc., will be furnished on application.

MAKING IT EASY TO BUY SMALL TOOLS

With the information and specifications given in this catalog; the net prices and F. O. B. points shown in the price supplement; and the Ryerson Guarantee on page one—you may confidently place your orders with the assurance that if the price or products is not right you may return the shipment without question and your money will be promptly refunded.

For Net Prices See Supplement

LITTLE GIANT SCREW PLATES



Set No. 1

These Little Giant Screw Plate Assortments contain taps and dies in cutting sizes and with threads per inch, as listed below.

U. S. S. threads furnished unless otherwise specified. S. A. E. or Whitworth Standard threads furnished without extra charge. Special automobile assortments can also be supplied.

Each assortment consists of taps, dies, collets, stock and tap wrench, in a hardwood case. Nos. AA-2 to M-3 inclusive are equipped with Plug Taps. All other sets have Taper Taps, except No. 0 which has a Plug Tap for $\frac{3}{16}$ " size. Nos. 0 and 1 also include a Bit Brace Holder.

Set No.	Cutting Sizes and Threads Per Inch	Diam. of Collets Inches	Length of Stock Inches	Net Weight Lbs.	List Price
*AA2	4-36, 6-32, 8-32, 10-24, 12-24.....	1 $\frac{1}{4}$	7 $\frac{1}{2}$	2 $\frac{1}{2}$	\$11.50
*AA4	4-36, 6-32, 8-32, 10-24, 10-32, 12-24, 14-20.....	1 $\frac{1}{4}$	7 $\frac{1}{2}$	3	14.50
A1	$\frac{1}{8}$ -40, $\frac{3}{16}$ -36, $\frac{1}{2}$ -24, $\frac{3}{4}$ -24, $\frac{1}{2}$ -20....	1 $\frac{1}{4}$	7 $\frac{1}{2}$	2 $\frac{1}{2}$	11.50
A1 $\frac{1}{2}$	$\frac{1}{16}$ -64, $\frac{3}{32}$ -50, and No. A1 sizes.....	1 $\frac{1}{4}$	7 $\frac{1}{2}$	3	14.50
A2	$\frac{7}{64}$ -48, $\frac{1}{4}$ -40, and No. A1 sizes.....	1 $\frac{1}{4}$	7 $\frac{1}{2}$	3	14.50
A2 $\frac{1}{2}$	$\frac{1}{16}$ -64, $\frac{3}{32}$ -60, $\frac{1}{2}$ -50, $\frac{3}{4}$ -48, $\frac{1}{2}$ -40, and No. A1 sizes.....	1 $\frac{1}{4}$	7 $\frac{1}{2}$	4	19.50
A3	$\frac{7}{64}$ -48, $\frac{1}{4}$ -40, $\frac{11}{64}$ -32, $\frac{11}{64}$ -24, $\frac{15}{64}$ -24, and No. A1 sizes.....	1 $\frac{1}{4}$	7 $\frac{1}{2}$	4	19.50
A10	No. A1 sizes, and $\frac{3}{16}$ -18, $\frac{1}{2}$ -16, with 2" Collets.....	1 $\frac{1}{4}$	7 $\frac{1}{2}$	5 $\frac{1}{2}$	18.25
310	$\frac{1}{8}$ -20 $\frac{3}{16}$ -18 $\frac{1}{2}$ -16, $\frac{3}{16}$ -14, $\frac{1}{2}$ -13, USS. and $\frac{1}{4}$ -28, $\frac{3}{16}$ -24, $\frac{1}{2}$ -24, $\frac{7}{16}$ -20 and $\frac{1}{2}$ -20 SAE.....	2	14 $\frac{1}{2}$	14	29.25
311	Same as 310, also $\frac{3}{16}$ -12 $\frac{3}{8}$ -11 $\frac{3}{4}$ -10 USS. and $\frac{3}{16}$ -18, $\frac{3}{8}$ -18, and $\frac{3}{4}$ -16 SAE.....	2, 2 $\frac{3}{4}$	14 $\frac{1}{2}$, 23	31	56.00
312	Same as 311, also $\frac{3}{8}$ -9, 1-8 USS. and $\frac{3}{8}$ -14 and 1-14 SAE.....	2, 2 $\frac{3}{4}$	14 $\frac{1}{2}$, 29	45	79.00
0	$\frac{3}{16}$ -24, $\frac{1}{4}$ -20, $\frac{5}{16}$ -18, $\frac{3}{8}$ -16, $\frac{7}{16}$ -14, $\frac{1}{2}$ -13.....	2	14 $\frac{1}{2}$	9 $\frac{1}{2}$	20.00
†1	$\frac{1}{4}$ -20, $\frac{3}{16}$ -18, $\frac{3}{8}$ -16, $\frac{7}{16}$ -14, $\frac{1}{2}$ -13....	2	14 $\frac{1}{2}$	9	18.50
†2	$\frac{1}{4}$ -20, $\frac{3}{8}$ -16, $\frac{1}{2}$ -13, $\frac{3}{8}$ -11, $\frac{3}{4}$ -10....	2 $\frac{3}{4}$	23	17	22.75
†3	$\frac{3}{8}$ -11, $\frac{3}{4}$ -10, $\frac{1}{2}$ -9, 1-8.....	2 $\frac{3}{4}$	26	18	26.25
†4	$\frac{1}{2}$ -13, $\frac{3}{8}$ -11, $\frac{3}{4}$ -10, $\frac{1}{2}$ -9, 1-8.....	2 $\frac{3}{4}$	26	20 $\frac{1}{2}$	29.25
†5	No. 1 sizes, and $\frac{3}{8}$ -11, $\frac{3}{4}$ -10.....	2 $\frac{3}{4}$	23	20	27.50
†5 $\frac{1}{2}$	No. 1 sizes, and $\frac{3}{16}$ -12, $\frac{3}{8}$ -11, $\frac{3}{4}$ -10, $\frac{3}{8}$ -16, $\frac{7}{16}$ -14, and No. 4 sizes.....	2 $\frac{3}{4}$	23	22	30.75
†6	No. 1 sizes, and $\frac{3}{8}$ -11, $\frac{3}{4}$ -10, $\frac{1}{2}$ -9, 1-8.....	2 $\frac{3}{4}$	26	23	35.00
†7	No. 1 sizes, and $\frac{3}{16}$ -12, $\frac{3}{8}$ -11, $\frac{3}{4}$ -10, $\frac{3}{8}$ -9, 1-8.....	2 $\frac{3}{4}$	26	27	42.00
†7 $\frac{1}{2}$	No. 1 sizes, and $\frac{3}{16}$ -12, $\frac{3}{8}$ -11, $\frac{3}{4}$ -10, $\frac{3}{8}$ -9, 1-8.....	2 $\frac{3}{4}$	26	29	44.25
8	Same as No. 5, but with 2 stocks..	2, 2 $\frac{3}{4}$	14 $\frac{1}{2}$, 26	19 $\frac{1}{2}$	30.00
†9	Same as No. 7, but with 2 stocks..	2, 2 $\frac{3}{4}$	14 $\frac{1}{2}$, 29	26	43.50
†9 $\frac{1}{2}$	Same as No. 7 $\frac{1}{2}$, but with 2 stocks..	2, 2 $\frac{3}{4}$	14 $\frac{1}{2}$, 29	26 $\frac{1}{2}$	46.50
20	$\frac{5}{8}$ -11, $\frac{3}{4}$ -10, $\frac{1}{2}$ -9, 1-8, 1 $\frac{1}{8}$ -7, 1 $\frac{1}{4}$ -7	4	40	49 $\frac{1}{2}$	53.50
25	$\frac{3}{8}$ -9, 1-8, 1 $\frac{1}{8}$ -7, 1 $\frac{1}{4}$ -7, 1 $\frac{3}{8}$ -6, 1 $\frac{1}{2}$ -6.	4 $\frac{1}{2}$	52	71	70.00
†30	1 $\frac{1}{8}$ -7, 1 $\frac{1}{4}$ -7, 1 $\frac{3}{8}$ -6, 1 $\frac{1}{2}$ -6.....	4 $\frac{1}{2}$	52	58	59.00
†40	No. 1 and No. 20 sizes, with 2 stocks	2 $\frac{3}{4}$, 4	23, 40	57 $\frac{1}{2}$	68.50
†50	No. 1, No. 3 and No. 30 sizes, with 2 stocks.....	2 $\frac{3}{4}$, 4 $\frac{1}{2}$	26, 52	84	92.00

*These sets contain machine screw sizes.

†These sets can be furnished when so specified and at extra charge, with sets of Taper, Plug and Bottoming Hand Taps.

For Net Prices See Supplement

LITTLE GIANT STOCKS FOR SCREW PLATES



These stocks are carefully made and well finished with polished handles knurled at the ends to prevent slipping from the hand and to insure a firm grip. They are used in all "Little Giant" Screw Plate Assortments as shown on page 26. In each of these assortments one stock accommodates all the collets regardless of the sizes of the dies except in a few cases where a wide range of cutting sizes necessitates the use of two stocks.

Stocks can be furnished complete with die and collet, making a complete equipment for cutting any size thread.

General Specifications

No. of Stock	Collet Diameter	Length of Stock Inches	Price
A1	1 1/4	7 1/2	\$1.25
A10	1 5/8	13 1/2	2.00
1	2	14 1/2	2.50
5	2 3/4	23	3.50
7	2 3/4	26	3.50
9	2 3/4	29	3.50
20	4	40	6.00
25	4 1/2	52	8.00

LITTLE GIANT FULL MOUNTED STOCKS

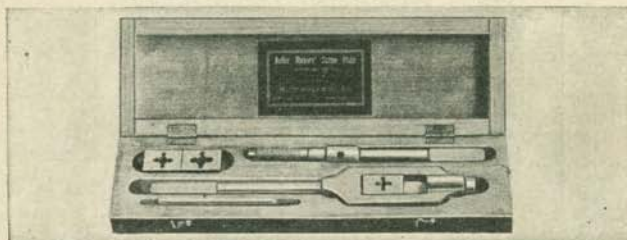
Full mounted stocks are finished in the same manner as the "Little Giant" Stocks shown above. The die slot in this stock is bevelled to fit "Little Giant" Dies the same as the slots in the collets shown on page 29. When ordered complete, each die is adjusted with its guide in a separate stock and is ready for use.



General Specifications

Size Inches	List Prices of Stocks and Parts				Stock, Die and Guide Complete
	Stock Only	Length of Stock, In.	Guide Only	Die Only	
3/16	\$1.60	8 3/4	\$.30	\$1.00	\$ 2.90
1/4	1.60	8 3/4	.30	1.00	2.90
5/16	1.60	8 3/4	.30	1.00	2.90
3/8	1.90	13 1/2	.30	1.25	3.45
7/16	1.90	13 1/2	.30	1.25	3.45
1/2	2.25	20 1/2	.50	1.50	4.25
9/16	2.25	20 1/2	.50	1.50	4.25
5/8	2.75	25 1/2	.50	1.75	5.00
11/16	2.75	25 1/2	.50	1.75	5.00
3/4	2.75	25 1/2	.50	2.00	5.25
13/16	3.25	29	.50	2.75	6.50
7/8	3.25	29	.50	2.75	6.50
15/16	3.25	29	.50	2.75	6.50
1	3.25	29	.50	2.75	6.50
1 1/16	4.50	39 1/2	.75	4.00	9.25
1 1/4	4.50	39 1/2	.75	4.00	9.25
1 3/8	6.75	50	1.00	5.00	12.75
1 1/2	6.75	50	1.00	5.00	12.75

BOILERMAKERS' SCREWPLATES



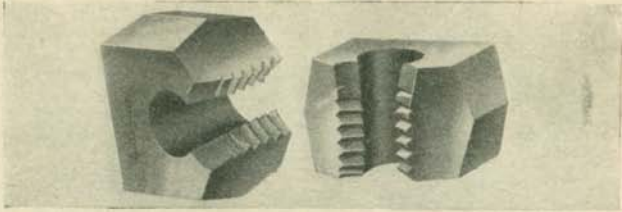
This type of Screw Plate is intended particularly for cleaning or re-cutting the threads on boiler staybolts. When the heads of the staybolts are cut off, in order to remove them from the boiler, the threads are generally mashed and damaged. Such bolts can be reclaimed for further use by going over the damaged portion of the threads with one of these screw plates.

Two-piece dies are furnished, one half being adjustable by turning the handle. This allows the die to be opened up and lifted off of the bolt after re-cutting the thread, eliminating the necessity of backing the die off.

Regularly furnished with 3/4, 1/2 and 1" dies. All dies have 12-V threads per inch. With three dies, in wooden box—weight 11 lbs.—List price \$12.00

LITTLE GIANT ADJUSTABLE DIES

Reversible



These dies are used in "Little Giant" Screw Plates shown on page 26. In use, they are held in a "Little Giant" collet, consisting of a cap and a screw guide as shown on page 29. In ordering, specify the outside diameter of the collet with which the die is used.

Sizes, dimensions, and threads not listed are subject to special prices. Left hand dies are also furnished at special prices.

General Specifications

Screw Gauge No.	List Price Dies for Each Size		Number of Threads to the Inch		
	Diameter Collet		ASME Std.		Also Furnished
	1 1/4"	1 3/8"	Fine Series	Coarse Series	
2	\$0.75		64	56	
3	.75		56	48	
4	.75		48	40	32, 36
5	.75		44	40	36
6	.75		40	32	36
7	.75		36	32	30
8	.75		36	32	30, 40
9	.75		32	30	24
10	.75		32	24	28, 30
12	.75		28	24	32
14	.75	\$1.00	24		20
16	.75	1.00			18, 20, 22
18		1.00			18, 20
20		1.00			16, 18, 20

Fractional Sizes

U. S. S. threads will be furnished unless otherwise specified. Sizes, dimensions and threads not listed are subject to special prices. In ordering dies, specify outside diameter of collet, the cutting size, and the number of threads per inch.

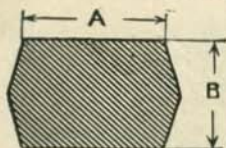
General Specifications

Cutting Sizes	Diam. Collets List Price Die, Each Size			No. Threads per Inch Standard Pitches				Also Furnished USF
	1 1/4"	1 3/8"	*2", 2 3/4", 4", 4 1/2"	USS	SAE	Whit.	BSF (Whit. form)	
1/16	\$0.75			64		60		72
3/32	.75			60				72
1/8	.75			50		48		48
5/32	.75			48				
3/16	.75			40		40		32
7/32	.75			40				
1/4	.75			36		32		32
5/16	.75			32				
3/8	.75		\$1.00	24		24		32
7/16	.75		1.00	24		24		
1/2	.75		1.00	24		24		32
5/8	.75		1.00	24		24		
3/4	.75	\$1.00	1.00	20	28	20	26	24, 27, 32
7/8	.75	1.00	1.00	18	24	18	22	20, 27, 32
1		1.25	1.25	16	24	16	20	20, 27
1 1/8		1.25	1.25	14	20	14	18	24, 27
1 1/4			1.50	13	20	12	16	12, 24, 27
1 1/2			1.50	12	18	12	16	27
1 3/4			1.75	11	18	11	14	12, 27
2			1.75	11	16	11	14	
2 1/4			2.00	10	16	10	12	12, 27
2 1/2			2.75	10		10	12	
2 3/4			2.75	9	14, 18	9	11	12, 27
3			2.75	9		9		
3 1/4			2.75	8	14	8	10	12, 27
3 1/2			4.00	7	12	7	9	
3 3/4			4.00	7	12	7	9	
4			5.00	6	12	6	8	
4 1/2			5.00	6	12	6	8	

*NOTE. 2" Diam. collets take die sizes 3/8"-1 1/2" incl.
 2 3/4" Diam. collets take die sizes 3/8"-1 1/2" incl.
 4" Diam. collets take die sizes 3/8"-1 1/2" incl.
 4 1/2" Diam. collets take die sizes 1 1/8"-1 1/2" incl.

For Net Prices See Supplement

LITTLE GIANT DIE BLANKS



The table shown below gives, in a compact form, the sizes of all "Little Giant" dies and collets, and stocks in which they fit. The die sizes are given according to cross-sectional dimensions which are indicated by "A" and "B" in the accompanying illustration.

Blank No.	Die Size Inches		Cutting Sizes	Made to Fit	
	A	B		Collets	Stocks
A1	$\frac{11}{16}$	$\frac{3}{4}$	{ 2-16 inc. Mach. Screw $\frac{1}{16}$ - $\frac{3}{16}$ " inc.	A1	
A10	$\frac{1}{2}$	$\frac{3}{8}$	{ 14-24 inc. Mach. Screw $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$ " Bolt	A10	
$\frac{1}{4}$ "	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{8}$ ", $\frac{1}{4}$ ", $\frac{5}{16}$ " Bolt $\frac{1}{4}$ " Pipe	$\frac{3}{8}$ " No. 1 $\frac{1}{4}$ " No. 5 $\frac{1}{4}$ " Mach.	$\frac{1}{4}$ " Full Mounted $\frac{1}{4}$ " No. 280 Pipe
$\frac{3}{8}$ "	$\frac{11}{16}$	$\frac{1}{2}$	$\frac{1}{4}$ ", $\frac{5}{16}$ ", $\frac{3}{8}$ " Bolt $\frac{3}{4}$ " Pipe	$\frac{3}{8}$ " No. 1 $\frac{3}{8}$ " No. 5 $\frac{3}{8}$ " Mach.	$\frac{3}{8}$ " Full Mounted $\frac{3}{8}$ " No. 281 Pipe
$\frac{1}{2}$ " No. 0 (Pipe)	$\frac{11}{16}$	$\frac{5}{8}$	$\frac{1}{2}$ ", $\frac{5}{8}$ ", $\frac{3}{4}$ ", $\frac{11}{16}$ ", $\frac{3}{4}$ " Bolt $\frac{3}{4}$ ", $\frac{1}{2}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ " Pipe	$\frac{1}{2}$ " No. 5 $\frac{1}{2}$ " No. 20 $\frac{1}{2}$ " Mach.	$\frac{1}{2}$ " $\frac{5}{8}$ ", $\frac{3}{4}$ " Full Mounted $\frac{1}{2}$ " No. 282 Pipe $\frac{1}{2}$ " No. 283 Pipe No. 260 Pipe No. 200 "Trio"
$\frac{3}{4}$ "	$1\frac{1}{16}$	$\frac{11}{16}$	$\frac{11}{16}$ ", $\frac{3}{4}$ ", $\frac{11}{16}$ ", 1" Bolt	$\frac{3}{4}$ " No. 5 $\frac{3}{4}$ " No. 20 $\frac{3}{4}$ " No. 25 $\frac{3}{4}$ " Mach.	$\frac{3}{4}$ " Full Mounted
$1\frac{1}{8}$ "	$1\frac{1}{4}$	1	$1\frac{1}{8}$ ", $1\frac{1}{4}$ ", $1\frac{1}{8}$ ", $1\frac{1}{4}$ " Bolt	$1\frac{1}{8}$ " No. 20 $1\frac{1}{8}$ " No. 25 $1\frac{1}{8}$ " Mach.	$1\frac{1}{8}$ " Full Mounted
$1\frac{1}{8}$ "	$1\frac{1}{2}$	$1\frac{1}{4}$	$1\frac{1}{8}$ ", $1\frac{1}{4}$ ", $1\frac{1}{8}$ ", $1\frac{1}{2}$ " Bolt	$1\frac{1}{8}$ " No. 25 $1\frac{1}{8}$ " Mach.	$1\frac{1}{8}$ " Full Mounted
No. 1 (pipe)	$1\frac{3}{8}$	$\frac{3}{4}$	$\frac{1}{2}$ ", $\frac{3}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{3}{4}$ ", 1" Pipe	No. 1 Mach. Pipe	No. 261 Pipe $\frac{3}{4}$ " No. 284 Pipe 1" No. 285 Pipe No. 210 "Trio" No. 220 "Duo"
No. 1 $\frac{1}{2}$ (pipe)	$1\frac{3}{4}$	$\frac{3}{4}$	$\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{3}{4}$ ", 1, $1\frac{1}{4}$ " Pipe		261 $\frac{1}{2}$ " & 286 Pipe
No. 2 (pipe)	$2\frac{1}{2}$	$\frac{3}{4}$	1, $1\frac{1}{4}$ ", $1\frac{1}{2}$ ", 2" Pipe	No. 2 M. P.	Nos. 262, 288 Pipe
No. 3 (pipe)	$3\frac{3}{8}$	$1\frac{1}{4}$	2 $\frac{1}{2}$ " and 3" Pipe	No. 3 M. P.	No. 263 Pipe

LITTLE GIANT COLLETS

The table below shows whether or not a specified collet is regularly furnished to take a certain size of die. In ordering extra collets or guides, it is only necessary to give the outside diameter of the collet and cutting size of the die for which it is required. A collet consists of a cap and a guide.

Collet, No.	Outside Diam. Collet, Ins.	Dimensions of Slot, Ins.	Sizes of Dies, Ins.	List Prices Each		
				Cap	Guide	Collet Comp.
A 1	$1\frac{1}{4}$	$2\frac{3}{4} \times 3\frac{1}{4}$	(Nos. 2-16) $\frac{1}{16}$ - $\frac{3}{16}$ " (Nos. 14-24)	\$0.35	\$0.20	\$0.55
A 10	$1\frac{3}{8}$	$1\frac{1}{2} \times 1\frac{3}{4}$	$\frac{5}{16}$ - $\frac{3}{8}$ "	.50	.30	.80
$\frac{1}{4}$ " No. 1	2	$\frac{1}{2} \times 1\frac{3}{8}$	$\frac{3}{16}$ - $\frac{3}{16}$ "	.50	.30	.80
$\frac{3}{8}$ " No. 1	2	$\frac{1}{2} \times 1\frac{3}{8}$	$\frac{3}{8}$ - $\frac{1}{2}$ "	.50	.30	.80
$\frac{1}{4}$ " No. 5	$2\frac{3}{4}$	$1\frac{1}{2} \times 1\frac{3}{4}$	$\frac{5}{16}$ - $\frac{3}{16}$ "	.80	.50	1.30
$\frac{3}{8}$ " No. 5	$2\frac{3}{4}$	$1\frac{1}{2} \times 1\frac{3}{4}$	$\frac{3}{8}$ - $\frac{7}{16}$ "	.80	.50	1.30
$\frac{1}{2}$ " No. 5	$2\frac{3}{4}$	$2\frac{1}{2} \times 1\frac{3}{4}$	$\frac{1}{2}$ - $\frac{3}{4}$ "	.80	.50	1.30
$\frac{3}{8}$ " No. 5	$2\frac{3}{4}$	$2\frac{1}{2} \times 2\frac{1}{16}$	$\frac{1}{2}$ -1"	.80	.50	1.30
$\frac{1}{2}$ " No. 20	4	$2\frac{1}{2} \times 1\frac{3}{4}$	$\frac{5}{8}$ - $\frac{3}{4}$ "	1.50	.75	2.25
$\frac{3}{8}$ " No. 20	4	$2\frac{1}{2} \times 2\frac{1}{16}$	$\frac{1}{2}$ -1"	1.50	.75	2.25
$1\frac{1}{8}$ " No. 20	4	$1\frac{1}{4} \times 2\frac{1}{2}$	$\frac{1}{2}$ - $1\frac{1}{4}$ "	1.50	.75	2.25
$\frac{1}{4}$ " No. 25	$4\frac{1}{2}$	$1\frac{1}{2} \times 2\frac{1}{16}$	$\frac{1}{2}$ -1"	2.00	1.00	3.00
$1\frac{1}{8}$ " No. 25	$4\frac{1}{2}$	$1\frac{3}{4} \times 2\frac{1}{2}$	$\frac{1}{2}$ - $1\frac{3}{4}$ "	2.00	1.00	3.00
$1\frac{3}{8}$ " No. 25	$4\frac{1}{2}$	$1\frac{1}{2} \times 3$	$\frac{1}{2}$ - $1\frac{1}{2}$ "	2.00	1.00	3.00

*Round Ends.

1 Bit Brace Shank Guide for 2" Diameter Cap \$0.50.

For Net Prices See Supplement

LITTLE GIANT STOCKS AND DIES FOR PIPE In Sets



Set No. 261-A

This assortment is furnished with a Little Giant Stock and Dies and Bushings for each size.

American (Briggs) Standard right hand taper threads furnished unless otherwise specified. British Standard pipe right hand taper threads can be had at the same list prices, as well as left hand pipe dies. Each set is packed in an attractive, strong light weight fibre container which occupies small space.

General Specifications

No.	260	261-A	261-B	261-C	261 1/2-A	261 1/2-B	262-A	262-B
Cutting Sizes Inches	1/8 3/8 1/2 3/4 1	1/8 3/8 1/2 3/4 1	1/8 3/8 1/2 3/4 1	1/8 3/8 1/2 3/4 1	1/8 3/8 1/2 3/4 1 1 1/4	1/8 3/8 1/2 3/4 1 1 1/4	1 1 1/4 1 1/2 2	1 1 1/4 1 1/2 2
Length Stock, Ins.	22	36	36	36	41	41	51	51
Net Wt. lbs.	6	12	10	13	12	18	26	29
List Price	\$9.00	\$12.00	\$9.00	\$14.00	\$14.00	\$19.00	\$18.00	\$21.00

Extra Dies and Bushings for Above Stocks

Series No.	Cutting Sizes, Inches	Blank Used	Dies, Each	Bushings, Each
260	1/8, 3/8, 1/2, 3/4	No. 0 pipe	\$1.60	\$0.30
261	1/8, 3/8, 1/2, 3/4, 1	No. 1 pipe	2.00	.40
261 1/2	1/8, 3/8, 1/2, 3/4, 1, 1 1/4	No. 1 1/2 pipe	3.50	.60
262	1, 1 1/4, 1 1/2, 2	No. 2 pipe	4.50	.75

"TRIO" AND "DUO" DIE STOCKS



Trio Die Stock

These die stocks, "Trio" and "Duo," are handy for the worker outside as well as inside the shop. They are light and compact and hold either two or three sizes of pipe dies—the sizes most often needed.

The dies are adjustable yet rigidly held in place when tightened. There are no parts to lose; no exposed screws to break; nor any cam plates to adjust. Since the dies required are kept in the stock all the time, there is no chance to lose or forget them. The handles are

detachable and the entire outfit can be neatly packed in the ordinary tool bag. American Standard (Briggs) right hand taper thread furnished unless otherwise specified. British Standard pipe right hand taper threads as well as right and left hand pipe dies are furnished at the same list price.

General Specifications "Trio" Die Stocks

No.	Cutting Sizes, Inches	Length Stock, Inches	Weight Lbs.	List Price, Each
200-A	1/8, 3/8, 1/2	28	5 1/4	\$ 8.50
200-B	1/8, 3/8, 1/2	28	5 3/4	8.50
210-A	1/8, 1/2, 3/4	40	11	11.00
210-B	1/2, 3/4, 1	40	11	11.00

"Duo" Die Stocks

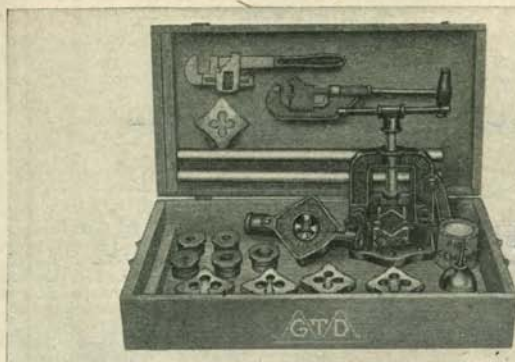
220-A	1/2, 3/4	26	8 1/2	8.50
220-B	3/4, 1	26	9	8.50

Extra Dies and Bushings for "Trio" and "Duo" Stocks

Stock No.	Cutting Sizes, In.	Blank Used	Dies, List Price	Bushing Guides
200	1/8, 3/8, 1/2, 3/4	No. 0 pipe	\$1.50	\$0.30
210	1/8, 1/2, 3/4, 1	No. 1 pipe	2.00	.40
220	1/2, 3/4, 1	No. 1 pipe	2.00	.40

For Net Prices See Supplement

G. T. D. PIPE TOOL SETS



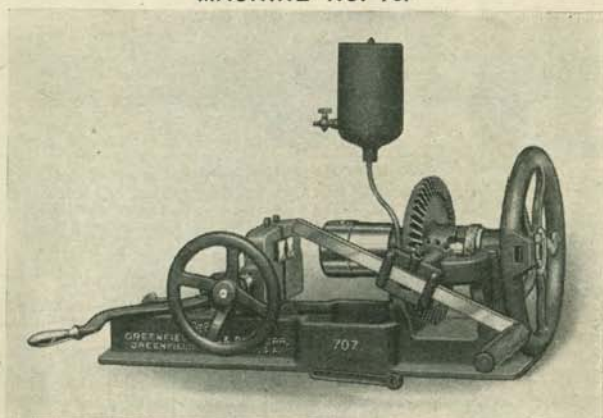
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The G. T. D. Pipe Tool Sets include an assortment of tools needed for piping Nos. FF and G are recommended particularly for ordinary piping jobs around the house or farm.

General Specifications

No.	A	B	D	FF	G
Cutting Sizes	1 Set No. 1 "OK" Stocks and Dies 1/4" to 1"	1 Set No. 1 1/2 "OK" Stocks and Dies 1/4" to 1 1/4"	1 Set No. 1 "OK" Stocks and Dies 1/4" to 1" 1 Set No. 2 "OK" Stocks and Dies 1 1/4" to 2"	1 Set No. 0 "OK" Stocks and Dies 1/4" to 1/2"	1 Set No. 1 "OK" Stocks and Dies 1/4" to 1"
Wrench	14"	14"	18"	10"	10"
Cutter	1	1	2	1	1
Vise	1	1	1	0	0
Net					
Wt. Lbs.	45	56	72	20	27
List Price	\$23.50	\$25.00	\$38.00	\$16.00	\$18.00

"LITTLE GIANT" BOLT AND PIPE THREADING MACHINE NO. 707



Hand Operated Threading Machine

This machine is especially suitable in the small shop where there is not enough threading to be done to justify the installation of the expensive opening die head machine, yet where there is so much work that it cannot be done economically and easily by the screw plate method. This machine employs "Little Giant" Dies fitting special machine collets. See page 28.

The driving handle operates direct or through a 3 1/2 to 1 reducing gear; vise jaws are opened and closed by a hand wheel and are fitted with hardened tool steel jaws for holding different shapes and sizes.

Capacity—bolt threads, 1/4" to 1", pipe threads 1/4" to 2".

Weight—net 245 lbs.; boxed for shipment 335 lbs.

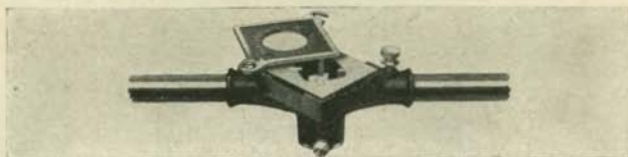
This machine can be furnished with or without legs, and is regularly supplied with G. T. D. Nut taps and "Little Giant" dies and machine collets cutting the following sizes of U. S. S. threads: 1/4", 3/8", 1/2", 5/8", 3/4", 7/8", 1", 1 1/8", 1 1/4", 1 1/2", 1 3/4", 2", S. A. E. American (Briggs) Standard Pipe, or Whitworth threads furnished if desired.

Detailed description of this machine will be sent on request.

For Net Prices See Supplement

ARMSTRONG PIPE DIES IN SETS WITH STOCKS

Solid Die Sets



Stock for Solid Dies

These sets consist of a die stock complete with dies and guides for threading pipe of the sizes listed in the table below. The dies in these sets have "backed off" chasers made from special alloy tool steel and have extraordinary easy cutting and long lasting qualities. The chasers are set at just the proper angle to give the best rake and the improved shape of the body gives great chip clearance, preventing jamming of die with resulting injury to both work and tools. Dies are furnished either right or left hand, in sizes listed.

Right hand American (Briggs) Standard dies will be sent if not otherwise specified in order.

The stocks will fit any solid pipe die of standard dimensions. The bodies are certified malleable iron finished in black lacquer. The guides are carefully machined inside and out.

Set No.	No. of Dies in Set	For Threading Pipe Size, Inches	Dimensions of Dies Inches	Price Stock Without Dies or Guides	Price Extra Dies Each	List Price of Set
0	Four	$\frac{1}{8}$ to $\frac{1}{2}$	2 x 2 x $\frac{1}{2}$	\$3.00	\$1.40	\$8.00
1	Five	$\frac{1}{4}$ to 1	$2\frac{1}{2}$ x $2\frac{1}{2}$ x $\frac{3}{4}$	3.50	1.60	10.50
1-6	Six	$\frac{1}{8}$ to 1	$2\frac{1}{2}$ x $2\frac{1}{2}$ x $\frac{3}{4}$	3.50	1.60	12.00
1-5	Five	$\frac{1}{8}$ to $\frac{3}{4}$	$2\frac{1}{2}$ x $2\frac{1}{2}$ x $\frac{3}{4}$	3.50	1.60	10.50
1-3	Three	$\frac{1}{2}$ to 1	$2\frac{1}{2}$ x $2\frac{1}{2}$ x $\frac{3}{4}$	3.50	1.60	7.50
1 $\frac{1}{2}$	Three	$\frac{3}{4}$ to $1\frac{1}{4}$	3 x 3 x $\frac{3}{4}$	4.00	2.00	9.50
1 $\frac{1}{2}$ -6	Six	$\frac{3}{4}$ to $1\frac{1}{4}$	3 x 3 x $\frac{3}{4}$	4.00	2.00	15.50
1 $\frac{1}{2}$ -4	Four	$\frac{1}{2}$ to $1\frac{1}{4}$	3 x 3 x $\frac{3}{4}$	4.00	2.00	11.50
2	Three	$1\frac{1}{4}$ to 2	4 x 4 x $\frac{3}{8}$	8.50	2.50	14.50
2-4	Four	1 to 2	4 x 4 x $\frac{3}{8}$	8.50	2.50	17.00
2-5	Five	$\frac{3}{4}$ to 2	4 x 4 x $\frac{3}{8}$	8.50	2.50	19.50
2-6	Six	$\frac{1}{2}$ to 2	4 x 4 x $\frac{3}{8}$	8.50	2.50	22.00

Adjustable Die Sets



Stock for Adjustable Dies

These sets, similar to the solid die sets, are complete with stock and an assortment of dies and guides as listed below. The dies are also made from special tool steel with "backed off" chasers. They have ample chip clearance, correct throat and cutting angle, insuring efficiency, ease of operation and long life. These dies fit any stock adapted for this type of die and are furnished either right-hand or left-hand. Unless otherwise specified right-hand American (Briggs) Standard thread dies will be sent.

The new and improved stocks are adapted for the use of any standard die of this type. The bodies are malleable iron, carefully machined and finished in black enamel.

Set No.	Pairs of Dies in Set	For Threading Pipe Size, Inches	Price Stock Without Dies or Guides	Price Extra Dies Pair	List Price of Set
1-A	Four	$\frac{1}{8}$ to $\frac{1}{2}$	\$3.25	\$1.60	\$9.00
2-A	Five	$\frac{1}{4}$ to 1	4.00	2.00	12.00
2-A-6	Six	$\frac{1}{8}$ to 1	4.00	2.00	14.00
2-A-5	Five	$\frac{1}{8}$ to $\frac{3}{4}$	4.00	2.00	12.00
2 $\frac{1}{2}$ -A	Two*	$\frac{1}{2}$ to $1\frac{1}{4}$	5.25	3.50	14.00
2 $\frac{1}{2}$ -A-6	Four*	$\frac{1}{4}$ to $1\frac{1}{4}$	5.25	3.50	20.00
3A	Three	$1\frac{1}{4}$ to 2	7.00	4.50	18.00
3-A-4	Four	1 to 2	7.00	4.50	21.00
3-A-5	Five	$\frac{3}{4}$ to 2	7.00	4.50	24.00
3-A-6	Six	$\frac{1}{2}$ to 2	7.00	4.50	27.00

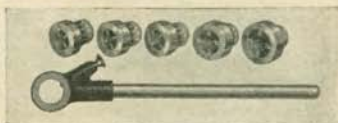
* $\frac{1}{2}$, $\frac{3}{4}$, 1 and $1\frac{1}{4}$ in. No. 2 $\frac{1}{2}$ -A Sets are Double End Dies. The $\frac{1}{4}$ and $\frac{3}{8}$ are Single End, price \$2.50 per pair.

For Net Prices See Supplement

TOLEDO PIPE THREADING TOOLS

No. 00 Ratchet Device

This tool is very desirable for threading small pipe. It operates with a ratchet and reaches the corner jobs and cuts perfectly tapered threads on $\frac{1}{8}$ " to $\frac{3}{4}$ " pipe. It is very efficient and so compact that it can be easily carried in the pocket as it is but 14" long. The die heads are instantly changed from one size to another simply by pulling the ratchet pawl knob and allowing one head to drop out and another to slip in. List price of ratchet only is \$3.00; $\frac{1}{8}$ ", $\frac{1}{4}$ " or $\frac{3}{8}$ " die heads complete with dies \$3.00 each. $\frac{1}{2}$ " or $\frac{3}{4}$ " die heads with dies \$3.50 each.



No. 00

No. 00 complete with $\frac{1}{8}$ " to $\frac{3}{4}$ " capacity list price..... \$19.00
 Information on special dies on request.

No. 11 Ratchet Threader



No. 11

This tool is similar to the No. 00 ratchet shown above, except that it will thread $\frac{1}{2}$ " to $1\frac{1}{4}$ " pipe. It is especially adapted for the electrician and will always be appreciated wherever these sizes of pipe are threaded.

The die heads in the above tool are instantly changed from one size to another and the die segments can be easily replaced or removed when

reground. The complete tool consists of the ratchet handle $\frac{1}{2}$ ", $\frac{3}{4}$ ", 1" and $1\frac{1}{4}$ " right hand die heads with dies, all packed in a strong carton. If the complete tool is not desired, any combination of die heads may be ordered. List price of ratchet only is \$4.00; $\frac{1}{2}$ ", $\frac{3}{4}$ ", 1" or $1\frac{1}{4}$ " die heads complete with dies each \$5.00. No. 11 complete set, capacity $\frac{1}{2}$ " to $1\frac{1}{4}$ " list price \$24.00.

Three-Way Threader

These Toledo 3-way threaders are very light and easy to operate. No. 30 threads $\frac{3}{8}$ " to $\frac{1}{2}$ " and weighs only $4\frac{3}{4}$ lbs. No. 31 threads $\frac{1}{2}$ " to 1" and weighs 7 lbs. Dies are all on center and handles project from either side making perfectly balanced tools.

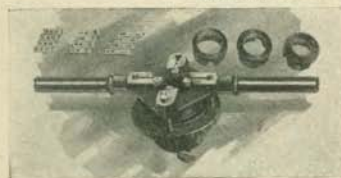


No. 30

A distinguished feature of these tools is that they employ the segmental dies which are easily removable and can be reground or replaced with new ones at slight cost.

When assembled ready for use no adjustments are necessary, no loose parts. The die heads are always ready to cut standard threads. No. 30 capacity $\frac{3}{8}$ " to $\frac{1}{2}$ " list price complete is \$15.00. No. 31, capacity $\frac{1}{2}$ " to 1" list price complete, \$18.00.

Adjustable Threader No. 1



No. 1

This model has been considered a standard tool for many years by users of 1" to 2" threading tools. It employs the receding die principle and threads pipe with greatest ease. It may be instantly adjusted for cutting over and under size as well as standard threads and produces perfectly true tapered threads at all times. Taper pins permit adjustment for any depth threads.

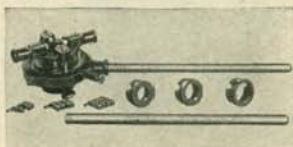
Being strong and durable, it will stand many years of service.

The complete tool outfit consists of the tool body, two handles, one set of 1" to 2" right hand dies and bushings, and instruction card all packed in a wooden box. It can also be furnished at a slightly higher price for cutting left hand threads, but neither tool will do both.

No. 1 threader with capacity of 1" to 2" takes a list price complete of \$24.00.

Adjustable Ratchet Threader No. 1-A

No. 1A is similar to No. 1 described above, except that it is equipped with a ratchet. Its threading capacity is likewise 1" to 2", it is known to be the easiest operating threader for this capacity. For working in close quarters this tool is considered very convenient. It can be made up for threading electrical conduit or can be had for cutting special threads on locomotive super heater tubes.

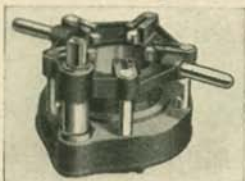


No. 1-A

No. 1-A capacity 1" to 2" list price complete \$30.00.

TOLEDO GEARED PIPE THREADING TOOLS

Adjustable Threading Device No. 2

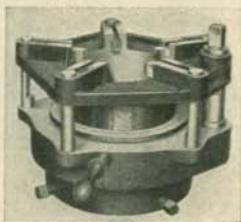


Capacity 2½" to 4"

This model is very light, practical, durable, and easily operated. It is made on the receding die principle and can be put on the pipe in almost any position and yet produce a perfect tapered thread. It consists of tool body, complete set of 2½" to 4" right hand dies and bushings, set screw wrench, and driving cross. The productive capacity of this tool can be greatly increased when used with a Toledo Power Drive. Shipping weight 99 lbs. List Price \$100.00 complete.

Adjustable Device No. 2½

This tool has been developed primarily for those who already own a No. 2 tool and find it necessary to thread up to 6" pipe. It has all the desirable qualities of the above threader being of the same general character. It utilizes a separate set of dies for each size pipe and will cut perfect threads on either wrought iron or steel pipe. This tool is one of the lightest 6" threaders made, weighing but 136 lbs. when ready for operation. Special long barreled bushings facilitate centering the tool on the pipe. The complete equipment including right hand dies of sizes from 4½" to 6"—List Price \$200.00. Shipping weight 187 lbs.



Capacity 4½" to 6"

Adjustable Device No. 3



Capacity 4½" to 8"

The No. 3 adjustable threading device has a capacity of 4½" to 8" and is built on the same principle as those described above. One distinguishing feature of this threader is that even with its relatively large capacity it is operated by one man; another is that with clearance in other directions it may be operated on a pipe the center of which is within 10 inches of a wall or other obstruction.

Special 4" dies and bushing may be furnished for this device.

Work can be speeded up by using the Power Drive described on the next page, which can be had at extra charge.

List price complete with 4½" to 8" dies is \$300.00. Shipping weight 238 lbs.

Adjustable Device No. 4

Threader No. 4 is the largest of the Toledo line, having a capacity of cutting threads in 12" pipe by one man operation. It is similar in design to the above geared tools and also operates on the receding die principle.

The regular equipment consists of tool body ratchet handle; one set of 9" to 12" right hand threading dies; 10" and 12" plain milling dies for truing up the pipe before threading; bushings; set screw wrench; and driving cross. List price, complete with dies, \$500.00. Shipping weight 373 lbs.



Capacity 9" to 12"

Adjustable Device No. 25



Capacity 2½" to 6"

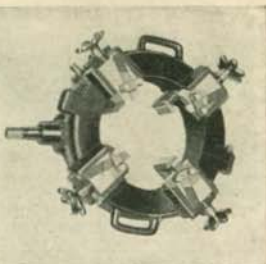
No. 25 threads pipe 2½" to 6" using but one set of dies and in this respect differs from the other tools shown on this page. Sharp dies are necessary in a tool of this character, hence an extra set is supplied so there may always be a sharp set on hand.

Long barrel bushings make centering on pipe also easy.

List price, No. 25 complete, \$230.00; shipping weight 231 lbs

TOLEDO GEARED PIPE CUTTERS

These cutters are all alike in design but differ in cutting capacities. They are portable and hand-operated for large sizes of pipe. Four knives fed by hand operated feed wheels cut the pipe clean without leaving a burr. All parts are made of the best materials. The cutters are high speed steel carefully ground; they are double ended so that when one end becomes dull they may be reversed or may be removed for regrinding. The driving pinion has an oil reservoir to lubricate bearing at all times. Toledo Power Drive shown below can be used to great advantage by speeding up the work.



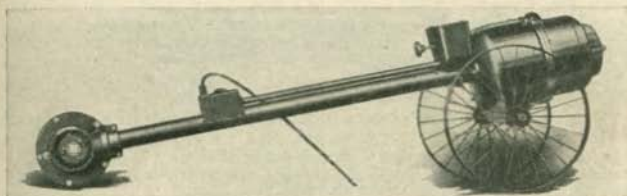
Pipe Cutter No. 250

Each complete cutter consists of the tool body, cutter knives, set screw wrench, ratchet handle and instruction card.

General Specifications

No.	Capacity	Net Weight, Lbs.	Shipping Weight, Lbs.	List Price
250	2 1/2" to 6"	98	121	\$80.00
300	4 1/2" to 8"	125	167	105.00
350	7 1/2" to 10"	150	178	130.00
400	9" to 12"	175	200	150.00

TOLEDO POWER DRIVES



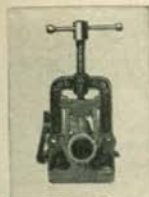
These drives are electrically operated machines for driving hand pipe threading and cutting tools.

The Standard Drive equipped with 1 1/2 H.P. A.C. or D.C. motor can be supplied with two speed transmission gearing, operating at 38 and 57 R.P.M. The Universal is equipped with a 1/2 H.P. motor that will operate on any 110 volt current. The motor is reversible so the dies can be backed off the complete thread by power. The variable speed motor automatically accelerates on the light work insuring maximum efficiency at all times.

The overall length of the drive is about 6 feet. Net weight varies from 230 to 255 pounds. The wire wheels which are 18" in diameter provide for easy moving from place to place.

- With A. C. Motor 60 or 50 cycle, single phase, list price \$600
- With A. C. Motor 40, 30, or 25 cycle, single phase, list price 700
- With D. C. Motor, list price 600
- Universal with motor for any 110 volt, list price 500

TOLEDO PIPE VISES



Pipe Vise No. 1

The construction of these pipe vises is such that the jaws accommodate themselves to irregular shapes and hold them firmly. The jaws are carefully heat treated and when they become dull may be returned to the factory to be recut at a small cost. While these vises are not made especially for holding nickel plated or polished pipes, their gripping action is such that the pipe is neither dented or scratched when held tight.

- No. 1 has capacity for 1/2" to 2 1/2" pipe. List price \$10.00.
- No. 2 holds pipe 3/4" to 4 1/2". List price \$20.00.



Vise Mount

TOLEDO VISE MOUNTS

This vise mount is a strong, portable work bench instantly set up and always ready for use; the legs fold up quickly. It is made in three sizes to suit requirements. The top may be drilled to fit any vise if template is furnished. The roller support shown in illustration is used for holding long pipe lengths.

- No. 0 for vise of 1" capacity, weight 36 lbs., list price \$12.00
- No. 1 for vise of 2 1/2" capacity, weight 48 lbs., list price 15.00
- No. 2 for vise of 4 1/2" capacity, weight 82 lbs., list price 18.00
- Roller support, weight 18 lbs., list price 5.00

WRENCHES

Coes Steel Handle Wrenches



These heavy duty steel handled wrenches are made to meet the demand for strong unbreakable tools. They have long been regarded as the standard in quality and durability.

The bar of these wrenches is made of carefully heat treated steel with hardened wearing surfaces. The head and bar are finished hot and water forged. The jaw is in one piece of semi-steel and does not contain rivets in the straps. The screw, also, is in one piece and has no spring dowels or securing pins and its thread has an unusually strong section design to stand hard blows. The handle is semi-steel casting which is forced on the bar under pressure.

General Specifications

	4"	6"	8"	10"	12"	15"	18"	21"
Overall Length, Ins.	5	6 ¹³ / ₁₆	8 ⁷ / ₁₆	10 ⁷ / ₁₆	12 ³ / ₁₆	15 ³ / ₁₆	18 ¹ / ₁₆	21 ¹ / ₁₆
Width of Opening Ins.	1 ¹³ / ₁₆	2 ¹ / ₁₆	2 ¹³ / ₁₆	3 ¹ / ₈	3 ¹ / ₄	4 ¹ / ₂	5	6 ¹³ / ₁₆
Depth of jaw to bar, Ins.	1 ¹³ / ₁₆	1 ¹³ / ₁₆	1 ¹³ / ₁₆	1 ¹³ / ₁₆	1 ¹³ / ₁₆	1 ¹³ / ₁₆	2	2 ¹ / ₄
Net Weight, lbs.	3 ⁵ / ₈	5 ¹ / ₄	7 ³ / ₈	10 ¹ / ₄	13 ³ / ₁₆	17 ³ / ₁₆	21 ³ / ₁₆	27 ³ / ₁₆

Coes Knife Handle Wrench



This is the original adjustable screw wrench which has proved its merit by years of hard service, in all parts of the world.

In its construction it is similar to wrench described above. The bar is made of specially analyzed steel to insure the best product obtainable. The head, screw and jaws are identical with those in the above wrench.

The handle is a semi-steel casting; with two wooden sides; a rivet, bur, a cross-key and the tip. The sides cannot be removed from the frame except by actually breaking them; they will not drop off or split from a blow.

General Specifications

Size	6"	8"	10"	12"	15"	18"	21"
Overall Length, Ins.	6 ⁹ / ₁₆	8 ⁷ / ₁₆	10 ¹ / ₄	12 ¹ / ₄	14 ⁷ / ₈	17 ¹³ / ₁₆	21
Width of Opening, Ins.	1 ¹³ / ₁₆	1 ¹³ / ₁₆	1 ¹³ / ₈	2 ¹ / ₁₆	2 ¹³ / ₁₆	3 ¹ / ₈	4
Depth of Jaw to Bar, Ins.	1 ¹³ / ₁₆	1 ¹³ / ₁₆	1 ¹¹ / ₁₆	1 ¹¹ / ₁₆	1 ¹³ / ₈	1 ¹³ / ₈	2 ¹ / ₁₆
Net Weight, Lbs.	3 ¹ / ₄	4 ¹ / ₈	6 ¹ / ₁₆	8 ³ / ₁₆	11 ³ / ₈	15 ³ / ₈	20 ³ / ₈

Hande Wrenches

Hande Wrenches can be used to advantage any place where the work of a wrench is required, whether in the shop, on the job, or in the home. They are operated with one hand and adjusted by moving the sliding sleeve with the thumb and finger, without using the other hand or moving the position of the wrench. The jaws lock with the first pressure and are released quickly by operating the sleeve.



Monkey Wrench

These wrenches are especially designed for work in tight places and made to fit any size nut or pipe within their capacity. They are made of drop forged heat-treated special steel suited for the purpose of giving maximum strength and toughness.



Pipe Wrench

The absolutely accurate adjustment to size of nut or pipe of these monkey wrenches and pipe wrenches insures against slipping and injury to the operator.

See price supplement for further information.

For Net Prices See Supplement

ARMSTRONG BROS. TOOLS

Pipe Wrenches



These frameless all-steel wrenches are exceedingly well built, handy, and have easy release. The patented "ball and socket" nut gives them increased flexibility and greater strength, especially under heavy side strain, than the ordinary wrenches. The adjusting nut cannot fall out; the lower jaw is replaceable, and all parts are self-cleaning in action so that clogging is impossible.

Length, Ins.	8	10	14	18	24	26
Capacity pipe, Ins.	$\frac{3}{8}$ - $\frac{3}{4}$	$\frac{3}{8}$ -1	$\frac{3}{4}$ -1 $\frac{1}{2}$	$\frac{3}{4}$ -2	$\frac{3}{4}$ -2 $\frac{1}{2}$	$\frac{3}{4}$ -3 $\frac{1}{2}$
Weight, lbs.	$\frac{3}{4}$	1 $\frac{1}{2}$	2 $\frac{3}{4}$	4 $\frac{1}{2}$	7 $\frac{1}{2}$	15 $\frac{1}{4}$
List Price	\$2.25	\$2.50	\$3.50	\$5.00	\$7.25	\$13.50

Chain Wrenches



The jaws of these chain wrenches hold solidly in place during the most severe work. The bolts are extra large and the shackles are drop-forged of chrome nickel steel.

Cable chain can be furnished but flat-link type will be sent unless otherwise specified.

No	Capacity Pipe, Ins.	Length Inches	Length of Chain, Ins.	Weight Pounds	List Price Each
10	$\frac{1}{8}$ to $\frac{3}{4}$	14	9 $\frac{1}{2}$	1 $\frac{3}{4}$	\$5.00
11	$\frac{1}{8}$ to 1 $\frac{1}{2}$	20	13 $\frac{1}{2}$	6	7.00
12	$\frac{1}{8}$ to 2 $\frac{1}{2}$	27	17 $\frac{1}{2}$	10	10.00
13	$\frac{3}{8}$ to 4	37	22 $\frac{1}{2}$	16 $\frac{1}{2}$	14.00
13 $\frac{1}{2}$	1 to 1	44	32	23	18.00
14	1 $\frac{1}{2}$ to 8	51	40 $\frac{1}{2}$	32	22.00
15	2 to 12	65	55 $\frac{1}{2}$	53	36.00
15 $\frac{1}{2}$	4 to 16	78	70	95	60.00
16	4 to 18	87	74 $\frac{1}{2}$	137	80.00

Saunders Type Pipe Cutters



This type of cutter is advantageous wherever working conditions allow revolving a cutter around the pipe. It has one cutter wheel and two hardened rollers which almost wholly eliminate burr formation.

It is well built to insure strength and efficiency being made of certified malleable iron with cutting wheel of special Alloy Tool Steel.

No.	Capacity Pipe, Ins.	Wt. Lbs.	List Price Pins	List Price Rollers	List Price Wheels	List Price Complete
1-S	$\frac{1}{8}$ to 1	3	\$0.10	\$0.24	\$0.24	\$3.00
2-S	1 to 2	6	.10	.32	.32	4.50
3-S	2 to 3	11 $\frac{1}{2}$	.15	.50	.60	11.00
4-S	2 $\frac{1}{2}$ to 4	15	.15	.50	.60	18.00
5-S	4 to 6	23	.15	.50	.60	28.00

Barnes Type Pipe Cutters

These high quality cutters have three cutting wheels and are well adapted to work wherein a cutter cannot be completely revolved around the pipe.



Cutter No.	Capacity Pipe, Ins.	Wt. Lbs.	List Price Pins Dozen	List Price Wheels Each	List Price Complete
1-B	$\frac{1}{8}$ to 1	3	\$1.00	\$.25	\$4.50
2-B	$\frac{1}{8}$ to 2	4	1.00	.30	6.00
3-B	1 $\frac{1}{2}$ to 3	8	1.00	.40	10.00
4-B	2 $\frac{1}{2}$ to 4	12	2.00	.50	20.00
5-B	4 to 6	20	2.00	.75	30.00

Parts for the above types of cutters are interchangeable with similar parts of other standard makes.

For Net Prices See Supplement

ARMSTRONG DROP FORGED WRENCHES

Engineers' Wrenches

For Nuts and Cap Screws. 15° Angle, Double Head



Armstrong drop forged wrenches are smoothly burnished, hardened and finished in black enamel; the heads are ground bright and plainly stamped to indicate the principal use for which the wrench is designed.

No.	For U. S. Std. Nuts; Size Bolts, Ins.	For Hex. Head Cap Screws; Diam. Screw, Ins.	For S.A.E. Std. Nut and Cap Screws; Size Bolts, Ins.	Openings Milled Inches	Weight Each Pounds	Extreme Length Inches	List Price Each
21-A	1/8	1/8		5/16	1/12	3 3/4	\$.34
21*	1/8	3/16		5/16	1/12	3 3/4	.34
22-A	1/8	1/8		5/16	1/12	4	.42
22	1/8	3/16		5/16	1/12	4	.42
23-A	1/8	1/8		5/16	1/12	4	.42
23-B		1/4		5/16	1/12	4	.42
23	3/16	1/4		5/16	1/12	4	.42
24-A	3/16	3/16		5/16	1/12	5	.50
24	3/16	1/4		5/16	1/12	5	.50
25-A		1/4	1/4	5/16	1/12	5	.50
25-B		3/8	3/8	5/16	1/12	5	.50
25-C	1/4	3/8	3/8	5/16	1/12	5	.50
25	1/4	3/8	3/8	5/16	1/12	5	.50
26-A	1/4	3/8		5/16	1/12	6	.62
26	1/4	3/8		5/16	1/12	6	.62
27-A		3/8	3/8	5/16	1/12	6	.62
27-B		3/8	3/8	5/16	1/12	6	.62
27	3/8	3/8	3/8	5/16	1/12	6	.62
28-A	3/8	3/8	3/8	5/16	1/12	7	.74
28	3/8	3/8	3/8	5/16	1/12	7	.74
29-A		3/8	3/8	5/16	1/12	7	.74
28-S		3/8	3/8	5/16	1/12	7	.74
29	3/8	3/8	3/8	5/16	1/12	7	.74
30-A		3/8	3/8	5/16	1/12	8	.90
30-B		3/8	3/8	5/16	1/12	8	.90
30	3/8	3/8	3/8	5/16	1/12	8	.90
31-A		3/8	3/8	5/16	1/12	8	.90
31-B		3/8	3/8	5/16	1/12	8	.90
31	3/8	3/8	3/8	5/16	1/12	8	.90
31-C		3/8	3/8	5/16	1/12	8	.90
32-A		3/8	3/8	5/16	1/12	8	.90
32	3/8	3/8	3/8	5/16	1/12	8	.90
32-B		3/8	3/8	5/16	1/12	9	1.10
32-B		3/8	3/8	5/16	1/12	9	1.10
33	1/2	3/8	3/8	5/16	1/12	9	1.10
33	1/2	3/8	3/8	5/16	1/12	9	1.10
33-A		3/8	3/8	5/16	1/12	9	1.10
33-C		3/8	3/8	5/16	1/12	9	1.10
34	1/2	3/8	3/8	5/16	1/12	9	1.10
34-A		3/8	3/8	5/16	1/12	10	1.36
35	1/2	3/8	3/8	5/16	1/12	10	1.36
35-A		3/8	3/8	5/16	1/12	10	1.36
36	3/8	3/4	3/4	5/16	1/12	11 1/2	1.92
36-A		3/4	3/4	5/16	1/12	11 1/2	1.92
37	3/8	3/4	3/4	5/16	1/12	11 1/2	1.92
37-A		3/4	3/4	5/16	1/12	11 1/2	1.92
37-S		3/4	3/4	5/16	1/12	11 1/2	1.92
38	3/8	3/8	3/4	5/16	1/12	11 1/2	1.92
39-A		1	1 1/4	5/16	1/12	13	2.80
39		1	1 1/4	5/16	1/12	13	2.80
39-B		1	1 1/4	5/16	1/12	13	2.80
40		1	1 1/4	5/16	1/12	13	2.80
41		1	1 1/4	5/16	1/12	15	3.80
42		1	1 1/4	5/16	1/12	15	3.80
43	1	1 1/8	1 1/4	5/16	1/12	17	5.30
44	1	1 1/8	1 1/4	5/16	1/12	17	5.30
45	1 1/8	1 1/4	1 1/4	5/16	1/12	19	7.20
46	1 1/8	1 1/4	1 1/4	5/16	1/12	19	7.20
47	1 1/4	1 1/4	1 1/2	5/16	1/12	21	10.50
48	1 1/4	1 1/4	1 1/2	5/16	1/12	21	10.50
49	1 1/8	1 1/4	1 1/2	5/16	1/12	23	14.00
50	1 1/8	1 1/4	1 1/2	5/16	1/12	23	14.00
51	1 1/2	1 1/4	1 1/2	5/16	1/12	25	18.00
52	1 1/2	1 1/4	1 1/2	5/16	1/12	25	19.80
53	1 1/2	1 1/4	1 1/2	5/16	1/12	27	22.00
53 1/2	1 1/2	1 1/4	1 1/2	5/16	1/12	27	24.00
54	1 1/2	1 1/4	1 1/2	5/16	1/12	27	26.00
55	1 3/4	2	2	5/16	1/12	31	28.50
55 1/2	1 3/4	2	2	5/16	1/12	31	31.00
56	1 3/4	2 1/4	2 1/4	5/16	1/12	31	34.00
56 1/2	1 3/4	2 1/4	2 1/4	5/16	1/12	34	40.00
57	2	2 1/4	2 1/4	5/16	1/12	32	42.00
57 1/2	2	2 1/4	2 1/4	5/16	1/12	40	47.00
57 1/2	2	2 1/4	2 1/4	5/16	1/12	37	56.00

ARMSTRONG VANADIUM WRENCHES



These wrenches are extremely long and light as compared to their capacity. The jaws are thin and narrow and can get at the nut that is placed in close quarters.

Their strength is not based upon bulk but upon excellence of design and material. They are drop forged from Chrome-Vanadium Steel, heat treated. They are finished in nickel over copper with heads buffed bright.

General Specifications

Number	For U. S. Std. Nuts; Size Bolts Inches	For Hex. Head Cap Screws; Diameter Screws Inches	For S. A. E. Std. Nuts and Cap Screws; Diam. Screws Inches	Openings Milled Inches	Extreme Length, Inches	Thickness Heads Inches	List Price Nickel Finished
1721	1/4	1/4		5/8	5 1/2	1 1/4	\$0.80
1021	1/4	1/4		5/8	5 1/2	1 1/4	.80
1722	1/4	1/4		5/8	5 1/2	1 1/4	.80
1723	1/4	1/4		5/8	5 1/2	1 1/4	.80
1022	1/4	1/4		5/8	5 1/2	1 1/4	.96
1023	1/4	1/4		5/8	5 1/2	1 1/4	.96
1723A	1/4	1/4		5/8	6	1 1/4	.96
1024	3/8	3/8		1 1/8	6 1/2	1 1/4	1.16
1725	3/8	3/8		1 1/8	6 1/2	1 1/4	1.16
1725A	3/8	3/8		1 1/8	6 1/2	1 1/4	1.16
1725B	3/8	3/8		1 1/8	6 1/2	1 1/4	1.16
1025	1/2	1/2		1 3/8	6 1/2	1 1/4	1.16
1726	1/2	1/2		1 3/8	7	1 1/4	1.40
1026	1/2	1/2		1 3/8	7	1 1/4	1.40
1727	1/2	1/2		1 3/8	7	1 1/4	1.40
1027	3/4	3/4		1 7/8	7	1 1/4	1.40
1027C	3/4	3/4		1 7/8	7	1 1/4	1.40
1728	3/4	3/4	1/2	1 7/8	8	1 1/4	1.74
1028	3/4	3/4	1/2	1 7/8	8	1 1/4	1.74
1028S	3/4	3/4	1/2	1 7/8	8	1 1/4	1.74
1729	3/4	3/4	1/2	1 7/8	8	1 1/4	1.74
1029	3/4	3/4	1/2	1 7/8	8	1 1/4	1.74
1030	3/4	3/4	1/2	1 7/8	8	1 1/4	1.74
1731	1	1	3/4	1 7/8	9	1 1/4	2.14
1731A	1	1	3/4	1 7/8	9	1 1/4	2.14
1031	1	1	3/4	1 7/8	9	1 1/4	2.14
1731B	1	1	3/4	1 7/8	9	1 1/4	2.14
1032	1 1/4	1 1/4	1	1 7/8	9	1 1/4	2.14
1033A	1 1/4	1 1/4	1	1 7/8	9	1 1/4	2.14
1033	1 1/4	1 1/4	1	1 7/8	9	1 1/4	2.14
1733	1 1/4	1 1/4	1	1 7/8	10	1 1/4	2.64
1033C	1 1/4	1 1/4	1	1 7/8	10	1 1/4	2.64
1034	1 1/2	1 1/2	1 1/4	1 7/8	10	1 1/4	2.64
1734	1 1/2	1 1/2	1 1/4	1 7/8	10	1 1/4	2.64
1035	1 1/2	1 1/2	1 1/4	1 7/8	10	1 1/4	2.64
1735	1 1/2	1 1/2	1 1/4	1 7/8	12	1 1/4	3.18
1036	1 1/2	1 1/2	1 1/4	1 7/8	12	1 1/4	3.18
1736	1 1/2	1 1/2	1 1/4	1 7/8	12	1 1/4	3.18
1037	1 1/2	1 1/2	1 1/4	1 7/8	12	1 1/4	3.18
1737	1 1/2	1 1/2	1 1/4	1 7/8	12	1 1/4	3.18

Hexagon Box Wrenches, 15° Angle, Single Head



No.	Size Bolt Inches	Short Diameter Opening Broached Inches	Extreme Length Inches	Outside Diameter of Head Inches	Weight Each Pounds	List Price Each
801	1/4	1/4	4	1 1/8	1/10	\$0.42
802	1/4	1/4	4 3/4	1 1/8	1/6	.50
803	1/4	1/4	5 1/2	1 1/8	1/4	.58
804	1/4	1/4	6 1/2	1 1/8	2/5	.70
805	1/4	1/4	7 3/4	1 1/8	2/5	.84
806	1/4	1/4	8	1 1/8	3/5	1.00
807	1/4	1/4	9 1/4	1 1/8	4/5	1.24
808	1/4	1/4	10 3/4	2 1/8	1 1/4	1.56
809	1/4	1/4	12	2 3/8	1 3/4	2.08
810	1 1/4	1 1/4	13 1/2	2 3/8	2 1/2	2.80
811	1 1/4	1 1/4	15	2 3/8	3	3.70
812	1 1/4	1 1/4	16 1/2	3 1/4	4	4.80
813	1 1/4	1 1/4	18	3 1/4	5	6.00
814	1 1/2	1 1/2	20	3 3/4	7	7.50

SQUARE BOX WRENCHES

No.	For Set-Screw Size Inches	Extreme Length Inches	Outside Diameter of Head Inches	Weight Each Pounds	List Price Each
108	1/4	3 1/4	1 1/8	1/10	\$0.34
109	1/4	3 3/4	1 1/8	1/6	.40
110	1/4	4	1 1/8	1/6	.48
111	1/4	4 1/4	1 1/8	1/4	.56
112	1/4	5 1/2	1 1/8	1/4	.68
113	1/4	6 3/4	1 1/8	1/4	.82
114	1/4	7	1 1/8	1/4	1.00
115	1/4	8	1 1/8	1/4	1.24
116	1/4	9	1 1/4	1	1.62
117	1	10	2	1 1/2	2.10
118	1 1/4	11	2 1/4	1 3/4	2.70

For Net Prices See Supplement

ARMSTRONG DROP FORGED WRENCHES



Engineers' Wrenches
For Nuts and Cap Screws
15° Angle, Single Head

Armstrong drop forged wrenches are smoothly burnished, hardened and finished in black enamel, the heads are ground bright and plainly stamped to indicate the principal use for which the wrench is designed.

No.	For U.S. Stand. Nut	For Hex. Head Cap Screw	For S.A.E. Std. Nut and Cap Screw	Opening Milled Inches	Extreme Length Inches	Weight Each, Pounds	List Price, Each
00	3/8	3/8	.....	5/16	3	3/16	\$.28
0-A	3/8	3/16	.....	3/8	3 1/2	1/12	.30
0	3/16	.....	.....	15/32	3 1/2	1/12	.30
1-A	1/4	1/4	1/4	7/16	4	1/8	.36
1	1/4	5/16	5/16	15/32	4	1/8	.36
2-A	5/16	3/8	3/8	9/16	5	1/4	.44
2	5/16	.....	.....	19/32	5	1/4	.44
3-A	3/8	7/16	7/16	5/8	6	1/2	.52
3	3/8	.....	.....	11/16	6	1/2	.52
4-A	1/2	1/2	1/2	3/4	7	1/2	.64
4	1/2	.....	.....	25/32	7	1/2	.64
5-A	5/8	9/16	9/16	13/16	8	2/3	.76
5	5/8	9/8	9/16	7/8	8	2/3	.76
6	9/16	.....	.....	31/32	9	2/3	.92
6-A	3/4	3/4	11/16	1	9	1	.92
7	5/8	.....	3/4	11/16	10	1 1/4	1.14
7-A	3/4	7/8	3/8	1 1/8	10	1 1/4	1.14
8	3/4	1	7/8	1 1/4	11 1/2	1 3/4	1.50
8-B	.....	1 1/8	.....	1 3/8	11 1/2	1 3/4	1.50
9	7/8	.....	1	1 7/16	13	2	2.30
9-A	.....	1 1/4	.....	1 1/2	13	2	2.30
10	1	1 3/8	1 1/8	1 5/8	15	4	3.20
11	1 1/8	.....	1 1/4	1 13/16	17	5	4.20
12	1 1/4	.....	1 3/8	2	19	7	5.70
13	1 3/8	.....	1 1/2	2 3/16	21	9	7.30
14	1 1/2	.....	.....	2 3/8	23	11	9.20
15	1 5/8	.....	.....	2 9/16	25	12 1/2	11.20
16	1 3/4	.....	.....	2 3/4	27	17	13.40
16 1/2	1 7/8	.....	.....	2 15/16	27	17	13.40
17	2	.....	.....	3 1/8	30	20	20.50
18	2 1/4	.....	.....	3 1/4	33	30	29.50
19	2 1/2	.....	.....	3 7/8	37	38	42.00
19 1/2	2 3/4	.....	.....	4 1/4	37	38	42.00
20	3	.....	.....	4 5/8	42	54	62.00
20 1/2	3 1/4	.....	.....	5	42	54	62.00

Car Wrenches
22 1/2° Angle, Double Head
Long Leverage



No.	Size Bolts Inches	Openings Inches	Extreme Length Inches	Weight Each Pounds	List Price Each
367	3/8 & 1/2	23/32 & 29/32	12	1 1/2	\$ 1.50
370	1/2 & 5/8	29/32 & 17/64	19	3	2.50
371	1/2 & 3/4	29/32 & 119/64	19	3	3.10
372	1/2 & 7/8	29/32 & 11 1/2	20	3 1/2	3.10
373	5/8 & 3/4	17/64 & 119/64	20	3 1/2	3.10
374	5/8 & 3/8	17/64 & 1 1/2	21	4	3.70
375	5/8 & 1	17/64 & 111/16	21	4	3.70
376	3/4 & 7/8	119/64 & 1 1/2	21	4	3.70
377	3/4 & 1	119/64 & 1 11/16	22	5	4.50
378	3/4 & 1 1/8	119/64 & 1 7/8	22	5	4.50
379	3/4 & 1	1 1/2 & 111/16	22	5	4.50
380	7/8 & 1 1/8	1 1/2 & 1 7/8	23	5 3/4	5.30
381	7/8 & 1 1/4	1 1/2 & 2 1/16	23	5 3/4	5.30
382	1 & 1 1/8	1 11/16 & 1 7/8	23	5 3/4	5.30
383	1 & 1 1/4	1 11/16 & 2 1/16	24	6 3/4	6.30
385	1 1/4 & 1 1/2	1 7/8 & 2 1/16	24	6 3/4	6.30
387	1 1/8 & 1 1/2	1 7/8 & 2 1/16	25	9	9.00
389	1 1/4 & 1 1/2	2 1/16 & 2 7/16	25	9	9.00

Car Wrenches are milled and hardened all over but heads are not ground bright. Unfinished (not hardened) car wrenches can be furnished, when specified, at current prices.

For Net Prices See Supplement

ARMSTRONG DROP FORGED WRENCHES



22½° Angle, Double Head
For USS and SAE Standard Nuts and Cap Screws

Heavy "S" Wrenches

No.	For U. S. Std. Nuts, Size Bolts Inches	For Hex. Head Cap Screws: Inches	For S. A. E. Std. Nuts & Cap Screws: Inches	Openings Milled Inches	Ex-treme Length Inches	Wt. Each Lbs.	Price Each
661-D	1/4	3/8	3/8	3/8	4	1.6	\$0.44
661-A	1/4	3/8	3/8	3/8	4	1.6	.44
661-E	1/4	3/8	3/8	3/8	4	1.6	.44
661-B	3/8	1/2	1/2	1/2	4	1.6	.44
661-F	3/8	1/2	1/2	1/2	4	1.6	.44
661-G	3/8	1/2	1/2	1/2	4	1.6	.44
661-C	1/2	3/4	3/4	3/4	4	1.6	.44
662-A	1/2	3/4	3/4	3/4	5	1.8	.58
662-D	1/2	3/4	3/4	3/4	5	1.8	.58
662-E	1/2	3/4	3/4	3/4	5	1.8	.58
662-F	1/2	3/4	3/4	3/4	5	1.8	.58
662-B	3/4	1	1	1	5	1.8	.58
662-G	3/4	1	1	1	5	1.8	.58
662-C	1	1 1/4	1 1/4	1 1/4	5	1.8	.58
663-D	1 1/4	1 3/4	1 3/4	1 3/4	6	2.1	.78
663-E	1 1/4	1 3/4	1 3/4	1 3/4	6	2.1	.78
663-A	1 3/8	1 7/8	1 7/8	1 7/8	6	2.1	.78
663-B	1 3/8	1 7/8	1 7/8	1 7/8	6	2.1	.78
663-F	1 3/8	1 7/8	1 7/8	1 7/8	6	2.1	.78
663-G	1 3/8	1 7/8	1 7/8	1 7/8	6	2.1	.78
663-C	1 1/2	2	2	2	6	2.1	.78
664-A	1 1/2	2	2	2	7	2.4	1.06
664-D	1 1/2	2	2	2	7	2.4	1.06
664-E	1 1/2	2	2	2	7	2.4	1.06
664-B	1 3/4	2 1/4	2 1/4	2 1/4	7	2.4	1.06
664-C	1 3/4	2 1/4	2 1/4	2 1/4	7	2.4	1.06
664-F	1 3/4	2 1/4	2 1/4	2 1/4	7	2.4	1.06
665-D	1 3/4	2 1/4	2 1/4	2 1/4	9	2.7	1.44
665-A	1 7/8	2 3/8	2 3/8	2 3/8	9	2.7	1.44
665-E	1 7/8	2 3/8	2 3/8	2 3/8	9	2.7	1.44
665-B	1 7/8	2 3/8	2 3/8	2 3/8	9	2.7	1.44
665-F	1 7/8	2 3/8	2 3/8	2 3/8	9	2.7	1.44
665-C	2	2 1/2	2 1/2	2 1/2	9	2.7	1.44
665-G	2	2 1/2	2 1/2	2 1/2	9	2.7	1.44
666-A	2 1/4	3	3	3	10	3.0	2.00
666-D	2 1/4	3	3	3	10	3.0	2.00
666-B	2 3/8	3 1/8	3 1/8	3 1/8	10	3.0	2.00
666-C	2 3/8	3 1/8	3 1/8	3 1/8	10	3.0	2.00
666-E	2 3/8	3 1/8	3 1/8	3 1/8	10	3.0	2.00
666-F	2 3/8	3 1/8	3 1/8	3 1/8	10	3.0	2.00
667-D	2 3/4	3 1/2	3 1/2	3 1/2	12	3.6	2.90
667-A	2 3/4	3 1/2	3 1/2	3 1/2	12	3.6	2.90
667-E	2 3/4	3 1/2	3 1/2	3 1/2	12	3.6	2.90
667-B	2 3/4	3 1/2	3 1/2	3 1/2	12	3.6	2.90
667-F	2 3/4	3 1/2	3 1/2	3 1/2	12	3.6	2.90
667-C	3	3 3/4	3 3/4	3 3/4	12	3.6	2.90
668-A	3 1/4	4	4	4	14	4.2	5.00
668-B	3 1/4	4	4	4	14	4.2	5.00
668-C	3 1/2	4 1/4	4 1/4	4 1/4	14	4.2	5.00

Light "S" Wrenches

475-B	1/4	3/8	3/8	3/8	6 1/4	1.6	\$0.54
475-A	1/4	3/8	3/8	3/8	6 1/4	1.6	.54
475	1/4	3/8	3/8	3/8	6 1/4	1.6	.54
477-A	3/8	1/2	1/2	1/2	7 1/8	1.8	.68
477-B	3/8	1/2	1/2	1/2	7 1/8	1.8	.68
477-C	3/8	1/2	1/2	1/2	7 1/8	1.8	.68
477-D	3/8	1/2	1/2	1/2	7 1/8	1.8	.68
477	3/8	1/2	1/2	1/2	7 1/8	1.8	.68
479-A	1/2	3/4	3/4	3/4	8 1/4	2.0	.86
479-B	1/2	3/4	3/4	3/4	8 1/4	2.0	.86
479-C	1/2	3/4	3/4	3/4	8 1/4	2.0	.86
479-D	1/2	3/4	3/4	3/4	8 1/4	2.0	.86
479-E	1/2	3/4	3/4	3/4	8 1/4	2.0	.86
479	1/2	3/4	3/4	3/4	8 1/4	2.0	.86
481-C	3/4	1	1	1	9 1/4	2.2	1.10
481	3/4	1	1	1	9 1/4	2.2	1.10
481-B	3/4	1	1	1	9 1/4	2.2	1.10
481-A	3/4	1	1	1	9 1/4	2.2	1.10
483-C	7/8	1 1/4	1 1/4	1 1/4	10 3/8	2.4	1.40
483	7/8	1 1/4	1 1/4	1 1/4	10 3/8	2.4	1.40
481-B	1 1/2	2	2	2	11 3/8	2.6	1.40
483-A	1 1/2	2	2	2	11 3/8	2.6	1.40
485-D	1 3/4	2 1/4	2 1/4	2 1/4	12	2.8	2.00
485	1 3/4	2 1/4	2 1/4	2 1/4	12	2.8	2.00
487-A	2	2 3/4	2 3/4	2 3/4	12	2.8	2.00
487-C	2	2 3/4	2 3/4	2 3/4	12	2.8	2.00
487-B	2	2 3/4	2 3/4	2 3/4	12	2.8	2.00

For Net Prices See Supplement

LOWELL REVERSIBLE RATCHET WRENCHES

Standard Type



An improved type of Reversible Ratchet Wrench of the strongest possible construction. The reversing mechanism is operated from the end of the handle, and only a one-half turn of the knurled piece is necessary to reverse the action from right hand to left hand, or vice versa.

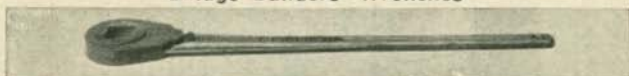
This safety construction keeps the operator's hand away from any moving parts of machinery to which the wrench may be applied. Excellent for operating vises and hand-feed screws on machine shop equipment.

Gears with various openings for square or hexagon heads and nuts are interchangeable. One gear with any standard square or hexagon opening furnished with each ratchet.

General Specifications

Size No.	Length of Handle Inches	Standard Sizes of Gears—Size of Opening Inches		List Price Extra Gears Each	List Price Ratchet with One Gear
		Square	Hexagon		
0	7	$\frac{3}{8}$, $\frac{3}{8}$, $\frac{1}{2}$	$\frac{1}{2}$, $1\frac{1}{8}$	\$1.00	\$ 5.00
1	10	$\frac{3}{8}$ -taper, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$	$\frac{1}{2}$, $1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{3}{8}$	1.00	6.00
2	12	$\frac{1}{2}$, $\frac{3}{8}$, $1\frac{1}{8}$, $\frac{3}{4}$	$\frac{1}{2}$, $1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{3}{8}$, $1\frac{1}{2}$	1.25	7.00
3	15	$\frac{3}{8}$, $1\frac{1}{8}$, $\frac{3}{4}$, $1\frac{1}{4}$, $\frac{3}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$	$\frac{1}{2}$, $1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{3}{8}$, $1\frac{1}{2}$, $1\frac{3}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$	1.50	9.00
3½	18	$\frac{3}{8}$, $1\frac{1}{8}$, $\frac{3}{4}$, $1\frac{1}{4}$, $\frac{3}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$	$\frac{1}{2}$, $1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{3}{8}$, $1\frac{1}{2}$, $1\frac{3}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$	1.50	10.00
4	18	$1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{3}{8}$, $1\frac{1}{2}$, $1\frac{3}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$	$1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{3}{8}$, $1\frac{1}{2}$, $1\frac{3}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$	2.00	12.00
4½	24	$1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{3}{8}$, $1\frac{1}{2}$, $1\frac{3}{4}$	$1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{3}{8}$, $1\frac{1}{2}$, $1\frac{3}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$	2.00	14.00

Bridge Builders' Wrenches



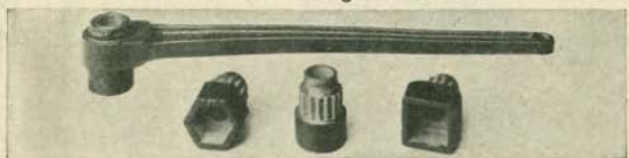
These are long handled, substantial ratchet wrenches of large capacity, especially suitable for bridge and structural work. Action is reversed by means of the lever pawl near the head of the wrench.

Each wrench furnished with one gear having any standard square or hexagon opening.

General Specifications

Size No.	Length of Handle Feet	Approx. Weight Lbs.	Standard Sizes of Gears Size of Openings, Inches		List Price Extra Gears Each	List Price Ratchet with One Gear
			Square	Hexagon		
1	3	11	$1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{3}{8}$, $1\frac{1}{2}$	$1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{3}{8}$, $1\frac{1}{2}$	\$2.00	\$14.00
2	3	14	$1\frac{1}{4}$, $1\frac{3}{8}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2	$1\frac{1}{8}$, $1\frac{1}{4}$, 2, $2\frac{1}{8}$, $2\frac{1}{4}$	4.00	16.00
3	3	23	2, $2\frac{1}{4}$, $2\frac{3}{8}$, $2\frac{1}{2}$	$2\frac{1}{8}$, $2\frac{1}{4}$, $2\frac{3}{8}$, $2\frac{1}{2}$, $2\frac{3}{4}$, $3\frac{1}{8}$	6.00	24.00

Steel Socket Bridge Wrenches



A series of rugged ratchet wrenches with steel sockets—for extra heavy service. Will handle a range of nuts from $\frac{3}{8}$ to $3\frac{1}{4}$ " bolt size, or $1\frac{1}{8}$ to 5" across the flat sides.

Nuts may be turned on or off without removing the wrench. Action is reversed by means of the lever pawl near the head of the wrench.

Each wrench furnished with one steel socket having any standard square or hexagon opening.

General Specifications

Size No.	Length of Handle Feet	Approx. Weight Lbs.	Standard Sizes of Sockets Square or Hexagon Size of Opening, Inches		List Price Extra Sockets Each	List Price Ratchet with One Socket
			Square	Hexagon		
1	2	10	$1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{3}{8}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2	$1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{3}{8}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2	\$ 3.00	\$10.00
1½	3	12	$1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{3}{8}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2	$1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{3}{8}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2	3.00	14.00
2	3	23	2, $2\frac{1}{8}$, $2\frac{1}{4}$, $2\frac{3}{8}$, $2\frac{1}{2}$, $2\frac{3}{4}$, 3	2, $2\frac{1}{8}$, $2\frac{1}{4}$, $2\frac{3}{8}$, $2\frac{1}{2}$, $2\frac{3}{4}$, 3	6.00	20.00
2½	4	26	2, $2\frac{1}{8}$, $2\frac{1}{4}$, $2\frac{3}{8}$, $2\frac{1}{2}$, $2\frac{3}{4}$, 3	2, $2\frac{1}{8}$, $2\frac{1}{4}$, $2\frac{3}{8}$, $2\frac{1}{2}$, $2\frac{3}{4}$, 3	6.00	24.00
3	3	50	$3\frac{1}{8}$, $3\frac{1}{4}$, $3\frac{3}{8}$, $4\frac{1}{4}$, $4\frac{3}{8}$, 5	$3\frac{1}{8}$, $3\frac{1}{4}$, $3\frac{3}{8}$, $4\frac{1}{4}$, $4\frac{3}{8}$, 5	12.00	40.00
3½	4	54	$3\frac{1}{8}$, $3\frac{1}{4}$, $3\frac{3}{8}$, $4\frac{1}{4}$, $4\frac{3}{8}$, 5	$3\frac{1}{8}$, $3\frac{1}{4}$, $3\frac{3}{8}$, $4\frac{1}{4}$, $4\frac{3}{8}$, 5	12.00	45.00

In ordering ratchets, be sure to state size of gear or socket wanted and whether hexagon or square.

For Net Prices See Supplement

ARMSTRONG BROS. PIPE VISES

Standard Vises

These vises are automatic locking and combine convenient weight with strength and quick action. The pipe jaws are made of carefully milled, hardened, and tested tool steel. The hooks are drop forged of steel and the frame and base are made of malleable iron, finished in black enamel.



Standard

No.	Holds Pipe Inches	Weight Pounds	List Price
7000	1/8 to 1 1/4	3	\$ 2.50
700	1/8 to 1 1/2	5	3.60
70	1/8 to 2	7 1/2	4.25
71	1/8 to 2 1/2	10	5.00
72	1/8 to 3 1/2	16	7.50
73	1/8 to 4 1/2	25	11.00
74	1/8 to 6	49	23.50

Heavy Duty Vises

Armstrong Heavy Duty Pipe Vises are particularly designed for work requiring exceptional strength and rigidity. The base and frame are made of certified malleable iron; the jaws are made of heat treated tool steel.



Heavy Duty

No.	Holds Pipe Inches	Weight Pounds	List Price Complete
21	1/8 to 2 1/4	16	\$ 8.00
22	1/8 to 3 1/2	29	14.00
23	1/4 to 5	42	20.00
24	1/2 to 7	76	35.00

Open Side Vises

Within the range of their adaptability these pipe vises have all the desirable features of Armstrong quality, combining strength, quick action, convenience of operation and solid gripping power. The construction is similar to the other pipe vises shown above.



Open Side

No.	Holds Pipe Inches	Weight Pounds	List Price
10	1/8 to 2	12 3/4	\$6.00

Chain Pipe Vise

This strong portable vise is easily attached to a post or bench, and its solid one piece construction gives full support between the jaws for holding small pipe sizes. The jaws of number 1-C and 2-C are drop forged.

Screws will be sent with chains, unless "chain only" is specified.

No.	Holds Pipe Inches	Weight Pounds	List Price
1-C	1/8 to 2	4 1/2	\$7.00
2-C	1/4 to 4	12 1/2	15.00
3-C	1/4 to 6	18	27.00
4-C	1/4 to 8	30	36.00



Chain

YOST PIPE VISES

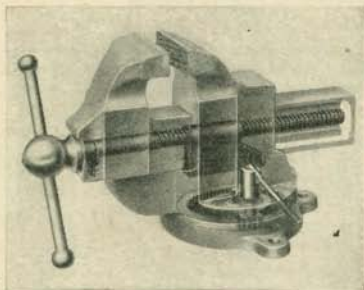
These self-locking vises are compact and substantial and will give satisfactory service under severe and exacting conditions. The frame and base are made of malleable iron; the handle and screw are steel, while the pipe jaws are drop forgings made from a selected quality of steel, milled, hardened in oil, and polished.



Standard

Capacity Pipe, Ins.	Standard Series			Heavy Series		
	No.	Wt. Lbs.	List Price	No.	Wt. Lbs.	List Price
1/8-2 1/4	51	12	\$ 5.00	61	13	\$6.00
1/8-3 1/2	52	17	7.50	62	20	9.00
1/8-4 1/2	53	26	11.00	63	30	12.50
1/8-6	..	..	.....	64	49	23.50
1 to 8	..	..	.....	65	81	47.50
1 1/2 to 12	..	..	.....	66	163	70.00

ATHOL VISES



Phantom View

No detail in material, workmanship, or skill has been overlooked or omitted in the manufacture of this line of vises. The castings are made under chemical control of special selected grade semi-steel embodying high tensile and compressive strength combined with the desired elasticity. The screws are made of steel and have exceptionally strong buttress threads. The nut is made from malleable iron, is removable and can be easily replaced when necessary. The patented swivel base—on the swivel base vises—is made with a corrugated runway and clamp bolt head which gives it a positive lock in any position in the full swing of the circle.

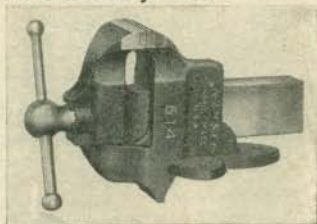
Jaw facings are made from special selected tool steel and welded to the face of the jaws in the combination vises the pipe grips are made of selected tool steel, machined from the solid bar, hardened and tempered, and can easily be replaced when necessary.

The pipe grips do not project beyond the face of the vise jaws. This design increases the usefulness, making possible the holding of flat work to the full width and depth of the vise.

Machinist's Vise With Stationary Base

General Specifications

No.	Width Jaws, Inches	Jaws Open, Inches	Weight, Pounds	List Price
612 1/2	2 1/2	3 1/2	12 1/2	\$ 9.00
613	3	4 1/4	22	10.00
613 1/2	3 1/2	5	29	11.25
614	4	6	44	12.75
614 1/2	4 1/2	6 1/2	62	15.50
615	5	7 1/2	80	20.00
615 1/2	5 1/2	8 3/4	105	30.00
616	6	10	146	39.00
617	7	12 1/2	203	55.00
618	8	12 1/2	260	75.00



Stationary Base

Machinist's Vise With Swivel Base

General Specifications



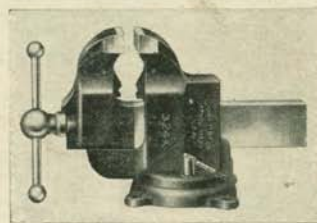
Swivel Base

No.	Width Jaws, Inches	Jaws Open, Inches	Weight, Pounds	List Price
622 1/4	2 1/4	2	7	\$ 9.00
622 1/2	2 1/2	3 1/4	16	12.00
623	3	4 1/4	27	13.00
623 1/2	3 1/2	5	34	15.00
624	4	6	54	17.00
624 1/2	4 1/2	6 1/2	65	20.00
625	5	7 1/2	91	30.00
625 1/2	5 1/2	8 3/4	120	38.00
626	6	10	173	52.00
627	7	12 1/2	240	70.00
628	8	12 1/2	300	98.00

Combination Pipe Vise

The jaws of this combination vise are made heavier than the regular machinist's vise to withstand the strain of the pipe work.

A feature of special merit on these vises is the double type pipe jaws which do not project beyond the regular jaws. The usual range of pipe can be handled and yet it is also possible to grip wide work in the regular jaws, permitting it to drop to the beam, which cannot be accomplished in other makes.



With Pipe Grips

General Specifications

No.	Jaws Open, Inches	Width of Jaws, Inches	Size Pipe, Inches	Weight, Pounds	List Price
323 1/2 X	4 3/4	3 1/2	1/4-2 1/2	40	\$16.00
324 X	5 1/2	4	1/4-3	59	18.00
324 1/2 X	5 3/4	4 1/2	1/4-3 1/2	83	22.00
325 1/2 X	8 1/2	5 1/2	1/4-5	135	38.50

For Net Prices See Supplement

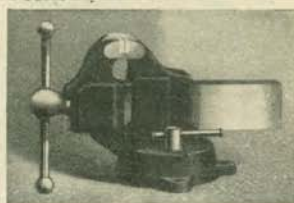
YOST VISES

Machinist's Vises

Yost Machine Vises are made heavy, being solid and cast of semi-steel: the jaw steels are cast solid with the vise jaws to give durability and service.



Stationary Base

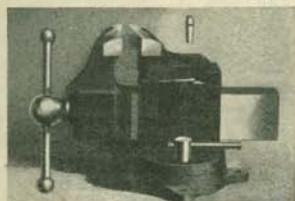


Swivel Base

Sta. Base Vise No.	Wdth. Jaw Ins.	Opens Ins.	Wt. Lbs.	List Price
102	2	3	10	\$ 8.25
102 1/2	2 1/2	3 1/2	14	9.00
103	3	4	23	10.00
103 1/2	3 1/2	5	30	11.25
104	4	6	43	12.75
104 1/2	4 1/2	6 1/2	57	15.50
105	5	7 1/2	72	20.00
105 1/2	5 1/2	9	102	30.00
106	6	10	130	39.00
107	7	12	183	55.00
108	8	13	250	75.00

Swivel Vise No.	Wdth. Jaw Ins.	Opens Ins.	Wt. Lbs.	List Price
202	2	3	15	\$10.50
202 1/2	2 1/2	3 1/2	18	12.00
203	3	4	28	13.00
203 1/2	3 1/2	5	37	15.00
204	4	6	50	17.00
204 1/2	4 1/2	6 1/2	66	20.00
205	5	7 1/2	88	30.00
205 1/2	5 1/2	9	118	38.00
206	6	10	148	52.00
207	7	12	210	70.00
208	8	13	280	98.00

Special Vises



Adjustable Jaw Swivel Base Vise



Universal Double Swivel Vise

Vise No.	Wdth. Jaw Ins.	Opens Ins.	Wt. Lbs.	List Price
42	3	4	34	\$17.50
43	3 1/2	5	44	20.00
44	4	6	56	24.00
45	4 1/2	6 1/2	72	28.00
46	5	7 1/2	97	35.00
47	5 1/2	9	135	44.00
48	6	10	165	60.00
49	7	12	220	75.00

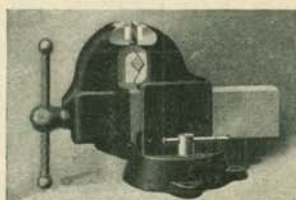
No.	Wdth. Jaw Ins.	Opens Ins.	Wt. Lbs.	List Price
D	3	4	27	\$23.00
E	3 1/2	5	42	27.00
F	4	6	64	32.00
G	4 1/2	7	94	39.00
H	5	8	120	49.00
I	6	10	178	70.00

Combination Pipe Vise

The pipe jaws in this vise are drop forged and made of a selected quality steel. The front pipe jaw is reversible to give double wear.

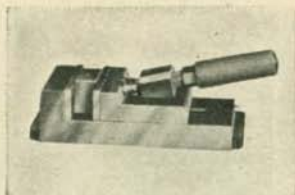
Vise No.	Wdth. Jaw Ins.	Size Pipe Holds Ins.	Wt. Lbs.	List Price
31	3 1/2	1/8 to 2 1/2	50	\$16.00
32	4 1/2	1/8 to 3 1/2	70	22.00
33	5	1/8 to 4 1/2	115	32.00
34	6	1/4 to 6	175	45.00

Yost Double Swivel combination Pipe Vises adjustable to any position can also be supplied with either 4" or 4 1/2" jaws. Prices and further information on request.

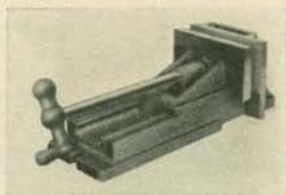


For Net Prices See Supplement

ARMSTRONG QUICK ACTION DRILL VISES



Quick Action



Marvel

The Armstrong Quick Action Drill Vise is very handy for tool-makers and general machine shop use. One turn of the handle sets or releases the vise. The sides are ground true at right angles with the bottom, projecting lugs on the bottom of the vise at either end facilitate clamping it to the machine when desirable.

The Marvel Drill press vise has deep, liberal jaws. The movable jaw is clamped by a half turn of the ball handle. Machined on all sides and can be used on the side when desired. There is a clamping strip around the entire edge, also an elongated slot in the solid jaw for clamping the vise itself, or clamping bushing holders for jig work, etc. Made in two sizes as shown in the table below.

General Specifications

Size No.	Width of Jaw Inches	Depth of Jaw Inches	Opens Inches	Weight Each Pounds	List Price
1-V Armstrong	2	$1\frac{1}{16}$	$1\frac{3}{4}$	$4\frac{1}{2}$	\$13.50
2-V Armstrong	$2\frac{3}{4}$	$1\frac{3}{16}$	$2\frac{1}{2}$	$8\frac{1}{2}$	18.00
3-V Armstrong	$3\frac{1}{2}$	$1\frac{1}{16}$	3	16	24.00
40 Marvel	$5\frac{5}{8}$	$2\frac{1}{2}$	5	28	20.00
41 Marvel	7	4	8	56	27.00

V BLOCKS AND PARALLEL STRIPS



The V Block is extremely handy when working on round pieces. It is built especially for use in the Marvel vises in two sizes $2\frac{1}{2} \times 5\frac{5}{8}$ " to fit the No. 40 and 4×7 " to fit the No. 41.

The steel parallel strips come in sets of 5 pairs $5\frac{5}{8}$ " long for the No. 40 Marvel vise and 7 pairs 7" long for the No. 41. They are arranged for building up any height varying by $\frac{1}{16}$ ths from $\frac{1}{4}$ " up to the height of the jaw.



SHAPER AND PLANER CHUCKS OR VISES



Round Base Type

Designed especially for use on shapers but it gives good service on planers and milling machines. The round base is accurately graduated for holding straight or taper work. There is a $1\frac{1}{4}$ " rib cast on the bottom to fit the planer table.

Square Base Type

A very heavy, strong chuck assuring rigidity. This chuck may be used on planers, milling machines, shapers or drill presses for holding straight or taper work.



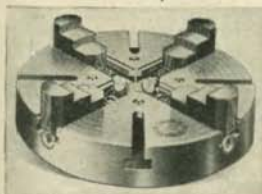
General Specifications

Size Inches	Length of Jaw Inches	Depth of Jaw Inches	Jaws Will Open Inches	Space Required Inches		List Price	
				Round Base	Square Base	Round Base	Square Base
6	7	$1\frac{1}{4}$	$3\frac{1}{2}$	10	$7\frac{1}{4} \times 11$	\$ 48.00	\$ 37.00
8	9	$1\frac{3}{8}$	5	$12\frac{1}{2}$	$9 \times 12\frac{1}{2}$	61.00	43.00
10	11	$2\frac{3}{8}$	6	$14\frac{1}{2}$	11×15	76.00	51.00
12	13	$2\frac{3}{8}$	8	$16\frac{3}{4}$	13×17	93.00	64.00
15	$15\frac{1}{2}$	$2\frac{1}{2}$	$9\frac{1}{2}$	20	$15\frac{1}{2} \times 21$	120.00	87.00
18	$18\frac{1}{2}$	$2\frac{3}{4}$	$11\frac{1}{4}$	23	$18\frac{1}{2} \times 24$	155.00	110.00
24	$24\frac{3}{4}$	$2\frac{3}{4}$	16	27	$24\frac{3}{4} \times 28$	220.00	160.00
30	$30\frac{1}{4}$	$2\frac{3}{4}$	$21\frac{1}{2}$	34	$30\frac{1}{4} \times 34$	320.00	270.00

For Net Prices See Supplement

LATHE CHUCKS

Improved 4-Jaw Independent Chucks



In the Independent Chucks, each jaw is moved to or from the center separately, and only one jaw can be moved at a time. These chucks are furnished with all steel construction or with iron body as preferred.

The iron body chucks are of an improved design, with socket screws which provide a longer bearing of the screws in the jaws. Hardened and ground steel thrust bearings take the thrust of the screws. In the 12" size and larger, the jaws slide on a double bearing rib, adding strength and insuring longer life.

The all steel chucks have a cast steel body of high tensile strength. Extra width jaws and enlarged screws provide more than the usual bearing, and increase the strength of the chucks.

The all steel chucks are recommended for heavy service, on production work, or in any place where the requirements demand something better and stronger than an iron body chuck.

In both styles, the jaws are made of high grade steel, heat treated, and with raised and ground steps. They may be reversed by running them outward off of the screws and turning them end for end.

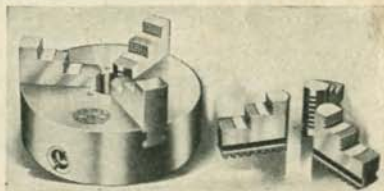
Equipment includes a T-handle steel wrench of suitable size, and a set of four bolts for attaching the chuck to a chuck-plate. Rough chuck-plate castings furnished at additional charge.

General Specifications

Nominal Size Inches	Iron Body		All Steel		Nominal Size Inches	Iron Body		All Steel	
	Wt. Lbs.	List Price	Wt. Lbs.	List Price		Wt. Lbs.	List Price	Wt. Lbs.	List Price
4	8	\$ 27.00	.....	.....	24	288	\$139.00	284	\$204.00
5	10	29.00	.....	.....	26	319	156.00	340	233.00
6	16	32.00	21	\$ 53.00	28	354	177.00	360	277.00
8	36	37.00	36	61.00	30	442	220.00	470	324.00
9	40	40.00	45	67.00	32	518	253.00	515	387.00
10	47	47.00	60	72.00	34	560	280.00	590	433.00
12	93	56.00	75	91.00	36	575	320.00	610	493.00
14	115	61.00	89	104.00	38	1,089	375.00	.....	.....
15	123	67.00	95	112.00	40	1,175	420.00	.....	.....
16	128	72.00	140	117.00	42	1,203	505.00	.....	700.00
18	184	93.00	170	141.00	44	1,250	560.00	.....	.....
20	208	107.00	218	163.00	46	1,500	640.00	.....	.....
21	242	117.00	.....	.....	48	1,600	675.00	.....	.....
22	255	124.00	229	181.00	.....	.....	.....	.....	.....

3-Jaw Universal Geared Scroll Chucks

In the Universal Chucks, all jaws move simultaneously toward or from the center, by application of the wrench to any one of the pinions. The jaws have a common center at all times, and one jaw cannot be operated independently of the others. Movement of the jaws is secured through a scroll-threaded disc or plate, which is revolved by the pinion gears, to any one of which the wrench may be applied. These chucks are furnished either in All Steel construction or with Iron Body, as preferred.



The Iron Body Chucks are solidly and substantially built, with a one-piece shell. The All Steel Chucks are of similar design, but have a solid one-piece cast steel body, and are recommended for the heaviest work.

In both styles, the jaws are made of high grade steel, heat treated and with raised and ground steps. Each chuck is regularly furnished with two sets of jaws—one set of Common Jaws, Style No. 1, with steps running up toward the outside, and one set of Reverse Jaws, Style No. 2, with steps running up toward the center. These jaws are not reversible, end for end.

Allowance will be made if only one set of jaws is wanted in which case specify whether they should be Common Jaws, Style No. 1, or Reverse Jaws, Style No. 2.

All sizes of both Iron Body and All Steel Chucks can be supplied with four jaws instead of three, at a slightly higher price. Four-Jaw Chucks furnished with two sets of jaws, or only one set of either style, as preferred.

Both iron and steel body chucks can be furnished with Reversible Jaws, in either 3-Jaw or 4-Jaw type, at a price slightly below the price with two sets of jaws.

Unless otherwise specified, Universal Chucks will be supplied in the 3-Jaw Type, with two sets of jaws.

General Specifications

Nominal Size Inches	Wt. Lbs.	Iron Body List Price	All Steel List Price	Nominal Size Inches	Wt. Lbs.	Iron Body List Price	All Steel List Price
2½	2	\$26.00	\$35.00	10½	72	\$ 64.00	\$ 93.00
3	4	29.00	40.00	12	104	75.00	112.00
4	10	33.00	44.00	15	170	107.00	149.00
5	15	36.00	49.00	18	240	140.00	200.00
6	23	41.00	59.00	21	329	200.00	267.00
7½	34	48.00	69.00	24	.....	267.00	347.00
9	60	57.00	85.00	.....	.....	.....	.....

For Net Prices See Supplement

COMBINATION GEARED SCROLL CHUCKS



In the Combination Chucks the jaws can be operated together as in a Universal Chuck, or they can be operated singly as in an Independent Chuck.

The jaws can be set as desired for holding round, elliptical or irregular work, either centered or in an eccentric position. Combination Chucks, therefore, are suitable for a very wide variety of work, and will frequently save the necessity of having separate Independent and Universal Chucks.

The jaws are of the reversible type. They may be reversed by running them to the periphery and then turning them end for end.

These chucks are furnished either in all steel construction or with iron body, as preferred. All sizes of both styles can be supplied either with three jaws or with four jaws, as may be needed. In ordering, be sure to specify whether three-jaw or four-jaw chuck is wanted.

General Specifications

Nominal Size Inches	Weight Lbs.	Iron Body List Prices		All Steel List Prices	
		3-Jaw Type	4-Jaw Type	3-Jaw Type	4-Jaw Type
4	12	\$53.00	\$60.00		
5	20	59.00	65.00		
6	29	67.00	75.00		
7½	40	80.00	91.00		
9	64	88.00	99.00	\$120.00	\$133.00
10½	89	99.00	109.00	133.00	147.00
12	120	112.00	125.00	153.00	173.00
15	200	141.00	160.00	187.00	213.00
18	305	187.00	213.00	253.00	287.00
21	403	240.00	267.00	320.00	360.00
24	500	298.00	333.00	400.00	460.00

REVERSIBLE FACE PLATE JAWS

Strong, serviceable jaws furnished either in all steel construction or with iron body, as preferred. Intended for attaching directly to the face plates of large lathes, for holding large, heavy work.

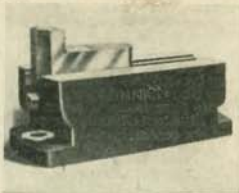
The iron body type will be found entirely satisfactory under all ordinary conditions of manufacturing. For work which is unusually severe we recommend the all steel type.

In both types the adjustable holding jaw is made of steel and is reversible. The screw, likewise, is made of steel in both types.

Furnished in sets of three or four jaws, each set with a wrench and suitable bolts for attaching.

General Specifications

Nominal Size Ina.	Weight Per Jaw Lbs.	Iron Body List Prices		All Steel List Prices	
		Per Set of Three	Per Set of Four	Per Set of Three	Per Set of Four
6	30	\$64.00	\$80.00	\$90.00	\$112.00
8	38	77.00	96.00	112.00	139.00
10	51	103.00	128.00	150.00	187.00
12	79	128.00	160.00	182.00	227.00
14	82	172.00	214.00	256.00	320.00



EXTRA HEAVY STYLE FACE PLATE JAWS

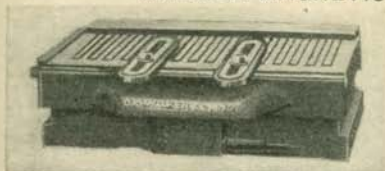
These are extra heavy jaws, made only in the iron body type, with steel adjustable holding jaw and screw. The adjustable jaw is reversible. The bearing for the adjusting screw is of generous proportions to take up any end thrust.



General Specifications

Nominal Size Inches	Weight Per Jaw Pounds	LIST PRICES	
		Per Set of Three	Per Set of Four
10	100	\$192.00	\$240.00
12	129	234.00	292.00
18	209	320.00	400.00

WALKER MAGNETIC CHUCKS



Rectangular

Magnetic chucks are made to operate on direct current only. All rectangular chucks are arranged for wet grinding. An improved demagnetized switch, back rests and table clamps are furnished with each chuck.

With the exception of sizes 410, 610, 617 and 520 all Standard Rectangular

Chucks are provided with end stops, tee slots, and work fingers. The work fingers are convenient for staying the work sidewise in planing and milling operations. When ordering specify whether for 110 or 220 volts.

*No.	Working Surface Inches	Magnetic Surface Inches	Size Base Inches	Height Inches	Watts Used	List Price
610	6 ³ / ₄ x10	4 ¹ / ₂ x 8	6 x 9 ⁷ / ₈	3 ¹ / ₈	30	\$80.00
613	6 ³ / ₄ x12 ³ / ₄	4 ¹ / ₂ x11 ¹ / ₂	6 x12 ⁵ / ₈	3 ⁷ / ₈	55	100.00
613T	6 ³ / ₄ x12 ³ / ₄	4 ¹ / ₂ x11 ¹ / ₂	6 ⁷ / ₈ x18	4 ¹ / ₄	55	135.00
814	8 x13 ⁷ / ₈	5 ¹ / ₄ x12 ¹ / ₂	7 x13 ³ / ₄	3 ¹⁵ / ₁₆	60	120.00
814T	8 x13 ⁷ / ₈	5 ¹ / ₄ x12 ¹ / ₂	8 x22	4 ⁹ / ₁₆	60	155.00
617	6 ³ / ₄ x17 ³ / ₈	4 ¹ / ₂ x15 ¹ / ₂	6 x17 ¹ / ₄	3 ¹ / ₂	55	115.00
520	5 ⁵ / ₈ x19 ³ / ₈	4 ⁵ / ₈ x18	5 x19 ¹ / ₂	3 ¹ / ₂	60	125.00
821	8 ¹ / ₂ x21 ¹ / ₈	5 ¹ / ₄ x19	7 x21	3 ³ / ₄	70	150.00
821T	8 ¹ / ₂ x21 ¹ / ₈	5 ¹ / ₄ x19	8 ¹ / ₄ x28 ¹ / ₂	4 ⁹ / ₁₆	70	195.00
827	8 x26 ³ / ₄	5 ¹ / ₂ x25	7 x26 ¹ / ₂	3 ³ / ₄	90	165.00
827T	8 x26 ³ / ₄	5 ¹ / ₂ x25	8 x34 ¹ / ₈	4 ³ / ₈	90	215.00
1031	10 ³ / ₈ x31 ³ / ₈	7 x29	8 x31 ¹ / ₄	4 ¹ / ₂	175	225.00
1031T	10 ³ / ₈ x31 ³ / ₈	7 x29	9 ⁵ / ₈ x42	5 ³ / ₈	175	275.00
1036	10 ³ / ₈ x36 ¹ / ₂	7 x35	8 x36 ³ / ₈	4 ¹ / ₂	300	275.00
1036T	10 ³ / ₈ x36 ¹ / ₂	7 x35	9 ⁵ / ₈ x47	5 ³ / ₈	300	335.00
1048	10 ³ / ₈ x48	7 x46	8 x47 ³ / ₄	4 ¹ / ₂	350	350.00
1048T	10 ³ / ₈ x48	7 x46	9 ⁵ / ₈ x59	5 ³ / ₈	350	425.00
1324	13 ³ / ₄ x24	11 ³ / ₈ x22	12 x23 ³ / ₄	4	140	275.00
1336	13 ³ / ₄ x36 ¹ / ₂	11 ³ / ₈ x34 ⁵ / ₈	12 x36 ¹ / ₄	4	210	350.00
1348	13 ³ / ₄ x48	11 ³ / ₈ x46 ¹ / ₄	12 x47 ⁷ / ₈	4	280	475.00
1360	13 ³ / ₄ x60	11 ³ / ₈ x57 ⁷ / ₈	12 x59 ³ / ₄	4	350	600.00
1372	13 ³ / ₄ x72	11 ³ / ₈ x69 ¹ / ₂	12 x71 ¹ / ₂	4	420	750.00
1624	16 ³ / ₄ x24	14 x22	15 x23 ³ / ₄	4 ¹ / ₄	175	350.00
1636	16 ³ / ₄ x36 ¹ / ₂	14 x34 ⁵ / ₈	15 x36 ¹ / ₄	4 ¹ / ₄	260	450.00
1648	16 ³ / ₄ x48	14 x46 ¹ / ₄	15 x47 ⁷ / ₈	4 ¹ / ₄	350	600.00
1660	16 ³ / ₄ x60	14 x57 ⁷ / ₈	15 x59 ³ / ₄	4 ¹ / ₄	435	750.00
1672	16 ³ / ₄ x72	14 x69 ¹ / ₂	15 x71 ¹ / ₂	4 ¹ / ₄	520	950.00
1696	16 ³ / ₄ x96 ⁵ / ₈	14 x94 ¹ / ₄	15 x96 ⁵ / ₈	4 ¹ / ₄	700	1250.00



Toolroom Chuck



Universal Chuck

Magnetic Chucks for Toolroom

*No.	Working Surface Inches	Magnetic Surface Inches	Base Dimensions Inches	Height Inches	Watts Used	List Price
410	4x10 ¹ / ₂	3 ³ / ₈ x9 ¹ / ₄	4 x11	3 ³ / ₁₆	30	\$70.00
410T	4x10 ¹ / ₂	3 ³ / ₈ x9 ¹ / ₄	4 ⁷ / ₈ x15 ¹ / ₂	3 ³ / ₄	30	100.00
410D	4x10 ¹ / ₂	3 ³ / ₈ x9 ¹ / ₄	4 ⁷ / ₈ x18	4 ¹ / ₂	30	160.00
Universal Magnetic Chucks						
410S	4x10	4x10	3x18	5	33	\$125.00
420S	4x20	4x20	3x28	5	66	175.00
430S	4x30	4x30	3x38	5	99	250.00

*"T" in catalog No denotes taper base; "S," swivel; "D," duplex.

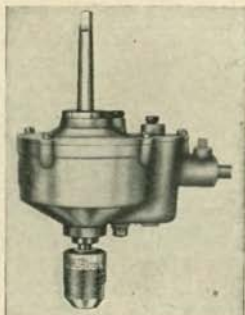
Rotary Type

No.	Diam. Face Plate, In.	Face to Back Plate Seat, In.	Diam. Back Plate Seat, In.	List Price Std. Face
6-R	6 ¹ / ₂	3	2 ¹ / ₂	\$80.00
7-R	7 ³ / ₈	3 ³ / ₄	3 ¹ / ₂	90.00
8-R	8 ³ / ₈	3 ³ / ₈	3 ¹ / ₂	100.00
10-R	10 ³ / ₈	4 ³ / ₈	4 ³ / ₈	125.00
12-R	12 ³ / ₈	4 ³ / ₈	4 ³ / ₈	175.00
14-R	14 ³ / ₈	4 ³ / ₈	4 ³ / ₈	200.00
16-R	16 ³ / ₈	4 ³ / ₈	7	225.00
20-R	20 ¹ / ₂	4 ³ / ₈	9 ¹ / ₄	Special
24-R	24 ¹ / ₂	4 ³ / ₈	9 ¹ / ₄	Special
30-R	30 ¹ / ₂	4 ³ / ₈	13 ¹ / ₂	Special
36-R	36 ¹ / ₂	5 ³ / ₈	13 ¹ / ₂	Special



Rotary

ETTCO HIGH SPEED TAPPING ATTACHMENT



No. 1

acting purpose would be impractical. Even if the case and gears were removed, a tap would run true and could be driven in. The thrust is taken by the drill press spindle. Two oil holes take care of the entire oiling system.

The No. 1 attachment has a capacity of $\frac{1}{4}$ ". The distance from chuck nose to press spindle is $5\frac{1}{4}$ ". Either No. 1 or No. 2 M. T. Shank included Weight $3\frac{3}{4}$ pounds.

No. 2 price includes Nos. 1, 2 or 3 Morse Taper Shank and somewhat larger Chuck, with a capacity of $\frac{3}{8}$ ".

Extremely sensitive tapping without adjustment, and high spindle speed are the superior characteristics of the Ettco Tapping Attachments. The leather-lined cone clutch and cast iron driving cones have so smooth an action that tap breakage is almost impossible. A tap may be stopped or entered at whatever speed is desired by simple regulation of the press lever, and when it sticks or hits the bottom of the hole the clutch slips. The reverse cone slips if a tap sticks while backing out.

The design, workmanship and material are of exceptional quality. The aluminum case and light alloy steel parts greatly reduce the weight. All journals are hardened and ground.

A lateral float is imparted to the leather-lined cone clutch by an Oldham coupling attached to the chuck spindle. This takes up unevenness of the leather and inevitable inaccuracies of the parts. There is no binding. Without this patented feature, a leather-lined clutch for this ex-

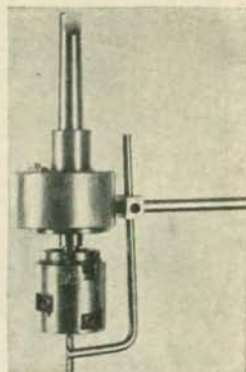
ERRINGTON AUTO-REVERSE TAPPING CHUCKS

A well constructed tapping chuck of the quick reverse type, built strictly in accordance with the latest engineering practice and design. Four steel spur gears comprise the quick reverse mechanism, while the self centering tap holder (fitted with two Universal dogs, sliding one over the other) centers the tap by a direct pressure of two set screws against wide V surfaces.

The Style B Chuck, equipped with positive tap holder, is intended where the work is first drilled and then tapped.

The Style C Chuck is furnished with friction tap holder and is especially desirable for tapping steel, copper, etc., and where particular danger of tap-breakage is likely; also where several cuts are required to drive the tap the desired depth.

Styles D and E, intended for heavy stationary work which should first be drilled then tapped in line without moving the work or the spindle of the machine. These chucks are furnished with a slip-spindle quick-change mechanism, thereby enabling the work to be tapped at drilling speed.



Style C

General Specifications

Size No.	Tap Sizes Standard Taps Inches	Pipe Taps Ins.	Morse Taper Shank	List Prices			
				Style B Positive Tap-Holder and Stop	Style C Friction Tap-Holder and Stop	Style D Friction Quick-Change Pin-Drive with Drill and Tap-Holder	Style E Positive Quick-Change Ball-Drive with Two Drill Collets (No Tap Holder)
00HS	Up to $\frac{1}{16}$ "	...	Almond No. 1	\$25.00	\$30.00	.....	.....
00	$\frac{1}{16}$ — $\frac{3}{16}$	...	No. 1, 2	25.00	30.00	.....	.....
0	$\frac{1}{8}$ — $\frac{1}{4}$	$\frac{1}{4}$	3, 2 *(1)	30.00	35.00	.....	35.00
1	$\frac{1}{4}$ — $\frac{3}{8}$	$\frac{1}{2}$	3, 4	35.00	40.00	\$55.00	40.00
2	$\frac{3}{8}$ — $\frac{1}{2}$	$\frac{3}{4}$	4, *(3)	40.00	50.00	65.00	50.00
3	$\frac{1}{2}$ — $1\frac{1}{8}$	1	4, *(3)	50.00	60.00	75.00	60.00
4	$\frac{3}{4}$ — $1\frac{1}{2}$	$1\frac{1}{4}$	5, 4	70.00	80.00	90.00	80.00
5	$\frac{1}{2}$ —2	2	5, *(4)	80.00	90.00	100.00	90.00

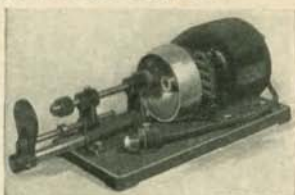
*These size shanks can be furnished but they must be re-inforced by a set screw. In ordering, state size of Morse Taper Shank required.

For Net Prices See Supplement

ALTO HIGH SPEED TAPPING MACHINES

Alto motor-driven tapping machines are designed for accurate high speed work. The No. 1 type has a reversing speed equal to three times the forward or tapping speed while No. 1-A has reversing speeds twice that of its forward speed, and is so arranged that lost motion is eliminated. These machines are complete and need only to be connected to a light socket to be ready for operation.

The cone friction drive enables the operator to tap to the bottom of a hole with little danger of tap breakage. The work is held against the face plates (to which jigs may be attached) and pushed against the tap.



No. 1

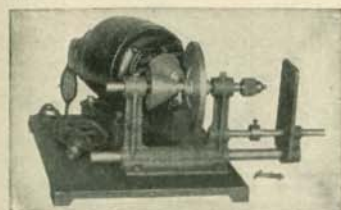
This automatically engages the tap into the work. When the tap has reached the proper depth (as governed by the depth stop), the operator pulls slightly on the work thereby engaging the reversing cone for the backing out operation.

These features tend toward increased production and more economical tapping.

The No. 1-A is somewhat larger than No. 1 and has proper speed ratio to tap larger holes at the greatest efficiency. An extra large friction surface is provided to give long life to the cone driver.

Each machine is complete with 110 volt, 60 cycle, single phase, A.

C. or D. C. motor. When ordering specify what type motor is required.



No. 1-A

Specifications

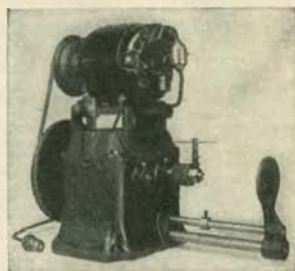
Size	No. 1	No. 1A
Capacity, Inches.....	$\frac{3}{16}$ " in Brass $\frac{3}{16}$ " in Steel	$\frac{5}{16}$ " in Brass $\frac{3}{8}$ " in Steel
Overall Length, Inches.....	19 $\frac{1}{2}$ "	18"
Speed of Motor, R. P. M.....	1725	1725
Tap Speed, Forward R. P. M.....	1450	850
Tap Speed, Reverse R. P. M.....	5000	1750
Net Weight, lbs.....	45	65
Shipping Weight, lbs.....	65	85

No. 2 ALTO 3-SPEED TAPPER

The No. 2 Alto Motor Driven 3-Speed Tapping Machine differs from the No. 1 Tapper in several respects. The speed of the spindle is considerably lower and is variable to three adjustments, thus enabling the operator to select the most efficient speed for each job.

It has a somewhat larger capacity and has ample power to drive a $\frac{3}{8}$ inch tap through steel. A special patented feature holds the belt at the proper tension and at the same time permits easy and quick changing of the belt for the different speed adjustments. The enclosed spur gear mechanism, in which Bakelite gears are used insures quietness in operation. These composition gears have ample face width to assure minimum wear and infrequent replacements. Power is transmitted through a friction clutch which permits tapping at high speed to the bottom of a hole with little danger of tap breakage. Ample power is furnished to tap larger holes at reduced speed.

The operation of this tool is identical with that of the smaller high speed type. The work is held against the face plate and pushed against the tap thereby engaging the driving clutch. When the tap has reached the desired depth, as governed by the depth gauge, a slight pull on the work engages the reversing clutch for the withdrawal of the tap.



Specifications

Capacity.....	$\frac{1}{8}$ "- $\frac{3}{8}$ " in steel
Weight, Net.....	85 lbs.; crated, 100 lbs.
Speed Forward.....	150, 300, 450 R. P. M.
Speed Reverse.....	300, 600, 900 R. P. M.
Lubrication.....	{ Two wick oiled motor bearings Gear Bearings provided, with oilers

When ordering be sure to specify voltage required and whether alternating current or direct current is to be used.

For Net Prices See Supplement

DRILL CHUCKS AND ARBORS

Ettco Keyless



The Ettco Keyless Self-tightening Drill Chuck has a continuous grip, which does not require tightening by hand; it is only necessary to close the chuck which takes its grip when the work is started, and as the load on the chuck is increased the grip becomes more firm. No matter how tight the grip, it can be easily released by a slight twist of the hand. All parts including outer shell and body are hardened. All Ettco drill chucks take drills $\frac{1}{64}$ " over listed capacity. Chucks for any air or electric portable drill can also be furnished.

General Specifications

Chucks			Arbors		
No.	Sizes	List Price	No.	Sizes	List Price
1A	0 to $\frac{1}{4}$ "	\$ 5.50	1	Morse Taper Shank	\$.75
1½A	0 to $\frac{3}{16}$ "	6.00	2	Morse Taper Shank	.75
2A	0 to $\frac{3}{8}$ "	6.50	3	Morse Taper Shank	1.00
3A	0 to $\frac{1}{2}$ "	9.00	4	Morse Taper Shank	1.50
3½A	$\frac{1}{8}$ " to $\frac{3}{8}$ "	11.00	½"	or $\frac{1}{64}$ " Str. Shank	1.00

New Britain Hand Operated Drill Chuck

This chuck is quick acting, has a powerful grip and will not lock. After it has been tightened sufficiently by hand to start drilling, the jaws will tighten their hold on the drill with a sure grip. It is designed to meet the demand for a moderately priced chuck that will fill all the requirements of the user. It is positively a hand operated chuck. The ball bearings reduce friction to a minimum and there are no exposed gears or threads to break or clog. All wearing parts are hardened, carefully made and tested for accuracy.

It is made regularly with Morse Taper Arbors integral with the body or with taper hole for separate arbor.

General Specifications
With Taper Hole for Separate Arbor

Number	Capacity Inches	List Price
05	0 to $\frac{3}{16}$ "	\$7.50
06	0 to $\frac{3}{8}$ "	9.00
07	0 to $\frac{17}{32}$ "	12.00
08	0 to $\frac{3}{4}$ "	20.00
09	0 to 1"	28.00



With Morse Taper Arbor Attached

Number	Capacity Inches	Size of M. T. Arbor	List Price
5	0 to $\frac{3}{16}$ "	No. 1	\$8.00
6	0 to $\frac{3}{8}$ "	No. 2	9.50
7	0 to $\frac{17}{32}$ "	No. 2	12.50
8	0 to $\frac{3}{4}$ "	No. 3	21.00
9	0 to 1"	No. 4	29.00

Hand Operated

Union Drill Chucks

The Union Drill Chuck is made in seven sizes (0 to 2 inches) with patent Transverse Slot so that drills with tenons can be inserted making a positive drive.



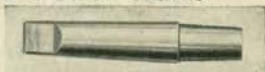
No.	Diameter Inches	Holding Capacity In.	List Price
000	$1\frac{11}{32}$ "	0 to $\frac{1}{4}$ "	\$ 8.00
00	$1\frac{3}{8}$ "	0 to $\frac{3}{8}$ "	10.00
1100	$2\frac{1}{4}$ "	0 to $\frac{1}{2}$ "	12.00
1101	$2\frac{11}{16}$ "	0 to $\frac{3}{4}$ "	13.50
1102	$3\frac{15}{32}$ "	0 to 1"	17.50
103	5"	0 to $1\frac{1}{2}$ "	30.00
104	6"	0 to 2"	37.50

Arbors for New Britain and Union Chucks



$\frac{1}{2}$ in., $\frac{3}{8}$ in., or $\frac{1}{4}$ in. shank for blacksmith's drill presses.

List Prices Each
Fitted to $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$ in. Drill Chucks \$0.70
Fitted to $\frac{3}{4}$ inch..... 1.00
Fitted to 1 inch..... 1.35



Taper shanks fitted to any size chucks
List Prices Each
No. 1 Morse Taper Shanks..... \$1.35
No. 2 Morse Taper Shanks..... 1.35
No. 3 Morse Taper Shanks..... 1.70
No. 4 Morse Taper Shanks..... 2.00
No. 5 Morse Taper Shanks..... 2.70

HORTON DRILL CHUCKS Horton-Morrow Ball Bearing Drill Chucks

Hand-operated, ball-bearing drill chucks, self-tightening with automatic grip. Will drive high-speed drills positively without slipping. The patent releasing device insures quick and unresisting release by hand.



The jaws are made from a high-grade of alloy steel. Arbors with Morse Taper Shank can be furnished for any of these chucks at an additional charge.

General Specifications

Size No.	Capacity, Straight Shank Drills, Inches	Net Weight, Lbs.	List Price, Without Arbor
1	0 to 1/4	3/4	\$10.00
2	0 to 3/8	1 1/2	11.50
3	0 to 1/2	3	14.75
4	1/4 to 3/4	5	26.50
5	1/2 to 1	7 1/2	37.00

Horton Style B B Drill Chucks

The Horton Style BB Chucks are of the two-jaw type, key-operated, and are exceptionally simple and compact. They are made in seven sizes, the two largest arranged to attach by means of face-plate recess, and three screws. All other sizes made as per illustration with taper hole for arbor.

Size No.	Capacity, Straight Shank Drills, Inches	Net Weight, Lbs.	List Price Without Arbor
0	0 to 1/4	1/4	\$ 8.00
1	0 to 3/8	1 1/2	10.00
2	0 to 1/2	2	12.00
3	0 to 3/4	4 1/2	13.50
4	0 to 1	7	17.50
5	0 to 1 1/2	14 1/4	30.00
6	0 to 2	24 1/2	37.50



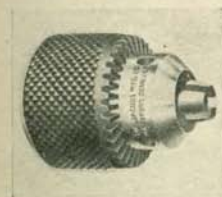
A key is supplied with each chuck.

Arbors for Horton Chucks

For Horton-Morrow Drill Chuck	For Horton Style BB Drill Chuck	With Morse Taper Shank			
		No. 1 or No. 2	No. 3	No. 4	No. 5
No. 1	No. 0	\$1.10	\$1.60	\$2.50	.....
No. 2	No. 1	1.10	1.60	2.50	.....
No. 3	No. 2	1.60	1.60	2.50	\$3.75
No. 4	No. 3	1.90	1.90	2.50	3.75
No. 5	No. 4	2.50	2.50	3.50	3.75

JACOBS DRILL CHUCKS

Care in selection of the proper type of chuck will result in a saving not only of the chuck itself, but also in Drilling Machine maintenance costs and drill breakage.



Jacobs Improved Drill Chucks are recommended for general drilling purposes on drill presses, lathes, tapping machines, radial drills, wall drills and blacksmith drills.

Jacobs Improved Light Weight Chucks are recommended for sensitive drills, jewelers drills, precision lathes, multiple drills, drill heads, tapping devices, etc., where light weight and high speed are essential.

Jacobs Super-Chucks are recommended for general drilling purposes on production work, where hard or constant use demands the greatest efficiency.

Heavy Duty

Light Weight

Size No.	Capacity, Straight Shank Drills, Ins.	List Price Without Arbor	Size No.	Capacity, Straight Shank Drills, Ins.	List Price Without Arbor
7	1/4	\$ 4.50	0	1/8	\$5.50
2	3/8	5.50	1	1/4	4.50
32	1/2	5.50	1A	3/8	4.50
3	3/4	9.00	30	1/2	5.50
4	1	15.00	2A	3/4	5.50
5	1 1/4	20.00	6A	1	9.00

Jacobs Super-Chucks

Arbors for Jacobs Chucks

Size No.	Cap., Straight Shank Drills, Inches	List Price Without Arbor	Accurately finished arbors supplied for any size or style of Jacobs Chucks at following prices:	
			Style of Shank	List Price
8 1/2 S	1/4	\$ 7.50	No. 1 Morse Taper	\$0.80
9S	3/8	8.00	No. 2 Morse Taper	1.80
11S	1/2	9.00	No. 3 Morse Taper	1.20
12S	3/4	12.00	No. 4 Morse Taper	2.00
14S	1	12.00	No. 5 Morse Taper	2.50
16	1 1/4	15.00	1/2" Straight	.75
18	1 3/4	18.00	1/4" Straight	.75
20	2	25.00		

In ordering drill chucks, be sure to specify style of arbor wanted.

For Net Prices See Supplement

APEX DRILLING AND TAPPING CHUCKS

Quick Change Drill Chucks



No. 1

The outstanding feature of the Apex Chucks is the hardened, ball-nosed driving plunger which cannot fall through, and is guaranteed for the life of the chuck. All parts are made of alloy steel, hardened and ground. These chucks can be furnished with special shanks for electric and air tools, and hand screw machines, lathes, etc.

Morse Taper Collets—The tools are instantly removed from the collets without the use of a drift, as the tang extends through a slot in the top of the collet.

Tap Collets—The tap is driven by the square and is held in the collet by means of two hardened plungers that enter notches ground in the shank. The collets are designed so that tap will float.

Straight Shank Drill Collets—Permit the use of jobber or other straight shank drills instead of taper shank drills. The drill is held in the collet by means of a split taper bushing. A knock out plunger in the top of the collet instantly removes the drill without using drift.

Chuck Specifications

No. Chuck	M. T. Shank	List Price	Diameter Hole, Ins.
0	1, 2	\$4.00	$\frac{11}{16}$
1	1, 2, 3, 4	5.00	$\frac{15}{16}$
2	2, 3, 4	6.50	$1\frac{1}{4}$
3	3, 4, 5	10.00	$1\frac{11}{16}$
4	4, 5	15.00	$2\frac{1}{8}$
5	5, 6	30.00	$3\frac{1}{8}$



M. T. Collet

Collet Specifications

M. T. Collets		Tap Collets Capacity			Straight Shank Drill Collets		
Cap. No.	List Price	Standard Inches	Pipe Ins.	List Price	Cap. Ins.	Collets	Bush'gs
0, 1	\$1.20	No. 5- $\frac{3}{4}$	$\frac{1}{2}$	\$1.50	0- $\frac{1}{8}$	\$1.40	\$.50
1, 2	1.30	No. 10- $\frac{3}{4}$	$\frac{1}{2}$	2.00	0- $\frac{17}{32}$	1.50	.50
1, 2, 3	1.60	$\frac{1}{2}$ -1	$\frac{3}{8}$	3.00	$\frac{1}{2}$ - $\frac{3}{8}$	2.00	.75
1, 2, 3, 4	3.00	$\frac{1}{2}$ -1 $\frac{1}{2}$	$1\frac{1}{4}$	4.50	$\frac{23}{32}$ - $1\frac{1}{8}$	3.50	.75
2, 3, 4, 5	5.00	$\frac{3}{4}$ -2 $\frac{1}{2}$	2	6.50			
4, 5, 6	7.50						

APEX SAFETY FRICTION TAP HOLDERS



Safety Tap Holder

The Apex Tap Holder will eliminate tap breakage. It is made in three sizes and also furnished with Vertical Float for Multiple Tapping. This device is well adapted for bottom hole tapping. The friction is of multiple disc construction, and remarkably easy to adjust. The taps and collets are driven by the square, and are free to float, being held in the collet by two hardened plungers. A spring locks the collet in the holder permitting its use in any position.

Special shanks and adapters are furnished for all makes of reversible tapping attachments, tapping machines, electric and air tools, hand screw machines, etc.

The same collets are used in "A" Tap Holder, "MA" Vertical Float Holder and "D" Chuck.

Reversible attachments equipped with Apex Holders will be furnished on application.

Tap Holders are also made to take same quick change collets as used in the Quick Change Drill Chucks—when it is necessary to change tools at high speeds. These are the A-4, B-4 and C-4 Quick Change Drilling and Tapping Chucks.

Tap Holder, Stud and Nut Setters

Type	Shank Size	Net Price	Stud Setter	Nut Setter
A	1 M. T.	\$12.00	\$4.50	\$3.00
A1	2 M. T.	12.50	4.50	3.00
A2	Special	12.50	4.50	3.00
A3	Adapter	12.75	4.50	3.00
B	2 M. T.	14.50	5.25	3.50
B2	Special	15.00	5.25	3.50
B3	Adapter	15.50	5.25	3.50
C	3 M. T.	24.50	6.50	5.50
C1	4 M. T.	24.50	6.50	5.50
C2	Special	25.50	6.50	5.50



Stud Setter

Collet Specifications

Type	Tap Collets			Morse Taper		Straight Shank Drill Collets		
	Std. Ins.	Pipe Ins.	List Price	Cap. No.	List Price	Cap. Ins.	List Price	Bushing
A	No. 4- $\frac{3}{4}$	$\frac{1}{2}$	\$1.50	0, 1	\$1.20	0- $\frac{1}{8}$	\$1.40	\$0.50
B	$\frac{1}{4}$ - $\frac{3}{4}$	$\frac{3}{8}$	2.00	1, 2	1.30	0- $\frac{17}{32}$	1.50	.50
C	$\frac{1}{2}$ - $\frac{1}{4}$	1	3.00	1, 2, 3	3.00			

APEX DRILLING AND TAPPING CHUCKS
Vertical Float Tapping Chucks



For Multiple Tapping

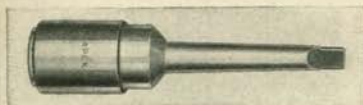
Vertical Float Tapping Chucks will compensate for the uneven starting of taps in multiple tapping and when using taps of different leads. Apex Standard Free Floating Collets are used in these chucks. No drift required to remove tools. These are furnished with either type D or E Positive Drive Chucks or A, B or C Friction Drive Holders.

Type	Holder			Tap Collets		
	List Price	M. T. Shank	O. D.	Capacity		List Price
				Std.	Pipe	
MD-50	\$8.50	1-2 or 3	1 1/8"	1/8"	1/4"	\$1.50
ME-100	12.50	2 or 3	1 3/8"	3/8"	3/8"	2.00

Friction Drive, A-B-C

MA-50	\$16.50	1 or 2	1 1/8"	3/8"	1/8"	\$1.50
MB-100	20.50	2 or 3	1 3/8"	3/8"	3/8"	2.00
MC-200	33.00	3 or 4	3"	1 1/8"	1"	3.00

Positive Drilling and Tapping Chucks for Multiple Spindle Machines



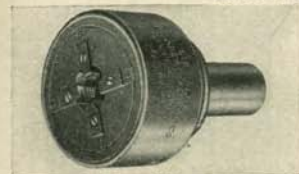
These chucks are real time-savers when changing tools on Multiple Spindle Machines and Drill Heads. Apex Standard Collets are used and will save 75% of the time required to change or sharpen tools, at the same time eliminating all possibility of disturbing the alignment or set-up which so often happens when using a drift.

Made in two sizes. Also furnished with Vertical Float for Multiple Tapping. Chucks have a small O. D. for close center distances.

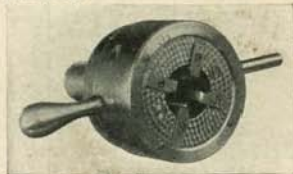
No.	Price	M. T. Shank	O. D.	Tap Collets	M. T. Collets	S. S. Drill Collets
D	\$4.00	1 or 2	1 1/8"	\$1.50	\$1.20	\$1.40
E	6.00	2 or 3	1 3/8"	2.00	1.30	1.50

Collet for D Chuck same as A Safety Friction Tap Holder.
Collet for E Chuck same as B Safety Friction Tap Holder.

APEX DIE HEADS



Revolving



Stationary

All parts of the Apex Die Head are hardened and ground to prevent wear and insure long life. It has many patented features and is very simple in construction, having few parts all of which are readily accessible. Prices include standard shank.

The simplicity of the chaser insures accuracy. Every set is guaranteed.

Chasers are ground after being hardened and threads are lapped, making them equal to a ground thread chaser.

Internal trip and trigger trip heads furnished upon application.

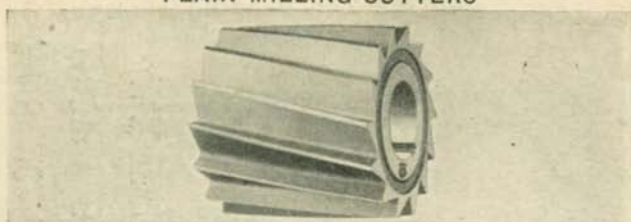


Chasers

Size	Stationary	Revolving	H. S. Chasers	Capacity		Diameter		Length	
				Std.	Pipe	Sta.	Rev.	Sta.	Rev.
7/8"	\$40.00	\$30.00	\$4.00	1/8"-7/8"	1/8"	2 1/8"	2 1/8"	2 1/4"	2 1/8"
3/4"	45.00	35.00	4.50	1/8"-3/4"	1/8"-3/8"	3 1/8"	3 1/8"	3"	2 7/8"
1"	60.00	45.00	5.50	1/8"-1"	1/8"-3/4"	4 1/8"	4 1/8"	3 3/8"	3 3/8"
1 1/2"	85.00	60.00	7.00	3/8"-1 1/8"	1/2"-1"	5 1/8"	5 1/8"	4 1/8"	3 3/8"
2"	105.00	85.00	9.00	1 1/4"-2"	3/4"-1 1/2"	5 1/8"	6 1/8"	4 3/4"	4 1/8"

For Net Prices See Supplement

PLAIN MILLING CUTTERS



Cutters of less than $\frac{3}{4}$ -inch face have straight teeth. Those of $\frac{3}{4}$ -inch and over have spiral teeth. Cutters having nicked teeth or dimensions other than listed are special and subject to special prices.

Give diameter, width of face, size of hole, and dimensions of keyway, when ordering. Carbon steel cutters will be sent unless High Speed are specified. The sizes listed are in accordance with "Simplified Practice Recommendation No. 36" endorsed by the U. S. Dept. of Commerce.

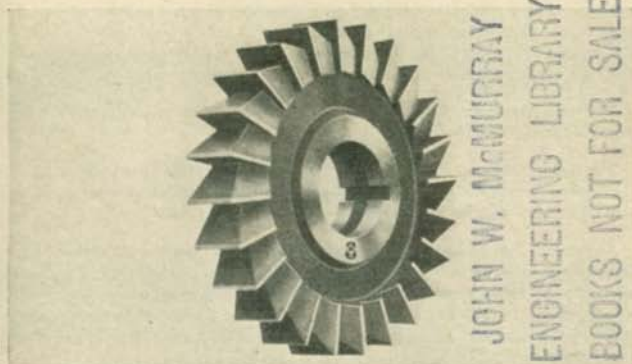
General Specifications

Diameter Inches	Width of Face, In.	Size of Hole, In.	List Price Each	
			Carbon Steel	High Speed Steel
2 $\frac{1}{4}$	$\frac{1}{2}$	$\frac{7}{8}$	\$2.25	\$4.15
2 $\frac{3}{4}$	1	$\frac{7}{8}$	3.20	6.00
2 $\frac{1}{2}$	$\frac{3}{16}$	1	1.65	3.25
2 $\frac{3}{8}$	$\frac{1}{4}$	1	1.80	3.50
2 $\frac{1}{2}$	$\frac{5}{16}$	1	1.90	3.75
2 $\frac{3}{8}$	$\frac{3}{8}$	1	2.10	4.00
2 $\frac{1}{2}$	$\frac{1}{2}$	1	2.20	4.25
2 $\frac{3}{8}$	$\frac{5}{8}$	1	2.30	4.50
2 $\frac{1}{2}$	$\frac{3}{4}$	1	2.50	4.80
2 $\frac{3}{8}$	$\frac{7}{8}$	1	2.80	5.40
2 $\frac{1}{2}$	1	1	3.10	6.00
2 $\frac{3}{8}$	1 $\frac{1}{4}$	1	3.30	6.50
2 $\frac{1}{2}$	1 $\frac{1}{2}$	1	3.70	7.50
2 $\frac{3}{8}$	1 $\frac{1}{2}$	1	4.00	8.25
2 $\frac{1}{2}$	1 $\frac{3}{4}$	1	4.35	9.15
2 $\frac{3}{8}$	2	1	4.75	10.10
2 $\frac{1}{2}$	2 $\frac{1}{2}$	1	5.25	11.60
2 $\frac{3}{8}$	3	1	5.70	13.00
2 $\frac{1}{2}$	4	1	7.00	16.35
3	$\frac{3}{16}$	1	1.75	3.60
3	$\frac{1}{4}$	1	2.10	4.00
3	$\frac{3}{8}$	1	2.35	4.50
3	$\frac{1}{2}$	1	2.70	5.10
3	$\frac{5}{8}$	$1 \frac{1}{4}$	2.70	5.10
3	$\frac{3}{4}$	$1 \frac{1}{4}$	2.85	5.40
3	$\frac{7}{8}$	$1 \frac{1}{4}$	3.10	5.90
3	1	$1 \frac{1}{4}$	3.50	6.75
3	$1 \frac{1}{8}$	$1 \frac{1}{4}$	3.85	7.50
3	$1 \frac{1}{4}$	$1 \frac{1}{4}$	4.20	8.25
3	1	$1 \frac{1}{2}$	4.60	9.10
3	$1 \frac{1}{4}$	$1 \frac{1}{2}$	5.10	10.35
3	$1 \frac{1}{2}$	$1 \frac{1}{2}$	5.50	11.50
3	$1 \frac{3}{4}$	$1 \frac{1}{2}$	5.70	12.30
3	2	$1 \frac{1}{2}$	6.00	13.30
3	2 $\frac{1}{2}$	$1 \frac{1}{2}$	6.60	15.25
3	3	$1 \frac{1}{2}$	7.00	17.00
3	3 $\frac{1}{2}$	$1 \frac{1}{2}$	7.50	18.80
3	4	$1 \frac{1}{2}$	8.15	20.75
3	5	$1 \frac{1}{2}$	9.90	25.50
3	6	$1 \frac{1}{2}$	13.70	33.00
4	$\frac{1}{4}$	1	2.60	5.50
4	$\frac{1}{4}$	$1 \frac{1}{4}$	2.60	5.50
4	$\frac{3}{16}$	1	3.20	6.50
4	$\frac{1}{4}$	$1 \frac{1}{4}$	3.20	6.50
4	$\frac{5}{16}$	1	3.85	7.70
4	$\frac{3}{8}$	$1 \frac{1}{4}$	3.85	7.70
4	$\frac{1}{2}$	$1 \frac{1}{4}$	4.50	8.85
4	$\frac{5}{8}$	$1 \frac{1}{4}$	5.00	9.75
4	$\frac{3}{4}$	$1 \frac{1}{4}$	5.50	10.90
4	$\frac{7}{8}$	$1 \frac{1}{4}$	6.00	12.10
4	$\frac{1}{2}$	$1 \frac{1}{2}$	6.50	13.35
4	1	$1 \frac{1}{2}$	7.15	14.70
4	$1 \frac{1}{4}$	$1 \frac{1}{2}$	7.90	16.70
4	$1 \frac{1}{2}$	$1 \frac{1}{2}$	8.40	18.40
4	2	$1 \frac{1}{2}$	9.50	21.90
4	3	$1 \frac{1}{2}$	11.50	28.50
4	4	$1 \frac{1}{2}$	14.00	36.75

Angular, Involute, End Mills, Convex and Concave and other standard cutters can also be furnished.

For Net Prices See Supplement

SIDE MILLING CUTTERS OR STRADDLE MILLS



Cutters having dimensions other than listed below are special and subject to special prices. Carbon steel cutters will be sent unless High Speed is specified.

General Specifications

Diameter Inches	Width of Face Inches	Size of Hole Inches	List Price Each	
			Carbon Steel	High Speed Steel
2	$\frac{3}{16}$	$\frac{1}{2}$	\$2.35	\$3.60
2	$\frac{3}{16}$	$\frac{3}{8}$	2.35	3.60
2	$\frac{1}{4}$	$\frac{1}{2}$	2.60	4.10
2	$\frac{1}{4}$	$\frac{3}{8}$	2.60	4.10
2	$\frac{3}{8}$	$\frac{1}{2}$	2.80	4.50
2	$\frac{3}{8}$	$\frac{3}{8}$	2.80	4.50
2	$\frac{1}{2}$	$\frac{1}{2}$	2.80	4.65
2	$\frac{1}{2}$	$\frac{3}{8}$	2.90	4.90
2	$\frac{3}{8}$	$\frac{1}{2}$	3.15	5.30
2	$\frac{3}{8}$	$\frac{3}{8}$	3.25	5.53
2	$\frac{1}{2}$	$\frac{1}{2}$	3.40	5.80
2	$\frac{1}{2}$	$\frac{3}{8}$	3.15	5.40
3	$\frac{1}{4}$	1	3.60	6.25
3	$\frac{3}{8}$	1	3.85	6.65
3	$\frac{1}{2}$	1	4.10	7.15
3	$\frac{1}{2}$	1	4.30	7.65
3	$\frac{3}{8}$	1	4.80	8.65
3	$\frac{1}{2}$	1	5.35	9.60
3	$\frac{3}{8}$	1	5.80	10.65
3	$\frac{1}{2}$	1	5.80	10.65
3	$\frac{3}{8}$	1	5.80	10.65
4	$\frac{1}{4}$	1	3.70	7.00
4	$\frac{3}{8}$	1	5.20	9.50
4	$\frac{1}{2}$	1	6.50	11.90
4	$\frac{1}{2}$	$1\frac{1}{4}$	6.50	11.90
4	$\frac{3}{8}$	1	7.10	13.15
4	$\frac{1}{2}$	$1\frac{1}{4}$	7.10	13.15
4	$\frac{3}{8}$	1	7.65	14.40
4	$\frac{1}{2}$	$1\frac{1}{4}$	7.65	14.40
4	$\frac{3}{8}$	1	8.25	15.75
4	$\frac{1}{2}$	$1\frac{1}{4}$	8.25	15.75
5	$\frac{1}{2}$	1	6.70	13.60
5	$\frac{3}{8}$	$1\frac{1}{4}$	6.70	13.60
5	$\frac{1}{2}$	1	7.30	15.20
5	$\frac{3}{8}$	$1\frac{1}{4}$	7.30	15.20
5	$\frac{1}{2}$	1	8.10	17.10
5	$\frac{3}{8}$	$1\frac{1}{4}$	8.10	17.10
5	1	1	9.90	20.20
5	1	$1\frac{1}{4}$	9.90	20.20
6	$1\frac{1}{2}$	1	8.60	18.65
6	$\frac{3}{4}$	1	9.65	22.25
6	$\frac{3}{4}$	$1\frac{1}{4}$	9.65	22.25
6	1	$1\frac{1}{4}$	11.00	26.40
7	$\frac{3}{4}$	$1\frac{1}{4}$	17.50	36.25
7	1	$1\frac{1}{4}$	20.40	43.15
8	1	$1\frac{1}{4}$	24.75	55.20

Sizes of cutters listed are in accordance with "Simplified Practice Recommendation No. 36" endorsed by the U. S. Dept. of Commerce.

For Net Prices See Supplement

ARMSTRONG TOOL HOLDERS

The various styles of Armstrong Tool Holders are designed and proportioned on lines which years of close study and experimentation have proved correct. They are drop forged from a special steel which combines stiffness and strength to a remarkable degree, and are accurately machined, heat-treated and hardened.

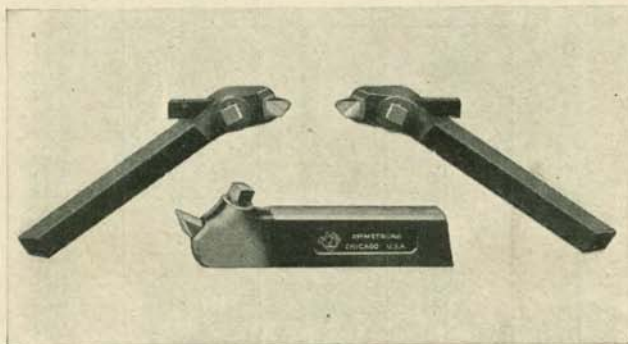
The set screws are made of treated alloy steel with hardened points and are practically unbreakable.

The cutter bits are of stock sizes and shapes. Ryolite High Speed Cutter Bits for the various sizes and styles of holders are carried in stock, and we can also furnish this high grade steel for the bits in 3-foot bars.

Armstrong Tool Holders are much more economical than the old style of heavy forged lathe tools, as they greatly reduce the amount of steel wasted in stub ends, eliminate forging costs and grinding losses, save the heavy wear on expensive grinding wheels, eliminate time lost by men going to the tool dresser while their machines stand idle, and require much less of an investment than solid forged tools of high speed steel.

On the following pages, we list the various standard types of these tool holders. In addition, we can supply various special styles such as Drop-Head Holders, Round Cutter Holders, Stellite Holders, etc.

Lathe Tool Holders



Left Hand Off-Set

Right Hand Off-Set

Straight Shank

Each Tool Holder is boxed separately. Price includes Wrench and one High Speed Cutter Bit.

General Specifications

Size Number			Size of Shank Inches	Size of Square Cutter Bit Inches	Weight of Tool Holder Complete Pounds	List Price High Speed Cutter Bits Each	List Price Tool Holder Complete Each
Straight Shank	Left Hand Off-Set	Right Hand Off-Set					
00-S	00-L	00-R	$\frac{5}{16} \times \frac{3}{4} \times 4\frac{1}{2}$	$\frac{3}{16}$	$\frac{1}{2}$	\$ 0.15	\$ 2.70
0-S	0-L	0-R	$\frac{3}{8} \times \frac{7}{8} \times 5$	$\frac{1}{4}$	$\frac{3}{4}$	.20	2.85
1-S	1-L	1-R	$\frac{1}{2} \times 1\frac{1}{8} \times 6$	$\frac{5}{16}$	$1\frac{1}{2}$	.35	3.25
2-S	2-L	2-R	$\frac{5}{8} \times 1\frac{3}{8} \times 7$	$\frac{3}{8}$	$2\frac{1}{4}$	.55	4.00
3-S	3-L	3-R	$\frac{3}{4} \times 1\frac{5}{8} \times 8$	$\frac{7}{16}$	$3\frac{3}{4}$	.90	5.40
4-S	4-L	4-R	$\frac{1}{2} \times 1\frac{3}{4} \times 9$	$\frac{1}{2}$	5	1.30	6.90
5-S	5-L	5-R	1 x 2 x 11	$\frac{5}{8}$	8	2.35	9.75
6-S	6-L	6-R	$1\frac{1}{4} \times 2\frac{1}{4} \times 13$	$\frac{3}{4}$	13	3.85	13.50
7-S	7-L	7-R	$1\frac{1}{2} \times 2\frac{1}{2} \times 16$	$\frac{7}{8}$	21	5.85	22.50
750-S	750-L	750-R	$1\frac{3}{8} \times 2\frac{3}{4} \times 18$	1	30	8.35	33.00
800-S	800-L	800-R	$1\frac{3}{4} \times 3 \times 20$	$1\frac{1}{8}$	35	11.35	42.75

For Net Prices See Supplement

ARMSTRONG TOOL HOLDERS

Cutting-Off Tools.



Left Hand Off-Set.



Right Hand Off-Set.



Straight Shank.

In these Cutting-Off Tools, the cutters are adjustable to any desired clearance, and the design is such that the greatest possible support is provided under all conditions.

The cutters are beveled on both sides, and are held at the proper angle to provide the side clearance and top rake necessary for a clean, smooth cut.

Each Cutting-Off Tool is boxed separately and price includes Wrench and one High Speed Cutter.

General Specifications

Size Number			Size of Shank Inches	Size of Cutter Inches	Approx. Weight of Tool Complete Pounds	List Price High Speed Cutters Each	List Price Tool Complete Each
Straight Shank	Left Hand Off-Set	Right Hand Off-Set					
19	29-L	29-R	$\frac{5}{16} \times \frac{3}{4}$	$\frac{3}{8} \times \frac{1}{2}$	$\frac{5}{8}$	\$0.60	\$2.85
20	30-L	30-R	$\frac{3}{8} \times \frac{7}{8}$	$\frac{5}{8} \times \frac{5}{8}$	$\frac{5}{8}$	.65	3.00
21	31-L	31-R	$\frac{1}{2} \times 1 \frac{1}{8}$	$\frac{7}{8} \times \frac{3}{4}$	$1 \frac{1}{2}$	.90	3.60
22	32-L	32-R	$\frac{5}{8} \times 1 \frac{3}{8}$	$\frac{7}{8} \times \frac{7}{8}$	$2 \frac{1}{4}$	1.30	4.50
23	33-L	33-R	$\frac{3}{4} \times 1 \frac{5}{8}$	$\frac{5}{8} \times 1$	$3 \frac{1}{2}$	2.15	6.00
24	34-L	34-R	$\frac{7}{8} \times 1 \frac{3}{4}$	$\frac{3}{4} \times 1 \frac{1}{4}$	$4 \frac{1}{2}$	2.90	7.50
25	35-L	35-R	1 x 2	$\frac{7}{8} \times 1 \frac{1}{4}$	$6 \frac{3}{4}$	4.00	9.75
26	36-L	36-R	$1 \frac{1}{4} \times 2 \frac{1}{4}$	$\frac{7}{8} \times 1 \frac{3}{8}$	9	4.65	11.65

Side Tools



Left Hand Straight Shank.



Right Hand Straight Shank.



Left Hand Off-Set.



Right Hand Off-Set.

The Armstrong Side Tools are strongly made, with generous support for the cutter. The Straight Shank type are well adapted for many classes of planer and shaper work.

Each Side Tool is boxed separately and price includes Wrench and one High Speed Cutter.

General Specifications

Size Number				Size of Shank Inches	Size of Cutter Inches	Approx. Weight of Tool Complete Pounds	List Price High Speed Cutters Each	List Price Tool Complete Each
Straight Shank		Off-Set						
Left Hand	Right Hand	Left Hand	Right Hand					
79-L	79-R	69-L	69-R	$\frac{5}{16} \times \frac{3}{4}$	$\frac{1}{8} \times \frac{1}{2}$	$\frac{5}{8}$	\$ 0.60	\$ 2.85
80-L	80-R	70-L	70-R	$\frac{3}{8} \times \frac{7}{8}$	$\frac{5}{8} \times \frac{5}{8}$	$\frac{5}{8}$	.90	3.40
81-L	81-R	71-L	71-R	$\frac{1}{2} \times 1 \frac{1}{8}$	$\frac{3}{8} \times \frac{3}{4}$	$1 \frac{1}{2}$	1.40	4.35
82-L	82-R	72-L	72-R	$\frac{5}{8} \times 1 \frac{3}{8}$	$\frac{7}{8} \times \frac{7}{8}$	2	2.30	6.00
83-L	83-R	73-L	73-R	$\frac{3}{4} \times 1 \frac{5}{8}$	$\frac{5}{8} \times 1$	$3 \frac{1}{2}$	3.40	7.85
84-L	84-R	74-L	74-R	$\frac{7}{8} \times 1 \frac{3}{4}$	$\frac{3}{4} \times 1 \frac{1}{4}$	$5 \frac{1}{2}$	5.00	10.65
85-L	85-R	75-L	75-R	1 x 2	$\frac{7}{8} \times 1 \frac{1}{2}$	8	6.00	12.75
86-L	86-R	76-L	76-R	$1 \frac{1}{4} \times 2 \frac{1}{4}$	$\frac{7}{8} \times 1 \frac{1}{2}$	12	7.90	16.50
87-L	87-R	.....	.....	$1 \frac{1}{2} \times 2 \frac{3}{8}$	$\frac{9}{16} \times 1 \frac{3}{8}$	16	10.00	23.65

ARMSTRONG TOOL HOLDERS

Boring Tools



A convenient and practical type of Boring Tool, in which the bar can be extended from the shank or holder to any desired length, insuring maximum possible stiffness for each job.

The cutter bits are simply pieces of tool steel of stock size and shape. Extra cutters of any desired shape can be ground from the stock bits very quickly, so that one of these tools, with a few extra bits, is equal in practical efficiency to a whole set of forged boring and inside threading tools.

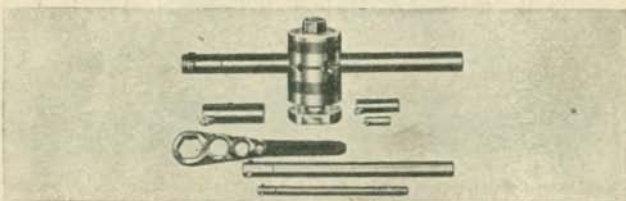
A slight turn of one nut releases or fastens both bar and holder. Bars can be changed almost instantly as needed, thus allowing the operator to use the stiffest bar possible for each job, with result that speeds and feeds can be increased and time saved.

Each Boring Tool is boxed separately, and price includes Holder and Bar, straight and 45 degree End Caps, two High Speed Cutters and Double Head Wrench.

General Specifications

Size Number	Size of Shank Inches	Diameter of Bar Inches	Size of Sq. Cutter Bit Inches	Weight of Tool Complete Pounds	List Price High Speed Cutter Bits Each	List Price Tool Complete Each
00B	$\frac{1}{4} \times \frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	1 $\frac{1}{2}$	\$0.10	\$ 4.90
8	$\frac{3}{8} \times \frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{4}$	1 $\frac{3}{4}$	.10	4.90
9	$\frac{1}{2} \times 1$	$\frac{3}{8}$	$\frac{3}{8}$	3 $\frac{3}{4}$	.18	5.80
10	$\frac{3}{8} \times 1 \frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	6 $\frac{1}{2}$	.30	7.65
11	$\frac{3}{8} \times 1 \frac{3}{4}$	1 $\frac{1}{2}$	$\frac{3}{8}$	11	.50	10.85
12	$\frac{1}{2} \times 1 \frac{3}{4}$	1 $\frac{3}{8}$	$\frac{1}{2}$	17	.75	16.00
13	1 x 2	1 $\frac{1}{2}$	$\frac{1}{2}$	25	1.00	22.50

Three-Bar Boring Tool



The head bolt and bottom part of holder are made of ample size to allow for fitting, which is necessary on account of the great variation in rests and sizes of T-Slots, and in the height of centers above the slide on various makes of lathes.

When so specified, we can furnish these Boring Tools fitted to any special dimensions, at an extra charge.

Each set is boxed separately and price includes Holder, three Armstrong Patent Boring Bars with straight and 45 deg. end caps, six High Speed Cutter Bits and Armstrong Combination Wrench.

General Specifications

Size Number.....	1-B	2-B	3-B	4-B
Diam. of Bars, inches...	$\frac{1}{2}$, $\frac{3}{4}$ & 1 $\frac{1}{4}$	$\frac{5}{8}$, $\frac{11}{16}$ & 1 $\frac{1}{8}$	$\frac{3}{4}$, 1 $\frac{1}{8}$ & 1 $\frac{1}{2}$	1 $\frac{1}{4}$, 1 $\frac{1}{2}$ & 1 $\frac{3}{4}$
Length of Bars, inches...	8, 11 & 16	9, 13 & 18	11, 16 & 21	13, 18 & 24
Size of Sq. Cutter Bits, inches.....	$\frac{1}{4}$, $\frac{3}{8}$ & $\frac{1}{2}$	$\frac{1}{4}$, $\frac{3}{8}$ & $\frac{1}{2}$	$\frac{1}{2}$, $\frac{3}{4}$ & 1	$\frac{1}{2}$, $\frac{3}{4}$ & 1
For Lathes Swinging, inches.....	14 to 16	16 to 18	20 to 22	24 to 32
Weight of Set complete, pounds.....	18	27	50	75
List Price Set complete..	\$22.50	\$30.00	\$52.50	\$75.00

Extra High Speed Cutter Bits

Size Square....inches	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$
List Price.....each	\$0.10	\$0.18	\$0.30	\$0.50	\$0.75	\$1.00	\$1.80

For Net Prices See Supplement

ARMSTRONG TOOL HOLDERS

Spring Threading Tools



This type of Threading Tool provides the resiliency which is considered necessary by many machinists to obtain a smooth finished thread, especially on extremely tough alloy steels. Convenient means are also provided for making the tool completely rigid when this is desired, as for instance, in taking a roughing cut or doing an ordinary job of turning.

The cutter bit can be held at various angles, by a convenient adjustment. Each Spring Threading Tool is boxed separately and price includes one High Speed V-Thread Cutter Bit and a Drop Forged Wrench.

General Specifications

Size Number	Size of Shank Inches	Size of Square Cutter Bit Inches	Weight of Tool Complete Pounds	List Price High Speed Cutter Bits Each	List Price Tool Complete Each
S-50	$\frac{3}{8} \times \frac{3}{8}$	$\frac{1}{8}$	$\frac{1}{2}$	\$0.35	\$4.15
S-51	$\frac{1}{2} \times 1 \frac{1}{8}$	$\frac{3}{8}$	1	.45	5.00
S-52	$\frac{3}{8} \times 1 \frac{3}{8}$	$\frac{5}{8}$	2	.55	6.40
S-53	$\frac{1}{2} \times 1 \frac{3}{8}$	$\frac{5}{8}$	$3 \frac{1}{4}$	.70	8.25

Threading Tools



These are the regular Armstrong Threading Tools, holding either Single Point or Chaser Cutters.

The cutters for these tools require grinding on the top face only in sharpening, and therefore always remain true to form and of correct angle, insuring perfect fitting threads. They are backed off to provide proper clearance. They are of eccentric form at the back, bearing against a hardened stop screw, which allows positive and accurate adjustment.

Each Threading Tool is boxed separately and price includes Wrench and one Single Point High Speed Cutter, for V. U. S. or Whitworth Standard thread.

Tools furnished with Single Point Sharp V Cutter unless otherwise specified. If wanted with cutter for U. S. or Whitworth threads, be sure to specify pitch or number of threads per inch.

General Specifications

Size No.	Size of Shank Inches	Weight of Tool Complete Lbs.	List Price Extra Cutters, Each				List Price Tool Complete Each
			Single Point		Chaser		
			Carbon	High Speed	Carbon	High Speed	
OOT	$\frac{3}{8} \times \frac{3}{8}$	$\frac{3}{8}$	\$1.90	\$2.65	\$2.65	\$4.15	\$4.15
50	$\frac{3}{8} \times \frac{7}{8}$	$\frac{7}{8}$	1.90	2.65	2.65	4.15	4.15
51	$\frac{1}{2} \times 1 \frac{1}{8}$	1 $\frac{1}{2}$	2.25	3.15	3.40	5.00	5.00
52	$\frac{3}{8} \times 1 \frac{3}{8}$	2 $\frac{3}{4}$	3.00	4.15	4.50	6.40	6.40
53	$\frac{3}{8} \times 1 \frac{3}{8}$	3 $\frac{1}{2}$	3.75	5.25	5.65	.....	8.25
54	$\frac{1}{2} \times 1 \frac{3}{8}$	4 $\frac{1}{4}$	3.75	5.25	5.65	.....	9.75
55	1 x 2	6 $\frac{1}{4}$	4.50	6.40	.....	.....	12.40

When ordering cutters (except Single Point V Cutters), it is always necessary to specify exact pitch or number of threads per inch.

High Speed Cutters will be furnished in all cases unless otherwise specified.

Carbon Steel Cutters are not guaranteed against drawing of temper.

Cutters should always be ground on a radial line from the point to the center of the hole, and then adjusted so that the newly ground cutting edge is horizontal.

Can be supplied in Carbon or High Speed Steel, and for Sharp V, U. S. Standard or Whitworth threads.



Chaser Cutter.

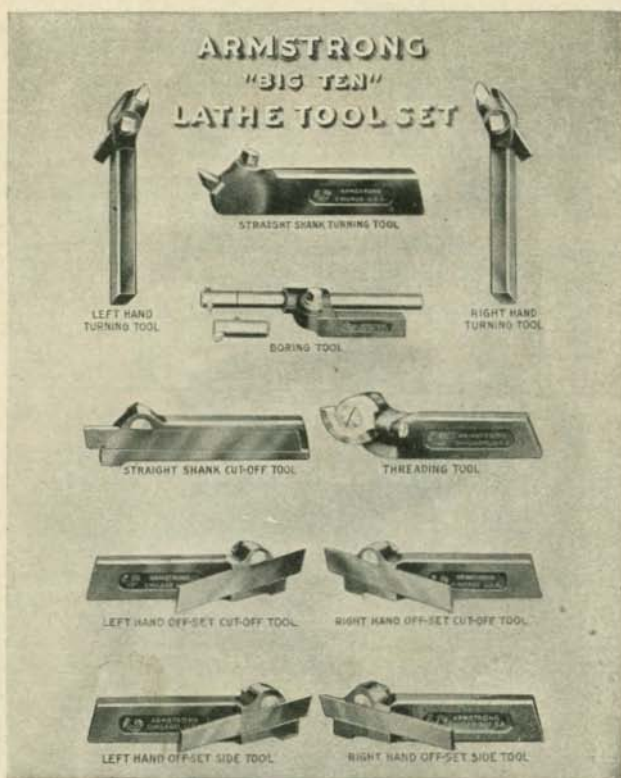
For Tool Number	Single Point Cutters All Standard Pitches	Chaser Cutters
OOT & 50	From 6 to 20, inclusive	14, 16, 18, 20 & 24*
51	From 5 to 20, inclusive	11 $\frac{1}{2}$ *, 12, 13†, 14, 16, 18, 20 & 24*
52	From 4 to 20, inclusive	8, 9, 10, 11, 11 $\frac{1}{2}$ *, 12, 13, 14, 16, 18 & 20
53, 54 & 55	From 3 to 20, inclusive	8, 9, 10, 11, 11 $\frac{1}{2}$ *, 12, 13, 14, 16, 18 & 20

*24—Pitch Chaser Cutters furnished in V-thread only.

†13—Pitch Chaser Cutters furnished in V and U. S. Standard thread only.

ARMSTRONG TOOL HOLDERS

Lathe Tool Sets



"Big Ten" Tool Holder Set

This set includes the ten tools shown above and practically covers the entire range of lathe work, so as to render entirely unnecessary the forging of individual tools with the attendant waste of time and material.

The "Handy Five" set is similar to the "Big Ten" set but is not as complete. It includes, however, the five lathe tools which are constantly used on all ordinary lathe work.

Straight Shank Turning Tool, Boring Tool, Threading Tool, Right Hand Off-Set Cutting-Off Tool and Right Hand Off-Set Side Tool.

Each Holder is equipped with Wrench and one High Speed Cutter.

General Specifications

Set Number		Size of Tool Shanks Inches	*Sizes of Lathes Recommended for	Weight of Set Complete, Lbs.		List Price per Set	
Big Ten	Handy Five			Big Ten	Handy Five	Big Ten	Handy Five
00	00-F	$\frac{1}{16} \times \frac{3}{4}$	7" to 10" Swing	6 $\frac{1}{2}$	4	\$31.40	\$17.45
0	0-F	$\frac{3}{16} \times \frac{1}{2}$	10" to 12" Swing	8 $\frac{1}{2}$	5	33.40	18.30
1	1-F	$\frac{1}{2} \times 1 \frac{1}{4}$	14" to 16" Swing	17	9 $\frac{1}{2}$	40.00	22.00
2	2-F	$\frac{5}{8} \times 1 \frac{1}{2}$	16" to 18" Swing	27	16	51.55	28.55
3	3-F	$\frac{3}{4} \times 1 \frac{3}{8}$	18" to 20" Swing	43	25	69.00	38.35
4	4-F	$\frac{1}{2} \times 1 \frac{3}{4}$	24" to 36" Swing	62	37	90.00	50.80
5	5-F	1 x 2	36" to 48" Swing	91	53	118.90	67.15

*As there is a wide variation in the proportions of lathes of different manufacture, it is only possible to give approximate size or swing of lathes for which the various sets of tools are adapted. Tool posts should be carefully measured before ordering tools.

For Net Prices See Supplement

ARMSTRONG TOOL HOLDERS

Knurling Tools



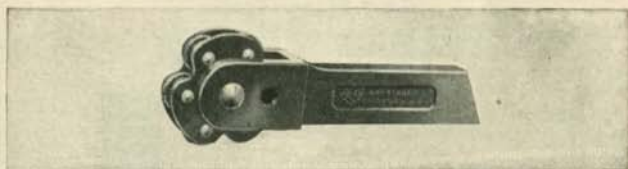
These tools are self-centering, and the knuckle or joint has ample bearing to resist the severe end and side thrust put upon it. The knurls and pins are of tool steel, accurately made and of proper hardness for the work. The body or shank is made of a heat-treated drop forging.

General Specifications

Size Number	Size of Shank Inches	Dimensions of Knurls, Inches			Weight of Tool Complete Lbs.	List Price Extra Knurls per Pair	List Price Tool Complete Each
		Diam.	*Face	Hole			
00-K	$\frac{5}{16} \times \frac{3}{4}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{7}{32}$	$\frac{5}{8}$	\$1.00	\$5.65
0-K	$\frac{3}{8} \times \frac{1}{2}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{7}{32}$	$\frac{1}{2}$	1.00	6.00
1-K	$\frac{1}{2} \times 1 \frac{1}{8}$	$\frac{5}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$1 \frac{1}{2}$	1.15	6.75
2-K	$\frac{3}{8} \times 1 \frac{3}{8}$	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	2	1.15	8.00

*Knurls with extra wide face ($\frac{5}{16}$ " wide for Nos. 00-K and 0-K, and $\frac{3}{8}$ " wide for Nos. 1-K and 2-K) will be supplied when required at regular prices. Regular width of face furnished unless otherwise specified.

Knurling Tool with Revolving Head



This is a Triple Knurling Tool, the advantage of which is obvious. The revolving head is fitted with three pairs of knurls—fine, medium and coarse. All three pitches of knurl are thus instantly available, without inconvenience or loss of time incident to changing the knurls. Made only in one size.

General Specifications

Size Number	Size of Shank Inches	Dimensions of Knurls Inches			Weight of Tool Complete Lbs.	List Price Extra Knurls per Pair	List Price Tool Complete Each
		Diam.	Face	Hole			
3-K	$\frac{1}{2} \times 1 \frac{1}{8}$	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	2	\$1.15	\$9.00

Knurls

Knurls can be supplied for any of the above tools with coarse, medium or fine pitch as illustrated. Also, all three pitches can be furnished in either Straight Line or Diamond pattern. Illustration shows Diamond pattern Knurling. In ordering, be sure to state whether coarse, medium or fine pitch Knurls are wanted. Medium Diamond Pattern Knurls always sent unless otherwise specified.



Coarse
14 Pitch
Medium
21 Pitch
Fine
33 Pitch

For Net Prices See Supplement

ARMSTRONG TOOL HOLDERS

Planer and Shaper Tools

These tools are carefully designed and are drop forged from a special steel possessing the properties of stiffness and strength. They are accurately machined and carefully heat-treated and hardened.

One of these tools is equal to a dozen forged tools on planer and shaper work. The cutter bit may be set at various angles and will handle work in very close corners.

They can be used to good advantage for cutting keyways by reversing the cutter bit and turning the tool around, which throws the cutting point behind the center of the tool, giving it the effect of a "goose-neck" tool.

Each Planer and Shaper Tool is boxed separately and price includes Wrench and one High Speed Cutter Bit.



General Specifications

Size Number	Size of Holder Inches	Size of Cutter Bit Inches	Weight of Tool Complete Lbs.	List Price High Speed Cutter Bits Each	List Price Tool Complete Each
* 40	1 1/2 x 1 x 6	1/4 x 3/8	1 3/4	\$0.35	\$4.65
*401	3/8 x 1 1/4 x 8 1/2	5/16 x 1/16	3 1/4	.55	6.00
*41	3/4 x 1 1/2 x 10	3/8 x 1/2	5	.80	7.85
42	1 1/8 x 1 3/4 x 13	1/2 x 3/4	11	1.95	12.40
43	1 3/8 x 2 x 16	5/8 x 7/8	19 1/2	3.35	21.75
44	1 7/8 x 2 1/4 x 19	3/4 x 1	35	5.00	39.00
45	2 1/8 x 2 3/4 x 22	7/8 x 1 1/8	51	8.20	57.00

*Sizes 40, 401 and 41 are recommended for Shaper work.

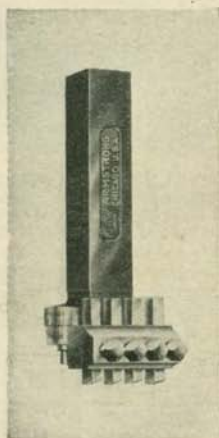
Gang Planer Tool

This Gang Planer Tool is particularly adapted for surfacing large castings, and on such work, will save a very large portion of the time required to do the same job with a single point tool.

The head is solidly secured to the shank, upon which it swivels to a limited degree by means of a deep, closely-fitted tongue and socket. After setting, the position is fixed by two steel collar screws, while two stop screws prevent slipping of the head. The head is graduated to facilitate setting the tool quickly and accurately to any desired feed.

As the chip taken by each cutter bit is comparatively light, a planer using this tool will easily handle a feed and depth of cut much greater than would be possible with an ordinary single point tool. Better work is also obtained as there is much less tendency for the material to "break out" at the end of the cut.

Each Gang Planer Tool is boxed separately and price includes one set of four High Speed Cutter Bits, Wrench and Grinding Gauge.



General Specifications

Size Number	Size of Shank Inches	Length Overall Inches	Size of Cutter Bits Inches	Feed Adjustment Inches	Weight of Tool Complete Lbs.	List Price High Speed Cutter Bits Each	List Price Tool Complete Each
61	1 1/4 x 1 3/4	10	3/8 x 1/2	0 to 1/4	10	\$0.85	\$26.00
62	1 3/8 x 2 1/4	12	1/2 x 11/16	0 to 3/8	20	1.70	44.00
63	2 x 2 3/2	14	5/8 x 7/8	0 to 1/2	35	2.80	60.00

For Net Prices See Supplement

ARMSTRONG LATHE DOGS



Bent Tail—
with Square
Head Screw.

Both the Straight Tail and Bent Tail Lathe Dogs can be furnished with either square head set screw or with headless hollow set screw, as preferred.

They are forged from a special grade of open hearth steel, giving them exceptional strength and toughness, and at the same time insuring the stiffness which is essential in a good lathe dog.

The Screws are of alloy steel with U. S. Standard threads, and are hardened on the point. The improved shape of the point makes them less liable to "flange" or upset. The hubs in which the screws operate are large enough to permit of retapping.



Straight Tail—
with Headless
Screw.

Size Number				Capacity Inches	Weight Each Pounds	Extra for Wrench for Headless Screw Each	*List Price Complete Each
Bent Tail		Straight Tail					
Square Head Screw	Head- less Screw	Square Head Screw	Head- less Screw				
1	1-H	21	21-H	3/8	1/4	\$0.12	\$1.00
2	2-H	22	22-H	1/2	3/8	.14	1.10
3	3-H	23	23-H	3/4	1/2	.16	1.20
4	4-H	24	24-H	1	3/4	.18	1.40
5	5-H	25	25-H	1 1/4	1 1/2	.20	1.70
6	6-H	26	26-H	1 1/2	2	.24	2.00
7	7-H	27	27-H	1 3/4	2 3/4	.26	2.40
8	8-H	28	28-H	2	3 1/2	.30	2.80
9	9-H	29	29-H	2 1/2	5 1/4	.38	3.60
10	10-H	30	30-H	3	6 3/4	.48	4.60
11	11-H	31	31-H	3 1/2	9	.60	6.00
12	12-H	32	32-H	4	12	.74	9.00
13	13-H	33	33-H	5	18	.90	16.00
14	14-H	34	34-H	6	24	1.10	24.00

*Price does not include Wrench. When ordering dogs with Headless Screws, specify whether Wrenches are wanted or not. When not otherwise specified, one wrench for each size dog ordered will be shipped and charged for. Bent Tail Dogs with Square Head Screws will be shipped when not otherwise specified.



Bent Tail
Safety Dog.

These Safety Lathe Dogs are furnished in both Straight Tail and Bent Tail types.

They combine the convenience and efficiency of the common lathe dog with a shield for the set screw head.

No special wrench is needed for these dogs. The extra leverage provided by the safety cap allows easy and fast adjustment of the set screw by hand.

The interior of the safety cap is shaped to conform to the head of the set screw, so that when the cap is turned the set screw turns with it, the head of the screw slipping up or down inside the cap.



Straight Tail
Safety Dog.

Size Number		Capacity Inches	Weight Each Pounds	List Price Complete Each
Bent Tail	Straight Tail			
1-A	21-A	3/8	1/4	\$1.80
2-A	22-A	1/2	3/8	1.90
3-A	23-A	3/4	1/2	2.00
4-A	24-A	1	3/4	2.30
5-A	25-A	1 1/4	1 1/2	2.80
6-A	26-A	1 1/2	2	3.40
7-A	27-A	1 3/4	2 3/4	4.00
8-A	28-A	2	3 1/2	4.80
9-A	29-A	2 1/2	5 1/4	6.00
10-A	30-A	3	7	7.60
11-A	31-A	3 1/2	9	10.00
12-A	32-A	4	12	14.00
13-A	33-A	5	18	21.00
14-A	34-A	6	25	30.00

Bent Tail Dogs will be shipped when not otherwise specified.

ARMSTRONG HEAVY DUTY LATHE DOGS



Bent Tail—with
Square Head
Screws.

Double screw dogs designed to meet the extreme requirement of high speeds and heavy feeds. These heavy duty lathe dogs are drop forged from steel particularly selected for its stiffness and tensile strength. The screws are of chrome nickel alloy steel with hardened points.

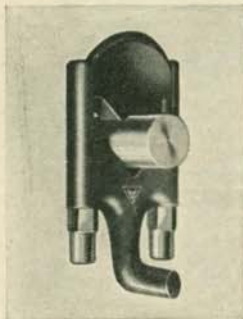
The Bent Tail type is made only in three sizes with 4, 5 and 6" capacities. The Straight Tail dogs range in size from 2" to 8" capacity, as shown in the specification below.



Straight Tail—
with Headless
Screws.

Size Number				Capacity Inches	Weight Each Pounds	Extra for Wrench for Headless Screws, Each	*List Price Complete Each
Bent Tail		Straight Tail					
Square Head Screws	Headless Screws	Square Head Screws	Headless Screws				
...	.....	128	128-H	2	5	\$0.30	\$ 5.50
...	.....	129	129-H	2½	6¾	.38	7.00
...	.....	130	130-H	3	8¾	.48	9.00
...	.....	131	131-H	3½	12½	.60	12.00
112	112-H	132	132-H	4	15	.74	16.00
113	113-H	133	133-H	5	21	.90	24.00
114	114-H	134	134-H	6	29	1.10	34.00
...	.....	135	135-H	7	37	1.30	46.00
...	.....	136	136-H	8	50	1.50	56.00

*Price does not include Wrench. When ordering dogs with Headless Screws specify whether Wrenches are wanted or not. When not otherwise specified, one Wrench for each size dog ordered will be shipped and charged for. Dogs with Square Head Screws will be shipped when not otherwise specified.

ARMSTRONG SAFETY
CLAMP LATHE DOG

The Safety Clamp Lathe Dog can be applied without removing the work from between centers of the lathe.

Especially adapted for uses on finished work, which might be damaged by the set screw of a common lathe dog.

Size No.	Capacity, Inches	Weight Each Pounds	List Price Complete Each
1-U	½ to ¾	½	\$ 2.40
2-U	¾ to 1	1¼	3.00
3-U	1 to 1½	3	4.00
4-U	1½ to 2	4½	5.50
5-U	2 to 3	9½	8.00
6-U	3 to 4	16	12.00
7-U	4 to 5	21	16.00

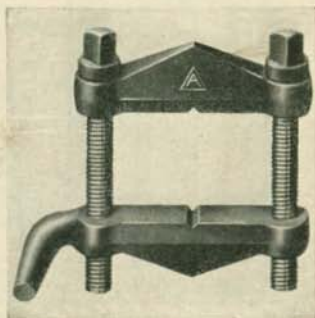
ARMSTRONG CLAMP LATHE DOGS

A clamp type dog with clamp bar forged from open hearth steel, carefully machined and hardened, and provided with hardened steel screws.

The under face of the screw heads is convex, fitting into a concave seat, and as the holes in the upper bar are larger in diameter than the screw, this allows considerable tilting without danger of bending the screws.

General Specifications

Size No.	Capacity Between Screws Inches	Weight Each Lbs.	List Price Complete Each
11	1½	¾	\$3.00
12	2¼	1	4.00
13	2¾	1½	5.00
14	3½	2¼	7.00



ARMSTRONG TOOLS Machine Strap Clamps

These clamps are used to advantage by saving time and labor in holding down work, fixtures, etc., on planers, punch presses, milling machines, boring mills and drill presses.



Plain Clamp



Screw Heel Clamp

Plain Clamp Specifications

No.	Length Inches	Width Inches	Thickness Inches	Size of Slot Inches		Weight Each Pounds	List Price Each
				Width	Length		
54	4	1 3/8	3/4	1 1/8	1 3/8	1	\$0.60
56	6	1 3/4	7/8	1 1/8	2 1/8	1 3/4	1.00
58	8	2 1/8	1 1/8	1 3/8	2 1/8	3 3/4	1.70
59	10	2 1/2	1 3/8	1 3/8	3 1/8	7	2.80

Screw Heel Clamp Specifications

No.	Length Inches	Width Inches	Thickness Inches	Size of Slot Inches		Weight Each Pounds	List Price Each
				Width	Length		
54-A	4	1 3/8	3/4	1 1/8	1 3/8	1 1/2	\$1.10
56-A	6	1 3/4	7/8	1 1/8	2 1/8	2	1.70
58-A	8	2 1/8	1 1/8	1 3/8	2 1/8	4	2.60
59-A	10	2 1/2	1 3/8	1 3/8	3 1/8	7 1/2	4.00



Gooseneck Clamp



Double Finger Clamp

Gooseneck Clamp Specifications

No.	Length Inches	Width Inches	Thickness Inches	Size of Slot Inches		Offset Inches	Weight Each Pounds	List Price Each
				Width	Length			
74	4	1 3/8	3/4	1 1/8	1 3/8	1 1/8	1	\$0.60
76	6	1 3/4	7/8	1 1/8	2 1/8	1 1/8	2	1.00
78	8	2 1/8	1 1/8	1 3/8	2 1/8	1 3/8	4 1/2	1.70

Double Finger Clamp Specifications

No.	Length Inches	Width Inches	Thickness Inches	Diam. Hole Inches	Size of Fingers Inches		Weight Each Pounds	List Price Each
					Diam.	Length		
30	3	1 1/8	3/4	1 1/8	1/2	1/2	3/8	\$0.40
35	3 1/2	1 3/8	3/4	1 1/8	5/8	5/8	5/8	.50
40	4	1 1/2	7/8	1 1/8	3/4	3/4	7/8	.70



"U" Clamp



Finger Clamp

"U" Clamp Specifications

No.	Length Inches	Width Inches	Thickness Inches	Size of Slot Inches		Size of Finger In.		Wt. Each Lbs.	List Price Each
				Wth.	Lth.	Diam.	Lth.		
44	4	1 3/8	3/4	1 1/8	1 3/8	1/2	1/2	3/4	\$0.60
46	6	1 3/4	7/8	1 1/8	2 1/8	5/8	5/8	1 1/2	1.00
48	8	2 1/8	1 1/8	1 3/8	2 1/8	3/4	3/4	3	1.70

Finger Clamp Specifications

No.	Length Inches	Width Inches	Thickness Inches	Size of Slot Inches		Size of Finger In.		Wt. Each Lbs.	List Price Each
				Wth.	Lth.	Diam.	Lth.		
64	4	1 3/8	3/4	1 1/8	3 1/2	7/8	7/8	1	\$0.60
66	6	2	3/4	1 1/8	5 1/2	1 1/8	1 1/8	2	1.00
68	8	2 3/8	1 1/8	1 3/8	7 3/8	1 3/8	1 3/8	4	1.70
110	10	2 3/4	1 3/4	1 3/8	9	1 3/8	1 3/8	6 1/2	2.50
112	12	3 1/4	1 3/4	1 3/8	11	1 3/8	1 3/8	11	3.70

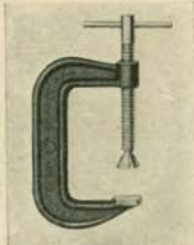
For Net Prices See Supplement



Heavy



Medium



Light

ARMSTRONG "C" CLAMPS

These Armstrong "C" Clamps can be supplied in either the Heavy, Medium or Light Design as tabulated below. All are made of Drop Forged Steel—properly heat treated and accurately finished.

Heavy Type

Size No.	Thickness Will Hold Inches	Depth of Throat Inches	Diameter of Screw Inches	Weight Each Pounds	List Price Each
9	0 to $\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	\$ 1.00
10	$\frac{3}{4}$ to $1\frac{1}{4}$	$1\frac{1}{2}$	$\frac{7}{8}$	$\frac{3}{4}$	1.50
11	$1\frac{1}{2}$ to $1\frac{3}{4}$	$1\frac{1}{2}$	$\frac{9}{8}$	$1\frac{1}{2}$	2.50
12	$\frac{1}{2}$ to $2\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{1}{8}$	$3\frac{1}{2}$	3.50
13	$1\frac{1}{4}$ to $3\frac{1}{4}$	$2\frac{1}{4}$	$1\frac{3}{8}$	6	5.00
14	$1\frac{1}{4}$ to $4\frac{1}{2}$	$2\frac{3}{4}$	$1\frac{3}{8}$	10	6.50
15	$2\frac{1}{2}$ to $5\frac{1}{2}$	$3\frac{1}{4}$	1	$13\frac{1}{2}$	8.00
16	$3\frac{1}{2}$ to $6\frac{1}{2}$	$3\frac{3}{4}$	$1\frac{1}{4}$	$18\frac{1}{2}$	10.00
18	$4\frac{1}{2}$ to $8\frac{1}{2}$	$4\frac{1}{4}$	$1\frac{1}{4}$	25	14.00
20	6 to $10\frac{1}{2}$	$4\frac{3}{4}$	$1\frac{3}{4}$	30	19.00
22	$7\frac{1}{2}$ to $12\frac{1}{2}$	4	$1\frac{1}{2}$	32	25.00

Medium Type

0	1 to 2	$1\frac{1}{2}$	$\frac{1}{2}$	$1\frac{1}{4}$	\$ 3.50
1	1 to 3	2	$\frac{3}{8}$	$2\frac{1}{2}$	4.00
2	2 to 4	$2\frac{3}{4}$	$\frac{3}{8}$	4	4.50
3	3 to 6	$2\frac{1}{2}$	$\frac{3}{8}$	6	5.50
4	4 to 8	$2\frac{3}{4}$	$\frac{3}{8}$	$7\frac{1}{4}$	6.50
5	6 to 10	$2\frac{3}{4}$	$\frac{3}{8}$	$8\frac{1}{2}$	7.50
6	8 to 12	$2\frac{3}{4}$	$\frac{3}{8}$	$11\frac{1}{2}$	8.50
7	10 to 15	$3\frac{1}{8}$	$\frac{3}{8}$	14	11.00
8	12 to 18	$3\frac{1}{4}$	$\frac{3}{8}$	18	14.00

Light Type

402	0 to 2	$1\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	\$1.50
403	0 to 3	2	$\frac{1}{2}$	$1\frac{1}{4}$	1.80
404	0 to 4	$2\frac{3}{4}$	$\frac{3}{8}$	2	2.20
406	$\frac{1}{4}$ to 6	3	$\frac{3}{8}$	3	3.00
408	$1\frac{1}{2}$ to 8	$3\frac{1}{4}$	$\frac{3}{8}$	$4\frac{1}{2}$	4.00
410	$2\frac{1}{2}$ to 10	$3\frac{3}{4}$	$\frac{3}{8}$	6	5.00
412	$3\frac{1}{2}$ to 12	4	$1\frac{1}{8}$	$7\frac{1}{2}$	6.50

ARMSTRONG TOOLMAKERS' "C" CLAMP

These clamps are forged from high grade heat-treated steel. The forged screws have a square neck for convenience in tightening with the wrench, and are fitted with swivel caps.



General Specifications

No.	Capacity Inches		Depth Center of Screw to Back Inches	Diam. of Screw Inches	Weight Pounds	Extra Screws with Swivel Cap Each	List Price Each Complete
	Min. In.	Max. In.					
301	$\frac{1}{4}$	1	$1\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	\$0.90	\$1.80
302	$\frac{3}{4}$	2	$1\frac{1}{8}$	$\frac{3}{8}$	$\frac{3}{4}$	1.00	2.10
303	1	3	$1\frac{1}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	1.20	2.70
304	$1\frac{1}{4}$	4	$1\frac{1}{2}$	$\frac{7}{8}$	1	1.60	3.70

BOILERMAKERS' MALLEABLE CLAMPS

A most desirable and serviceable type of clamp for boiler-makers. Made of a malleable casting, with high grade, hardened tool steel screw, which is provided with a bar for turning and will entirely close the opening. Only made in the one size.

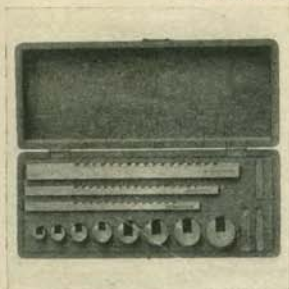
Thickness will hold 3"
Depth of Throat 3"
Weight, each 8 Lbs.
List Price, each \$5.00



For Net Prices See Supplement

LA POINTE KEYWAY SETS

Handy Keyway Set



Handy Type



In Operation

The Handy Set is an assortment of tools developed to meet the demand of small machine shops, garages and similar places that do not have sufficient work to warrant the purchase of broaching machines and their equipment. Splines can be cut in cams, pulley hubs, gears, levers, and many other parts of metal or fibre.

This set consists of three cutter bars, three shims, and eight work bushings, packed in a substantial box. Press is not included. Capacity is twelve keyways as follows:

$\frac{1}{8}$ " keyway in work up to $1\frac{1}{8}$ " long

$\frac{3}{16}$ " keyway in work up to $1\frac{3}{8}$ " long

$\frac{1}{4}$ " keyway in work up to 2" long

Diameter of work bushings $\frac{5}{8}$ ", $\frac{3}{4}$ ", $\frac{7}{8}$ ", 1", $1\frac{1}{8}$ ", $1\frac{1}{4}$ ", $1\frac{3}{8}$ " and $1\frac{1}{2}$ ".

$\frac{1}{8}$ " and $\frac{3}{16}$ " keyways in holes $\frac{3}{8}$ ", $\frac{3}{4}$ ", $\frac{7}{8}$ " and 1".

$\frac{1}{4}$ " keyways in holes $1\frac{1}{8}$ ", $1\frac{1}{4}$ ", $1\frac{3}{8}$ " and $1\frac{1}{2}$ ".

Specially shaped cutterbars, such as half-round, dovetail, etc., are furnished at a small additional price.

Giant Keyway Set



Giant Type

This set consists of four cutter-bars, four shims, one push bar, and eight work bushings having a greater capacity than the Handy Keyway Set. Splines of greater length and depth can be cut in cams, hubs, gears, etc., in either metal or fibre. All cutter bars are interchangeable with each work bushing.

The capacity of the Giant Set in thirty-two keyways is as follows:

$\frac{5}{16}$ " keyway in work up to 6" long

$\frac{3}{8}$ " keyway in work up to 6" long

$\frac{7}{16}$ " keyway in work up to 6" long

$\frac{1}{2}$ " keyway in work up to 6" long

Diameter of work bushings $1\frac{1}{16}$ ",

$1\frac{2}{16}$ ", $1\frac{4}{16}$ ", $1\frac{6}{16}$ ", $1\frac{8}{16}$ ", $1\frac{10}{16}$ ", $2\frac{2}{16}$ ", $2\frac{4}{16}$ ",

$2\frac{6}{16}$ ".

LA POINTE BROACHES

These round broaches were developed to meet the demand of machine shops, garages, and service stations that do not have sufficient work to warrant the purchase of broaching machines. They are made to give complete satisfaction, being the outcome of years of experience in this work. They can be used with any type of screw or arbor press of suitable capacity. These broaches, ground all over, with uniform lands and chip clearance, produce smooth round holes. They can be furnished for connecting rod main bearings and piston pin bushings for any make of car, in the following sizes.

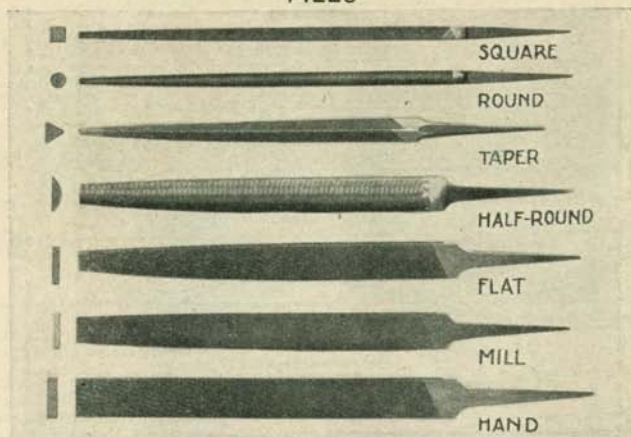
$\frac{7}{8}$ ", $1\frac{1}{16}$ ", $1\frac{1}{8}$ ", $1\frac{1}{4}$ ", $1\frac{3}{8}$ ", $1\frac{1}{2}$ ", $1\frac{5}{8}$ ", $1\frac{3}{4}$ ", $1\frac{7}{8}$ ", $1\frac{9}{16}$ ", $1\frac{11}{16}$ ", $1\frac{3}{4}$ ", $1\frac{13}{16}$ ", $1\frac{7}{8}$ ", $2\frac{1}{8}$ ", $2\frac{1}{4}$ ", $2\frac{3}{8}$ ", $2\frac{1}{2}$ ".

They may also be had in oversizes from .0025" to .015". In ordering, for automobile work, specify make of car, model, year of manufacture, also whether standard or oversize; if oversize, give amount.



For Net Prices See Supplement

FILES



List Prices Per Dozen

Size In.	MILL			MILL 1 R. E.		MILL 2 R. E.		MILL BLUNT	
	Bast.	2nd Cut	Smooth	Bast.	2nd Cut	Bast.	2nd Cut	Bast.	2nd Cut
3	\$ 3.00								
4	3.00	\$ 3.50							
5	3.20	3.80							
6	3.50	4.00	\$ 4.50	\$ 3.90	\$ 4.50	\$ 4.40	\$ 5.00	\$ 3.90	\$ 4.60
7	4.30	4.60		4.40	5.20	4.90		4.30	4.90
8	4.90	4.90	5.40	4.80	5.50	5.40	6.10	4.90	5.80
9	4.90	5.80		5.50	5.50	6.70			
10	5.60	6.40	7.00	6.30	7.20	7.00	8.00	6.70	7.80
12	7.50	8.60	9.40	8.40	9.70	9.40	10.80		
14	10.70	12.20	13.10	12.00					
16	14.70	16.80	17.90						
18	20.20								

Size In.	FLAT			HAND			SQUARE		
	Bast.	2nd Cut	Smooth	Bast.	2nd Cut	Smooth	Bast.	2nd Cut	Smooth
4	\$ 3.70	\$ 4.30	\$ 4.70	\$ 3.70	\$ 4.30	\$ 4.80	\$ 3.80	\$ 4.60	\$ 4.90
5	3.90	4.60	4.90	3.90	4.70	5.30	4.10	4.80	5.30
6	4.30	4.80	5.30	4.30	5.10	5.60	4.60	5.10	5.50
7	4.80	5.50	6.60	4.90	5.80	6.30	5.10	5.80	6.30
8	5.30	6.10	6.10	5.40	6.30	6.70	5.50	6.30	7.00
9	6.30	7.20	7.90	6.70	7.80	8.30			
10	7.00	8.10	8.70	7.50	8.70	9.40	7.40	8.50	9.10
12	9.70	11.00	12.10	10.70	12.30	13.50	10.20	11.50	12.80
14	13.30	15.30	16.70	15.00	17.00	18.20	13.90	16.10	17.50
16	17.80	20.10	22.30	20.10	22.80	24.20	18.70	21.20	23.30
18	23.90	26.80	29.20	26.80	29.90	31.50	25.10	28.20	30.40
20	31.50			35.10			32.80		

Size In.	TAPER			ROUND			HALF ROUND		
	Sgl. Cut	Dbl. Cut	Slim Tapers	Bast.	2nd Cut	Smooth	Bast.	2nd Cut	Smooth
3	\$ 2.10		\$ 2.10						
3½	2.10		2.10						
4	2.20	\$ 2.90	2.20	\$ 3.00	\$ 3.50	\$ 3.90	\$ 4.80	\$ 5.60	\$ 6.10
4½	2.40	3.10	2.30						
5	2.60	3.50	2.50	3.20	3.80	4.10	5.40	6.10	6.40
5½	3.00		2.90						
6	3.40	4.70	3.10	3.50	4.00	4.50	6.10	6.70	7.10
7	4.30	5.60	3.80	3.90	4.60	4.90	7.00	7.70	8.20
8	5.40	6.70	4.50	4.30	4.90	5.40	7.50	8.30	8.90
9				4.90	5.80	6.30			
10	8.10		6.40	5.60	6.40	7.00	9.10	10.10	10.70
12	12.50		9.50	7.50	8.60	9.40	11.80	13.00	13.90
14				10.70	12.20	13.10	15.50	17.00	18.30
16				14.70	16.80	17.90	20.60	22.50	24.20
18				20.20	22.70	24.30	27.50	29.90	32.00
20				27.40					

FILE HANDLES

Approximate Size	For Files Inches	List Prices	
		Per Gross	Per Dozen
4" x 1"	4-6	\$9.45	\$ 0.90
4¼" x 1½"	6-8	10.60	1.00
4½" x 1¾"	8-10	11.85	1.10
4¾" x 1¾"	12-14	13.30	1.20
5" x 1½"	16-18	14.85	1.40

For Net Prices See Supplement

OLIVER DIE MAKING MACHINES

Type S-1

This die making machine has a capacity of sawing $1\frac{1}{4}$ " thick tool steel to the center of a 17" circle. Special overarms for increasing capacity up to 36" can be furnished at a small additional cost. The Offset Overarm permits sawing $5\frac{1}{4}$ " strip any length from any width piece and up to $1\frac{1}{4}$ " thick; also extra high overarm with $8\frac{1}{2}$ " radius for wood, fibre, bakelite, etc., up to 4" thick.

The table is 9" square and tilts 10 degrees on either side. The reciprocating ram is made of hard high carbon steel and is made so as to insure permanent alignment. Its stroke is $1\frac{3}{8}$ " at about 500 per minute. The improved universal chuck which is attached directly to the ram will grip saws, lapping sticks and any shape or size of commercial hand files that will enter the chuck, as well as Oliver of Adrian Parallel Machine Files in sizes up to $\frac{3}{8}$ " square, $\frac{1}{2}$ "



S-1 for Sawing

pillar and $\frac{1}{2}$ " round. It has a $\frac{5}{8}$ " hole through center, and permits vertical adjustment of any length saw or file so as to utilize the entire cutting surface.

The motor is connected directly to pinion shaft through a universal coupling. It is $\frac{1}{4}$ H. P., standard enclosed with a speed of 1400 to 1750 R. P. M. 110 or 220 volt direct 25 or 60 cycle, single phase alternating current.

The equipment includes standard overarm; hold-down post and bracket; file-roller support; chuck wrench; oilstone holder; flat oilstone; one dozen assorted 4" saws and pusher; and two wrenches.

The whole machine occupies a bench space of $8 \times 13\frac{1}{2}$ " and weighs about 95 lbs., including equipment. Shipping weight about 115 lbs.

Type S-4



S-4 for Filing

to type S1 except that it is propelled by motor-belt drive having two speeds which permits of a wide range of usefulness. The higher speed is used on the softer materials such as brass, wood fibre, etc. The space occupied by this machine is $8 \times 15\frac{1}{4}$ ". The equipment includes a belt for pulley. Shipping weight is 115 lbs.

Pedestal Types

Type SP-2

The specifications of this machine are similar to the portable bench type S-4 above, except that the floor space occupied is $13\frac{1}{2}$ " \times $14\frac{1}{2}$ " and shipping weight 240 lbs.

Type P-4

This machine is made with the same outstanding features as all the above mentioned die making machines, but is intended for heavy duty. It is larger, having an overarm throat of 14" to permit cutting to center of 28" circle. The capacity is 2" in tool steel. The ram has a 1" hole through the center and makes 250, 350 and 450 strokes per minute.

The chuck holds file sizes up to $\frac{5}{8}$ " square

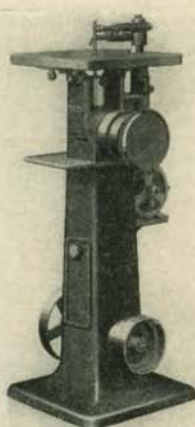


Type SP-2

$\frac{3}{4}$ " pillar and $\frac{5}{8}$ " round, and has $\frac{3}{8}$ " center hole. Drive is by belted $\frac{1}{2}$ H.P. motor. The equipment includes besides that mentioned above, a 7" die clamp, a screw-feed sawing attachment, and a $7\frac{1}{2}$ " saw blade instead of files. The floor space required is 18×18 ". Shipping weight 475 lbs.

Type P-5

Type P-5 is the same as type P-4 except that it is fitted with tight and loose pulleys or belt drive.



Type P-4

For Net Prices See Supplement

BURKE MILLING MACHINES



No. 1

The knee which is of solid top construction and very rigid can be locked in any position. All bearing surfaces are scraped to perfect alignment. Knee, saddle and table are held in place by adjustable gibs. The head is adjustable to two positions.

The No. 0 and No. 1 machines are all hand feed built without overhanging arms. See illustration of No. 1 machine above. No. 2 has power longitudinal feed and is also built without overhanging arm. It has graduated dials on transverse and vertical feeds. No. 3 is similar to No. 1 except that it has a heavy overhanging arm and in like manner No. 4 differs from No. 2.

Attachments

Many attachments can be furnished for the Burke machines at an extra charge. Index centers are especially designed for the rapid production and indexing of light work of any kind. The Slotting attachment is backgeared so that a heavy cut can be taken and is for use on No. 3 and No. 4 milling machines. A Vertical Milling Attachment is adapted for the No. 3 and No. 4 machines with a spindle constructed to use draw-in collets. One collet either $\frac{1}{4}$, $\frac{3}{8}$ or $\frac{1}{2}$ inch is furnished with the attachment, $\frac{1}{2}$ inch collet being the largest which can be used.

Draw-in attachments are made for all these, but for No. 0 must be ordered with the machine. No. 3 Cataract chucks with a maximum capacity of $\frac{1}{2}$ inch are used exclusively.

Vises with solid or swivel base can be supplied when specified.

A 32-inch column for the No. 0 or either a 23-inch or 28-inch column for Nos. 1 to 4 can be supplied at an extra charge.



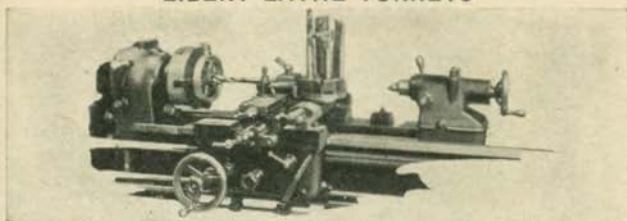
No. 4

General Specifications

No.	0	1	2	3	4
Long. Feed, in.	4 $\frac{1}{2}$	8	8	8	8
Long. Feed with one lever setting in.	4 $\frac{1}{2}$	5		5	
Transverse Feed, in.	1 $\frac{1}{2}$	3 $\frac{3}{8}$	3	3 $\frac{3}{8}$	3
Vertical Feed, in.	3 $\frac{1}{4}$	4 $\frac{1}{2}$	6 $\frac{1}{4}$	7 $\frac{1}{2}$	8
Max. distance Spindle to table, in.	4 $\frac{1}{4}$	5 $\frac{1}{4}$	6 $\frac{1}{4}$	7 $\frac{1}{2}$	8
Working surface, in.	3x9	3 $\frac{1}{2}$ x12	3 $\frac{1}{2}$ x16	3 $\frac{1}{2}$ x12	3 $\frac{1}{2}$ x16
Distance between centers, in.		3 $\frac{3}{4}$	7 $\frac{1}{2}$	3 $\frac{3}{4}$	7 $\frac{1}{2}$
Larg. Dia. Cone, in.	4 $\frac{1}{4}$	6	6	6	6
Smallest Dia. Cone, in.	2 $\frac{1}{4}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$
Width Driving Belt, in.	1 $\frac{1}{4}$	2	2	2	2
B and S Taper hole, No.	7	9	9	9	9
Hole in spindle, in.	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$
Height over all, in.	15 $\frac{1}{2}$	21	22	25 $\frac{1}{2}$	25 $\frac{1}{2}$
Size of loose pulley, in.	7x2 $\frac{1}{4}$	7x2 $\frac{1}{4}$	7x2 $\frac{1}{4}$	7x2 $\frac{1}{4}$	7x2 $\frac{1}{4}$
Speed Countershaft, R.P.M.	280	280	280	280	280
Shipping weight, lbs.	160	250	290	300	350

For Net Prices See Supplement

LIBERT LATHE TURRETS



Turret Shown on Lathe

The turret serves the purpose of making the engine lathe more efficient, productive, convenient, and economical in operation. The illustration shows a turret which is the product of years of development by practical mechanics. This turret is fastened to the back of the carriage where it is always ready to be swung into operating position, or out of position as quickly as changing a tool bit in the tool holders. It does not interfere with the regular operation of the lathe, but doubles and triples capacity for centering, drilling, boring, and reaming. When used for centering, drilling or reaming it is self centering. There is a micrometer index on the screw for boring. Bars are held rigidly in a saddle having a long bearing on the bar and secured by a clamp. It can be equipped with self opening dies, taps, box tools, floating reamers, and other turret tools.

General Specifications

No.	For Lathe	No.	For Lathe
1	14"-15"	3	20"-22"
2	16"-18"	4	24"

Boring Bars and Tools for Libert Turrets



Tool Holder

Drill Sleeve

"A" Bar

Adj. Small Bar Holder

"B" Bar

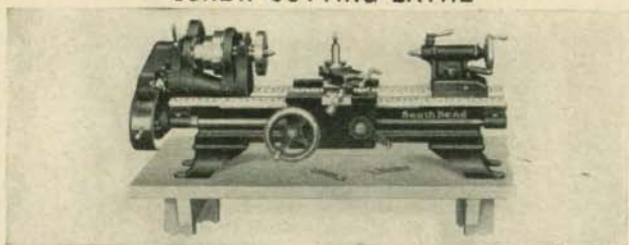
General Specifications

No.	Tools for No. 1 Turret	No.	Tools for No. 2 Turret
1	Universal Tool Holder.	2	Universal Tool Holder.
11	Drill Sleeve, each.	21	Drill Sleeve, each.
	Made in No. 2 and 3 Morse Taper (Specify No. Taper).		Made in No. 2, 3, and 4 Morse Taper (Specify No. Taper).
12	Adj. Small Bar Holder.	22	Adj. Small Bar Holder.
	Made for $\frac{3}{8}$ " or $\frac{3}{4}$ " Bars.		Made for $\frac{3}{8}$ ", $\frac{3}{4}$ " or $\frac{7}{8}$ " Bars.
	1 Bar furnished with each holder.		1 Bar furnished with each holder.
1 AS	Bar 1"x4 $\frac{1}{2}$ ".	2 AS	Bar 1"x4 $\frac{1}{2}$ ".
1 AL	Bar 1"x7".	2 AL	Bar 1"x7".
1 BS	Bar 1"x4 $\frac{1}{2}$ ".	2 AXL	Bar 1"x10".
1 BL	Bar 1"x7".	2 BS	Bar 1"x4 $\frac{1}{2}$ ".
		2 BL	Bar 1"x7".
		2 BXL	Bar 1"x10".

No.	Tools for No. 3 Turret	No.	Tools for No. 4 Turret
3	Universal Tool Holder.	4	Universal Tool Holder.
31	Drill Sleeve.	41	Drill Sleeve.
	Made in No. 3 and 4 Morse Taper (Specify No. Taper).		Made in No. 3 and 4 Morse Taper (Specify No. Taper).
32	Adj. Small Bar Holder.	42	Adj. Small Tool Holder.
	Made for $\frac{3}{8}$ ", $\frac{3}{4}$ ", $\frac{7}{8}$ ", or 1" Bars.		Made for $\frac{3}{4}$ ", $\frac{7}{8}$ " or 1" Bars.
	1 Bar furnished with each Holder.		1 Bar furnished with each Holder.
3 AS	Bar 1 $\frac{1}{4}$ "x5 $\frac{1}{2}$ ".	4 AS	Bar 1 $\frac{1}{4}$ "x6".
3 AL	Bar 1 $\frac{1}{4}$ "x9".	4 AL	Bar 1 $\frac{1}{2}$ "x10".
3 AXL	Bar 1 $\frac{3}{4}$ "x12".	4 AXL	Bar 1 $\frac{3}{4}$ "x13".
3 BS	Bar 1 $\frac{1}{4}$ "x5 $\frac{1}{2}$ ".	4 BS	Bar 1 $\frac{1}{4}$ "x6".
3 BL	Bar 1 $\frac{1}{4}$ "x9".	4 BL	Bar 1 $\frac{1}{2}$ "x10".
3 BXL	Bar 1 $\frac{3}{4}$ "x12".	4 BXL	Bar 1 $\frac{3}{4}$ "x13".

For Net Prices See Supplement

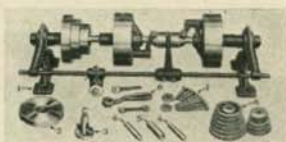
SOUTH BEND JUNIOR BACK GEARED SCREW CUTTING LATHE



No. 22

The No. 22, 9-inch Junior Screw Cutting Bench Lathe, used with the various attachments, can be made to cover a wide range of special work. It cuts threads 4 to 40 per inch, right or left, including $11\frac{1}{2}$ per inch pipe threads with power feed to carriage. It is made with back geared head stock giving six changes of spindle speeds; a ground head stock spindle of special carbon steel which can be fitted with a 6-inch chuck; hand scraped phosphor-bronze bearings, compound rest graduated 180 degrees; and precision lead screw $\frac{1}{8}$ " in diameter with 8 threads per inch. The automatic longitudinal screw feed permits various cutting feeds, fine or coarse, obtained through the gears furnished with the lathe.

Operation is by overhead countershaft or $\frac{1}{4}$ H. P. motor run by ordinary lighting current. Information regarding these machines will be furnished on request.

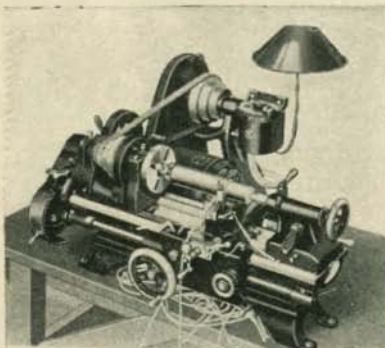


Equipment

General Specifications

No.	Swing Over Bed, Inches	Length of Bed, Feet	Dist. Bet. Centers, Inches	Spindle Hole, Inches	Swing Over Carriage, Inches	Shipping Weight, Lbs.
22 YC	$9\frac{1}{4}$	3	18	$\frac{3}{4}$	$6\frac{3}{4}$	375
22 ZC	$9\frac{1}{4}$	$3\frac{1}{2}$	23	$\frac{3}{4}$	$6\frac{3}{4}$	400
22 AC	$9\frac{1}{4}$	4	29	$\frac{3}{4}$	$6\frac{3}{4}$	425
22 RC	$9\frac{1}{4}$	$4\frac{1}{2}$	36	$\frac{3}{4}$	$6\frac{3}{4}$	450

SELF CONTAINED UNIT MOTOR DRIVE No. 722 FOR 9-INCH JUNIOR BENCH LATHE



No. 722

This unit as shown in the accompanying illustration may be applied to the above mentioned bench lathe. It consists of a $\frac{1}{4}$ H. P. 1200 R.P.M. motor of the proper type connected direct to countershaft through a reduction gear and pinion and then by belt to the lathe spindle. When the drive and lathe are mounted they form a complete unit ready for operation.

The regular equipment includes motor, belt countershaft and its parts, extension cord and drum type Westinghouse (or equivalent) reversing switch.

General Specifications Lathe and Drive Complete

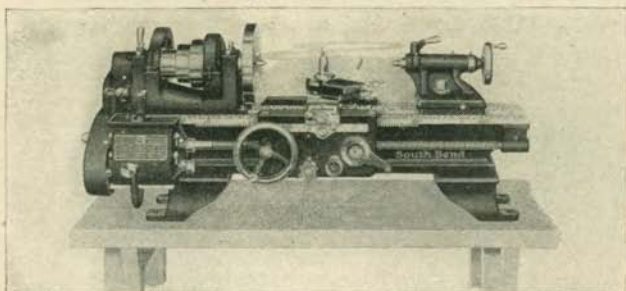
Lathe and Drive No.	Swing Over Bed, Inches	Length of Bed, Feet	Shipping Weight, Pounds
722 YC	$9\frac{1}{4}$	3	470
722 ZC	$9\frac{1}{4}$	$3\frac{1}{2}$	500
722 AC	$9\frac{1}{4}$	4	530
722 RC	$9\frac{1}{4}$	$4\frac{1}{2}$	560

Various attachments such as the following can be furnished for these lathes: lathe and drill chucks; draw-in attachments with collets; center and follow rests; semi-automatic turret heads and tool posts; taper attachments; thread indicators; milling and keyway cutting attachments.

For Net Prices See Supplement

THE NEW SOUTH BEND BENCH LATHE

Quick Change and Standard Gear



These bench lathes are excellent for light production work in manufacturing, yet have the precision and accuracy for fine tool room work and the capacity for a wide variety of small machine work.

The new quick-change gear box provides changes for cutting right and left-hand screw threads from 2 to 112 per inch. It also provides for adjustment of the automatic cross feed and automatic longitudinal feed.

The standard change gear lathe is the same as the quick change gear except that it is equipped with a set of individual change gears instead of a lever controlled quick-change gear box mechanism. The individual change gears provide adjustment for the automatic feeds and for cutting standard screw threads left and right, from 2 to 40 per inch including 11½ per inch pipe thread. A swinging gear guard permits convenient changing and complete protection of gears as well.

Regular equipment includes complete parts, Simplex drive counter-shaft, or Self-Contained Unit motor drive.

General Specifications 9-inch South Bend Lathes

Swing over Bed	Length of Bed	Between Centers	Hole Thru Spindle	Power Required	Shipping Wt. Lbs.	Quick Change No.	Standard Change No.
9 1/4"	2 1/2'	11"	3/4"	1/4 H.P.	405	82 XB	31 XB
9 1/4"	2'	18"	3/4"	1/4 H.P.	425	82 YB	31 YB
9 1/4"	3 1/2'	23"	3/4"	1/4 H.P.	445	82 ZB	31 ZB
9 1/4"	4'	29"	3/4"	1/4 H.P.	465	82 AB	31 AB
9 1/4"	4 1/2'	36"	3/4"	1/4 H.P.	490	82 RB	31 RB

11-inch South Bend Lathes

11 1/4"	3'	12"	7/8"	1/2 H.P.	575	84 YB	33 YB
11 1/4"	3 1/2'	18"	7/8"	1/2 H.P.	600	84 ZB	33 ZB
11 1/4"	4'	24"	7/8"	1/2 H.P.	625	84 AB	33 AB
11 1/4"	5'	36"	7/8"	1/2 H.P.	705	84 BB	33 BB

SIMPLEX MOTOR DRIVE FOR 9 AND 11 INCH SOUTH BEND BENCH LATHES

The Simplex Motor Drive for all types of 9 and 11 inch bench lathes is practical for the shop not equipped with line shaft. Regular equipment includes 9 or 11 inch quick change or standard change gear bench lathe with the lathe equipment, Simplex countershaft, two leather belts, reversing switch, extension cord, and proper type and size reversing motor. Wooden Benches (No. 129) with 72 x 28" x 1 1/4" top can be supplied with metal standards for countershaft base at extra charge.

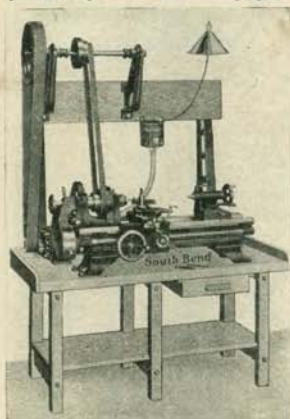
Complete information will be furnished on request.

General Specifications 9-inch Simplex Units

Swing Over Bed, In.	Length Bed, Ft.	Shipping Wt. Lbs.	Catalog. No. of Lathe	
			Quick Change	Std.
9 1/4"	2 1/2'	505	582XB	531XB
9 1/4"	3'	525	582YB	531YB
9 1/4"	3 1/2'	545	582ZB	531ZB
9 1/4"	4'	565	582AB	531AB
9 1/4"	4 1/2'	585	582RB	531RB

11-inch Simplex

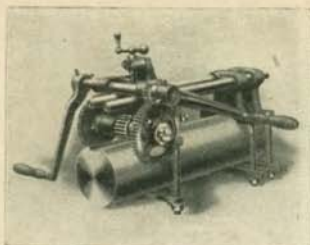
11 1/4"	3'	675	584YB	533YB
11 1/4"	3 1/2'	700	584ZB	533ZB
11 1/4"	4'	725	584AB	533AB
11 1/4"	5'	805	584BB	533BB



Motor Drive With Lathe

BURR KEYSEATERS

Hand Keyseater



No. 1

adjustment of the cutters is made easily and quickly without the use of spacing collars.

These machines are well designed and carefully built of the best materials, and have been in general use for many years. Parts and cutters are interchangeable, so that they may be obtained without any inconvenience.

Its ability to mill keyways in the ends or middle of shafting already erected without removal from hangers or boxes makes this machine particularly suitable for repair, alteration, and erection work, as well as valuable to factories of every description where keyseating is required.

The four sizes of this type of machine are made to mill keyways up to 12 inches long at each setting. The roller support on each eliminates jar and chatter thereby insuring keyways with straight sides and smooth bottoms.

An automatic feed is provided but it may be disengaged to allow the cutterhead to be fed by hand. The width

General Specifications

Machine Number	1	1A	2	3
Largest Shaft Capacity, inches.....	5	6	8	12
Will mill at each setting, inches.....	12	12	12	12
Number of Cranks.....	1	2	2	2
Number of Cutters in set.....	5	6	6	7
Will mill all widths, inches.....	$\frac{1}{4}$ - $1\frac{1}{8}$	$\frac{1}{4}$ - $1\frac{1}{4}$	$\frac{1}{4}$ - $1\frac{1}{2}$	$\frac{1}{4}$ - $2\frac{1}{2}$
Net weight, lbs.....	80	85	200	325
Shipping weight, lbs.....	110	115	250	390

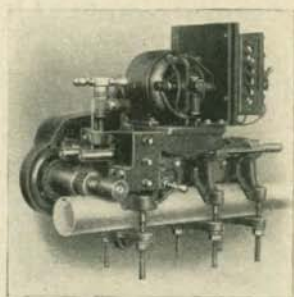
Power Keyseaters

Where keyseating work is so great that the hand power machine is inadequate the Burr Keyseaters Nos. 11, 12 and 13 are very serviceable. These machines correspond in capacity to the hand operated machines, described above, and operate on the same general principles.

The motor for use on any available current is mounted on a substantial platform bolted to the cutter-slide. It is connected to the spindle through a train of cut gearing carried in a strong cast iron case.

A set of milling cutters is furnished with each machine. By using several in combination, it is possible to cut any desired width from $\frac{1}{4}$ " to the capacity of the machine varying to the sixteenth of an inch. The equipment also includes switch, ten feet of cord with attachment plug, and all necessary binders, binder studs and wrenches.

These machines are built for hard and continuous service.



No. 11

General Specifications

Machine Number	11	12	13
Largest Shaft Capacity, inches.....	5	8	12
Will mill at each setting, inches.....	12	12	12
H. P. of Motor.....	$\frac{1}{2}$	$\frac{3}{4}$	1
Speed of Motor, R. P. M.....	1725	1725	1725
Number Cutters in set.....	5	6	7
Will Mill all widths, inches.....	$\frac{1}{4}$ to $1\frac{1}{8}$	$\frac{1}{4}$ to 2	$\frac{1}{4}$ to $2\frac{1}{2}$
Net weight, lbs.....	175	425	525
Shipping weight, lbs.....	225	500	725

UNDERWOOD CRANK PIN TURNING MACHINE

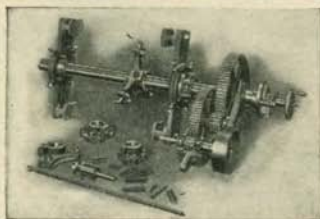
The Portable Crank Pin Turning Machine has been designed for turning up crank pins on side crank engines, with disc or bell shaped crank. The work is always in full view of the operator. Four set screws passing thru the cutter-head, centre the machine in the same manner as a lathe chuck. It can be set up so as to give original alignment to the pin. The finish is true smooth and accurate.

An attachment for reboring crank pin holes can be furnished when ordered.



No. Size	Max. Dia. will Turn	Length of Pin will Turn	Diam. of Pins Suitable for	Weight	
				Net	Gross
1	8½ in.	Up to 14½ in.	8 in. down	280	380
2	12 in.	Up to 20 in.	12 in. down	400	520
3	15 in.	Up to 20 in.	15 in. down	650	900
4	20 in.	Up to 23 in.	20 in. down	2150	2300
5	24 in.	Built to order			

UNDERWOOD PORTABLE BORING BAR FOR GENERAL WORK



The Portable Cylinder Boring Bar has been designed for boring all sizes of steam engine cylinders, valve chambers, pumps, large wheels, etc. In cylinder reboring it is only necessary to take off cylinder head and remove piston.

Hand wheel or pulley for power can be furnished as specified. Universal driving attachment to permit transmission of power in any direction can be had at an extra charge.

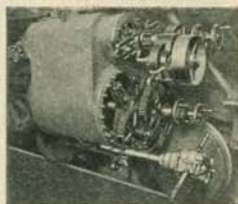
Other sizes of bars can be made to order.

Diam. Bar	Length Bar	Boring Capacity	Max. Boring Length		Dia. Cutter Heads Incl.	Weight Pounds	
			Both Heads off	One Head off		Net	Gross
Inches	Feet	Inches			Inches		
2	4	4-8	30	36	3½-4½-5½-7	210	310
2½	5	5-12	35	42	4½-5½-7-10	380	495
3	5½	6-16	40	47	6-8-10-12	590	770
3½	6	8-22	44	52	8-10-12-16	700	860
4	6	8-22	44	52	8-10-12-16	725	885
*4	6-8	12-26	42	50	12-16-20-24	1127	1400
4½	6	10-24	42-66	50-74	10-12-16-20	1170	1460
*4½	6	16-36	42	50	16-20-24-30	1235	1510
4½	6-8	12-30	42-66	50-74	12-16-20-24	1330	1635
4½	10	12-30	90	98	12-16-20-24	1440	1760
6	10	20-50	85	95	20-26-34-42	2550	3125
8	8	20-60	54	66	20-24-32-40-48-56		4500
8	11	20-60	90	102	20-24-32-40-48-56		5000
8	15	20-60	138	150	20-24-32-40-48-56		5650
10	12	30-100	94	109	To suit requirements.		
10	16	30-100	142	157	To suit requirements.		

*Special Locomotive Cylinder Boring Bars.

UNDERWOOD LOCOMOTIVE BORING BAR FOR CYLINDERS AND VALVE CHAMBERS

This bar is similar in construction to the above but is, however, especially adapted to reboring locomotive cylinders and valve chambers. It operate accurately with one or both cylinder heads off, and in any position; and is so constructed that the piece being bored serves as a support for the machine. All exposed gears are guarded.



Diam. of Bar	Length of Bar	Boring Capacity	Max. Boring Length		Dia. Cutter Heads Incl.	Weight Pounds	
			Both Cyl. Heads off	One Cyl. Head off		Net	Gross
Inches	Feet	Inches			Inches		
3	5½	6-16	40	47	6-8-10-12	590	770
3½	6	8-20	44	52	8-10-12-16	700	860
3½	6	8-20	44	52	8-10-12-16	725	885
4	6	12-30	42	50	12-16-20-24	1127	1400
4	8	12-30	66	74	12-16-20-24	1235	1460
4½	6	16-36	42	50	16-20-24-30	1235	1510
4½	8	16-36	66	74	16-20-24-30	1235	1570
6	10	20-50	85	95	20-26-34-42	2550	3125

For Net Prices See Supplement

BUFFALO BENCH DRILLS

10-Inch Junior Two Speed Drill



Motor Drive

For details of construction see the table of general specifications given below.

The 10" Junior drill is also made with a direct connected $\frac{1}{4}$ H. P. Motor. The steel motor pinion meshes with a machine cut, cast iron gear on the shaft carrying the two speed pulleys. When ordering motor drive be sure to give current characteristics.

A floor pedestal or stand can be supplied for this drill at an extra charge.

A substantial drill designed for any place where it is necessary to drill small holes up to $\frac{3}{8}$ ", quickly and conveniently.

This drill is made with a heavy cast iron frame and the working parts conform to best modern practice. An idea of the sturdy construction of this machine can be gained from the fact that although the normal speed of the driving pulleys is 550 R. P. M., it can be driven at 3000 R. P. M. and still stay in perfect balance.



Belt Drive

General Specifications

Height of Drill.....	27 $\frac{1}{2}$ "	Vertical Movement of Table.....	7"
Maximum Capacity of Holes.....	$\frac{3}{8}$ "	Speed of Driving Pulleys.....	550 R. P. M.
Drills to Center of.....	10"	Spindle fitted with No. 2A Jacob's Chuck	
Maximum Distance Table to Spindle.....	8"	Belt Drive, Net Weight.....	66 lbs.
Travel of Spindle.....	3 $\frac{1}{2}$ "	Belt Drive, Shipping Weight.....	78 lbs.
Diameter of Table.....	7"	Motor Drive, Net Weight.....	100 lbs.
Tight and loose pulleys.....	4"x1 $\frac{1}{2}$ "	Motor Drive, Shipping Weight.....	130 lbs.

10-Inch Three Speed Drill



Motor Drive

accurately planed and has counter sunk bolt holes for use as a table. Spindle is bored to take No. 1 Morse Taper Shanks.

This drill can be also furnished with direct connected $\frac{1}{4}$ H. P. Motor. Be sure to give current data when ordering. See table below for more detailed information.

This drill has a substantial one-piece frame insuring perfect alignment of gears and shafts. Gears are carefully machined and fitted. The upper cone pulley is supported between the bearings instead of being overhung. This type of construction decreases power losses materially and reduces strain on the drive shaft.

A friction spring device holds the feed lever and spindle in whatever position placed. The work table is adjustable up or down or may be pushed to one side. The base is



Belt Drive

General Specifications

Height of Drill.....	37"	Size of Tight and Loose Pulleys.....	4"x1 $\frac{1}{2}$ "
Max. Cap. Holes.....	$\frac{3}{8}$ "	Spindle Speeds.....	305, 428, 771 R. P. M.
Drills to center of.....	10"	Diameter of Cones.....	2 $\frac{1}{2}$ ", 3 $\frac{1}{2}$ ", 4 $\frac{1}{2}$ "
Greatest Dis. Table to Spindle.....	10 $\frac{1}{2}$ "	Belt Drive, Net Weight.....	110 lbs.
Travel of Spindle.....	3 $\frac{3}{4}$ "	Belt Drive, Shipping Weight.....	130 lbs.
Size of Table.....	7"x8"	Motor Drive, Net Weight.....	135 lbs.
Travel of Table.....	14"	Motor Drive, Shipping Weight.....	150 lbs.

BURKE 10-INCH SENSITIVE BENCH DRILLS

These are high grade, well built bench drills of the sensitive type, intended for light accurate work. The spindle is a crucible steel drop forging, turned and ground, and fitted with a ball thrust bearing. The quill is also ground to size, insuring perfect alignment. The end of the spindle is tapered to take a $\frac{3}{8}$ " drill chuck.

Built in two styles, alike in all respects, except that size No. 0 has a stationary table support, while size No. 1 is provided with a movable table support, swinging about the column.

Tight and loose pulley countershaft and belt shifter are mounted on the column with a two-step cone, providing two spindle speeds.

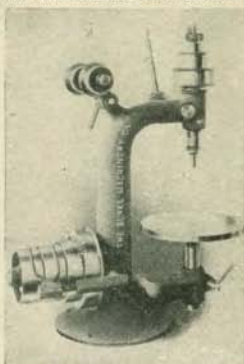
Size No. 1 can be furnished in a motor driven arrangement, with or without motor. Floor column supplied for either size at an additional charge.

General Specifications

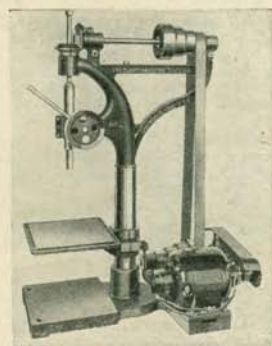
Capacity—Holes up to.....	$3\frac{1}{8}$ "
Dist. Column to Center of Spindle.....	$5\frac{1}{2}$ "
Max. Dist. Spindle to Table { No. 0	$8\frac{1}{2}$ "
{ No. 1	$9\frac{1}{2}$ "
Travel of Spindle.....	$2\frac{1}{2}$ "
Vertical Adjustment of Table.....	7"
Diameter of Table.....	8"
Countershaft Speed.....	550 R. P. M.

Shipping Weight..	No. 0—Belt Driven....	65 lbs.
	No. 1—Belt Driven....	75 lbs.
	No. 1—Motor Driven, with Motor.	100 lbs.

Height Floor Columns.....	34"
Weight Floor Columns.....	60 lbs.



BURKE HEAVY DUTY BENCH DRILL PRESS



The heavy duty press is equipped with belt drive arrangement or with a $\frac{1}{2}$ H. P. motor connected to the lower pulley spindle thru a Morse silent chain.

The frame is made of a single casting to insure perfect alignment of gears, spindle and shaft. Gears are spiral cut mitre with generated teeth, making the press powerful, but smooth in operation.

General Specifications

Capacity (holes up to).....	$6\frac{1}{2}$ "	
Dist. column to center of spindle.....	$6\frac{1}{2}$ "	
Max. dist. spindle to table.....	$10\frac{1}{2}$ "	
Max. dist. spindle to base.....	$18\frac{1}{2}$ "	
Vertical travel of spindle.....	4"	
Vertical adjustment of table.....	$10\frac{1}{2}$ "	
Size of table.....	10×10 "	
Speed of Countershaft R. P. M.....	800	
Height of drill press.....	39"	
Net weight {	Belt driven.....	170 lbs.
	Motor driven.....	240 lbs.
Shipping Wt. {	Belt driven.....	225 lbs.
	Motor driven.....	300 lbs.

When ordering motor driven drill press, be sure to state voltage, D. C. or A. C. current and with the latter give phase and cycle.

BURKE AUTOMATIC PRODUCTION DRILL

The Burke Automatic Production Drill Press, Size 10, shown in the illustration, is driven by worm gears with ball bearing thrust or worm shaft. The feed can be thrown in or out at any point or set for automatic knockout, or can be operated by hand. Thrust is taken on ball thrust bearing and the spindle runs through the large bearing on which the top cone used to prevent belt slipping, is mounted. Spindle and quill are ground to size and tapered to fit $\frac{3}{4}$ " Almond or Jacobs chucks. There is no pressure on the spindle from the driving belt. All parts are interchangeable.

General Specifications

Capacity.....	$\frac{3}{4}$ in.
Greatest Distance Spindle to table....	$9\frac{1}{2}$ in.
Vertical Movement of Spindle.....	$2\frac{1}{2}$ in.
Vertical Movement of Table.....	7 in.
Distance from Center of Spindle to frame.....	$5\frac{1}{2}$ in.
Net Weight.....	95 lbs.



BUFFALO POST DRILLS



No. 65



No. 615



No. 117

Ball Bearing Drill No. 65

The Buffalo Ball Bearing Post Drill No. 65 is a moderately priced, reliable drill of medium capacity, which adequately meets the needs of garages, carpenter shops, etc. It has two speeds; is automatic or hand fed; and can be furnished for power by replacing the handle with a pulley. The frame is cast iron with all bearings bored and reamed; the shaft and spindle are carefully finished steel; and the sheet steel table and form are in two pieces so that the table can be removed to allow the form to serve as a rest in such work as the drilling of wheel rims.

Specifications: No. 65 drills holes up to $\frac{5}{8}$ " to center of $11\frac{1}{2}$ " circle; spindle diameter, $\frac{7}{8}$ "; run of feed, 3"; run of table, $10\frac{1}{2}$ "; length overall, 32". Spindle is bored for $\frac{1}{2}$ " straight shank bits, but can be bored for $\frac{3}{16}$ ", $\frac{3}{8}$ " or Nos. 1 or 2 Morse Tapers if preferred. Net weight 53 lbs; crated 61 lbs.

Ball Bearing Drill No. 615

The Buffalo Ball Bearing Drill No. 615 is somewhat larger and heavier and of greater drilling capacity than the No. 65.

It is well constructed with a frame that is strongly ribbed to withstand rough handling. The shaft and spindle are made of steel, carefully finished. The bearings are bored and reamed in the solid metal of the frame—a feature which insures smooth and easy running. This drill, similar to the one shown above, has hand and automatic feeds and two speeds which are obtained by changing the handle from the front to the back gear. A round slotted table which can be adjusted to any position is provided. Specifications: Drills to center 15 inch circle; drills holes up to $1\frac{1}{2}$ "; Spindle diameter, $1\frac{1}{8}$ "; run of feed $\frac{3}{4}$ "; run of table $10\frac{1}{2}$ "; length overall 38"; pulley diameter 6". It is regularly furnished with chuck for $\frac{1}{2}$ " straight shank bits, but can be supplied bored for $\frac{3}{16}$ ", or Nos. 1, 2, 3, or 4 Morse Taper Shanks.

No. 615 (Hand Power) net weight 87 lbs.; crated 110 lbs.

No. 615-A (With Pulleys) net weight 95 lbs.; crated 110 lbs.

Capstan Lever Drill No. 117

The No. 117 is the smallest of the Buffalo Capstan Lever Drills.

A ball bearing takes up the thrust between feed screw and spindle, thus eliminating about 90 percent of the friction. The table is slotted and easily moved up, down or sideways. Two speeds can be obtained by shifting crank from front to back gear. An idler between the gears allows the crank to be turned forward with both speeds. This machine can be easily and simply changed from hand to automatic feed. Four-step cone pulleys and countershaft will be supplied with this drill if desired.

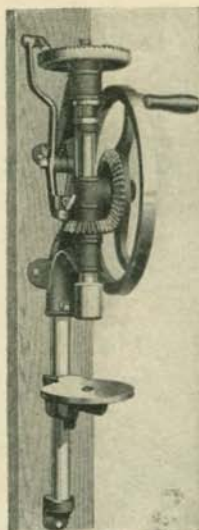
Specifications: Drills to center 17" circle; drills holes up to $1\frac{1}{4}$ "; spindle diameter $1\frac{1}{4}$ "; run of feed 6"; run of table 14"; length overall 50"; pulley size 8 x 3"; regularly furnished with chuck for $\frac{1}{2}$ inch straight shank bits; but can also be had for $\frac{3}{16}$ inch and Nos. 1, 2, 3, or 4 Morse Taper Shanks.

No. 117 (Hand Power) net weight 143 lbs., crated 175 lbs.

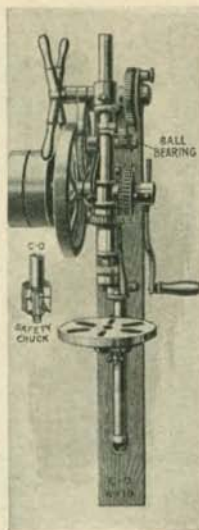
No. 117-A (With Pulleys) net weight 163 lbs., crated 195 lbs.

For Net Prices See Supplement

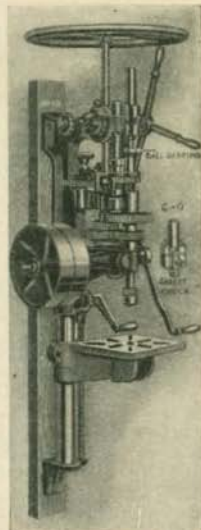
CANEDY-OTTO POST DRILLS



C-O No. 10



C-O No. 19



C-O No. 16

Post Drill No. 10

The Canedy-Otto Post Drill No. 10, is well suited to light drilling of all kinds. It is very satisfactory for general work; is well constructed; and sold at an exceptionally low price. Specifications are shown in table below.

Post Drill No. 19

C. O. Drill No. 19 is somewhat larger than the No. 10 and can be furnished either for hand power or with 8"x2" pulleys for power operation. On the hand power drill, the shaft is left extended so that pulleys may be added should the occasion arise. The hand and self feed, work independently allowing the operator to select and regulate the feed as the work requires; for this reason this drill is especially suited for wood boring. Wheel rims can be drilled conveniently by removing the table and using the support as a holder.

Post Drill No. 16

This drill is the largest of the three shown above and is built for heavier and larger work. In it are found most of the advantages of the machine shop floor drill. Similar to the No. 19 drill, it is made to operate by hand or by power, and on the hand machines, the shaft is left extended so that pulleys 10 $\frac{3}{4}$ "x2 $\frac{1}{2}$ " can be mounted at any time when power drilling is desired.

It is equipped with double back gears which give two speeds. Speed changes are easily made by sliding the gears.

The hand lever feed and positive self-feed driven by a horizontal gear, work separately and may be set for fast, slow, or medium speed.

The table is made of substantial material, lathe-turned and slotted, and is raised or lowered by a quick action screw.

Wheel rims can be drilled as easily on this machine as on the No. 19 described above.

General Specifications

No.	Bores	Drills to Center of Circle	Up and down Run of Table	Greatest Dist. of Spindle to Table	Takes Drill Shanks	Net Wt. Lbs.	Ship. Wt. Lbs.
CO-10	0 to $\frac{3}{4}$ "	10"	2 $\frac{1}{2}$ "	8 $\frac{1}{2}$ "	$\frac{1}{2}$ "	37	42
CO-19	0 to 1 $\frac{1}{4}$ "	16 $\frac{1}{2}$ "	5 $\frac{1}{2}$ "	14"	$\frac{1}{2}$ " or $\frac{1}{4}$ "	130	147
CO-16	0 to 1 $\frac{1}{2}$ "	24"	6 $\frac{1}{4}$ "	18 $\frac{1}{2}$ "	$\frac{1}{2}$ " or $\frac{1}{4}$ " or No. 1, 2, or 3 M.T.	343	377

For Net Prices See Supplement

TREPANNING AND BORING TOOLS



No. 2 Fixed Pilot Type

These tools are used for boring large holes in iron and steel. They have been thoroughly tested and are capable of boring straight and clean holes holding the size to within .003 of an inch. Holes can be made from $2\frac{1}{16}$ to 12 inches in diameter; the larger tools will go through steel up to 4 inches, and to 8 inches when the work is turned.

In work where center distances must be accurate the tool with fixed pilot is recommended. The patented spring-controlled pilot not only guides the cutters vertically but steadies the tool in a horizontal position and reduces tool breakage to a minimum. The shape of the tools enables the operator to advance the roughing tool $\frac{1}{16}$ of an inch ahead of

the finishing tool, and by so doing, helps to reduce the driving power. The pilot forces the metal slug out of the hole as soon as the cutters are through.

A five-inch hole can be bored through boiler plates $\frac{5}{8}$ " thick in 35 seconds. A seven-inch hole can be cut through 3-inch thick steel in 6 minutes.

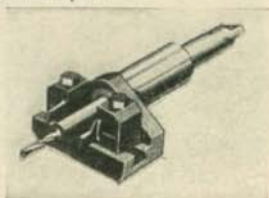
No. 1 has fixed pilot for holes $2\frac{1}{16}$ " to 6 inches in diameter through three inch metal. No. 11 has the same capacity but fitted with drill pilot.

No. 2 has fixed pilot but No. 22 is fitted with drill pilot and both bore holes $2\frac{1}{16}$ to 8 inches in three-inch metal.

Nos. 3 and 33 have a capacity of $3\frac{3}{8}$ to 12 inch holes in four-inch metal, No. 3 having fixed pilot and No. 33 the drill pilot.

Reaming is not necessary when these tools are used.

Each tool is furnished complete with one pair of cutters consisting of one roughing and one finishing cutter. See table below and be sure to mention size desired when ordering.



No. 22 Drill Pilot Type

General Specifications

No.	Pilot	Capacity		Morse Taper Shank No.*
		Diameter of Hole, Inches	Thickness Inches	
1	Fixed	$2\frac{1}{16}$ to 6	3	4 or 5
11	Drill	$2\frac{1}{16}$ to 6	3	4 or 5
2	Fixed	$2\frac{1}{16}$ to 8	3	4 or 5
22	Drill	$2\frac{1}{16}$ to 8	3	4 or 5
3	Fixed	$3\frac{3}{8}$ to 12	4	5 or 6
33	Drill	$3\frac{3}{8}$ to 12	4	5 or 6

*When ordering, specify shank desired.

Cutter Sizes

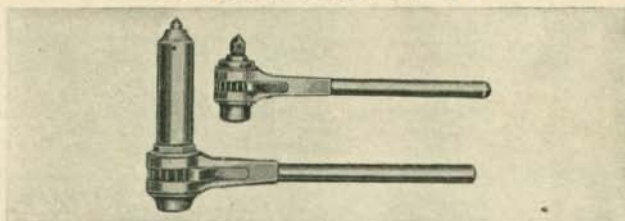
For 6" and 8" Tools			For 12" Tools		
No.	Depth Inches	Diameter of Hole Inches	No.	Depth Inches	Diameter of Hole Inches
1	1	$2\frac{1}{16}$ to 3	11	2	$3\frac{3}{8}$ to 6
2	1	3 to 4	12	2	6 to 8
3	1	4 to 5	13	2	8 to 12
4	1	5 to 8	14	3	$3\frac{3}{8}$ to 6
5	2	3 to 4	15	3	6 to 8
6	2	4 to 5	16	3	8 to 12
7	2	5 to 8	17	4	$3\frac{3}{8}$ to 6
8	3	3 to 4	18	4	6 to 8
9	3	4 to 5	19	4	8 to 12
10	3	5 to 8			

Cutters are supplied in pairs, consisting of one roughing and one finishing cutter.

RYERSON MACHINERY-SERVICE

Ryerson engineers are always at your service to help solve any equipment problems. There is a Ryerson Machinery office near you. Call on them for service.

PACKER RATCHET DRILLS



Upper View is of Boiler Ratchet—Style B
Lower View is of Sleeve Ratchet—Styles M and S

These Packer Ratchets are strong, well made tools, with extra large pawl and teeth. All wearing parts are hardened steel forgings.

Style M is a sleeve Ratchet fitted with a Morse Taper Socket to hold taper shank twist drills.

Style M—With Morse Taper Socket

Size No.	Length of Handle Inches	Morse Taper Socket	Length of Head Inches	Feed Inches	Weight Pounds	List Price Each
1-M	10	No. 2	8	2	5½	\$13.00
2-M	13	No. 3	8¼	2¼	7	16.00
3-M	16	No. 4	9½	2¾	11½	20.00
4-M	18	No. 4	9½	2¾	13	25.00
5-M	24	No. 4	9½	2¾	14	30.00

Style S—With Square Taper Socket

Style S is of the same type as Style M, but fitted with a Square Taper Socket to hold square taper shank ratchet drills.

Size No.	Length of Handle Inches	*Square Taper Socket	Length of Head Inches	Feed Inches	Weight Pounds	List Price Each
1-S	10	No. 1	8	2¼	5½	\$10.50
2-S	13	No. 1	8¼	2½	7	13.50
3-S	16	No. 2	9½	3½	11½	16.00
4-S	18	No. 2	9½	3¼	13	19.00
5-S	24	No. 2	9½	3¼	14	23.00

Style B—Boiler Ratchet With Square Taper Socket

Style B is a short ratchet of the boilermakers' type, intended for use in close quarters where working space is limited. It is fitted with a Square Taper Socket to hold square taper shank ratchet drills.

Size No.	Length of Handle Inches	*Square Taper Socket	Length of Head Inches	Feed Inches	Weight Pounds	List Price Each
1-B	10	No. 1	4½	2	4	\$ 9.00
2-B	13	No. 1	4½	2	5	10.50
3-B	16	No. 2	5	2¼	9	15.00
4-B	18	No. 2	5	2¼	11	18.00
5-B	24	No. 2	5	2¼	12	22.00

*No. 1 Square Taper Socket takes drills having No. 1 Square Taper Ratchet Shank, ⅝" square at small end by ⅜" square at large end by 1½" long.

*No. 2 Square Taper Socket takes drills having No. 2 Square Taper Ratchet Shank, ⅜" square at small end by ¾" square at large end by 1½" long.

Special sockets to adapt these Ratchet Drills to hold drills with various styles of shank are listed on page 12.

Morse Taper Shank Drills for use in Style M Ratchets are listed on page 7. Ratchet Shank Drills for Styles S and B Ratchets are shown on page 11.

Drilling Posts are shown on following page.

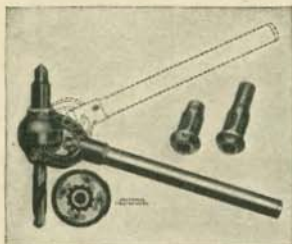
In addition to the regular Packer Ratchet Drills listed above, we can furnish Reversible Ratchet Drills with Morse Taper or Square Taper Sockets, and in the short boiler type. Write for information and prices.

For Net Prices See Supplement

ARMSTRONG UNIVERSAL RATCHET DRILLS

The Armstrong Universal Ratchet Drills can be used in confined quarters, where the ordinary ratchet is useless.

They are extremely flexible in operation, yet simple and strong in construction. Made entirely of drop forgings and bar steel, without ball joints or bevel gears to get out of order. All working parts are hardened.



The value of this type of ratchet is more readily appreciated when it is realized that a movement of as little as two inches at the end of the handle, in any direction, will turn the drill.

The universal motion of the ratchet is due to the fact that the axis of the two trunnions on which the handle turns is at an acute angle to the axis of the drill. There are also three countersunk positions into which the setting screw may be placed, converting the drill into a rigid handle type like an ordinary ratchet drill. In two of these positions, the handle stands at an angle, out of the way of possible obstructions, while in the third position it is at right angles to the axis of the drill.

Size No.	Length of Handle, Ins.	Taper Socket	Length of Head, Ins.	Feed, Ins.	Weight, Complete, Lbs.	List Price, Extra Spindle Each	List Price, Tool Complete, Each
64-M	14	No. 1 Square	4 $\frac{3}{8}$	1 $\frac{1}{2}$	5	\$3.60	\$18.00
64-K	14	No. 2 Morse	5 $\frac{3}{8}$	1 $\frac{1}{2}$	5	3.60	18.00
65-J	16	No. 1 Square	5 $\frac{1}{2}$	1 $\frac{7}{8}$	8	4.50	22.50
65-L	16	No. 2 Square	5 $\frac{1}{2}$	1 $\frac{7}{8}$	8	4.50	22.50
65-O	16	No. 3 Morse	7	1 $\frac{7}{8}$	8	4.50	22.50
66-F	18	No. 2 Square	5 $\frac{7}{8}$	2 $\frac{1}{4}$	12	5.40	27.00
66-N	18	No. 3 Morse	7 $\frac{3}{8}$	2 $\frac{1}{4}$	12	5.40	27.00
66-S	18	No. 4 Morse	7 $\frac{3}{8}$	2 $\frac{1}{4}$	12	5.40	27.00

Style M and style K spindles are interchangeable in the No. 64 ratchet; Styles J, L and O are interchangeable in No. 65, and Styles F, N and S in No. 66.

See page 11 for dimensions of No. 1 and No. 2 Square Taper Shanks.

Morse Taper Shank Drills are listed on page 7; Square Taper Ratchet Shank Drills on page 11.

Special sockets to adapt these Ratchet Drills to hold drills with various styles of shank are shown on page 13.

DRILLING POSTS



Base Type

for the tightening screw in the upper jaw. The adjusting nuts on the post are rounded on the bottom to fit cup-shaped seats in the clamping jaws.

Especially intended for use with Ratchet Drills such as shown above and on preceding page, and with Electric Drills having feed screw attachment.

The Base Type is the standard style, sometimes called an "Old Man."

The Double-Jaw Type has a cup-shaped screw in the lower clamping jaw, forming a guide and seat



Double-Jaw Type

General Specifications

Size No. Type	1-B Base	2-B Base	1-J Double Jaw	2-J Double Jaw
Height of Post.....Inches	20	26	.....	.....
Diameter of Post.....Inches	1 $\frac{7}{8}$	1 $\frac{7}{8}$	1 $\frac{7}{8}$	1 $\frac{7}{8}$
Radius of Arm.....Inches	10	12	10	12
Clamp Jaws Open.....Inches	.....	.....	4	4
Weight Each.....Lbs.	20	27	25	33
List Price, Each	\$8.00	\$10.00	\$8.00	\$10.00

In ordering, be sure to state whether Base Type or Double-Jaw Type is wanted. Prices do not include Ratchet Drill or Drill Bit.

For Net Prices See Supplement

RYERSON HAND AND PNEUMATIC CHISELS



Hand Flat Chisel

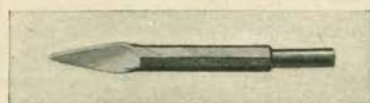
variably placed on this type of tool. Redressing of these chisels is readily accomplished due to the fact that this steel does not require any unusual or special treatment.

The Ryerson Pneumatic Chisels are made from the same stock as the hand chisels and are made, by proper treatment, to withstand the strain imposed on them while used in pneumatic chipping hammers. They can be furnished with either the round, hexagonal or differential shank made to the dimensions specified for standard bushings to fit the various makes of hammers. The



Pneumatic Flat Chisel

round and the combination or differential shanks are turned, while the hexagonal type is forged to size. Forged shanks are carefully heat treated to give the right degree of hardness and toughness.



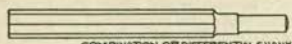
Pneumatic Cape Chisel

Ryerson Special Chisels, both hand and pneumatic, can also be furnished. These are manufactured from an alloy tool steel and are suitable for the most severe work. They will hold an edge longer and, consequently, require less redressing—an item to consider in the lowering of production costs through a saving of labor.

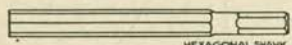
The cut shows the different types of shanks with which pneumatic chisels and pneumatic chisel blanks can be furnished. When



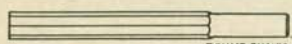
Pneumatic Chisel Blank



COMBINATION OR DIFFERENTIAL SHANK



HEXAGONAL SHANK



ROUND SHANK

Types of Pneu. Chisel Shanks

ordering, be sure to specify the type required. Standard chisels will be furnished unless the special steel chisels are specified.

Ryerson Chisels and Ryerson Special Chisels can also be supplied to conform to special specifications. Send details and information as to duty for which intended, with inquiry.

Standard Sizes

Size of Stock	Hand Chisels			Pneumatic Chisels	
	Length of Flat Chisel	Cape or Round Nose		Length of Flat, Cape and Round Nose	Length of Blanks
		Point	Length		
1/4	6				
3/8	6	3/8	6		
1/2	6	3/4	7		
3/4	6	7/8	7		
1	7	1	8		
	8, 10, 12	1 1/4	9	9	8 1/2
	9, 12	1 1/2	9	9	8 1/2
	9, 12	1 3/8			

In ordering Pneumatic Chisels or Blanks specify type of shank wanted.

In addition to the above we can supply Diamond Point Chisels in either hand or pneumatic types.

Rippers, Fullers, Roughing and Caulking Tools can also be furnished.

For Net Prices See Supplement

BOILERMAKERS' TOOLS

Beading Tools



Hand



Pneumatic

Our beading tools are made from drop-forged blanks of high-grade tool steel, with a heavy extension heel for added strength. The throat is accurately filed and ground to shape, and the tools are carefully hardened.

Used for beading the ends of boiler tubes back against the flue sheet or boiler head. Will take care of any diameter of tube.

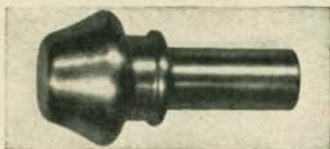
We can supply both hand and pneumatic beading tools made specially to blueprint, and with throat filed and ground to conform exactly to any special template.

General Specifications

Type	Size Stock Inches	Overall Length Inches	List Price, Each
Hand	$\frac{3}{4}$ Octagon	9	\$1.30
Pneumatic—	$\frac{3}{4}$ Octagon	9	1.60
with	$\frac{3}{4}$ Octagon	15	2.00
Round Shank	$\frac{3}{4}$ Octagon	9	1.80

In ordering, specify whether Hand or Pneumatic, size of stock and overall length. $\frac{3}{4}$ " octagon and 9" length with round shank furnished unless otherwise specified.

Pneumatic Flaring Tools



These Flaring or Belling Tools are intended for flaring the ends of the tubes outward before expanding. They facilitate both the expanding and beading operations.

The Shanks are made to fit a standard long-stroke pneumatic riveting hammer, but tools are suitable for use by hand where compressed air is not available.

A separate size is required for each different diameter of tube.

Sizes and Prices

Size For Tubes, Outside Diameter, Inches	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{4}$	$2\frac{1}{2}$
List Price, Each.....	\$4.00	\$4.00	\$4.00	\$4.50	\$5.00

Staybolt Headers



Standard Type.

These tools are designed for heading the ends of staybolts. They are made of high-grade vanadium tool steel, with shanks to fit standard long-stroke pneumatic riveting hammers.

The Standard type is the usual form of Staybolt Header, and will be furnished unless otherwise specified.

A separate tool is required for each different size of staybolt.

Sizes and Prices

Size For Staybolts, Diam. Inches	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$
List—Standard Type, Each....	\$5.20	\$5.20	\$5.20	\$5.60	\$5.60	\$5.60

Perfection Reversible Staybolt Chucks

Intended to grip and turn round staybolts, without the necessity of squaring the ends. Will grip threaded ends, as well as blank ends, without damaging the threads.

Chuck is reversible, so that the bolt may be backed out when necessary without removing the chuck.

Furnished either with $\frac{3}{4}$ " Square Shank or No. 3 Morse Taper Shank.

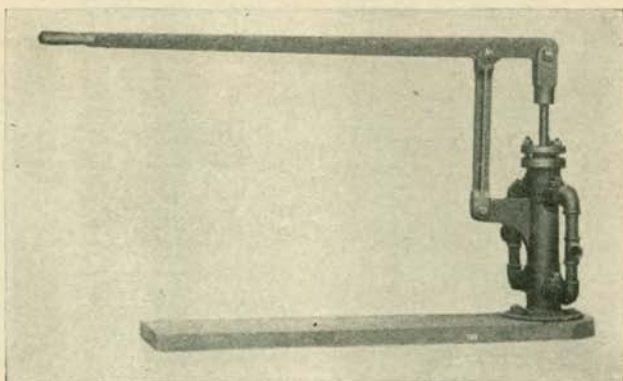


Sizes and Prices

SIZE.....	No. 1	No. 2	No. 3
CAPACITY—For Staybolts, Diam., Inches	$\frac{3}{4}$ to $\frac{3}{4}$	$1\frac{1}{8}$ to $1\frac{1}{8}$	$1\frac{1}{2}$ to $1\frac{1}{2}$
List Price—With Square Shank, Each.....	\$10.00	\$10.00	\$10.00
List Price—With No. 3 Morse Taper Shank, Each.....	11.00	11.00	11.00

For Net Prices See Supplement

BOILER TEST PUMP



Our Boiler Test Pump is of the double-acting type, very simple in operation, of excellent design and particularly substantial construction. Both piston rod and piston are made of brass, the latter being well packed, and the connections are forged. It is mounted on a wooden floor base, from which it may quickly be removed for convenience when cleaning or repacking is necessary.

Capacity—Pressure.....	500 lbs. per sq. in.
Diameter of Piston.....	2 inches
Length of Stroke.....	5 inches
Size of Suction Pipe.....	1 inch
Size of Discharge Pipe.....	$\frac{3}{4}$ inch
Weight.....	60 lbs.
List Price.....	\$32.00

FLUE HOLE CUTTERS

An indispensable tool in the shop for cutting out flue holes in boiler heads. Made entirely of steel, and of an improved design.

The cutters are 4 inches long and are made of special high speed tool steel. They are formed to a special shape for their entire length, conforming to the diameter of hole to be cut, and need be ground only on the end for sharpening. They are adjustable lengthwise for various thicknesses of heads and for wear, and also have a slight adjustment for oversize holes. Hardened tool steel set screws, flush with the body of the tool, hold them firmly in place and insure accuracy.

The center reamer sizes the center hole previously punched, and then acts as a guide for the tool. It is removable and may be changed to suit other sizes of center holes.

Sizes above No. 4 have four cutters instead of two. All sizes are regularly furnished with No. 4 Morse Taper Shank, but can be supplied blank or with other tapers when so specified.



Size No.	Capacity, Holes Inches	Weight, Pounds	List Price
1 $\frac{7}{8}$	1 $\frac{7}{8}$ to 1 $\frac{11}{16}$	8 $\frac{1}{2}$	\$12.00
2	2 to 2 $\frac{1}{16}$	8 $\frac{1}{2}$	14.00
2 $\frac{1}{2}$	2 $\frac{1}{2}$ to 2 $\frac{3}{16}$	8 $\frac{1}{2}$	15.00
3	3 to 3 $\frac{1}{16}$	8 $\frac{1}{2}$	16.00
3 $\frac{1}{2}$	3 $\frac{1}{2}$ to 3 $\frac{3}{16}$	11	18.00
4	4 to 4 $\frac{1}{16}$	11	20.00
4 $\frac{1}{2}$	4 $\frac{1}{2}$ to 4 $\frac{3}{16}$	16	30.00
5 $\frac{1}{2}$	5 $\frac{3}{8}$ to 5 $\frac{5}{16}$	22	40.00

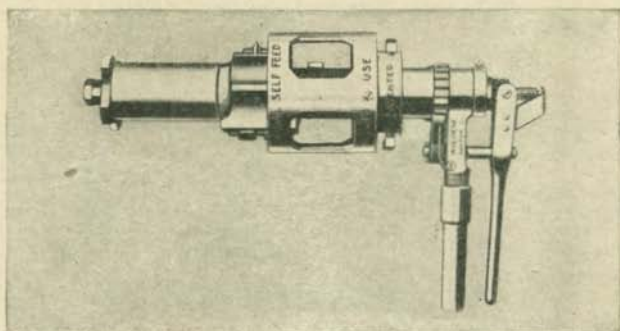
Extra Cutters, list price each.....\$2.50

Extra Center Reamers, list price each.....3.00

For Net Prices See Supplement

IDEAL SELF-FEED TUBE CUTTERS

For Hand Use Only



A high-grade hand-operated tube cutter for cutting off tubes inside or outside of the boiler head. Cuts off new tubes with a bevel ready for beading, and in such a manner as to prevent cracking of the tubes in the beading process.

Construction throughout of the very best materials. All parts subject to wear or strain are made of drop forgings, and are properly tempered to insure strength and durability.

One man can operate this tool with one hand, the feed being made automatic, merely by slipping the feed handle over the stud on the operating handle. It will cut off new tubes at a uniform distance from the boiler head, even though they project unevenly to start with. The length of tube left outside of the head may be varied to suit the operator.

For removing old tubes, the guard and sleeve are simply moved back on the frame, allowing the cutter wheel to pass inside of the head. The tubes are then cut off with a scarfed end ready for welding. To remove one leaky tube through its own hole in the head, the cutter wheel may be set to cut off the tube at the point where it passes through the head, but care must be exercised not to cut into the head itself after the tube is cut through.

Size Outside Diameter of Tube Inches	Smallest Inside Diameter of Tube Will Cut Inches	Approx. Shipping Weight Pounds	List Price Complete	Extra Cutter Wheels Part No. 19	
				List Price Each	List Price Per Doz.
2	1 $\frac{1}{2}$ "	18	\$ 40.00	\$1.00	\$ 6.00
2 $\frac{1}{4}$	1 $\frac{3}{4}$ "	19	44.00	1.00	6.00
2 $\frac{1}{2}$	2"	20	46.00	1.00	6.00
2 $\frac{3}{4}$	2 $\frac{1}{4}$ "	20	50.00	1.00	6.00
3	2 $\frac{1}{2}$ "	29	60.00	1.00	6.00
3 $\frac{1}{4}$	2 $\frac{3}{4}$ "	30	66.00	1.00	6.00
3 $\frac{1}{2}$	3"	32	68.00	1.00	6.00
4	3 $\frac{1}{2}$ "	33	70.00	1.00	6.00
4 $\frac{1}{2}$	4"	51	110.00	2.00	12.00
5	4 $\frac{1}{2}$ "	54	126.00	2.60	15.00
5 $\frac{1}{2}$	4 $\frac{3}{4}$ "	55	128.00	2.60	15.00
6	5 $\frac{1}{2}$ "	56	130.00	2.60	15.00



EXTENSIONS

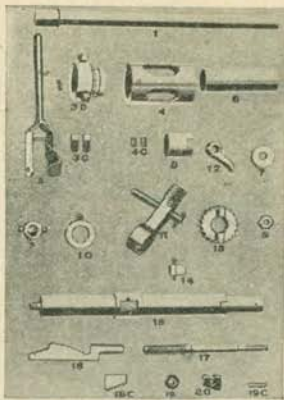
For Ideal Self-Feed Tube Cutters

These Extensions, used in connection with the Ideal Self-Feed Tube Cutters, in many cases allow the operator to stand upright outside of the smoke box of the boiler, or in the fire box of certain types of boilers, enabling him to handle with ease a great deal more work than when sitting or crouching in such close quarters.

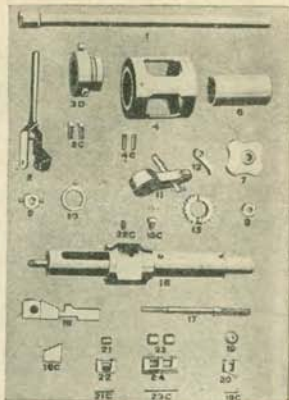
For Ideal Tuber Cutters Sizes Inches	Size of Extension	Length of Extension	Approx. Shipping Weight Pounds	List Price
2, 2 $\frac{1}{4}$, 2 $\frac{1}{2}$, 2 $\frac{3}{4}$	D-1 $\frac{1}{2}$	19"	9	\$10.00
	D-3	38"	25	20.00
	D-6	6 ft.	37	40.00
	D-8	8 ft.	49	45.00
3, 3 $\frac{1}{4}$, 3 $\frac{1}{2}$, 4	E-1 $\frac{1}{2}$	19"	12	12.00
	E-3	38"	31	25.00
	E-6	6 ft.	41	45.00
	E-8	8 ft.	55	50.00
4 $\frac{1}{2}$, 5, 5 $\frac{1}{2}$, 6	F-1 $\frac{1}{2}$	19"	25	45.00
	F-3	38"	35	55.00

For Net Prices See Supplement

PARTS FOR IDEAL SELF-FEED TUBE CUTTERS

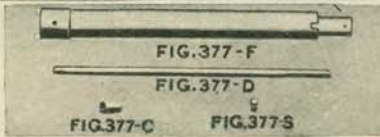


For Cutters Up to 2 3/4"



For Cutters 3" and Larger

Part Name	No.	For Tube Cutter, Size (Outside Diam. of Tube)											
		2"	2 1/4"	2 1/2"	2 3/4"	3"	3 1/4"	3 1/2"	4"	4 1/2"	5"	5 1/2"	6"
Handle.....	1	\$1.20	\$1.20	\$1.20	\$1.20	\$1.80	\$1.80	\$1.80	\$1.80	\$3.00	\$3.00	\$3.00	\$3.00
Feed Handle	2	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	2.00	2.00	2.00	2.00
Guard Sleeve	3-D	3.00	3.00	3.00	3.00	4.00	4.00	4.00	4.00	8.00	8.00	8.00	8.00
Sl'v'e Screws	3-C	.40	.40	.40	.40	.40	.40	.40	.40	.60	.60	.60	.60
Guard.....	4	3.00	4.00	4.00	4.80	5.00	5.40	5.60	6.00	10.00	12.00	12.00	12.00
Guard Scr's.	4-C	.40	.40	.40	.40	.40	.40	.40	.40	.60	.60	.60	.60
Short Bush..	5	1.20	1.20	1.20	1.20	.....	.....	.....	.....	.....	.....	.....	.....
Long Bush..	6	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	2.00	2.00	2.00	2.00
Guide Ring..	7	.80	.80	.80	.80	1.20	1.40	1.40	1.60	2.00	2.40	2.40	2.40
Nut.....	8	.40	.40	.40	.40	.40	.40	.40	.40	.60	.60	.60	.60
Stl. Feed Nut	9	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.80	2.00	2.00	2.00
Ratchet Col.	10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.60	1.60	1.60	1.60
Ratchet Fr..	11	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	12.00	12.00	12.00	12.00
Ratchet Pw'l	12	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.60	1.80	1.80	1.80
Ratch. Whl.	13	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	4.00	4.00	4.00	4.00
Feed Stop..	14	.60	.60	.60	.60	.....	.....	.....	.....	.....	.....	.....	.....
Fd. Stp. Bolt	15-C	.....	.....	.....	.....	.40	.40	.40	.40	.60	.60	.60	.60
Frame.....	16	12.00	14.00	15.00	17.00	22.00	24.00	26.00	28.00	40.00	46.00	46.00	46.00
Feed Rod... 17		1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.80	2.00	2.00	2.00
Feed Wedge	18	4.60	4.60	4.60	4.60	6.00	6.00	6.00	6.00	9.00	10.00	10.00	10.00
Guide Plate.. 18-C		.40	.40	.40	.40	.60	.60	.60	.60	.80	.80	.80	.80
Cut. Whl. ea	19	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.60	2.60	2.60
Cut. Wh., dz.	19	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	12.00	15.00	15.00	15.00
Cut. Car. Pin	19-C	.40	.40	.40	.40	.40	.40	.40	.40	.60	.60	.60	.60
Cutter Carr'r	20	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	5.00	6.00	6.00	6.00
Sgls. Car. Rl.	21	.....	.....	.....	.....	.60	.60	.60	.60	1.00	1.20	1.20	1.20
Sgls. Car. Pin	21-C	.....	.....	.....	.....	.40	.40	.40	.40	.60	.60	.60	.60
Sgls. Car. Sc.	22	.....	.....	.....	.....	2.00	2.00	2.00	2.00	4.00	4.00	4.00	4.00
Sgls. Car. Sc.	22-C	.....	.....	.....	.....	.20	.20	.20	.20	.40	.40	.40	.40
Dbl. Car. Rls	23	.....	.....	.....	.....	1.40	1.40	1.40	1.40	2.40	2.80	2.80	2.80
Dbl. Car. Pn.	23-C	.....	.....	.....	.....	.60	.60	.60	.60	.80	.80	.80	.80
Dbl. Rl. Car.	24	.....	.....	.....	.....	4.00	4.00	4.00	4.00	7.00	8.00	8.00	8.00

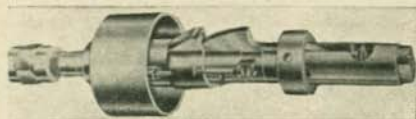


Parts for Extensions

Always order parts by both name and number, stating size of tube cutter or extension for which they are wanted.

Part Name	No.	For Extension No.									
		D-1 1/2	D-3	D-6	D-8	E-1 1/2	E-3	E-6	E-8	F-1 1/2	F-3
Ext. Frame	377-F	\$8.00	\$18.00	\$36.00	\$44.00	\$10.00	\$22.00	\$40.00	\$48.00	\$40.00	\$48.00
Ext. Fd. Rd.	377-D	3.00	6.00	10.00	12.00	3.00	6.00	10.00	12.00	6.00	10.00
Coupling...	377-C	.80	.80	.80	.80	.80	.80	.80	.80	1.20	1.20
Set Screw...	377-S	.40	.40	.40	.40	.40	.40	.40	.40	.60	.60
Lgth. of Ex.		19"	38"	6 Ft.	8 Ft.	19"	38"	6 Ft.	8 Ft.	19"	38"
For cutters.		2"	2 1/4"	2 1/2"	2 3/4"	3"	3 1/4"	3 1/2"	4"	4 1/2"	5 1/2"
										5"	6"

RYERSON PNEUMATIC FLUE CUTTERS



Size No. 1

The Ryerson Pneumatic Flue Cutters are extremely rapid, efficient tools, particularly recommended for railroad shops and large commercial boiler shops, for use in the manufacture of steam shovels, tractors and threshing machines.

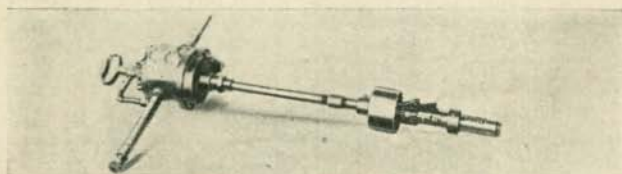
or for any service where large numbers of tubes must be cut on a production basis.

They are excellently adapted for cutting off old flues inside of the boiler head or tube sheet to permit their removal from the boiler. Where new tubes are to be cut off to uniform length outside of the boiler head an extra attachment is furnished to serve as a guide and support for the tool.

Operation is by means of a pneumatic drill, running at about 300 R. P. M., on standard shop pressure of 80 pounds. A piece of $\frac{3}{4}$ " pipe should be used to connect the cutter to the air drill, and a $\frac{1}{4}$ " pipe by-pass is necessary from the air inlet into the spindle of the drill, as shown in illustration below. These connections are readily provided in the shop, to suit the particular style of drill used. They are inexpensive, and in no way injure the drill for other work.

The novel feature of this cutter is the air feed which eliminates the weakness usually found in other machines where the feed is obtained through springs, screws, etc.

The cutter wheel is gradually forced through the wall of the tube requiring but a few revolutions to complete the cut, and leaves a neat clean edge. Cutter wheels are made of high-grade tool steel, and will cut a great many tubes before replacement is necessary.



Size No. 1 Cutter Connected to Pneumatic Drill

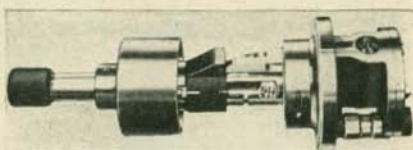
One of the chief advantages of these cutters is in the air feed, which eliminates the weakness usually found in other types of tube cutters where the feed is obtained through springs, screws or eccentrics. The by-pass and the $\frac{3}{4}$ " pipe connection provide a positive air feed, which forces the cutter wheel through the wall of the tube at a uniform rate, requiring but a few revolutions to complete the cut, and leaving a neat, clean edge. Production is speeded up by a whistle signal, which notifies the operator as soon as the tube is severed.

Records from one of the leading railroad flue shops show an average cutting time of about $4\frac{1}{2}$ seconds per flue in cutting out 2" flues, with one man operating the tool.

Construction is of the very best throughout. All wearing parts are properly hardened. The cutter wheels are of high grade tool steel.

Made in four sizes as listed below.

Repair parts shown on following page.

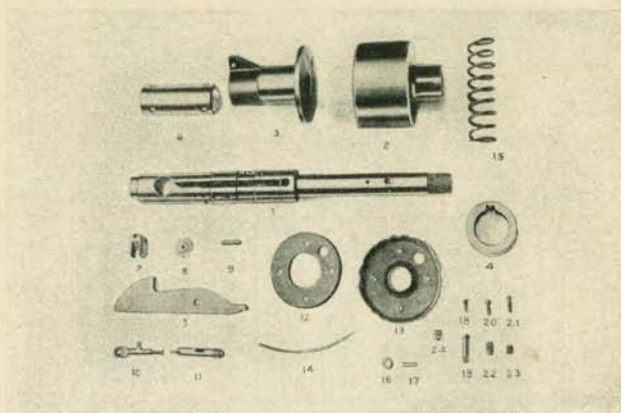


Superheater Size

Size	Capacity—Outside Diameter of Flues		Weight, Lbs.
	With Regular Cutter Block	With Special Cutter Block	
No. 1	2" and 2 $\frac{1}{4}$ "	2 $\frac{1}{2}$ "	25
No. 2	3" and 3 $\frac{1}{4}$ "	3 $\frac{1}{2}$ "	30
No. 3	3 $\frac{1}{2}$ " and 3 $\frac{3}{4}$ "	4 $\frac{1}{4}$ "	40
Superheater	5 $\frac{3}{8}$ " and 5 $\frac{1}{2}$ "	6"	60

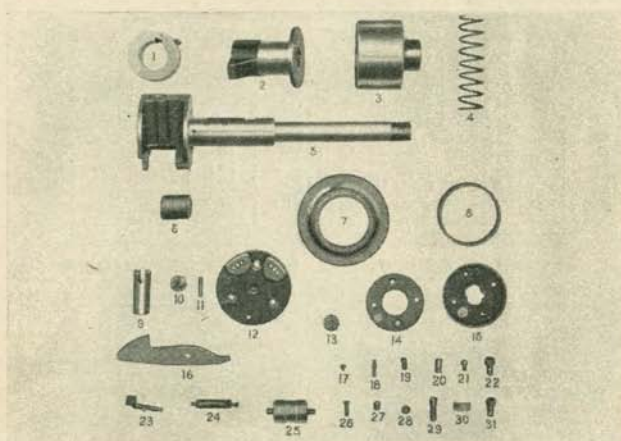
For Net Prices See Supplement

RYERSON PNEUMATIC FLUE CUTTERS



Repair Parts Sizes 1, 2 and 3

- | | | |
|----------------|------------------------|--------------------------|
| 1—Main Spindle | 9—Cutter Wheel Pin | 17—Cam Roller Pin |
| 2—Cylinder | 10—Whistle Post | 18—Shoe Screw |
| 3—Piston | 11—Whistle | 19—Cam Lever Pin |
| 4—Collar | 12—Piston Follower | 20—Piston Follower Screw |
| 5—Cam Lever | 13—Cup Leather Packing | 21—Whistle Post Screw |
| 6—Shoe | 14—Flat Steel Spring | 22—Collar Screw (Long) |
| 7—Cutter Block | 15—Coil Spring | 23—Collar Screw (Short) |
| 8—Cutter Wheel | 16—Cam Roller | 24—Cylinder Screw |



Repair Parts—Superheater Size

- | | | |
|----------------------|------------------------|-------------------------|
| 1—Collar | 11—Cutter Wheel Pin | 21—Follower Screw |
| 2—Piston | 12—Stem Cap | 22—Stem Cap Screws |
| 3—Cylinder | 13—Eccentric Bearing | 23—Whistle Post |
| 4—Brass Coil Spring | 14—Piston Follower | 24—Whistle |
| 5—Stem | 15—Cup Leather Packing | 25—Thrust Roller |
| 6—1" Pipe Coupling | 16—Cam Lever | 26—Whistle Post Screw |
| 7—Guide | 17—Sleeve Screw | 27—Collar Screw (Short) |
| 8—Guide Sleeve | 18—Whistle Spring | 28—Cam Lever Roller |
| 9—Cutter Wheel Block | 19—Collar Screw (Long) | 29—Hand Lever Pin |
| 10—Cutter Wheel | 20—Cam Roller Pin | 30—Flat Key |

In ordering parts give both part number and name.

For Net Prices See Supplement

RYERSON FRICTIONLESS ROLLER EXPANDER



Frictionless Bronze Bearing back of collar—No small screws or cotter pins.

Body—Tempered Steel. Mandrel and Rolls—Tool Steel, hardened and ground.

Made in two types—Self-Feed Fig. 30 and

Hand Feed Fig. 31. Self Feed type, Fig. 30 carried in stock.

Size Outside Diam. of Tube Inches	Approx. Weight Boxed Lbs.	List Price Complete	Extra Mandrels Each	Extra Rolls Each	Size Outside Diam. of Tube Inches	Approx. Weight Boxed Lbs.	List Price Complete	Extra Mandrels Each	Extra Rolls Each
1 1/4	4	\$16.00	\$3.50	\$0.30	2 1/2	12	\$19.50	\$ 4.50	\$0.40
1 3/4	4	16.00	3.50	.30	2 3/4	13	22.00	4.50	.60
1 1/2	4 1/4	16.00	3.50	.30	2 3/4	14 1/4	22.00	4.50	.60
1 3/4	6 1/4	16.00	3.50	.30	3	16 1/4	22.00	5.50	.60
1 1/4	7	16.00	3.50	.30	3 1/4	18	24.50	5.50	.70
1 3/4	7 1/2	16.00	3.50	.30	3 1/2	20 1/2	24.50	6.50	.70
2	8	16.00	3.50	.30	3 3/4	22 1/2	27.00	6.50	.80
2 1/4	8 1/2	18.00	3.50	.35	4	26 1/2	27.00	7.50	.80
2 1/2	9	18.00	3.50	.35	4 1/4	29	40.00	10.00	1.10
2 3/4	10 1/4	19.50	4.50	.40	4 1/2	31	50.00	10.00	1.10

RYERSON ALL-STEEL ROLLER EXPANDER



One-piece body with retaining back—No cotter pins. Body—Tempered Steel. Mandrel and Rolls—Tool Steel, hardened and ground.

Made in two types—Self Feed Fig. 32 and Hand Feed Fig. 33.

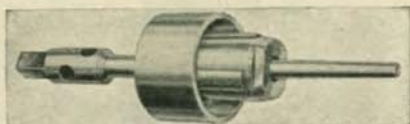
Size Outside Diam. of Tube Inches	Approx. Weight Boxed Lbs.	List Price Complete	Extra Mandrels Each	Extra Rolls Each	Size Outside Diam. of Tube Inches	Approx. Weight Boxed Lbs.	List Price Complete	Extra Mandrels Each	Extra Rolls Each
1 1/4	4	\$11.00	\$1.60	\$0.25	2 1/2	8	\$17.00	\$2.50	\$0.40
1 3/4	4 1/4	11.00	1.60	.25	2 3/4	10	19.00	2.75	.60
1 1/2	4 1/2	11.00	1.80	.25	3	13	20.00	3.00	.60
1 3/4	5	12.50	2.00	.30	3 1/4	15	22.00	3.25	.70
2	5 1/4	13.00	2.10	.30	3 1/2	18	24.00	3.50	.70
2 1/4	5 1/2	15.00	2.10	.35	3 3/4	22	26.00	3.75	.75
2 1/2	6	15.50	2.25	.35	4	25	28.00	4.00	.75

RYERSON UNIVERSAL BOILER EXPANDER

Particularly useful for rolling flues which extend more than the usual length outside of the front end flue sheet.

Collar is reversible and removable.

Body—Tempered Steel. Mandrel and Rolls—Tool Steel, hardened and ground.

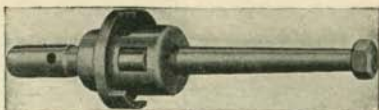


Made in two types—Self Feed Fig. 36 and Hand Feed Fig. 36-H.

Size Outside Diam. of Tube Inches	Approx. Weight Boxed Lbs.	List Price Complete	Extra Mandrels Each	Extra Rolls Each	Size Outside Diam. of Tube Inches	Approx. Weight Boxed Lbs.	List Price Complete	Extra Mandrels Each	Extra Rolls Each
1 1/4	6	\$11.00	\$1.80	\$0.25	2 1/2	13	\$19.00	\$2.75	\$0.60
1 3/4	6 1/4	12.50	2.00	.30	3	16 1/4	20.00	3.00	.60
2	7 1/2	13.00	2.10	.30	3 1/4	18	22.00	3.25	.70
2 1/4	8	15.00	2.10	.35	3 1/2	21	24.00	3.50	.70
2 1/2	9	15.50	2.25	.35	3 3/4	22 1/2	26.00	3.75	.75
2 3/4	11	17.00	2.50	.40	4	26	28.00	4.00	.75

Rolls and Mandrels of all roller expanders are replaceable. Self-Feed Types have combination mandrel for hand or power use. Hand Feed Types have rolls set straight—Mandrel for hand use only. Self-Feed Type furnished unless otherwise specified.

DUDGEON PATTERN ROLLER EXPANDER



An inexpensive tool for the occasional job. Removable guard or collar. Solid Body. Mandrel and Rolls made of Tool Steel. For hand use only. Fig. 37.

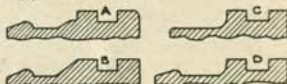
Size Outside Diam. of Tube Inches	Approx. Wgt. Boxed Lbs.	List Price Complete	Extra Mandrels Each	Extra Rolls per Set	Size Outside Diam. of Tube Inches	Approx. Wgt. Boxed Lbs.	List Price Complete	Extra Mandrels Each	Extra Rolls per Set
1	2 1/2	\$10.00	\$2.40	\$.80	3	10 1/2	\$18.00	\$4.00	\$1.60
1 1/4	2 3/4	10.00	2.40	.80	3 1/4	14 1/2	20.00	4.60	1.75
1 1/2	3	10.00	2.40	.90	3 1/2	17	23.00	5.00	2.00
1 3/4	3 1/4	10.00	2.40	.90	3 3/4	20	25.00	5.75	2.25
1 7/8	4 1/2	10.00	2.60	1.05	4	23	30.00	6.70	2.50
2	5	10.00	2.70	1.10	4 1/4	26 1/2	35.00	7.90	3.50
2 1/4	6	12.00	3.10	1.25	4 1/2	30 1/2	40.00	7.90	3.50
2 1/2	8	14.00	3.50	1.35	5	36	50.00	11.00	4.00
2 3/4	9	16.00	3.70	1.50	6	55	60.00	15.00	5.00

RYERSON SECTIONAL BEADING EXPANDER

This high grade expander made of best tool steel, is particularly suitable for railroad work. Standard Forms A, B are for new, and C and D contour are for repair work; Type F is for copper ferrules. Type B contour furnished unless otherwise specified. It has eight double-tapered or relieved sections and octagon mandrel. Sections are interchangeable and replaceable. Coil steel spring retainer is furnished unless otherwise specified, but rubber or flat steel retainer can be furnished if required.



Type B—Fig. 10



Size Outside Diam. of Tube Inches	Approx. Weight Boxed Lbs.	List Price Complete	Extra Mandrels Each	Extra Sections Each	Size Outside Diam. of Tube Inches	Approx. Weight Boxed Lbs.	List Price Complete	Extra Mandrels Each	Extra Sections Each
1 1/4	2	\$11.00	\$2.00	\$0.80	2 1/2	6	\$15.00	\$2.50	\$1.10
1 1/2	2 1/2	11.00	2.00	.80	2 3/4	7	16.50	2.50	1.15
1 3/4	3	11.00	2.00	.85	2 3/4	8	18.00	2.50	1.20
1 3/4	3 1/4	11.00	2.00	.85	3	9	22.00	2.50	1.75
1 7/8	3 1/2	12.00	2.00	.90	3 1/4	11	26.00	3.00	2.45
2	4	12.00	2.00	.90	3 1/2	13 1/2	30.00	3.00	2.55
2 1/4	4 1/4	12.50	2.00	.95	3 3/4	14	31.50	3.50	2.60
2 1/2	4 1/2	13.00	2.00	1.00	4	15	33.00	4.00	2.75
2 3/4	4 1/2	14.00	2.00	1.05					

RYERSON PROSSER SECTIONAL EXPANDER

Designed for use in small boiler shops where service is not severe.

Made with Form A contour only—Suitable for repair work.

Has eight sections, round mandrel, and rubber or flat steel retainer.



Type A—Fig. 11

Sections are not interchangeable or replaceable.

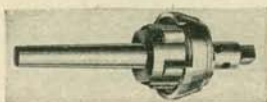
Size Outside Diam. of Tube Inches	Approx. Weight Boxed Lbs.	List Price Complete	Extra Mandrels Each	Size Outside Diam. of Tube Inches	Approx. Weight Boxed Lbs.	List Price Complete	Extra Mandrels Each
1 1/4	2	\$12.00	\$2.00	3 1/4	11	\$26.00	\$ 3.00
1 1/2	2 1/2	12.00	2.00	3 1/2	13 1/2	30.00	3.00
1 3/4	3 1/4	12.00	2.00	3 3/4	14	31.50	4.00
1 7/8	3 1/2	12.00	2.00	4	15	33.00	4.00
2	4	12.00	2.00	4 1/4	16 1/4	35.00	4.50
2 1/4	4 1/4	12.50	2.00	4 1/2	17 1/2	37.00	4.50
2 1/2	4 1/2	13.00	2.00	5	19	42.00	8.00
2 3/4	6	15.00	2.50	5 1/2	22 1/2	52.00	10.00
3	8	18.00	2.50	6	27	60.00	12.00
	9	22.00	2.50				

In ordering Sectional Expanders always state thickness of flue sheet or boiler head. Orders cannot be filled without this information.

For Net Prices See Supplement

SUPERHEATER ROLLER EXPANDERS

Five-Roller Frictionless Type with Collar



out when the mandrel is removed. This tool has no cotter pins or other small parts to become lost or misplaced. Furnished with combination mandrel for power and hand use, as shown.

The Body is milled from machinery steel, and hardened. It is provided with anti-friction bearing plate back of collar, insuring ease of operation. Rolls and mandrels are made of an excellent grade of tool steel, carefully machined, hardened and ground to size. The retaining nut prevents the rolls from dropping

Five-Roller All Steel Type

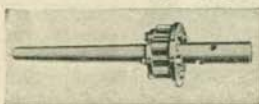
This tool is of same general construction as the Frictionless Type shown above, except that it is not provided with a collar. Regularly furnished with hand mandrel as illustrated, but can be supplied with combination mandrel for hand and power use when so specified.



Frictionless and All Steel Types

Size Outside Diam. of Flue Inches	Complete Tools List Price Each	Extra Mandrels List Price Each	Extra Rolls List Price Each
4½	\$40.00	\$11.00	\$0.80
5	47.50	13.00	.85
5½	55.00	16.00	.90
6	70.00	20.00	1.00

Five-Roller Standard Plate Type

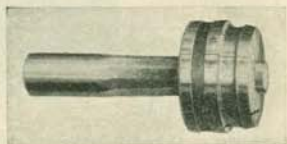


Our standard Plate or Built-Up-Cage Type expanders are constructed in accordance with specifications of the Locomotive Superheater Co. The five rolls are mounted between two slotted plates, which are securely bolted together. Rolls and mandrels are of tool steel. Expanders of this type also furnished per blue-print.

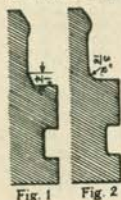
Size Outside Diam. of Flue Inches	Complete Tools List Price Each	Extra Mandrels List Price Each	Extra Rolls List Price Each
4½	\$30.00	\$ 8.00	\$ 1.00
5½	38.00	10.00	1.20

SUPERHEATER SECTIONAL EXPANDERS

High grade superheater sectional expanders, constructed in accordance with specifications of the Locomotive Superheater Co., made in 12 sections, of an excellent grade of tool steel, carefully machined and hardened. Sections are interchangeable and may be replaced in case of loss or breakage. Regularly furnished with 12-sided mandrel, but supplied with round mandrel when so specified. Can also be furnished to special order with mandrel having rounded end to fit the cupping of a 1" button head rivet set, or with shank on end of mandrel to fit a pneumatic riveting hammer, or made entirely in accordance with blue-print.

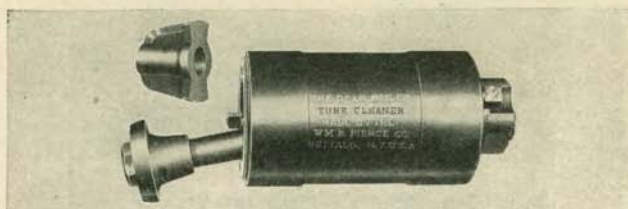


Furnished with style 1 contour for new work, or style 2 for repair work. Specify contour, style of mandrel, size and thickness of flue sheet in ordering.



Size Outside Diameter of Flue	4½"	5½"
Complete Tools—List Price Each	\$36.00	\$40.00
Extra Mandrels—List Price Each	10.00	10.00
Extra Sections—List Price Each	2.20	2.50

DEAN BOILER TUBE CLEANER



This tool, by completely dislodging scale from boiler tubes, effects a considerable saving of fuel, promotes efficiency of boilers, and prolongs the life of the tubes.

The Dean is a vibratory cleaner which may be operated as well with steam as with compressed air. It works by tapping rapidly on the walls of the tubes, thus breaking up the scale completely from either the inside or outside of the tubes. It operates in the same manner on water tube, fire tube boilers, locomotives, condensers, evaporators, curved tube boilers and economizers. In plants operating both water tube and return tubular boilers, one Dean cleaner can be used in both types by using interchangeable vibrator heads. If desired, one cleaner can be adapted for use in several sizes of tubes at a slight extra expense.

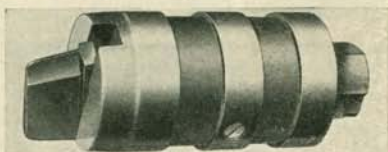
The cleaner for curved tubes is provided with a conical shell to permit passage through the bends.

No. 1 for tubes 1½" O. D.	No. 7 for tubes 4" O. D.
No. 2 for tubes 1¾" O. D.	No. 8 for tubes 4½" O. D.
No. 3 for tubes 2" O. D.	No. 8-0 for tubes 5" O. D.
No. 3A for tubes 2¼" O. D.	No. 8-1 for tubes 5½" O. D.
No. 4 for tubes 2½" O. D.	No. 9 for tubes 6" O. D.
No. 5 for tubes 3" O. D.	No. 10 for curved tube boilers.
No. 6 for tubes 3½" O. D.	No. 11 for locomotive arch tubes.

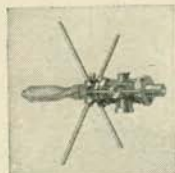
Special sizes can be furnished to fit from 1½" to 6" inside diameter. State outside diameter of tubes and where over ½" thick, specify inside diameter as well. Also always indicate whether tool is to be used in water tube or return tubular boiler or both.

SPECIAL DEAN CLEANER

This cleaner is made expressly for 4-inch water boiler tubes. The striking surface of the vibrator taps the tube at such a tremendous rate that the scale is loosened from the walls of the tube and shattered to bits. This process positively removes every particle of incrustation. The cleaner is designed so that a perfect job is done even in the hands of an unskilled worker.



SWIVEL COUPLING



This device which can be used in connection with the Dean cleaner, although not a necessary part of the equipment, is a desirable adjunct for the convenience of the operator in turning the cleaner in the tubes; it will make the work more agreeable and enable the operator to handle the cleaner with greater facility. It is recommended in boilers having straight tubes in a horizontal position when the space in front of the boilers permits the use of gas pipe.

RUGGLES PERFECTION FLUE CLEANER

This cleaner is made so that it is always in direct contact with the metal of the flues. The knives are always sharp and operate like a plane, working deeper at every stroke. It is made of high grade steel, and works very easily.



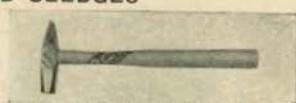
2 inch and smaller	\$2.00	3¼ inch	\$3.25
2¼ inch	2.25	3½ inch	3.50
2½ inch	2.50	4 inch	4.00
2¾ inch	2.75	4½ inch	5.00
3 inch	3.00	5 inch	6.00

HAMMERS AND SLEDGES



Ball Pein

No.	Oz.	Size	Overall	Packed
306	4	00000	10 $\frac{3}{8}$ in.	$\frac{1}{2}$ doz. 2 $\frac{1}{2}$ lbs.
307	6	0000	12 in.	$\frac{1}{2}$ doz. 3 $\frac{1}{2}$ lbs.
308	8	000	13 in.	$\frac{1}{2}$ doz. 5 lbs.
309	12	00	14 in.	$\frac{1}{2}$ doz. 6 $\frac{1}{2}$ lbs.
310	16	0	14 $\frac{1}{2}$ in.	$\frac{1}{2}$ doz. 8 $\frac{1}{4}$ lbs.
311	20	1	15 in.	$\frac{1}{2}$ doz. 10 $\frac{1}{4}$ lbs.
312	24	2	16 in.	$\frac{1}{2}$ doz. 11 $\frac{1}{4}$ lbs.
313	28	3	16 in.	$\frac{1}{2}$ doz. 13 $\frac{1}{4}$ lbs.
314	32	4	16 in.	$\frac{1}{2}$ doz. 10 lbs.
315	36	5	16 in.	$\frac{1}{2}$ doz. 10 $\frac{3}{4}$ lbs.
316	40	6	16 in.	$\frac{1}{2}$ doz. 12 $\frac{3}{4}$ lbs.
318	48	8	16 in.	$\frac{1}{2}$ doz. 15 lbs.
319	56	9	16 in.	$\frac{1}{2}$ doz. 16 lbs.



Riveting—Polished

No.	Oz.	Size	Overall	Packed
230	4	0	11 in.	$\frac{1}{2}$ doz. 2 $\frac{1}{2}$ lbs.
231	7	1	12 in.	$\frac{1}{2}$ doz. 4 lbs.
232	9	2	12 in.	$\frac{1}{2}$ doz. 4 $\frac{1}{2}$ lbs.
233	12	3	13 in.	$\frac{1}{2}$ doz. 6 lbs.
234	15	4	14 in.	$\frac{1}{2}$ doz. 7 $\frac{3}{4}$ lbs.
235	18	5	14 in.	$\frac{1}{2}$ doz. 9 $\frac{1}{4}$ lbs.

Ball Pein

Hammers with Special Black Finish having polished face and pein only will be supplied if desired. In such cases the letter "B" should be added to the catalog number shown in the table to the left.



Cross Pein—Polished

No.	Oz.	Size	Overall	Packed
400	26	0	15 in.	$\frac{1}{2}$ doz. 12 lbs.
401	32	1	16 in.	$\frac{1}{2}$ doz. 10 $\frac{1}{4}$ lbs.
402	42	2	16 in.	$\frac{1}{2}$ doz. 12 $\frac{1}{2}$ lbs.
403	48	3	16 in.	$\frac{1}{2}$ doz. 14 $\frac{1}{4}$ lbs.
404	56	4	16 in.	$\frac{1}{2}$ doz. 8 lbs.
405	72	5	16 in.	$\frac{1}{2}$ doz. 10 lbs.



Double Face—Polished

No.	Oz.	Size	Overall	Packed
391	24	1	15 in.	$\frac{1}{2}$ doz.
392	38	2	16 in.	$\frac{1}{2}$ doz. 11 $\frac{3}{4}$ lbs.
393	48	3	16 in.	$\frac{1}{2}$ doz. 14 $\frac{1}{4}$ lbs.
394	58	4	16 in.	$\frac{1}{2}$ doz. 8 $\frac{3}{4}$ lbs.

Cross Pein Sledges



No. 830—6, 8, 10, 12, 14 & 16 lbs.	Length	Dia. Face	Pein
Dimensions of 6-lb. wt.	6 $\frac{1}{2}$ in.	2 in.	2 in.
Dimensions of 8-lb. wt.	7 in.	2 $\frac{1}{4}$ in.	2 $\frac{1}{4}$ in.
Dimensions of 14-lb. wt.	8 $\frac{1}{2}$ in.	2 $\frac{3}{4}$ in.	2 $\frac{3}{4}$ in.

Straight Pein Sledges

No. 840—6, 8, 10, 12, 14 & 16 lbs.	Length	Diam. Face	Pein
Dimensions of 6 lb. wt.	6 $\frac{1}{2}$ "	2"	2"
Dimensions of 8 lb. wt.	7"	2 $\frac{1}{4}$ "	2 $\frac{1}{4}$ "
Dimensions of 14 lb. wt.	8 $\frac{1}{2}$ "	2 $\frac{3}{4}$ "	2 $\frac{3}{4}$ "



Double Face Sledges

No. 850—2, 2 $\frac{1}{2}$, 3, 4, 5, 6, 8, 12, 14, 16, 18, 20 and 24 lbs.	Length	Diam. Face
Dimensions of 6 lb. wt.	6 $\frac{1}{2}$ "	2"
Dimensions of 8 lb. wt.	6 $\frac{3}{4}$ "	2 $\frac{1}{4}$ "
Dimensions of 14 lb. wt.	8 $\frac{1}{4}$ "	2 $\frac{3}{4}$ "



Nevada or Long Pattern Sledge

No. 750—3, 3 $\frac{1}{2}$, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16 and 20 lbs.	Length	Diam. Face
Dimensions of 4 lb. wt.	6 $\frac{1}{4}$ "	1 $\frac{1}{2}$ "
Dimensions of 8 lb. wt.	7 $\frac{3}{4}$ "	1 $\frac{3}{4}$ "
Dimensions of 16 lb. wt.	8 $\frac{1}{2}$ "	2 $\frac{3}{8}$ "



Oregon or Short Pattern Sledge

No. 760—3, 4, 6, 7, 8, 10 and 12 Lbs.	Length	Diam. Face
Dimensions of 4 lb. wt.	4 $\frac{3}{4}$ "	1 $\frac{3}{8}$ "
Dimensions of 8 lb. wt.	6 $\frac{1}{4}$ "	2"
Dimensions of 12 lb. wt.	6 $\frac{3}{4}$ "	2 $\frac{3}{8}$ "

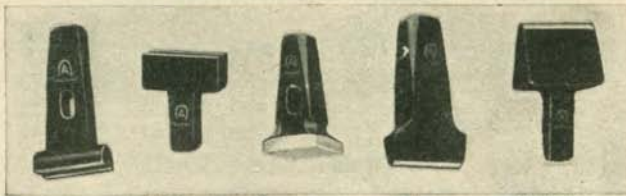


HICKORY HANDLES (List Prices Per Dozen)

Length, Ins.	10-15	16	18	20	22	24	26 & 28	30 & 32	34 & 36
Grade A	\$3.75	\$3.95	\$4.45	\$5.05	\$6.00	\$7.45	\$8.50	\$9.80	\$11.10
B	2.60	2.95	3.25	3.70	4.05	4.60	7.40	8.20	10.00
C	1.90	2.05	2.30	2.70	3.00	3.35	5.30	6.50	7.50

For Net Prices See Supplement

BLACKSMITH'S TOOLS



Top Swage Bottom Swage Square Flatters Top Fuller Bottom Fuller

The Bottom Tools are regularly made with shanks to fit a one-inch square hole. Other sizes can be furnished on special orders at special prices.

Swages

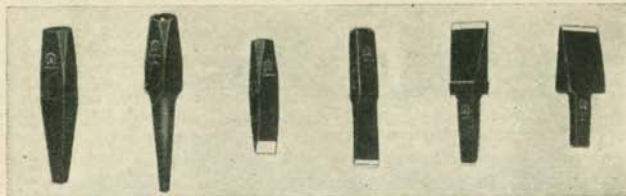
Top and Bottom Swages as illustrated can be furnished in the following sizes: ¼", ⅜", ½", ⅝", ¾", ⅞", 1", 1¼", 1½", 1¾", 2", 2½", 3".

Square Flatters

Square Flatters as illustrated can be furnished in the following sizes: 2", 2½", 3", 3½", 4".

Fullers

Top and Bottom Fullers as illustrated can be furnished in the following sizes: ¼", ⅜", ½", ¾", 1", 1¼", 1½", 1¾", 2".



Square Punch Round Punch Cold Chisel Hot Chisel Regular Hardy Straight Hardy

Square Punches

Size, Punch Face, Inches.....	¼	⅜	½	⅝	¾	⅞	1
Stock at Eye, Ins.....	1¼	1¾	1¾	1¾	1¾	1¾	1¾
Length, Ins.....	7	7	7	7	7	7½	1¼
Weight, Lbs.....	1¾	1¾	2	2¼	2½	3½	3½

Round Punches

Size, Punch Face, Ins.....	¼	⅜	½	⅝	¾	1
Stock at Eye, Ins.....	1¼	1¼	1¾	1¾	1¾	1¾
Length, Ins.....	7¼	7½	7¾	8	8½	8¾
Weight, Lbs.....	1¾	1½	1¾	2½	3½	4½

Cold Chisels

Size at Eye, Ins.....	1¼	1¾	1½	1¾
Cutting Edge, Ins.....	1¼	1¾	1½	1¾
Length, Ins.....	5¾	6½	6¼	7¾
Weight, Lbs.....	2	2½	3	5

Hot Chisels

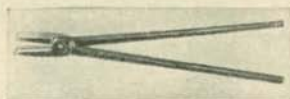
Size at Eye, Ins.....	1¼	1¾	1½	1¾
Cutting Edge, Ins.....	1¾	1¾	2	2¼
Length, Ins.....	7¾	7¾	8¼	9¾
Weight, Lbs.....	2	2½	3	5

Hardies

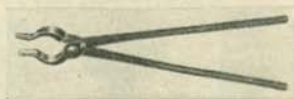
Size, Sq. Shank, Ins.....	Regular Hardies						Straight		
	⅝	¾	⅞	1	1¾	1¾	¾	⅞	1
Width Bit, Ins.....	1¾	1¾	2	2¼	2¼	2¼	1¾	2	2
Weight, Lbs.....	1	1¼	1¼	2	2½	2¾	1½	2	2½

For Net Prices See Supplement

BLACKSMITH AND RIVET TONGS



Straight Lip



Curved Lip

Straight Lip

These Tongs have a "V" notch in each jaw so that they can firmly hold square or round work.

No.....	11A	11C	11D	11E	11F	11G	11H	11J
Size Square, Ins.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{2}$
Length, Ins.....	18	20	20	22	22	24	24	26

Curved Lip

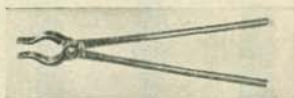
These Tongs are used for holding bolts or other round work. The opening between the jaws and the hinge allows ample space for the head of bolt.

No.....	12A	12C	12D	12E	12F	12G	12H	12J
Size Rounds, Ins.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{2}$
Length, Ins.....	18	20	20	22	22	24	24	26



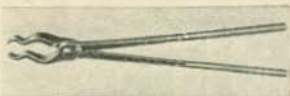
Double Pick Up

Double Pick Up used for picking up hot work, either flat or round. Furnished in the following lengths: 18", 20", 22", 24".



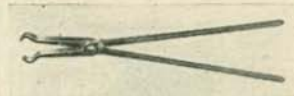
Single Pick Up

Single Pick Up similar to Double Pick Up but jaws are larger and will handle heavier work. Furnished in the following lengths: 18", 20", 22" and 24".



Rivet

Furnished in the following lengths: 18", 20", 22" and 24".



Straight Sticking

Furnished in 18" lengths only.

Drift Pins



Barrel Type



Plug Type

General Specifications
Barrel and Plug Types

For Rivets, Ins.....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
Diameter, Ins.....	$\frac{3}{16}$	$\frac{9}{16}$	$\frac{11}{16}$	$\frac{13}{16}$	$\frac{15}{16}$
Length, Ins.....	6	6	6	6	6

Order by Rivet Sizes. Barrel type furnished unless otherwise specified. Special drift pins made to order.

HAND FORGED STRUCTURAL WRENCHES



These are hand forged wrenches of superior quality. Sizes are Bolt dimensions for U. S. Standard Nuts.

Size, Ins.....	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
Length, Ins.....	9	10	12	15	17	19	21

For Net Prices See Supplement

STRUCTURAL IRON WORKERS TOOLS

Button Head Rivet Sets



Size, Ins.	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$
Diameter cup, Ins.	$\frac{3}{8}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$
Length, Ins.	$6\frac{1}{4}$	7	7	7
Weight, Lbs.	$3\frac{1}{2}$	$5\frac{1}{2}$	$5\frac{1}{2}$	7

Sizes given are rivet sizes.

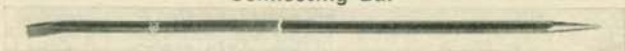
Backing Out Punches

Size, Ins.	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Length, Ins.	$7\frac{1}{2}$	$7\frac{3}{4}$	8	$8\frac{1}{4}$	$8\frac{1}{2}$
Weight, Lbs.	$1\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{4}$	$2\frac{3}{4}$	$3\frac{1}{2}$

Sizes given are diameters of face.



Connecting Bar



36 Ins. long, $\frac{3}{4}$ inch Hexagon Steel Pointed one end, other end Chisel Point.

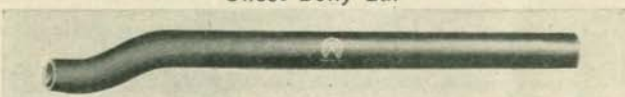
Straight Dolly Bar



Size, Ins.	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
Length, Ins.	24	24	24	30	30	30
Size of Stock, Ins.	$1\frac{3}{8}$	$1\frac{3}{8}$	2	2	$2\frac{1}{4}$	$2\frac{1}{4}$
Weight, Lbs.	14	14	22	27	30	34

Sizes given are rivet sizes.

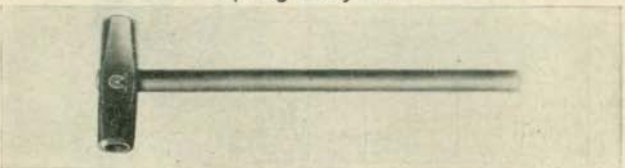
Offset Dolly Bar



Size, Ins.	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
Length, Ins.	24	24	24	30	30	30
Size of Stock, Ins.	$1\frac{3}{8}$	$1\frac{3}{8}$	2	2	$2\frac{1}{4}$	$2\frac{1}{4}$
Weight, Lbs.	15	15	23	28	31	35

Sizes given are rivet sizes.

Spring Dolly Bar



Size, Ins.	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
Length Overall, Ins.	48	48	48	48	48	48
Size of Handle, Ins.	1	1	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{4}$
Weight, Lbs.	16	16	23	25	27	29

Size is the size of rivet for which intended.

Ripping Bars



Gooseneck

No.	Size	Wgt.
112	$\frac{1}{2}$ in. x 12 in.	1 lb.
118	$\frac{5}{8}$ in. x 18 in.	$1\frac{1}{4}$ lbs.
124	$\frac{3}{4}$ in. x 24 in.	$3\frac{1}{2}$ lbs.
130	$\frac{3}{4}$ in. x 30 in.	4 lbs.
136	$\frac{3}{4}$ in. x 36 in.	5 lbs.



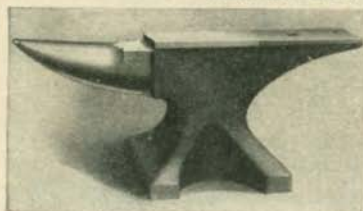
Straight

No.	Size	Wgt.
12	$\frac{1}{2}$ in. x 12 in.	$\frac{3}{4}$ lb.
18	$\frac{5}{8}$ in. x 18 in.	$1\frac{1}{4}$ lbs.
24	$\frac{3}{4}$ in. x 24 in.	3 lbs.
30	$\frac{3}{4}$ in. x 30 in.	$3\frac{1}{2}$ lbs.
36	$\frac{3}{4}$ in. x 36 in.	$4\frac{1}{2}$ lbs.

These ripping bars are drop-forged from high carbon tool steel.

For Net Prices See Supplement

ALL STEEL ANVILS



Standard Pattern

These anvils are made in one solid piece of special analysis crucible steel, properly proportioned for maximum strength. They are uniform throughout and free from cracks or welds. The face is large, of high tensile strength, and at the same time possesses the desired quality of elasticity. It cannot be hammered loose since it is part of the anvil itself. Its temper is gauged to overcome chipping yet to retain its hardness and resiliency.

General Specifications

Size of Anvil Lbs.	Dimensions of Face Inches	Length of Horn Inches	Size of Square Hole Inches	Size of Round Hole Inches	Height of Anvil Inches
100	14 $\frac{1}{2}$ x3 $\frac{1}{2}$	8 $\frac{3}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	10 $\frac{1}{16}$
125	15 $\frac{1}{2}$ x3 $\frac{3}{4}$	9 $\frac{1}{4}$	1	$\frac{1}{2}$	10 $\frac{3}{8}$
150	16 $\frac{1}{2}$ x4	10	1	$\frac{1}{2}$	11 $\frac{1}{2}$
200	18 $\frac{1}{4}$ x4 $\frac{1}{2}$	10 $\frac{7}{8}$	1 $\frac{1}{4}$	$\frac{5}{8}$	12 $\frac{3}{8}$
250	19 $\frac{1}{2}$ x4 $\frac{3}{4}$	11 $\frac{3}{4}$	1 $\frac{3}{4}$	$\frac{5}{8}$	13 $\frac{3}{8}$
300	20 $\frac{1}{2}$ x5	12 $\frac{1}{2}$	1 $\frac{3}{8}$	1 $\frac{1}{16}$	14 $\frac{1}{2}$
350	21 $\frac{3}{4}$ x5 $\frac{1}{4}$	13 $\frac{1}{8}$	1 $\frac{3}{8}$	1 $\frac{1}{16}$	15 $\frac{1}{4}$

COLUMBIAN SOLID BOX WROUGHT STEEL BLACKSMITH'S VISES

These Columbian Forged Steel Leg Vises are used for every kind of heavy work—for blacksmith shops, farms, factories, service stations and garages.

Every part of this vise is made of steel, except the box, which is malleable iron. This open-end box reduces the wear on the threads and makes the screw self-cleaning.

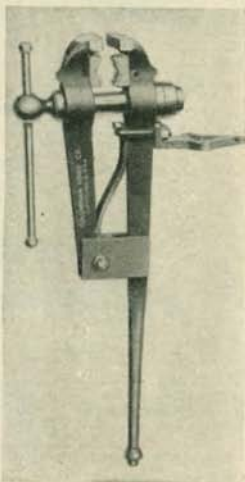
The entire front jaw and the entire back jaw, with its supporting leg, are each forged in one piece. The jaw faces are properly tempered.

The close-coupled bench plate for attachment to the bench is very simple, strong and extremely rigid. It has no gibs to work loose and become lost.

The removable pipe jaws shown in the illustration are extra and are supplied on the Nos. 35, 50 and 70 vise only when so ordered. See paragraph below table.

General Specifications

Size No.	Approx. Weight Lbs.	Width of Jaws Inches	Depth from Top of Jaw to Top of Box Inches	Jaws Open Inches	List Price Each
35	35	4	3 $\frac{1}{4}$	3 $\frac{3}{4}$	\$10.00
50	50	4 $\frac{1}{4}$	4 $\frac{1}{4}$	4 $\frac{1}{2}$	11.50
70	70	5	4 $\frac{3}{4}$	5 $\frac{1}{4}$	15.00
100	100	6	5 $\frac{1}{2}$	6	22.00
150	150	7	6 $\frac{1}{2}$	7	36.00
200	200	8	7 $\frac{1}{2}$	8	56.00



No. 50-P with Pipe Jaws in Place

COMBINATION PIPE VISES

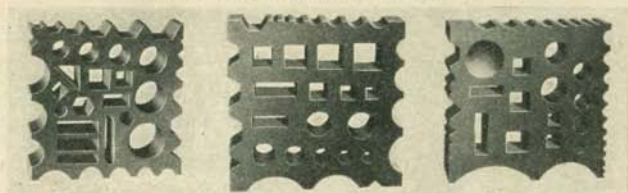
Numbers 35, 50 and 70 can also be furnished with pipe jaws in the throat below the regular jaws, providing a very satisfactory and popular combination vise. The pipe jaws are of forged steel, held in place by bolts and can be removed at will.

No. 35 will hold pipe up to 2" O. D., No. 50-P up to 2 $\frac{1}{2}$ " O. D. and No. 70-P up to 3 $\frac{1}{2}$ " O. D. Weights and list prices are the same as for the standard types, but discount varies.

FOR OTHER SMALL TOOLS

We have endeavored to give brief description and essential specifications of only the leading tools in each line. If you desire any equipment which is not listed here we will be glad to receive your inquiry—which will have our prompt attention.

CAST IRON SWAGE BLOCKS



No. 0/2

Nos. 1/2, 2/2 & 3/2

Nos. 4 and 4/2

Size No.	Dimensions of Holes, Inches			Thick-ness, Ins.	Width Ins.	Length Ins.	Lbs.
	Round	Square	Rectangu-lar				
0	1/2, 3/4, 1, 1 1/4 1 1/2, 1 3/4, 2 1/2	1/2, 3/4, 1 1/2, 1 3/4 1 3/4, 1 3/4, 2 1/2	2 3/8 x 1 3/8	4	14	19 1/2	170
0 1/2	1, 1 1/4, 1 1/2, 1 3/4 2 1/4, 2 3/4, 3 1/4, 3 1/2	1 1/4, 1 1/2, 2	1 1/4 x 2 1/2 3/4 x 4 1 1/2 x 4 1 1/4 x 4 3/4 x 4 3/4	4	15	15	123
1	1, 1 1/2, 2	1, 2		3 3/4	10	14	106
1 1/2	1, 1 1/4, 1 1/2, 2 2 1/4, 2 1/2	1, 1 1/2, 2, 2 1/2	1 x 3 1 1/4 x 3 1/2	4	12 1/2	12 1/2	100
2	1, 1 1/2, 2	1, 2		3 3/4	11 3/8	14 3/8	126
2 1/4	1, 1 1/4, 1 1/2, 2 2 1/4, 2 1/2	1, 1 1/2, 2, 2 1/2	1 1/2 x 3 1 1/4 x 3 1/2	4 1/4	13 3/4	13 3/4	135
2 1/2	1 1/2, 1 3/4, 1 1/2, 2 2 1/4, 2 1/2	1 1/2, 1 3/4, 2	1 1/2 x 3 1 1/4 x 3 1/2	4	14 3/8	14 3/8	148
3	1, 1 1/2, 2	1, 2		4 1/2	11 1/2	15	143
3 1/2	1, 1 1/4, 1 1/2, 1 3/4 1 3/4, 2 1/4, 2 1/2	1, 1 1/4, 1 1/2, 1 3/4 2, 2 1/4, 2 1/2	1 x 3 1 1/2 x 3 1/2	4 1/2	16	16	198
4	1, 1 1/4, 1 1/2, 1 3/4, 2, 2 1/2	1 1/2, 1 1/4, 1 1/2 1 3/4, 2 1/2	3/4 x 3 3/4 1 1/2 x 4	4	15	15	164
4 1/2	1 1/4, 1 3/4, 1 1/2 2 1/4, 3	1 1/2, 1 3/4, 2 1/4, 2 1/2	1 1/2 x 3 1 1/4 x 4	4 1/2	18	18	255
5	3/4, 1, 1 1/4, 1 1/2 2, 2 1/2, 3	3/4, 1, 1 1/4, 1 1/2 2, 2 1/2	3/4 x 3 1 1/4 1 1/2 x 5	6	24	24	675

No. 0 1/2 has 2 3/8 x 3 1/4 triangular hole and 1 3/4 hexagonal.

CAST IRON LEVELING BLOCKS

These blocks are made of superior pig iron and are accurately planed on one side, unless otherwise ordered. We can furnish either solid or ribbed pattern. The ribbed blocks are cast hollow and therefore weigh less. To ascertain weight of solid blocks figure one pound to four cubic inches. Ribbed blocks weigh about one-third less. Solid pattern can be furnished planed on both sides and edges at extra charge.



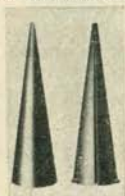
Standard Sizes

1 1/2" x 10" x 12"	1 1/2" x 18" x 24"	2" x 20" x 24"
1 1/2" x 12" x 12"	1 1/2" x 20" x 24"	2" x 20" x 30"
1 1/2" x 14" x 20"	2" x 14" x 20"	2" x 24" x 30"
1 1/2" x 16" x 20"	2" x 18" x 24"	2 1/2" x 28" x 40"
1 1/2" x 16" x 24"	2" x 18" x 36"	

Other sizes made: 1 1/2" to 5" thick, 10" to 28" wide, 12" to 80" long.

BLACKSMITH'S CONES OR MANDRELS

The plain pattern is cast smooth and round, and is adapted for ring forming, band forming, etc. The Cheney pattern has a slot which is convenient for holding the end of the iron during bending; ties on the inside strengthen the cone.



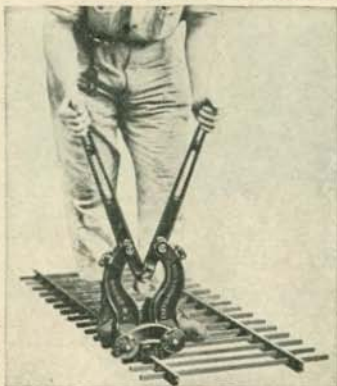
General Specifications

Size No.	Height Inches	Diameter, Ins.		Weight, Lbs.	
		Top	Base	Plain	Cheney
1	36	1	8	55	60
1 1/2	40	1	10	90	100
2	48	1	12	115	125
3	50	1	14	140	150
4	54	2	16	200	220
5	50	5	24	500	.....

No. 5 not furnished in Cheney Type.
Plain type furnished unless Cheney type is specified.

For Net Prices See Supplement

BROWN HAND CALKING TOOL



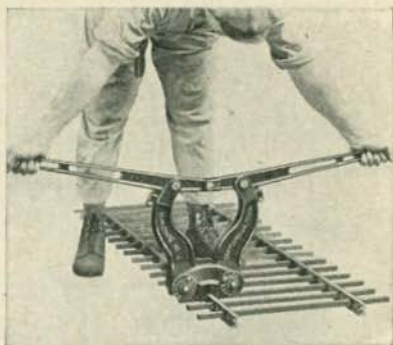
This is a very ingenious calking tool and almost indispensable in the ornamental iron shop or for manufacturing fences, window guards, grating and similar work, especially where a tight job is necessary. Is considerably faster than the old hand method, it being estimated that one experienced operator will in ten hours calk 200 to 500 feet on both sides, depending on the weight and the design of the fence.

Such work, if calked with this tool, will be much stiffer and stronger and will stand more hard usage and rough handling than work calked by hammering. As the calking is done entirely by pressure, there is no

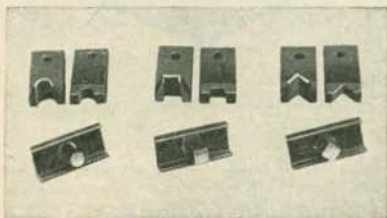
possibility of loosening pickets which have previously been calked, and all pickets are left tight, holding the panel true to shape.

This is a one-man tool, requiring no special skill to operate. It is adjusted for thick or thin railing by turning the eccentric pin to the point where the pressure exerted by the operator will force the handles down to the stop, calking the picket in place. The dies are then disengaged by lifting the handles upward, and the tool is moved to the next picket, where its own weight will adjust it for the next stroke.

Construction is very substantial throughout. The main levers are made of stiff high carbon steel castings, and the dies are hand forged from high grade tool steel.



Three styles of dies can be supplied. These are shown in the illustration, together with the particular type of picket for which each is intended. Style 1 is for round pickets, Style 2 is for square pickets, and Style 3 is for square pickets set diagonally.



Style 1. Style 2. Style 3.

Each pair consists of a Cutting Die and a Backing Die, although where flat bars are used for the rails instead of channels, both dies may be cutting dies. All three styles can be furnished for all standard sizes of pickets up to 1", and a separate pair of dies is required for each different size of picket, except in Style 3, where one pair of dies will handle several sizes of pickets.

Extra dies can be furnished at all times.

General Specifications

Capacity—Will calk any size picket up to 1", round or square.

Equipment—One pair of dies, Style 1, 2 or 3, for any standard size of picket, round or square.

In ordering complete tool or extra dies, state size of pickets to be calked, style of dies wanted, whether pickets are to be calked into channel or flat bar rails, and size of rails.

When dies are ordered in pairs, we will supply one Cutting Die and one Backing Die, unless otherwise specified.

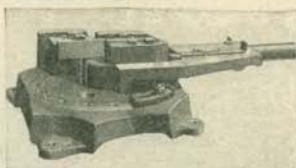
*Machines of larger capacity than those listed above are built to special order.

For Net Prices See Supplement

HAND BAR BENDERS



No. 1—Post Base



No. 4—Flat Base

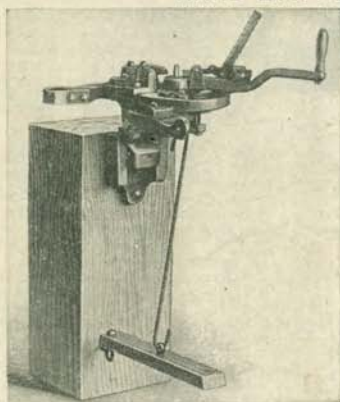
Intended for bending flat, round, square, twisted or deformed bars to various angles. Will not form bars into Circles. No. 1 is furnished with post socket for bolting to a post or bench, or for clamping in a vise. Other sizes have a flat base for bolting to a bench. No. 2 and 4 are so constructed as to permit of hook and U bends, and can be furnished with forms for such work at a moderate extra charge. No. 2 will handle hooks, loops and U bends up to 8½ in. across outside, while No. 4 will take care of such work up to 12 in. across outside.

No. 3 is of the same capacity as No. 4 but is not adaptable to hook and U bending. It is particularly recommended for bending reinforcing bars for concrete construction work.

The three larger sizes can be furnished with dies of various heights, which allow bending of wide flat bars, but do not affect the capacity for round or square bar bending.

Size	Height of Dies	Bending Capacity				Weight Lbs.	List Price
		Flat Bars		Rounds, Squares or Twisted			
		Cold	Hot	Cold	Hot		
No. 1—Post Base	.....	¼" x 1½"	½" x 2"	½"	¾"	60	\$30 00
No. 2—Flat Base	2"	⅜" x 2"	¾" x 2"	¾"	1½"	155	45 00
	3"	⅜" x 3"	¾" x 3"	¾"	1½"	165	48 00
No. 3—Flat Base	2"	½" x 2"	1" x 2"	1¼"	1¾"	225	55 00
	3"	½" x 3"	1" x 3"	1¼"	1¾"	230	58 00
	5"	½" x 4"	1" x 5"	1¼"	1¾"	240	62 00
No. 4—Flat Base	2"	½" x 2"	1" x 2"	1¼"	2"	270	60 00
	3"	½" x 3"	1" x 3"	1¼"	2"	280	63 00
	5"	½" x 4"	1" x 5"	1¼"	2"	290	67 00

HAND EYE BENDERS



Especially designed for bending eyes, rings, hooks, chain links, loops, staples, U bends, etc., No. 3 intended for heavy bending, is recommended particularly for railroad, ship, bridge and structural iron works.

Rated capacities are based on material being heated, for bending. Equipment includes one forming pin with which eyes, of any size stock within the range of the bender, can be turned to the same inside diameter. Extra forming pins for eyes of other inside diameters can be furnished at slight additional charge. When ordering forming pins, be sure to specify inside diameter of eyes to be turned.

When ordering Eye Benders, it is preferable to send a sample of the work to be done or a sketch with all dimensions shown.

Size No.	Bending Capacity		Weight Lbs.	List Price
	Round Bar Stock (Hot)	Maximum Outside Diameter of Rings or Eyes		
1	1½"	2¾"	50	\$35.00
2	3½"	3"	85	40.00
3	1½"	7"	155	70.00

BUFFALO BLACKSMITHS' FORGES

These forges are made of cast iron and are well adapted to the needs of various types of shops. The blowers are, in each case equipped with New Departure Ball Bearings.

The model illustrated, No. 243-H, is the type, which serves particularly contractors, blacksmiths, automobile repairman, in a variety of work. The gear ratio of the fan mechanism is $47\frac{1}{2}$ to 1.

No. 247-H is a large size intended for general use. It is especially well made and braced throughout. The spacious hearth is cast integrally with the coal box.

No. 249-H is an extra large substantial forge designed to meet the requirements of the shop where heavy work is the usual thing. The hearth is of extra depth, provided with a coal box cast in at one end.

All of these forges are made with steel half hood, cast iron hearth, well braced steel pipe legs, Vulcan tuyere and No. 200 Buffalo hand-driven silent blower.



No. 243-H

Size No.	243-H	247-H	249-H
Size of hearth.....	28"x40"	32"x45"	38"x42"x7"
Diameter of fan.....	14"	14"	14"
Shipping weight, lbs.....	322	331	820

Unless otherwise specified, these forges will be furnished without water tank, which, however, can be supplied at a slight additional cost.

BUFFALO FORGES—SERIES 35



This series of forges has a square one-piece pressed steel hearth which has no cracks to widen out or collect moisture and result in rusting.

They are medium weight and well adapted to the work of contractors, tank and boiler-makers, shipbuilders and bridge builders, miners, etc.

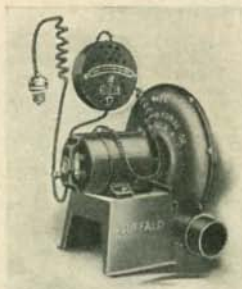
Mounted on four well braced angle iron legs and furnished with either windshield or rolled steel halfhood, Vulcan tuyere and Buffalo Blowers.

Number	Size Hearth	Blower No.	Hood	Net Weight	Shipping Weight
235.....	24x30x3	200	Windshield	138	165
235-H.....	24x30x3	200	Half Hood	143	170
335.....	24x30x3	300	Windshield	161	188
335-H.....	24x30x3	300	Half Hood	166	191
535.....	24x30x3	500	Windshield	180	220
535-H.....	24x30x3	500	Half Hood	190	230
735.....	24x30x3	700	Windshield	97	124
735-H.....	24x30x3	700	Half Hood	100	130
835.....	24x30x3	Electric	Windshield	102	135
835-H.....	24x30x3	Electric	Half Hood	107	140
835-F.....	24x30x3	Electric	Full Hood	120	153

These forges can also be furnished with hearth $5\frac{3}{4}$ " deep instead of 3".
For other electric forges see next page.

For Net Prices See Supplement

BUFFALO ELECTRIC BLOWERS



No. 2-E Variable Speed Blower

regulating the volume of air, attachment cord and plug.

A line of direct-connected motor driven blowers, designed particularly for forge fire service, but also adapted to many other uses in industrial plants. Made in both Variable Speed and Constant Speed types, and for either 110 or 220 volts, as specified.

The Variable Speed Blowers are more generally used, being equipped with ball bearing motors of the Universal type, which will operate equally well on direct current and on single phase alternating current of any frequency from 25 to 60 cycles. This type is more suitable for operation from lighting circuits, and is furnished with a six-speed regulator, attachment cord and plug.

The Constant Speed type does not have a Universal motor, but can be supplied either for direct current or for single phase, 60 cycle alternating current. When furnished with alternating current motor this type will operate on 3 phase line by connecting only two of the wires. Regular equipment includes sliding blast gate for

Size	2-E	2-EH	3-E	*4-E
Suitable for.....	1 small fire	1 or 2 fires	2 or 3 fires	3 to 5 fires
Diam. of Outlet.....	3"	3"	4"	5"
Height Overall.....	15"	15"	15"	15"
Speed, R. P. M.				
Variable Speed.....	2600	3000	3400	.....
Constant Speed.....	1750	3000	3400	3400
Weight, lbs.....	48	57	78	140

*No. 4-E cannot be connected to lighting circuit. This size has a $\frac{1}{2}$ H. P. Motor and requires special wiring.

Always state whether wanted for 110 or 220 volts. If Constant Speed type is selected, state whether for Direct or Alternating Current.

BUFFALO ELECTRIC FORGES

These are standard sizes of the Buffalo forges, equipped with electric blowers, making them particularly suitable for various classes of work where production is essential, or where the service is continuous.

Sizes 831 and 831-H are steel plate forges of the same general construction and specifications as the Buffalo Steel Forges described on Page 104, except that they are equipped with electric blowers.

832-H is of the same type of construction but of larger size.

Sizes 843-H, 847-H, and 849-H have cast iron hearths, and correspond in all respects to the three sizes of Blacksmiths' Forges described on Page 104, except that they have electric blowers. All sizes furnished with steel half hood.

Either Variable Speed or Constant Speed Blower will be supplied, according to preference. Attachment cord, plug and blast control equipment furnished in accordance with specifications of electric blowers above.



No. 843-H Electric Forge

General Specifications

Size No.	Size of Hearth Inches	Size of Blower	Shipping Weight Pounds
831	30x30	No. 2-E	135
831-H	30x30	No. 2-E	140
832-H	30x36	No. 2-E	280
843-H	28x40	No. 2-E	350
847-H	32x45	No. 2-E	310
849-H	38x42x7	No. 2-EH	470

In ordering, state whether wanted for 110 or 220 volts. If forge is desired with Constant Speed Blower, state whether for direct or alternating current.

For Net Prices See Supplement

BUFFALO STATIONARY FORGES

Plain, Electric and Down-Draft



No. 86—Plain

These forges are designed and built for heavy work. They are made of heavy steel plate, rigidly stiffened and strengthened throughout. The edges are reinforced. The hearth may be lined with clay to reduce heat radiation through the sides.

Furnished with blast gate and heavy anti-clinker dumping tuyere. Combination water tank and coal box, as shown in illustration, will be supplied at an additional charge.

Sizes 85 and 86 are the plain type, intended for connection to independent or central blast supply, and are not equipped with blowers.

Sizes 885 and 886 are exactly the same as Nos. 85 and 86, except equipped with electric blower mounted inside of the forge casing. The blower is thus in the most protected position, at the same time easily accessible through the door in the side of the forge. Either variable speed or constant speed blower will be furnished, according to preference. See description of electric blowers on page 105.

Sizes 85-D and 86-D are the same sizes and built to the same specifications as Nos. 85 and 86, but are a "down-draft" type, intended for connection to permanent underground blast and exhaust piping. The "down-draft" system is particularly recommended for large forge shops, eliminating overhead sheet metal piping, which requires frequent renewals, and which is otherwise objectionable owing to the space it occupies and to the interference it offers in handling large work. The down draft ventilates the shop, removing the soot, smoke and gases.

The patented Down-Draft Hood, with which these forges are equipped, may be turned back out of the way when necessary in handling large, heavy work.

Size 87-D is an extra large "down-draft" type, built along the same lines as the smaller sizes, but intended for the heaviest forge shop work. This size is recommended for use in connection with a steam hammer.



No. 85-D—"Down-Draft"

Size No.....	85	86	885	886	85-D	86-D	87-D
Type.....	Plain	Plain	Electric	Electric	Down-Draft	Down-Draft	Down-Draft
Diam. of Hearth..... Ins.	36	48	36	48	36	48	60
Height to Top of Hearth... Ins.	26	26	26	26	26	26	26
Size Blast Connection..... Ins.	3	4			3	4	
Size of Blower.....			2-E	2-EH			
Size Exhaust Connection... Ins.					6	8	10
Approximate Weight..... Lbs.	400	500	400	500	550	800	850

STATIONARY AND TELESCOPIC HOODS

We can furnish four sizes of hoods for stationary forges, in both stationary and telescopic types. These are made of heavy sheet steel, with reinforced rims.

The stationary type consists merely of the canopy with a collar at the top, to which a vertical exhaust pipe may be connected. The telescopic type is furnished complete with telescoping sections, wire rope, pulleys and counterweight

Size No.....	1	2	3	4
Diam. overall... Ins.	26	30	40	51
Diam. Pipe or Collar... Ins.	9	10	11	12
Range of Length Ins.	50 to 75	50 to 75	56 to 80	56½ to 83
Weight—Stationary..... Lbs.	20	25	35	50
Weight—Telescopic,..... Lbs.	70	75	110	145



Telescopic Type

PORTABLE RIVET FORGES

Buffalo Steel Rivet Forges, Series No. 210



A very popular series of forges for rivet heating, suitable for use in railroad, boiler and structural iron shops, bridge building plants, garages, and other places where rivets or other small pieces are to be heated. All sizes have the new improved one-piece pressed steel hearth with removable pipe legs, and are equipped with Buffalo No. 200 Silent Blower. This is a remarkably noiseless, smooth-running blower, with the high-speed pinion made of steel with cut helical teeth. The fan shaft runs in high-grade radial ball bearings, and the fan is carefully balanced on its shaft. The fan blades are unusually large and are tapered, the fan case conforming to their shape. The gear case is a one-piece oil-tight casting with a removable cover, insuring permanent alignment of gears. Each turn of the hand crank produces $47\frac{1}{2}$ revolutions of the fan.

The standard sizes have a shield, and differ only in the diameter of the hearth. Size No. 210 is the most popular for use out on the job, as it is the smaller and more conveniently handled.

Size No.	210-	212	210-H	212-H
Diameter of Hearth.....	18"	24"	18"	24"
Diameter of Fan Case.....	12"	12"	12"	12"
Net Weight, Pounds.....	115	130	120	140

Sizes designated by H are the same as the standard sizes, except furnished with half-hood instead of shield.

Buffalo Steel Rivet Forge, Series No. 310

The No. 310 Rivet Forge has a deep, one piece, drawn steel hearth. It is of the seamless type, exceptionally strong and durable—stronger than any sheet metal hearth ever made, and lighter and better than cast iron types. There are no seams to accumulate moisture with resultant corrosion as in the old 2-piece hearth. This hearth is identical with the one used on the No. 210 forge shown above.

The distinction between the No. 210 and No. 310 forges is solely in the Blower. The No. 310 uses the No. 300 Blower. The latter model has gears contained in a one-piece case provided with a dust-proof cover. This arrangement allows easy access to the gearing. The one-piece construction gives perfect alignment. The gear train, consisting of spur gear, steel pinion, and bronze spiral cut gear with steel pinion, has ample arrangements for lubrication. The fan shaft is fitted with radial ball-bearings.

The fan is of the pear shaped type so that it can be operated equally well in either direction.

No.	310	312	310-H	312-H
Diameter Hearth, Inches	18	24	18	24
Diameter Fan Case, Inches	10	10	10	10
Net Weight, Pounds.....	110	120	118	128
Shipping Weight, Pounds	130	146	138	154

Sizes designated by "H" are the same as standard sizes, except furnished with half-hood instead of shield.



GUNNELL PNEUMATIC RIVET FORGE



This Forge will heat 20 rivets at a time, and will easily handle 200 per hour, furnishing them smooth, evenly heated and neither burned nor melted on the end. The fuel consumption is very low, and only a small amount of air is required.

The hollow cylinder above the fire contains the fuel, which is steadily fed down to the fire in a highly pre-heated condition. The cylinder and funnel arrangement, to which the air hose is attached, is an efficient pneumatic draft inducer which maintains a steady and easily regulated air supply. The upper part of the forge is pivoted, enabling the operator to reach any rivet simply by revolving the fire-bed.

This forge is particularly suitable for portable use, on account of its extremely light weight. It is adaptable to small pea coal, hard coal screenings or coke screenings.

Capacity, per Heat..... 20 Rivets
 Capacity per Hour..... 200 Rivets
 Air Consumption per Minute..... 2 Cu. Ft.
 Weight, Approximately..... 50 pounds

BUFFALO ELECTRIC RIVET FORGE

These Electric Forges are exactly the same as the No. 210 Buffalo Rivet Forge, except that they are equipped with a No. 2-E Buffalo Electric Blower instead of a hand blower. They will operate equally well on Direct Current or Single Phase, 60-Cycle Alternating Current and can be furnished for either 110 or 220 volts as specified. All sizes furnished with either Constant or Variable Speed motor as preferred. A six-speed regulator is supplied with Variable Speed equipment only. When equipped with Constant Speed motor, the air supply pipe leading from fan outlet to tuyere is provided with a sliding blast gate, giving perfect control over the air supply delivered to the fire.



Size No.	810	812	810-H	812-H
Diameter of Hearth.....	18"	24"	18"	24"
Net Weight, Pounds.....	105	125	115	135

Sizes designated by H are the same as the standard sizes, except furnished with half-hood instead of shield.

BUFFALO OIL BURNING RIVET FORGE



The "Buffalo" Oil Burning Rivet Forge is an efficient portable unit which eliminates the danger and inconvenience from flying sparks that is encountered in the ordinary open hearth coal forge. Designed for use either as a stationary installation or for work within the shop or out on the job. The oil tank has two handles to facilitate moving.

The Forge consists essentially of a welded steel oil tank on which is mounted a head, or fire-box. The latter is made up of a circular steel plate housing held between cast iron top and bottom plates by means of three heavy screw bolts.

The fire chamber has a one piece lining of high grade refractory material two inches thick. To replace old lining, it is only necessary to loosen the three screw bolts, remove top of fire chamber and lift out lining—a very simple operation when compared to that involved in other types.

The operation of this forge is simple and does not involve complex mechanism. Air pressure is applied to a single connection

and furnishes pressure for both the oil supply and the atomizer or burner. Regulation of temperature is good and operation is entirely automatic, following the initial adjustment of the oil and air supplies. The tank is subjected to an air pressure of 125 pounds per square inch to insure it against possible leakage. Burns kerosene, distillate or any fuel oil.

It is one of the fastest heating forges on the market and has the added advantage of heating work without any danger of burning. Recent tests show that it will heat 50- $\frac{1}{2}$ " x 1" rivets in 2 $\frac{1}{2}$ minutes.

The forge can be mounted on a truck as illustrated, making it easily one of the most practical forges for construction work.

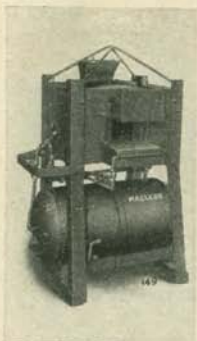


General Specifications

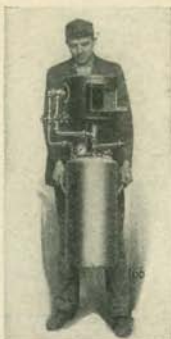
	No. 1	No. 2
Height to top of chamber.....	43 in.	45 in.
Height of chamber.....	11 $\frac{1}{2}$ in.	14 $\frac{1}{2}$ in.
Inside diam. of chamber.....	7 in.	10 in.
Inside height of chamber.....	6 in.	8 in.
Fire opening.....	3 $\frac{1}{2}$ x 5 $\frac{1}{4}$ in.	4 x 6 in.
Capacity of tank.....	12 gal.	18 gal.
Shipping Weight.....	175 lbs.	260 lbs.
Shipping Weight with Truck.....	235 lbs.	320 lbs.

For Net Prices See Supplement

MACLEOD RIVET FORGES



No. 149



No. 166



No. 150

While this line of rivet forges is primarily intended for either crude or refined oil any of the sizes shown can be supplied with suitable burners for gas, if required, at special prices.

No. 149 and 150 are particularly useful for structural iron workers, ship builders and for all outside construction work. They can be picked up by crane and easily moved. The sill of No. 150 is 38" above the base while the No. 149 is somewhat lower. Either will heat about 400- $\frac{1}{2}$ " rivets per hour and both are built with standard fire brick. They have Macleod Hopper Heads providing for the preheating of all rivets and allowing them to be fed automatically into the heating chamber.

No. 166 is the smallest of these forges. As it weighs only 100 lbs. it is particularly suited for work requiring a forge that one man can carry.

Forge No. 143 shown below is constructed with an opening in the back so that long lengths of material can also be heated. The top is slightly recessed to preheat rivets and also has an opening for a soft metal melting pot.

The illustration below on the right side shows the Macleod Rivet Forges made for central fuel supply. The No. 180 is the same as No. 181 shown except that it has only one opening. Either furnace may be equipped with any of the following burners:

Type B for 10 to 90 lbs. air pressure, same oil pressure.

Type F. B. for 8 to 10 oz. air pressure, 10 to 20 lbs. oil pressure.

Type B. L. for 10 to 90 lbs. air pressure, 10 to 20 lbs. oil pressure.

Type P. P. for 1 to 2 lb. air pressure, 10 to 20 lbs. oil pressure.

All forges are fitted with face shields when specified at no additional charge.



No. 143



No. 181

General Specifications

No.	Heating Chamber Size, In.	Opening Size, In.	Arch Thickness, In.	Wall Thickness, In.	Tank Size Gal.	Oil per Hour, Gal.	Air per Minute Cu. Ft.	Ship. Wt., Lbs.
143	10" Diam.	6x2 $\frac{1}{4}$	2	2 $\frac{1}{2}$	17	$\frac{1}{2}$ -2	5-15	350
149	16 $\frac{1}{2}$ x9	5 $\frac{1}{2}$ x4 $\frac{1}{2}$	4 $\frac{1}{2}$	2 $\frac{1}{2}$	12	$\frac{1}{2}$ -3	8-18	550
150	16 $\frac{1}{2}$ x9	5 $\frac{1}{2}$ x4 $\frac{1}{2}$	4 $\frac{1}{2}$	2 $\frac{1}{2}$	17	$\frac{1}{2}$ -3	8-18	670
166	8" Diam.	4x2 $\frac{1}{2}$	2	2	9	$\frac{1}{2}$ -1 $\frac{1}{2}$	5-12	175
180	13 $\frac{1}{2}$ x9	4x4	2 $\frac{1}{2}$	4 $\frac{1}{2}$	..	1-3	..	1250
181	18x9	4x4	2 $\frac{1}{2}$	4 $\frac{1}{2}$	..	2-4	..	1600

For Net Prices See Supplement

STEWART METAL FURNACES

Brass Furnace

These Gas or Oil Heated Furnaces are designed for melting brass, aluminum and other non-ferrous metals. A swing top made of one piece of molded refractory banded with steel to add strength; and with a special lifting device which lifts the entire top very easily from the body of the furnace. The top can be swung to one side, giving a clear opening into the body of the furnace for drawing the metal and also to facilitate changing crucibles. The linings are all made of high grade refractory material.

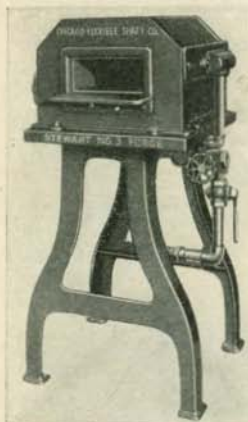
Stewart Metal Melting Furnaces are furnished either in the tilting or the non-tilting types. The standard non-tilting types are made in four sizes: No. 12A, No. 35A, No. 60A and No. 80A. The No. 12A will accommodate a No. 12 Crucible or smaller, the No. 35A will accommodate a No. 35 Crucible or smaller, etc. Tilting types are made for crucibles from No. 12 to No. 150, inclusive.



For Gas or Oil

General Specifications

Furnace No.	Capacity	Size Dixon Crucible	Floor Space	Gas Connections	Air Connections	Oil Connections	Size Blower Required	Shipping Weight
12A	36 lbs. brass	No. 12	24"x24"	1"	1"	1/2"	No. 3	435 lbs.
35A	105 lbs. brass	No. 35	28"x28"	1 1/4"	1 1/4"	1/2"	No. 4	750 lbs.
60A	180 lbs. brass	No. 60	30"x30"	1 1/4"	1 1/4"	1/2"	No. 5	865 lbs.
80A	240 lbs. brass	No. 80	32"x32"	1 1/2"	1 1/2"	1/2"	No. 5	1025 lbs.



No. 3—For Gas Only

STEWART FORGES

Small Types

These forges are made for general purpose forge work; they are exceptionally desirable for tool dressing, pipe bending, or for any emergency job that may arise in the shop.

The burners are on both sides of the furnace and so applied as to obtain a uniform forging heat within two or three minutes. Combustion takes place immediately over the hearth.

Linings are of first quality refractories and consist of unit slabs, making them easy to refine. Slabs can be supplied at any time. The body is sturdily built of cast iron with cast iron base and legs.

Complete information concerning these and heavier forges for hammer work will be sent on request.

General Specifications

No.	Front Opening	Depth
0	3 1/2"x5"	7"
1	2"x12"	12"
3	3 1/2"x8"	10"
5	2"x12"	8 1/2"
6	3"x4 1/2"	8"
Rod End	2"x10"	8"

STEWART RIVET HEATERS

These rivet heaters, popular among boilermakers and structural iron workers, are capable of heating a large number of rivets in a short time; in fact, heating them as fast as they can be placed and replaced. This is possible because of the large burner area, position of the burners, and the manner in which the flames are brought to bear on the hearth.

The linings are made of best refractories of molded tile, which can be easily replaced. The body and legs are made of heavy cast iron.

The smaller heaters are made for gas consumption only, but the larger sizes burn gas, oil, or both.

Type	Opening, Inches	Heating Space, Inches
Bench	4x5	5x7
No. 2	4x5	5x7
No. 3	4x8	12x12
No. 4	4x9	20x15
*No. 5	4x9	36x15
No. 6	3x7	12x12

*No. 5 has two openings.



No. 4—For Gas or Oil

For Net Prices See Supplement

STEWART SEMI-MUFFLE OR OVEN FURNACES



No. 14

Stewart Oven Furnaces are built in many sizes and are used for carburizing, normalizing, annealing and general heat treating operations.

In the Stewart Oven Furnaces combustion takes place under the hearth. The products of combustion rise to the heating chamber from both sides, completely surrounding the work and heating it evenly throughout.

All Stewart Oven Furnaces listed below can be furnished either plain Oven or Semi-Muffle, as desired. When they are built Semi Muffle, the working width of the furnace is reduced slightly, but the actual working capacity of the furnace is not reduced. This Semi-Muffle type is superior to the Oven Type for practically any heat treating operation.

Furnaces are heavy, sturdy, and thoroughly dependable with first class refractories which are backed by a layer of insulating material.

The doors, while heavy, are so well balanced that little effort is required to raise and lower them, and when closed, they afford an effective seal.

Complete information concerning these furnaces, and prices on special sizes will be furnished on request.

General Specifications

Number	Size of Opening Inches	Depth Inches	Floor Space Inches	Size Blower Required	Shipping Weight Pounds.
*1	5x 9	13 $\frac{1}{2}$	28x28	No. 3	1,000
2	8x14	18	36x40	No. 4	1,650
3	9x15	24	36x48	No. 4	1,900
4	11x15	36	38x54	No. 5	2,250
5	10x12	28	34x46	No. 5	2,150
6	10x11	30	33x48	No. 5	2,150
7	10x12	32	34x50	No. 5	2,225
8	10x16	40	38x58	No. 5	3,000
9	10x18	44	40x62	No. 5	3,250
10	12x20	48	42x66	No. 5	3,900
11	12x20	36	42x54	No. 5	3,500
12	10x24	36	46x54	No. 5	4,100
13	20x20	36	54x54	No. 5	4,500
14	6x10	15	34x36	No. 4	1,210
15	8x14	20	38x44	No. 4	1,500
16	8x14	22	36x42	No. 4	1,600
17	8x16	30	38x48	No. 5	2,000
18	9x16	36	36x54	No. 5	2,300
19	4x 6	38	26x56	No. 4	1,700
20	4x10	40	30x58	No. 5	1,900
21	6x 8	42	28x60	No. 5	2,325
22	5x 7	44	27x62	No. 5	1,775
23	6x12	44	34x62	No. 5	4,000
24	14x20	54	44x70	No. 6	4,250
25	14x22	60	50x74	No. 6	7,000
26	6x12	22	36x44	No. 4	1,500
27	6x12	18	36x40	No. 4	1,450
*28	4x 8	12	24x24	No. 3	750
29	10x18	30	40x48	No. 5	2,200
30	8x16	24	38x42	No. 5	1,900
31	6x18	24	40x48	No. 4	2,000
32	6x20	24	42x48	No. 4	2,200
33	15x18	24	40x48	No. 5	2,700
34	10x18	24	40x48	No. 4	2,300
35	14x30	60	62x86	No. 6	9,450
36	20x36	72	68x94	No. 6	12,000
37	20x42	72	74x94	No. 6	14,000
38	12x16	50	38x64	No. 5	3,200
39	10x24	24	52x48	No. 5	3,350
40	10x24	30	52x48	No. 5	3,500
41	12x20	30	42x48	No. 5	3,200
42	15x24	30	42x48	No. 5	3,500
43	8x24	36	36x54	No. 5	2,600
44	14x20	48	42x66	No. 5	4,600
45	18x20	48	42x66	No. 5	5,200
46	12x24	48	46x66	No. 5	5,400
47	15x24	48	46x66	No. 5	5,700
48	18x24	48	46x66	No. 5	6,000
49	10x20	20	42x42	No. 5	1,800
50	6x20	15	42x43	No. 4	1,400

*Regularly equipped with hinged door: but supplied with counterbalanced door at small cost.

For Net Prices See Supplement

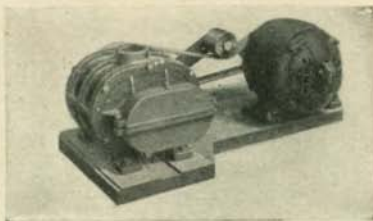
STEWART POSITIVE PRESSURE BLOWERS

Stewart Positive Pressure Blowers are built to supply air for combustion at 1½-lb. pressure to the square inch, without surging or pulsation, and are especially desirable for use in connection with medium and small sized furnaces.

These blowers produce a steady blast of air at a uniform pressure; a feature most important in the operation of any oil or gas burning equipment. They are simple in construction, being of the double impeller type. And, are made exceptionally rugged to stand severe service. Tight or tight and loose pulleys can be furnished.

The Stewart Motor Driven Blower illustrated has been designed to supply the demand for a furnace and blower as a complete unit independent of the main power plant. To operate a furnace when the blower is belted to the main line shaft, makes it necessary to run the large plant motor when only a fraction of such power is required. The Stewart Motor Driven Blower Unit avoids this needless expense thus making it ideal for small installations.

When ordering motor driven units, be sure to specify the voltage and kind of current available. If alternating current is used, give the frequency and phase.



Motor Driven



Belt Driven

Motor Driven

Motor Driven Unit No.	Size Standard Blower	Motor H. P.
35	No. 3	1
45	No. 4	1½
55	No. 5	2
65	No. 6	2½

Belt Driven

No.	Speed R.P.M.	Displacement Cubic In., per Rev.
3	500 to 800	180
4	400 to 600	290
5	300 to 500	575
6	200 to 300	1152

STEWART DOUBLE DECK HIGH SPEED FURNACES

These Double Deck High Speed Steel Furnaces are especially designed for high temperatures and the quick heats required for the proper hardening of high speed steel.

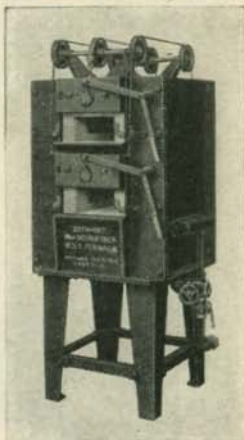
The upper chamber, which is heated by the waste gases from the lower chamber, is used for pre-heating the steel before it is put into the high heat chamber. Although the upper chamber is equipped with an auxiliary burner, it has been found that 85 per cent of the heat required for it is supplied by the waste heat from the high heat chamber below. This utilizing of waste heat is a distinct fuel economy and is an outstanding feature of these furnaces.

The lower chamber is heated by burners placed at both sides of the heating chambers; combustion takes place under the Carbofrax floor and because of the high heat conductivity of Carbofrax, an even heat is assured throughout the entire length of the furnace. The Carbofrax floor and Carbofrax supports are for the purpose of withstanding the high temperatures necessary in handling high speed steels. A soft reducing atmosphere so necessary for the hardening of high speed steel is easily maintained in this furnace.

The linings are of first quality refractory, backed by special insulation which conserves the heat and thus furthers fuel economy. The furnaces are strong and rugged to withstand the severe conditions required by high temperatures.

General Specifications

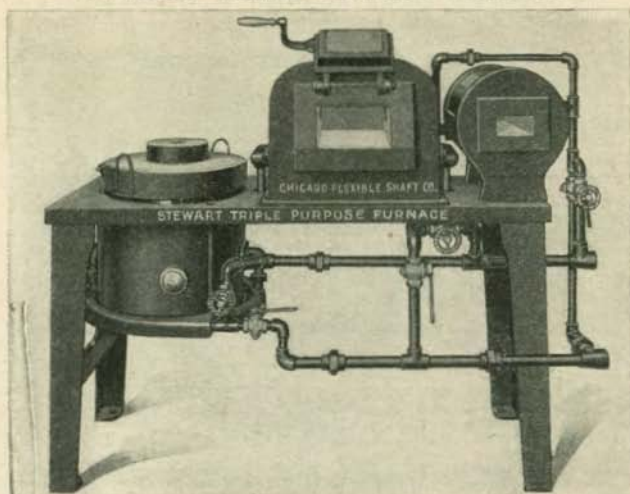
No.	Size Opening	Depth	No.	Size Opening	Depth
1	5"x 9"	13½"	7	6"x12"	36"
2	4"x 8"	12"	8	8"x20"	36"
3	6"x10"	15"	9	7"x27"	27½"
4	6"x14"	20"	10	7"x24"	27½"
5	6"x12"	22"	11	8"x10"	20"
6	8"x12"	22"	12	8"x14"	30"



For Gas or Oil

For Net Prices See Supplement

STEWART TRIPLE PURPOSE FURNACE



This is an assembly of three standard Stewart Furnaces consisting of No. 612 Pot Furnace, No. 28 Oven Furnace, and No. 3 High Speed Steel Furnace for hardening tools and for light forging work. This unit makes a complete, compact plant covering practically all of the heat treatments of metal.

All units can be operated at one time or any of the units may be operated separately. The Center section has an opening 4' high, 8' wide and 12" deep. It is fitted with a U slab, combustion taking place under the floor, assuring an even heat throughout the furnace. To withstand the high heats necessary for the proper hardening of high speed steel, the oven should be fitted with a Carbofrax Hearth. This can be done at a small extra cost, if specified with the order. Any two of the furnaces illustrated can be furnished in combination. The A combination consists of the No. 3 High Speed Steel and No. 28 Oven Furnace. The B combination is the No. 28 Oven Furnace and the No. 612 Pot Furnace. The C combination is No. 3 High Speed Steel Furnace and the No. 612 Pot Furnace. All furnaces are lined with first quality refractories and replace tile can be secured at any time.

POT FURNACES



Rectangular Pot Furnaces

Number	Width of Pot, In.	Length of Pot, In.	Depth of Pot, In.
4	10	20	8
5	22	34	14
6	33	40	24
7	19	48	20
8	33	40	18
9	12	25	10
11	27	60	36
12	30	30	24
14	3	18	20
15	5	10 1/2	9
16	6	15	6 1/4
17	14	16	12
18	10	20	12
19	8	24	8
20	12	20	8 1/4
21	10 1/2	19	7 1/4
22	12	30	12

Round Pot Furnaces

No.	Diam. of Pot, Inches	Depth of Pot, Inches	No.	Diam. of Pot, Inches	Depth of Pot, Inches
66	6	6	1214	12	14
68	6	8	1216	12	16
610	6	10	1218	12	18
612	6	12	1414	14	14
88	8	8	1416	14	16
810	8	10	1418	14	18
812	8	12	1616	16	16
814	8	14	1618	16	18
1010	10	10	1620	16	20
1012	10	12	1718	17	18
1014	10	14	1818	18	18
1016	10	16	1820	18	20
1212	12	12	2424	24	24

Stewart Pot Furnaces for Cyanide, Lead, and Salt Bath Hardening are also used for Oil Tempering.

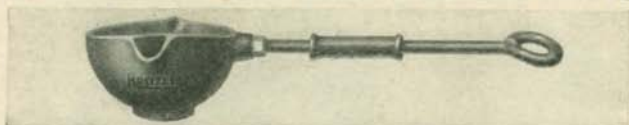
Direct impingement of the flame on the Pot is avoided thus adding greatly to the life of the Pot. The Burners for gas fuel are placed high in the furnace thus giving their greatest efficiency up around where the work is performed in the furnace.

Stewart Pot Furnaces for Oil Fuel are fitted with a special combustion chamber. The burner fires into a combustion chamber directly under the Pot, which is protected with a heavy refractory. The products of combustion having a rotary motion pass around the refractory to the top of the Furnace which is vented at the highest possible point thus giving maximum efficiency.

The refractory lining used in the construction of these Furnaces is of the very best grade obtainable and under normal usage relining is reduced to the minimum.

For Net Prices See Supplement

ROWELL BOTTOM-POUR BABBITT MELTING LADLES



These are self-skimming ladles, constructed in such a way as to pour the metal from the bottom of the bowl instead of the top. All scum, dirt or dross which gathers on the surface of the molten metal is left undisturbed, and only clean, pure metal is poured. Hand skimming, with its resultant loss of time and metal, is thus eliminated.



Interior View of Bowl

The four larger sizes have a sliding hand grip as shown in illustration. This protects the workman's hand, at the same time readily permitting the handle to be turned to pour the metal.

General Specifications

Size	No. 4	No. 5	No. 6	No. 7	No. 8
Diameter of Bowl, inches.....	4	5	6	7	8
Depth of Bowl, inches.....	2	2½	3	3½	4
Lead Capacity, pounds.....	4½	9	18	25	40
Water Capacity, pints.....	½	1	2	3	4
Diameter of Handle, inches.....	7/16	¾	¾	¾	5/8
Length of Handle, inches.....	14	24	31	31	31
Net Weight, pounds.....	3	4½	7½	9½	13

ROWELL MELTING FURNACES

Rowell furnaces are simple in construction, easy to operate, and will melt, refine and alloy all white metals. They are made to burn coal, coke, wood, oil or gas. The furnaces burning coal, coke or wood are made with all provisions for installing oil or gas burners at any time. Gas and oil burning furnaces will use coal, coke or wood also.

The melting pot is made of heavy cast iron and equipped with two bottom internal valve devices operated by hand wheels above top of furnace. The bottom draw permits dirt and other impurities to settle on the surface of the metal to protect the metal beneath from oxidation.

The body is a riveted steel jacket with lining of fire brick and an insulation backing of asbestos. The base is made of heavy cast iron. The legs of the base are made hollow so that the furnace can be raised to any desired position by fitting four pieces of pipe in these openings at any time.

Air circulation chambers eliminate chilling the molten metal and provide a better circulation of heat around the pot. Smoke and fume pipes serve to keep the air in the shop from being contaminated.



General Specifications

No. 102

No.	Capacity Lbs.	Fuel	Outside Diam.	Over-all Height	Height Floor to Draw Pipe	Floor Space	Shipping Weight Lbs.
101	500	Coal, Coke or Wood.	22½"	35¾"	23¾"	23x33	520
102	500	Gas (with Burner) ..	22½"	35¾"	23¾"	23x33	540
102	500	Oil (without compressor).....	22½"	35¾"	23¾"	23x33	550
104	500	Oil (with comp. equip.).....	22½"	35¾"	23¾"	23x33	850
105	500	Kerosene (with burner equip.)....	22½"	23¾"	23¾"	23x33	590
201	1000	Coal, Coke or Wood	20½"	37"	23¾"	30x40	815
202	1000	Gas (with burner equip.).....	29½"	37"	23¾"	30x40	846
203	1000	Oil (without comp.)	29½"	37"	23¾"	30x40	880
204	1000	Oil (with comp.) ..	29½"	37"	23¾"	30x40	1150
301	2000	Coal, Coke or Wood	29½"	42½"	23¾"	30x40	975
302	2000	Gas (with burner equip.).....	29½"	42½"	23¾"	30x40	1006
303	2000	Oil (without comp.)	29½"	42½"	23¾"	30x40	1310
304	2000	Oil (with comp. equip.).....	29½"	42½"	23¾"	30x40	1610

For Net Prices See Supplement

JOHNSON DIRECT JET GAS FURNACES

No. 118 Combination Bench Furnace



No. 118

Heating long rods or sweating joints is also possible by opening the side doors in the hood. The lid on the hood may be removed and a 25 lb. capacity melting pot may be inserted for melting small quantities of soft metal, such as babbitt, lead, tin, zinc, etc.

The burners are, as in other Johnson Appliances, of the direct jet type insuring high temperatures through complete combustion—no auxiliary air blast is required.

General Specifications

Length.....	16 inches	Fire box Opening.....	4x6
Height.....	9 $\frac{1}{2}$ inches	Gas Consumption.....	.40 cu. ft. per Hr.
Weight.....	45 lbs.	Melting Pot (6 in. Diam.)..	25 lbs. Capacity
Size Fire Box.....	6 $\frac{1}{4}$ x5x6 $\frac{1}{2}$	Width of Doors in Hood..	2 $\frac{3}{4}$ inches

No. 650 Heat-Treating Furnace

The No. 650 Heat-Treating Furnace is designed to fill the needs of shops interested in heat-treating their own steel. Temperatures of 1800 to 2000 degrees F. can be maintained in the direct flame and 1600 degrees F., in a muffle without a forced air blast or blower—a temperature high enough to temper, case harden, pack harden, or anneal any carbon steel. In the treatment of small and polished pieces, it is necessary to use a muffle—Ordinary carbon steels can be subjected to the direct flame. In this connection, it will be noted that there is no tendency toward oxidation from the flame.

The fire box is lined with 2" of fire brick to withstand the heat from the six independent burners so placed that the inside of the firebox is uniformly heated—an important item in successful heat treating.

General Specifications

Height of Opening 40 in.	Rear Door Opening...
Overall Height... 48 in.	..... 3 $\frac{1}{2}$ x3 $\frac{1}{2}$ in.
Net, Wt. 300 lbs.	Gas Consumption (ft.
Shipping, Wt. . 350 lbs.	per Hour) .. 75 to 90
Fire Box.... 13 $\frac{1}{2}$ x8x5	Gas Supply Pipe.....
Front Door Opening ..	...Not less than 1 in.
.....8x5 in.	



No. 650

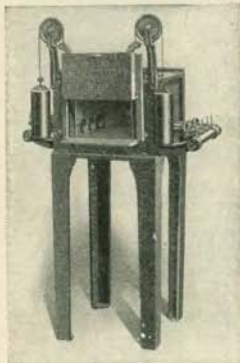
No. 700 Oven Furnace

The No. 700 Oven Furnace is larger than the No. 650 type and has a temperature limit of 2150 degrees F., without the use of auxiliary air pressure. Temperature regulation is both sensitive and accurate to a few degrees resulting in a better and more uniform product. The furnace is especially recommended for carbonizing, hardening, annealing and tempering of steels.

Six independent burners, advantageously arranged, heat the fire-box which is heavily lined with a high grade refractory material. This furnace is rapid and economical in operation. It is a sturdily constructed unit built to withstand severe service. A balanced door facilitates opening and closing.

General Specifications

Fire Box.....	7x11x14"
Front Door Opening....	7x11"
Height to Opening.....	36 $\frac{1}{2}$ "; Overall 48
Floor Space.....	27"x27"
Max. Gas Consumption.	240 ft. per hour.
Gas Connections.....	Not less than 1 $\frac{1}{4}$ " Pipe
Approx. Shipping Wt. .	725 lbs.



No. 700

This furnace can also be furnished with a pre-heating oven which maintains a temperature of 150° F.

For Net Prices See Supplement

JOHNSON "DIRECT JET" MELTING FURNACES

An improved line of gas melting furnaces, primarily designed for melting various soft metals such as lead, babbitt, tin, zinc or type metal. Strongly constructed and built for greatest possible efficiency. Operation is entirely without a forced air blast and will be found as rapid and far more economical to operate than a blast-regulated outfit. In addition to soft metal melting the larger sizes can be used for cyanide hardening, oil tempering and melting of various chemicals.



No. 8 Johnson
Adj. Torch and
Melting Pot

The chief feature of the Johnson Furnace is the patented Direct Jet Regulator. This device provides the necessary means for delivering gas to burners, under velocity without the use of air blowers. The regulator controls the flow of gas passing into the burners by increasing or decreasing the size of the orifice, which, however, does not decrease the velocity of the jet. The result is a high, even flame temperature.

Size No. 8 is a combination adjustable torch and melting pot for metal workers, plumbers, or general shop use where only small quantities of soft metals are melted. By removing the pot and shield the torch can be used for soldering, tempering or pre-heating. Size No. 20 is intended almost entirely for average quantities



No. 300 Johnson
Melting Furnace

of soft metal melting. The larger sizes, No. 300, 305 and 400 are equipped with valve for drawing off the molten metal.

General Specifications

Size No.	Dimensions Cast Iron Pot		*Capacity Lbs.	Height Overall Ins.	Gas Consumption Cu. Ft. Per Hr.	Weight Lbs.	List Price
	Dia. Ins.	Depth Ins.					
8	6	4	25	14	15	9½	\$ 9.00
20	7	5	50	18	35	36	14.00
300	9	7	150	28	40	100	32.50
305	13	7	300	31	85	185	45.00
400	16½	10	600	31	240	345	75.00

*Capacity based on lead melting.

JOHNSON BENCH FURNACES



No. 1 Johnson Bench
Furnace

Johnson Bench and Soldering Furnaces are operated on the same principle as the "Direct Jet" Melting Furnaces described above. Each is equipped with Johnson Bunsen Burners, with pilot light and shut-off valve. Construction is of the best throughout and the fire-box of each furnace is carefully lined with a heavy refractory lining. A shelf is provided in the back of the fire box to protect the tinned points of soldering coppers.

Sizes 501 and 502 are designed especially for heating soldering coppers up to 6 pounds and 10 pounds a pair respectively. Furnaces Nos. 1 and 101 will in addition

to heating soldering coppers, heat treat carbon steel tools such as dies, gears, taps, drills, reamers and chisels. Size No. 1 is furnished with single burner and size No. 101 with two burners. The latter is capable of producing heat of from 1600 to 1800 degrees F.

Types No. 21A and No. 111A are automatic in operation and have the same capacities as sizes Nos. 1 and 101 previously described. The shut-off valve is equipped with an automatic attachment so that when the iron is placed on the fire, the gas is automatically turned on. When removed it is turned off.

Size No. 108 is supplied with three independent burners which will produce a heat of 1800 to 2000 degrees F. This furnace is for general shop service and is of larger capacity.



No. 111A Johnson Auto-
matic Gas Soldering
Furnace

General Specifications

Size No.	Firepot Opening Ins.	Size Furnace Chamber Ins.	Overall Dimensions		Gas Consumption Cu. Ft. Per Hr.	Weight Lbs.	List Price
			Length	Height			
501	3½x2½	4 x3½x4	12	7½	10	15	\$ 7.00
502	4½x3	.....	14	8	12	18	9.00
1	3½x2½	4 x3½x4	12	7	10	12	10.00
101	4½x2½	4½x4½x5½	14	7½	12	18	13.00
21A	3½x2½	4 x3½x4	12	7	10	12	12.00
111A	4½x2½	4½x4½x5½	14	7½	12	18	15.00
108	4 x 6	6½x5 x6½	16	9½	40	43	22.50

For Net Prices See Supplement

TURNER BLOW-TORCHES AND FIRE POTS



No. 45

One of the exclusive features of this line of blow torches is the one opening in the tank on top above the fuel line which is sealed by the screw thread filler plug. By eliminating such soldered connections as burner inlet and upper and lower pump brackets a frequent cause of leaks is removed. The safety valve also an exclusive feature is accurately proportioned to release automatically 40 lbs. pressure which is double the amount necessary to obtain the highest efficiency. A



No. 52

thumb nut on the safety valve permits the operator to decrease the pressure when desired and to entirely release it when finished with the work.

The heater plug heats the fuel to a dry gas insuring perfect combustion of the gasoline or kerosene giving about 400 degrees more heat on lower fuel consumption without clogging the burner. An air adjusting tube (on the better grade torches) provides correct air mixture. Flame size regulation is made by the adjusting needle which is itself separate from the shut-off needle.

This burner can be used in a strong wind or during cold weather due to the supplementary air inlet.

No. 45

The Turner blow torch No. 45 embodies all the improvements noted above. The burner is of special composition bronze with prominent baffle and heater plug and an abundance of generating capacity which enable the operator to use either gasoline or kerosene without clogging. The "swell" in the burner deflects the flame onto the baffle and the absence of the holes in the side of the burner permits the use of the torch in severest weather. Tank capacity is one quart of fuel; entire weight 4½ lbs.

No. 52

The No. 52 satisfies the demand of the trade for a flat type auto torch having the pistol grip handle. The tank is drawn in one piece from extra heavy seamless brass obviating the possibility of leak. This torch also operates with gasoline or kerosene. Tank holds one pint of fuel; weight 3 pounds.



Hot Blast No. 206

Hot Blast No. 206

This type is made for those who favor the single needle torches. It is fitted with backflow under generator burner. The pump is of the parachute principle type with automatic check valve as found on the above torches. The tank has a capacity of one quart; weight 4 lbs. No. 106 is similar but tank has one pint capacity only.



Coil Furnace No. 63

Coil Furnace No. 63

The hot blast coil furnace is known to many plumbers. It has stood the test of years by its service and durability. The tank is made of extra heavy seamless drawn steel scientifically treated for rust resistance. It is fitted with bronze spider casting for supporting the uprights automatic combined pump and filler plug automatic safety valve and air release.

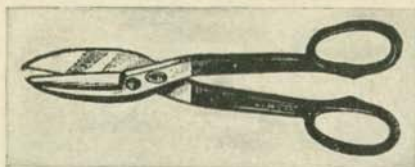
Furnace No. 53 is similar to No. 63 except that it has a rubber bulb instead of combined pump and filler plug and does not have automatic safety valve and air release.

All parts are standardized.

MAKING IT EASY TO BUY SMALL TOOLS

With the information and specifications given in this catalog; the net prices and F. O. B. points shown in the price supplement; and the Ryerson Guarantee on page 1; you may confidently place your orders with the assurance that if the price or product is not right you may return the shipment without question and your money will be promptly refunded.

PEXTO SNIPS



Straight Blade

A high grade of Tinner's snips forged from special grade steel. Used by sheet metal workers throughout the world.

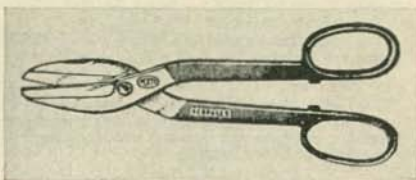
The regular snips, Nos. 06½ to 13 are known as left hand cut, and are used by right handed men.

For left handed men we can furnish, when specified, Nos. 7 to 10 with right hand cut.

Number.....	06½	6½	7	8	9	10	11	12	13
Will cut Iron..... No.	22	24	25	26	27	28	28	28	28
Length Cut..... inches	4½	4½	4	3½	3	2½	2¼	2	1¾
Length over all..... inches	17	15¾	14¼	13½	12	11	10¼	8½	8
Weight..... lbs.	5	3½	2¾	2¼	1¾	1¼	1	¾	½

NOTE:—For curved blade Snips in all above sizes prefix letter "C" to number.

These Snips are made so as to easily cut Circles, Scrolls, etc., and are equally adapted to the same class of work as the regular Snip. The jaws are beveled with straight cutting edges, which allows the material to pass freely when cutting curves or changing direction of the cut. Superior tool for various kinds of work and one of unusually desirable qualities.

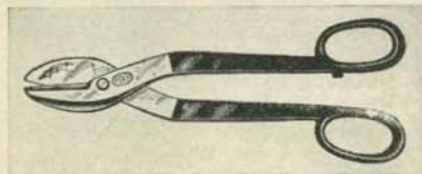


Straight Blades Combination Snips

Number.....	146	147	148	149	150
Will Cut Iron..... No.	24	25	26	27	28
Length Cut..... inches	4½	4	3½	3	2½
Length Over All..... inches	15½	14½	13½	12½	11½
Weight..... lbs.	3¾	3	2¼	2	1½

Finish—Blued Handles and Polished Heads.

Can furnish with Curved Blades Nos. G-147—C-148—C-149.



Bull Dog Snip

A heavy Snip designed for cutting the heavier gauges of iron for which the ordinary Snip is not adapted. The long handles in this Snip offer great leverage. The jaws are extra heavy and the cutting edges are steel laid.

No..... 14
Will cut Iron. Ga. No. 18
Length Cut..... inches 2½
Length Over all inches 16
Weight..... lbs. 4¼

PEXTO BENCH SHEARS



Number.....	00	0	1	2	4	5	6	Elbow 31	Elbow 32	Elbow 33
Capacity Gauge Iron... No.	18	18	18	19	20	21	22	18	16	14
Length Cut..... inches	11½	10½	9	8¾	7¾	6¾	5¼	4	6	7
Length Over All..... inches	46	42½	39	37	30	27	25	26	39	46
Weight..... lbs.	36	30	24	19	12	9	8¼	9½	26	48

As regularly made, Bench Shears have a right-hand cut with the lower blade on the right side of the Shear.

PEXTO STAKES

Wrought Iron With Steel Faces



Bevel Edge Square Stake Nos. 931-932



Coppersmith's Square Stake No. 935



Square Stake Nos. 936-938-939

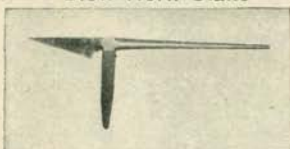
Number.....	931	932	935	936	938	939
Weight, lbs.....	16	14	11	11	14	3
Size Face, inches..	3x5	2½x4½	2¾x4½	2¾x4½	3x5	1¾x2½



Hollow Mandrels Cast Iron

Number.....	910	911
Weight.....Lbs.	60	108
Entire Length.....Inches	40	60
Length Flat Part.....Inches	9	12
Width Flat Part.....Inches	6	7
Length Oval Part.....Inches	31	48
Size Oval Part Radius of Circle.....Inches	2	2½

Blow Horn Stake



Blow Horn Stake No. 925

Beak Horn Stake



Wrought Iron with Steel Faces

Weight.....lbs.	14	46	27
Large End, Length.....in.	9	16½	14
Small End, Length.....in.	18	21½	19
Dia. Small End at Wide Point in.	1½	2½x1½	2x1½
Dia. Small End at Narrow Point.....in.	¾		
Dia. Large End at Wide Point in.	4¾	¾	¾
Dia. Large End at Narrow Point.....in.	1½	2½	2



Hatchet Stakes Wrought Iron with Steel Faces

Number.....	941	943	944
Weight.....lbs.	14	8½	6½
Length Blade.....inches	16	13	11
Width Blade at Center.....inches	2½	2½	2½
Width Blade at Ends.....inches	1½	1¼	1½

Bench Plates

Number.....	980	981	982
Weight.....lbs.	85	46	31
Length.....inches	48	37½	30
Width.....inches	12	8	8



Solid Mandrel Stakes



Cast Iron with Polished Faces

Number.....	960½	961	962
Length to Stand.....in.	40	34½	30
Diameter.....in.	3	2¾	2¼
Weight.....lbs.	86	56	43

PEXTO "COLUMBIAN" BENCH MACHINES

Turning Machine or (Thick Edge)



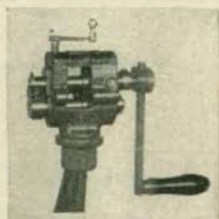
Number	540	541	542
Size	Ex. Sm.	Sm.	Lge.
Capacity	22	22	22
Diam. Rolls	1 1/2	2 1/16	3
Smallest Wire can be used	11	11	9
Largest Wire can be used	7	7	4
Shipping Wt.—Approx. Lbs.	22	25	31

Furnished complete with No. 975 offset standard, and an extra pair of thick turning rolls.

Burring Machine or (Thin Edge)

Number	576	577
Size	Small	Large
Capacity, inches	22 Ga.	22 Ga.
Diameter Rolls, inches	1 1/2	2 3/8
Widest Burr that can be turned, ins.	3/16	1/4
Shipping Weight—Approx. Lbs.	21	25

Furnished complete with No. 975 offset standard and an extra upper roll.



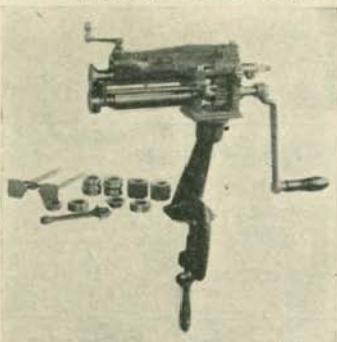
Wiring Machine

Number	525
Capacity	22 Ga.
Diameter of Rolls, inches	3
Largest Wire that can be used, gauge	0
Shipping Weight—Approx. Lbs.	31

Furnished complete with No. 976 offset standard. Forming roll gauge not furnished unless specified and then at an extra charge.



PEXTO "ALLINWON" ROTARY MACHINE



The introduction of this Combination Machine does not substitute the use of separate machines for different operations. For the active shop there is no economy found in one machine that will do the greatest number of operations. The changing of Rolls many times a day is a time killer. Where several mechanics are employed machines should be set up ready for use.

However, for the one man shop where a set of machines are idle a great part of the time a Combination Machine of this type will answer all purposes.

General Specifications

Number	622
Capacity—Using crimping or beading rolls	26 Ga.
Capacity—Using Turning, Wiring or Burring Rolls	24 Ga.
Depth, Throat to Frame	Inches 6 1/4
Depth, Throat to Gauge	Inches 5 1/2
Width, Crimping Rolls	Inches 1 1/8
Width, Beading Rolls	Inches 1 1/8
Diam. Turning and Wiring Rolls	Inches 1 3/8
Smallest wire that can be used with Turning Rolls	Gauge 11
Wiring Rolls will receive wire up to	Gauge 5
Widest flange or burr that can be turned with Burring Rolls	Inches 3/8
Distance between shaft centers	Inches 1 1/8
Packed one in a box—Weight Approx. Lbs.	60

Furnished complete with standard and five pairs of rolls, viz: Crimping, beading, turning, wiring, and burring and one extra gauge. Extra special rolls quoted on receipt of specifications. Provided with forward and reverse drive.

For Net Prices See Supplement

PEXTO BENCH MACHINES

Elbow Edging Machines

Number.....	550	551
Capacity.....	24 Ga.	24 Ga.
Diam. of Rolls.....inches	1½	2½
Shipping Wt. approx. lbs.	21	25

Furnished with No. 975 Offset Standard and V shaped Rolls No. 1 for inner and outer edges.

Can furnish Universal Elbow Edging Rolls and Rolls Nos. 1 to 6 for 551 machine. Also Universal Collar Edging Rolls. Circular covering complete line of power production elbow equipment will be gladly sent on request.

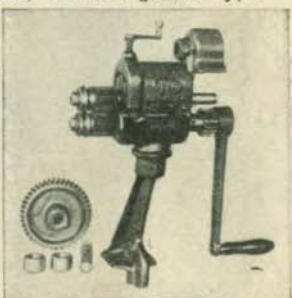
Crimping and Beading Machines
Combination Type

Number.....	581	0581
Style of Crimp.....	Spiral	Straight
Capacity.....	24 Ga.	24 Ga.
Width of Crimping Rolls.....in.	1¾	1¾
Width Beading Rolls.in.	1	1
Diameter Beading Rolls.....in.	1½	1½
Diameter Crimping Rolls.....in.	1½	1½
Size Ogee Bead.....in.	½	½
Shipping weight, boxed, approx. lbs.....	30	30

Furnished complete with one pair of Steel Blank collars and Offset Bench Standard No. 975. By substituting the Blank Collars for the Beading Rolls, the machine is converted into a plain crimper.

Crimping and Beading Machines, Interchangeable Type

Number.....	0585	585
Style of Crimp.....	Straight	Spiral
Capacity.....	20 Ga.	20 Ga.
Diameter Beading Rolls.....in.	1½	1½
Diameter Crimping Rolls.....in.	1½	1½
Width Crimp Rolls.in.	1¾	1¾
Width Bead Rolls.in.	1	1
Size Ogee Bead.....in.	½	½
Ratio Gearing.....	3 to 1	3 to 1
Distance between Shaft Centers.....in.	1¾	1¾
Shipping Weight, boxed, approx. lbs.....	65	65



One pair Blank Rolls are furnished and also a No. 975 Standard. Foot Treadle Attachment for depressing Upper Roll can be furnished at extra cost.

With Crank in place as shown, machine is direct driven. If desired it may be converted to drive through back gearing in which case the handle is placed on the upper shaft.



Setting Down Machines

Number.....	561	562
Capacity.....gauge	24	18
For Seams up to...inches	¾	¾
Shipping Wt. approx. lbs.	60	100

Regular Offset Standard No. 975 is furnished with No. 561. Standard No. 977 with No. 562.

The improvements in these Setting Down Machines adapt them for setting down the seams on differently shaped vessels to better advantage than any other design. The inclined position of both Upper and Lower Faces allows work to be held up or down, the seams to be started inward while setting down, thereby facilitating the operation of double seaming.

For Net Prices See Supplement

No. 620 PEXTO BEADING MACHINE

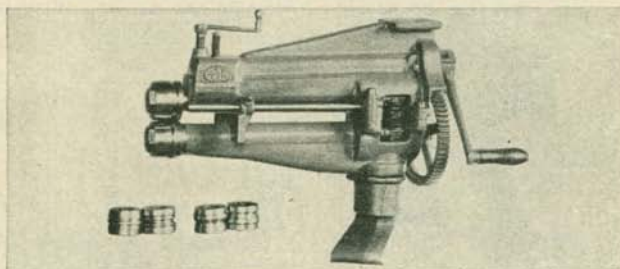
General Specifications



Number.....	620
Capacity.....	24 Ga.
Depth Throat to Frame.....Inches	6 $\frac{1}{4}$
Depth Throat to Gauge.....Inches	5 $\frac{1}{2}$
Diameter of Rolls.....Inches	1 $\frac{5}{16}$
Width of Rolls.....Inches	1 $\frac{1}{16}$
Distance between Shaft Centers.....Inches	1 $\frac{7}{8}$
Shipping Weight, Boxed — Approximate Lbs.....	50

Furnished with four pairs of Rolls; one pair each Ogee $\frac{3}{8}$ ", triple $\frac{5}{8}$ ", single $\frac{1}{4}$ " and $\frac{3}{16}$ ". Improved Standard No. 975 is included. Straight Crimping Rolls can be furnished at extra cost.

PEXTO STANDARD BEADING MACHINES



General Specifications

Number.....	617	619
Capacity.....	20 Ga.	20 Ga.
Depth Throat to Frame.....Inches	13	7 $\frac{1}{2}$
Depth Throat to Gauge.....Inches	12	6 $\frac{3}{4}$
Distance between Shaft Centers.....Inches	2 $\frac{5}{8}$	2 $\frac{1}{4}$
Diameter Rolls.....Inches	2 $\frac{3}{4}$	2 $\frac{3}{8}$
Width Rolls.....Inches	1 $\frac{7}{8}$	1 $\frac{5}{8}$
Ratio of Gearing.....	3 $\frac{1}{2}$ to 1	2 $\frac{1}{2}$ to 1
Size Single Bead in Rolls.....Inches	$\frac{3}{8}$	$\frac{5}{16}$
Size Ogee Bead in Rolls.....Inches	1	$\frac{7}{8}$
Size Triple Bead in Rolls.....Inches	1	$\frac{7}{8}$
Shipping Weight, Boxed.....Approximate Lbs.	165	110

Standard No. 978, is furnished regularly. Three pairs Beading Rolls are included. Straight Crimping Rolls can be furnished at extra cost. A Guide Rest for supporting long work can be furnished at extra cost. Regularly supplied with crank for hand operation, but if preferred, can be furnished arranged for power drive with either tight pulley, tight and loose pulleys or with treadle controlled friction clutch.

MACHINE STANDARDS



No. 975



No. 976



No. 977 and 978

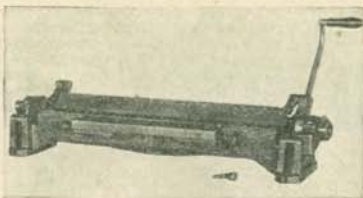
General Specifications

Number.....	975	976	977	978
Size Hole.....Inches	1 $\frac{5}{8}$	1 $\frac{5}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{2}$
Height overall from bench.....Inches	9 $\frac{3}{4}$	9 $\frac{3}{4}$	10 $\frac{1}{8}$	9 $\frac{7}{8}$
Shipping Weight.....Lbs.	10 $\frac{1}{2}$	11	23	24

In making Machine Standard substitutions, deduct half price of Standard as regularly furnished with the machine and add full price of Standard required. When ordering Standards separate from machines mention diameter of machine stem, if same does not correspond to hole dimensions given.

For Net Prices See Supplement

PEXTO "ARROW" BAR FOLDERS



These improved folders are intended for forming edges of sheet metal at various angles. The gauge is adjusted by turning a knob in front of machine, the width to which it is adjusted being indicated on a graduated brass plate in addition to regular square and bevel stops. An adjustable stop is provided to permit the forming of any desired angle.

General Specifications

Number.....	62	63
Capacity, width locks on 22 gauge.....inches	$\frac{3}{8}$	$\frac{3}{8}$
Capacity, width locks on 24 gauge and lighter.....inches	$\frac{3}{8}$	$\frac{3}{8}$
Capacity, width locks on XX Tin.....inches	$\frac{3}{8}$	$\frac{3}{8}$
Length for Sheets—width.....inches	20	30
Will form closed and open locks.....inches	$\frac{3}{8}$ to 1	$\frac{3}{8}$ to 1
Will form open locks to receive a wire up to.....inches	$\frac{3}{8}$	$\frac{3}{8}$
Shipping weight, boxed.....Approximate pounds	140	220

Following sizes regularly furnished with two handles and counterbalance.

Number.....	055	058
Capacity, width locks on 20 gauge.....inches	$\frac{3}{8}$	$\frac{3}{8}$
Capacity, width locks on 22 gauge and lighter.....inches	$\frac{3}{8}$	$\frac{3}{8}$
Length for sheets, width.....inches	36	42
Will form closed and open locks.....inches	$\frac{3}{8}$ to 1	$\frac{3}{8}$ to 1 $\frac{1}{2}$
Shipping weight, boxed.....Approximate pounds	420	520

PEXTO BENCH FOLDERS AND BRAKES



With this new Bench Combination Folder and Brake a variety of folding operations are possible. Like the regular floor brake, the jaws allow for the forming of any size of angle, the sheet remaining stationary while the folding takes place. It will form edges for lock seams with a nicety. Fitted with adjustable gauges, the scribing of sheets before each bend is not necessary.

The clamping bar can be adjusted for great clearance above the bed from 1 to 3". By turning the crank the top leaf is lowered 1". The sheet placed between the jaws to be edged or folded is securely clamped with a turn of crank. The folding bar is of solid steel and so proportioned that its upper edge is only $\frac{3}{8}$ " wide for permitting the forming of very narrow locks and angles. It is adjustable up and down for forming open locks for wiring with not more than $\frac{1}{4}$ " radius, but a special folding blade to replace the beveled blade is recommended in order to secure the best results.

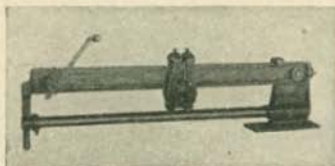
A removable rear gauge, adjustable from $\frac{3}{4}$ " to 10", is provided and can be easily removed when not needed. A front gauge, which is adjustable from $\frac{1}{4}$ " to $\frac{3}{4}$ ", is attached to folding bar.

Sharp or closed locks for lock seams can be formed from $\frac{3}{4}$ " to 1" on heavy stock, and as small as $\frac{3}{8}$ " on light material. With the Special Rounded Blades, a wide range of wire locks can be formed. Floor Legs can also be furnished.

General Specifications

Number.....	696	697
Capacity.....gauge	20	20
Length for sheets, width.....inches	36	42
Shipping weight, coated.....Approximate pounds	430	500

For Net Prices See Supplement

No. 518 PEXTO RAPID GROOVER

The best machines of their kind for grooving the longitudinal seams in stove pipe and other sheet metal cylinders. They differ from the ordinary Groover in that they are more rapid, the operator stands in front of the machine and does not have to change his position when inserting and removing work and operating the machine. The Traveling Carriage is quickly and easily returned to the

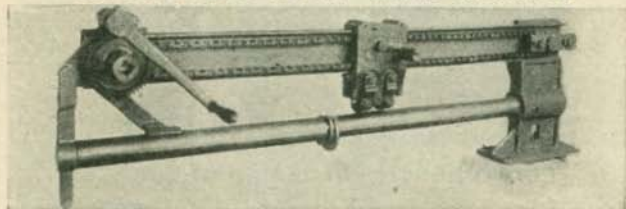
starting point by means of handle. Adjustable Stop on Upper Bar stops the Traveling Carriage at any desired point to suit the length of the work.

Lower bar is reversible, so that either the flat surface or one of the grooves which is placed into the Horn can be turned upward, permitting the locating of seams on the inside or the outside of the work.

Specifications

Capacity.....	Gauge	24
Maximum Length will Groove.....	Inches	30
Minimum Diameter Pipe can be Grooved.....	Inches	2
Shipping Weight, approximately.....	Lbs.	200

Equipment includes four rolls, one each for $\frac{1}{4}$ ", $\frac{5}{16}$ " and $\frac{3}{8}$ " grooves and one flattening roll.

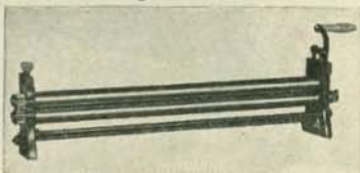
No. 520 PEXTO HEAVY RAPID GROOVER**Specifications**

Capacity.....	Gauge	20
Will Groove Work Length.....	Inches	36
Diameter Smallest Pipe that can be Grooved.....	Inches	3
Ratio of Gearing.....		$3\frac{1}{2}$ to 1
Shipping Weight, approximately.....	Lbs.	410

Furnished with $\frac{5}{16}$ " grooving roll for No. 20 gauge, $\frac{1}{16}$ " for No. 22 gauge, $\frac{5}{16}$ " for No. 24 gauge and lighter, and one flattening roll.

**PEXTO PLAIN FORMING MACHINES
With Steel Compensating Gears**

These Formers have solid housings and are fitted with machine cut steel compensating gears. Gears, to run smoothly, should mesh constantly to a certain depth and the shape of the teeth should be accommodated to such depth. In these Formers the gears on the gripping rolls do not mesh with each other, but with two gears so hung that when the gripping rolls



are moved the mesh of the gearing is unchanged. This insures uniformity of action and durability. These gears run more smoothly than cast iron cogs and without any danger of slipping or breaking regardless of the thickness of the metal.

Specifications

Number.....	380	373	372	0372
Capacity..... Gauge	24	22	22	22
Length Rolls, for Sheets..... Inches	20	30	36	42
Diameter of Rolls..... Inches	$1\frac{1}{2}$	2	2	2
Shipping Weight, approximately..... Lbs.	60	140	165	185

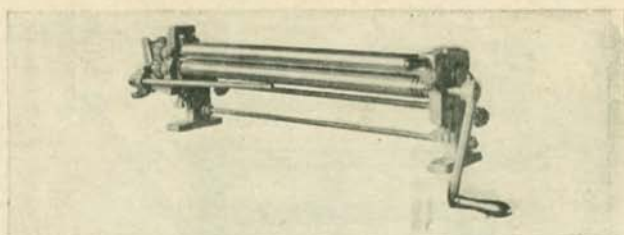
**PEXTO PLAIN FORMING MACHINES
CAST IRON GEARS**

These Formers are the same as the above but have two cast iron Gears fitted to the Rolls. For the little difference in price we recommend the use of the Compensating Gear Former.

Specifications

Number.....	361	359	357	355	356
Capacity..... Gauge	26	24	22	22	22
Length Rolls, for Sheets..... Inches	12	20	30	36	42
Diameter of Rolls..... Inches	1	$1\frac{1}{2}$	2	2	2
Shipping Weight, approx..... Lbs.	40	60	140	160	177

PEXTO LIGHTNING SLIP ROLL FORMING MACHINES



All sizes furnished for hand operation. They are greatly improved over the old slip roll pattern forming machines and others now on the market. A careful study of the illustration shows the time and steps saved through being able to perform all operations at one end of the machine, the convenient end where the crank is fitted. The gears are steel, machine cut, running more smoothly than cast iron gears without danger of slipping or breaking regardless of the thickness of the metal used.

The roll raising mechanism in these machines is so balanced that the roll is easily lifted with a slight pressure on the lever. The latch is released and closed with one movement, and is self-locking.

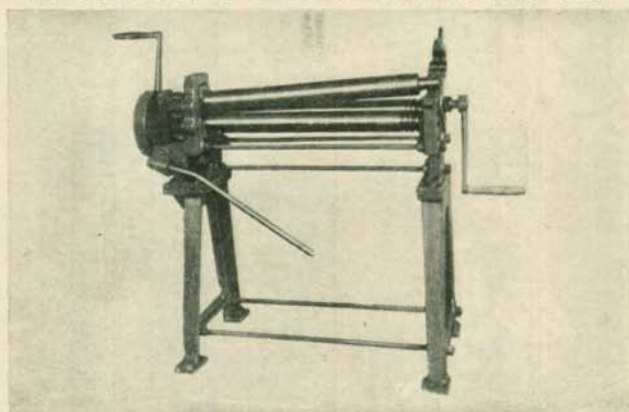
General Specifications

Number.....	383	382	381	0381	*390
Capacity.....	22 Ga.	22 Ga.	22 Ga.	22 Ga.	16 Ga.
Length Rolls for Sheets, width, ins.	30	30	36	42	36
Diameter Rolls.....inches	1 $\frac{3}{4}$	2	2	2	2 $\frac{1}{2}$
Shipping Weight.... Approx. lbs.	175	185	205	225	360

*No. 390 is back geared 2 to 1.

Gripping Rolls have an extreme clearance of $\frac{1}{2}$ ". Grooves cut in rolls are intended to allow work with a wire to be formed. Tight Pulleys or Tight and Loose Pulleys and iron Floor Legs can be fitted when so ordered. When preferred all three rolls can be driven, but at extra cost.

PEXTO HEAVY SLIP ROLL FORMING MACHINES



Three-Inch (Single Geared) Forming Machine

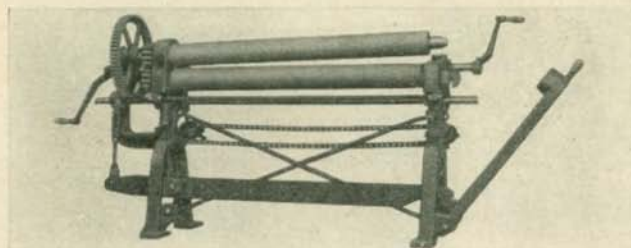
General Specifications

Number.....	416	417	418	424	425	426	427	428
Capacity.....	14 Ga.	16 Ga.	18 Ga.	10 Ga.	12 Ga.	14 Ga.	15 Ga.	16 Ga.
Length Rolls for sheets,								
Ins.	36	42	48	36	42	48	54	60
Diameter Rolls....Ins.	3	3	3	4	4	4	4	4
Ratio Gearing.....	3 to 1	3 to 1	3 to 1	5 to 1	5 to 1	5 to 1	5 to 1	5 to 1
Shipping Weight,								
Approx. Lbs.	590	650	700	1130	1330	1340	1400	1490

Furnished regularly for hand operation. Iron floor legs are extra on Sizes 416, 417 and 418 but included as regular equipment on other sizes. When ordering for power, mention whether Tight or Tight and Loose Pulleys are required. Can be arranged for Direct Motor Drive.

For Net Prices See Supplement

BERTSCH HEAVY SLIP ROLL FORMING MACHINES



These slip forming rolls are built in the Initial Pinch type to give positive feed. The rear rolls adjustable for conical forming, and different diameters.

The drop hinge opening and closing device, is easily operated. It is counter-balanced by the top roll, and when opened it tilts the top roll and drops the gear end of the bottom roll so that all pinch on the sheet is automatically released. When the hinge is closed all rolls return to their original position ready for a duplicate piece.

The frames of these machines are cast semi-steel and have the normal working height. The rolls are forged steel in which grooves can be cut, when so specified, for forming rodded or wired materials.

Tight and loose pulleys or friction clutch pulleys can be furnished when ordered. 1150 R. P. M. motors are recommended in direct motor drive.

The 3" rolls are single geared with a through crank shaft to operate from either end for hand power. The 3½" and larger can be operated at either end single or double geared. All sizes are furnished with two hand cranks.

General Specifications

Number	Diam. Rolls	Length Rolls	Capacity	Gear Ratios	Approx. Wt.
330	3"	30"	14 ga.	5-1	700 lb.
336	3"	36"	14 "	5-1	750 "
342	3"	42"	16 "	5-1	800 "
348	3"	48"	16 "	5-1	850 "
360	3"	60"	18 "	5-1	950 "
372	3"	72"	20 "	5-1	1025 "
396	3"	96"	22 "	5-1	1150 "
330A	3½"	30"	12 "	11-1	900 "
336A	3½"	36"	12 "	11-1	975 "
342A	3½"	42"	12 "	11-1	1050 "
348A	3½"	48"	14 "	11-1	1150 "
360A	3½"	60"	16 "	11-1	1225 "
372A	3½"	72"	18 "	11-1	1300 "
396A	3½"	96"	20 "	11-1	1500 "
3120A	3½"	120"	22 "	11-1	1750 "
430	4"	30"	10 "	20-1	1100 "
436	4"	36"	10 "	20-1	1200 "
442	4"	42"	11 "	20-1	1300 "
448	4"	48"	12 "	20-1	1400 "
460	4"	60"	14 "	20-1	1600 "
472	4"	72"	16 "	20-1	1900 "
496	4"	96"	18 "	20-1	2300 "
4120	4"	120"	20 "	20-1	2800 "
430A	4½"	30"	8 "	20-1	1200 "
436A	4½"	36"	9 "	20-1	1350 "
442A	4½"	42"	10 "	20-1	1500 "
448A	4½"	48"	10 "	20-1	1650 "
460A	4½"	60"	12 "	20-1	1900 "
472A	4½"	72"	14 "	20-1	2200 "
496A	4½"	96"	16 "	20-1	2600 "
4120A	4½"	120"	18 "	20-1	3100 "
530	5"	30"	1½"	15-1	1500 "
536	5"	36"	1½"	15-1	1650 "
542	5"	42"	1½"	15-1	1825 "
548	5"	48"	1½"	15-1	2000 "
560	5"	60"	#10	15-1	2350 "
572	5"	72"	#10	15-1	2700 "
596	5"	96"	#12	15-1	3200 "
5120	5"	120"	#14	15-1	3800 "
530A	5½"	30"	1½"	17-1	1900 "
536A	5½"	36"	1½"	17-1	2100 "
542A	5½"	42"	1½"	17-1	2300 "
548A	5½"	48"	1½"	17-1	2500 "
560A	5½"	60"	1½"	17-1	2950 "
572A	5½"	72"	1½"	17-1	3400 "
596A	5½"	96"	#10	17-1	4000 "
5120A	5½"	120"	#12	17-1	4600 "

For Net Prices See Supplement

BERTSCH FOOT POWER SQUARING SHEARS

Bertsch Shears are built with liberal proportions to insure users against delays because of break-downs and to insure many years of service.

They are built with adjustable gibs on the front side of the slide-head bearings for taking up normal wear. The table is adjustable to allow re-adjusting after grinding the blades and to follow normal wear. The wood top shelf, 6" wide front to rear, is furnished with all sizes. The "A" and "B" series are furnished without the hold-down attachment, though it can be furnished if desired at an additional price. The "C" series is regularly furnished with this attachment.

Standard equipment includes a pair of front arms, a complete set of front, side and rear gauges.



No.	Capacity Gauge No.	Length of Blades	Front Gauge Range	Rear Gauge Range	Weight Lbs.
130A	18	31"	30"	21"	525
136A	18	37"	30"	21"	600
142A	18	43"	30"	21"	800
148A	18	50"	30"	21"	1000
130B	16	31"	30"	21"	650
136B	16	37"	30"	21"	775
142B	16	43"	30"	21"	900
148B	16	50"	30"	21"	1250
130C	14	31"	30"	21"	950
136C	4	37"	30"	21"	1100
142C	4	43"	30"	21"	1250
148C	14	50"	30"	21"	1500

BERTSCH FOOT AND HAND LEVER GAP SHEARS



These shears have recently been re-designed. The lever attachment is a new feature which can be used independently or with the treadle as desired, according to the work to be done, without disengaging any parts of the machine. The special advantage of the lever attachment is that the operator can cut any distance into a sheet and accurately control the point of stopping. The 18" gap allows splitting a 36" sheet. The slide head is provided with adjustable gibs on the front side which allow adjustment for wear. The splitting gauge allows easy handling and correct alignment for successive cuts, when splitting sheets longer than the cutting blades. They can be used as a regular squaring shear and will cross cut sheets the full length, depending upon the length machine being used.

Regular equipment in all sizes includes hold-down attachment, front arms, drop leaf tables with splitting gauge and complete set of front, rear and side gauges.

No.	Capacity Gauge No.	Length of Blades	Depth of Gap	Front Gauge Range	Rear Gauge Range	Weight Lbs.
230B	16	31"	18"	30"	21"	1500
236B	16	37"	18"	30"	21"	1650
242B	16	43"	18"	30"	21"	1900
248B	16	50"	18"	30"	21"	2200
260B	16	62"	18"	30"	21"	2600
230C	14	31"	18"	30"	21"	1600
236C	14	37"	18"	30"	21"	1800
242C	14	43"	18"	30"	21"	2100
248C	14	50"	18"	30"	21"	2400

For Net Prices See Supplement

PEXTO "SILVER CITY" FOOT POWER SQUARING SHEARS

Silver City Shears are carefully manufactured of high grade materials, and can be depended upon for many years of service. The line has recently been re-designed and improved, making it a leader in shears of this type.

No. 122B regularly furnished with short front arms. Other numbers furnished with long front arms. Nos. 137, 142 and 152 regularly equipped with hold-down attachment. No. 152 has extensible steel treadle. Wood Top Shelf can be furnished for Nos. 122 and 132 and Finger Guard can also be fitted, but at an extra cost. Side Tables can be furnished with all sizes at extra cost.



General Specifications

Number	122	132	137	142	152
Capacity, soft steel.....	18 Ga.	18 Ga.	18 Ga.	18 Ga.	18 Ga.
Length for sheets.....inches	22	30	36	42	52
Length Short Front Arms.....inches	12½				
Length Long Front Arms.....inches		19	25¼	25¼	25¼
Length Rear Gauge Arms.....inches	24	30	30	30	30
Width of Bed.....inches	12	14	14	14	14
Shipping Weight.....Approx. lbs.	375	510	600	750	1000

No. 255 PEXTO SLITTING SHEAR

These shears will prove a time saver in any shop. They permit the most rapid means for slitting iron used



in cornice, furnace, blow-pipe, ventilation work, etc. They may be utilized for conveniently cutting large irregular curves and circles when following a scribed line, in a fraction of the time it takes to do the work with snips or bench shears. The cutters are made from a special high grade tool steel, properly hardened and tempered and have two cutting edges, making them reversible.

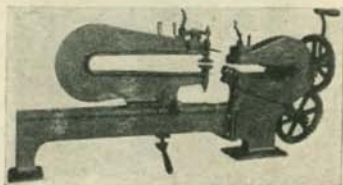
General Specifications

Capacity, soft steel.....	16 Ga.
Diameter Cutters.....inches	3¼
Depth Cutting Head to Gauge.....inches	18
Depth Cutting Head to Frame.....inches	19
Size Table.....inches	20x8
Shipping Weight.....Approx. lbs.	330

PEXTO RING AND CIRCLE SHEARS

An efficient Bench Ring and Circular Shears, intended for cutting circles or internal rings and irregular curves. In circular cutting the blanks are clamped between Rubber Covered Discs by means of a quick-acting Eccentric Lever Device, adjustable for exerting extreme uniform pressure to prevent the work from slipping and insuring accurate cutting. The angular position of Cutters allows for as clean cutting on the inside as on the outside of circle.

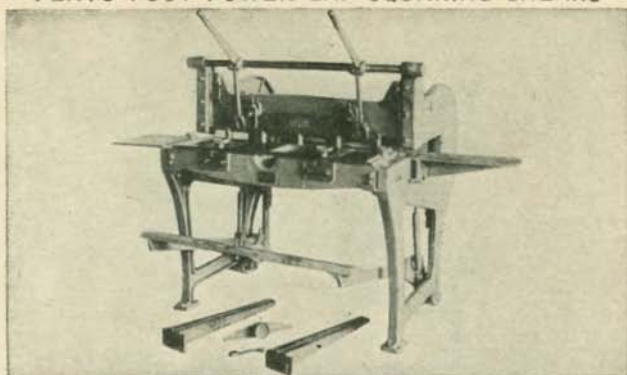
Regular equipment includes crank for hand operation, but when so specified can be furnished with tight and loose pulleys at an extra charge.



General Specifications

Number	298	299
Capacity, soft steel.....	20 Ga.	20 Ga.
Diameter Cutters.....inches	1¾	1¾
Depth Cutting Head to Frame.....inches	10	10
Depth Circle Arm.....inches	16¼	30½
Will circle from Square Blanks.....inches	3¼ to 22	3¼ to 42½
Will cut Rings small as (inside diameter).....inches	3¼	3¼
Will cut Rings large as (outside diameter).....inches	22	42½
Shipping Weight.....Approx. lbs.	200	300

PEXTO FOOT POWER GAP SQUARING SHEARS



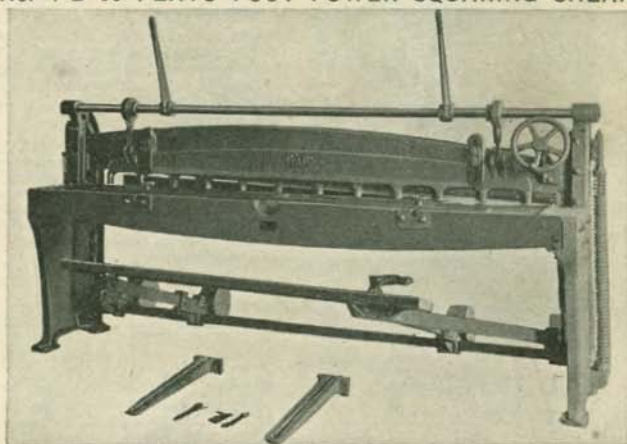
These shears embody every improvement for a well-balanced, easy-operating machine. Housings have a gap of 18". The slitting gauge facilitates the slitting of sheets of longer length than the cutting blades as after the first cut is made, the slitting gauge provides proper alignment for the successive cuts. Used as a regular squaring shears, they will cross-cut sheets the full width, according to the length of shears used.

Regular equipment includes hold-down attachment, side shelf, slitting gauge, one pair front arms and a complete set of gauges.

Specifications

Number	XC-36	XC-42	XC-52
Capacity, soft steel	16 Ga.	16 Ga.	16 Ga.
Length cutting blades	36	42	52
Depth of Gap in Housings	18	18	18
Length of Front Arms	26½	26½	26½
Length of Rear Gauge Arms	24	24	24
Width of Bed	14	14	14
Shipping Weight	1500	1650	1750

No. Y-B 96 PEXTO FOOT POWER SQUARING SHEAR



This shear embodies the latest improvements in long length foot shears, including a hold-down actuated through eccentrics by means of conveniently placed hand levers. Rear gauge is moved by a screw and bevel gears, controlled from the front of the machine by a handwheel.

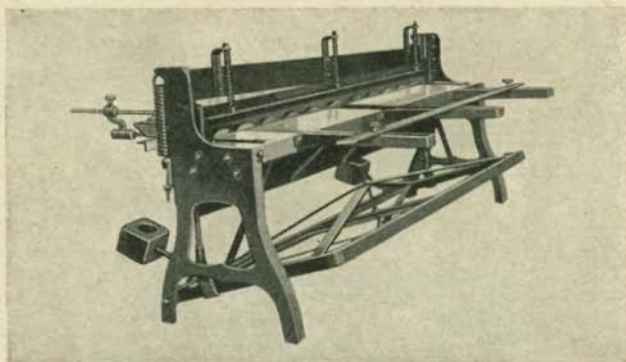
Equipment includes hold-down, one pair long front arms and complete front and back gauges.

Specifications

Capacity, soft steel	18 Ga.
Length for sheets	96 Ga.
Width of Bed Plate	16 Ga.
Length of Rear Gauge Arms	32 Ga.
Movement of Rear Gauge	0 to 20
Length of Front Gauge Arms	28½
Shipping Weight	3050

For Net Prices See Supplement

PEERLESS STEEL FOOT SQUARING SHEARS



Size No. 8

The Peerless Foot Squaring Shears are made entirely of steel, except the end stands and balance weights which are fine grey iron castings. All working parts are of crucible cast steel, carefully machined, and adjustable for wear.

The bed or table consists of a heavy channel section into which the table plates are mortised, and which is supported underneath by a heavy plate riveted the full length of the channel and braced in such a manner as to insure strength and rigidity. The bed is adjustable forward and back, sliding on lugs cast in the end housings.

The upper cutter bar is made of a heavy steel plate, reinforced by a second plate of equal strength set at right angles, and riveted and braced for its entire length. A truss rod with an adjustable screw provides further support and prevents any possibility of springing or getting out of alignment. The upper cutter bar is carefully fitted into the end housings, working up and down against gibs or guide plates which have set screw adjustment for wear.



Size No. 2

The treadle is made entirely of steel, and is designed in such a manner that the pressure, no matter where applied, is equally and automatically distributed, eliminating danger of twisting or breakage.

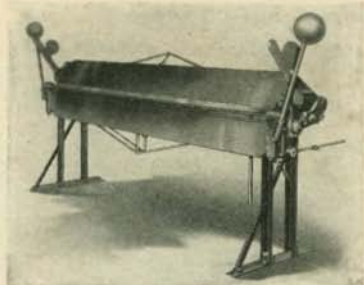
Capacities are based on cutting of soft steel sheets. Regular equipment includes a set of front, back and side gauges. All sizes except No. 2 have an automatic hold-down. The larger sizes, beginning with No. 5, have balance weights on the foot treadle, for ease of operation.

General Specifications

Size No.	Capacity Gauge	Nominal Cutting Length Inches	Actual Length of Blades Inches	Approx. Shipping Weight Pounds
2	No. 18	36	37	650
3	No. 18	42	43	850
4	No. 18	52	53	970
5	No. 18	62	64	1300
6	No. 18	72	74	1950
8	No. 18	96	98	2500
10	No. 22	120	122	3200
2-A	No. 16	36	37	700
3-A	No. 16	42	43	950
4-A	No. 16	52	54	1150
5-A	No. 16	62	64	1600
6-A	No. 16	72	74	2150

For Net Prices See Supplement

CHICAGO HAND BRAKES



Hand Bending Brake

all machines is perfectly balanced affording easy operation.

The machine is built to stand continuous hand work and will not spring or warp. Strength and rigidity are insured by its all-steel construction. Hinges and other fittings are steel castings or forgings.

This hand brake is suitable for a large variety of work such as cornice, gutter, skylight, flashing and furnace jobs.

A number of devices and advantages are embodied in this machine, such as one man operation; light weight; quick action; wide opening jaws; provision on ends for flanges; bending edge for forming as small as $\frac{1}{4}$ inch reverse bends; and set screws for adjustments to material and kind of bend, are not only practical but absolutely necessary in modern shop practice.

On the larger brakes each end clamps independently and adjustment is provided for clamping pressure. The bending leaf on

General Specifications

New No.	Old No.	Length	Cap. Ga.	Weight Lbs.	New No.	Old No.	Length	Cap. Ga.	Weight Lbs.
312		3' $\frac{1}{2}$ "	12	900	616	3B	6' 1"	16	1200
314	5B	3' $\frac{1}{2}$ "	14	700	618	4B	6' 1"	18	950
316	6B	3' $\frac{1}{2}$ "	16	500	812		8' 1"	12	2700
412		4' $\frac{1}{2}$ "	12	1050	814	2C	8' 1"	14	2000
414	5	4' $\frac{1}{2}$ "	14	850	816	3	8' 1"	16	1500
416	6	4' $\frac{1}{2}$ "	16	650	818	4	8' 1"	18	1090
512		5' 1"	12	1250	1014	1B	10' 1"	14	3000
514		5' 1"	14	1100	1016	2	10' 1"	16	2500
516		5' 1"	16	980	1018	2B	10' 1"	18	2100
518	4C	5' 1"	18	850	1020	2A	10' 1"	20	1800
612		6' 1"	12	2300	1218	1	12' 1"	18	4000
614	17	6' 1"	14	1550	1222		12' 1"	22	3000

The rated capacity is for mild sheet metal and for bending a flange of one inch or wider on sheets of full capacity. Narrower flanges can be bent in lighter metal in proportion, but narrow flanges cannot be bent in full length sheets of rated capacity.

All the above sizes are regularly furnished with $\frac{1}{4}$ " detachable steel bar and apron, angle bar for heavy bending, improved adjustable stop gauge, five moulding formers with clamps and wrench.

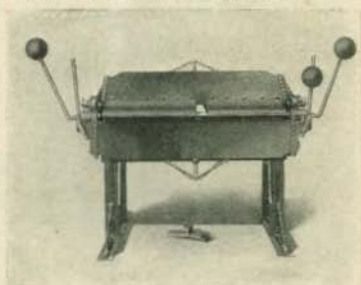
Foot treadle attachment can be supplied at extra cost.

CHICAGO STEEL BOX AND PAN BRAKE

This Chicago Brake is made to form a box or pan out of one piece of metal besides doing the work of the regular hand brake. It is used by practically all electrical manufacturers in forming electric switch boxes, cut-out boxes, and panel board cabinets. It is also used extensively in the making of conveyor buckets, tote boxes and a great variety of other articles.

The entire machine is strong and reliable. The fingers are adjustable to permit any size box to be formed within the rated capacity of the brake. The steel construction is a guarantee against breakage, and insures easy and quick handling.

The labor-saving qualities are apparent and the large demand for them has proven their efficiency for quantity production as well as for a variety of work.



Box and Pan Brake

General Specifications

No.	Length	Finger Ext.	Capacity Gauge	Weight Lbs.	No.	Length	Finger Ext.	Capacity Gauge	Weight Lbs.
30	3 ft.	6 in.	14	850	36	6 ft.	6 in.	16	2000
31	4 ft.	6 in.	14	1300	37	8 ft.	6 in.	16	2600
32	5 ft.	6 in.	14	1800	38	10 ft.	6 in.	18	3000
33	3 ft.	8 in.	14	950	39	6 ft.	8 in.	16	2400
34	4 ft.	8 in.	14	1600	40	8 ft.	8 in.	18	3000
35	5 ft.	8 in.	14	2000					

BENCH SHEARS**Chicago Steel Hand Slitting Shear**

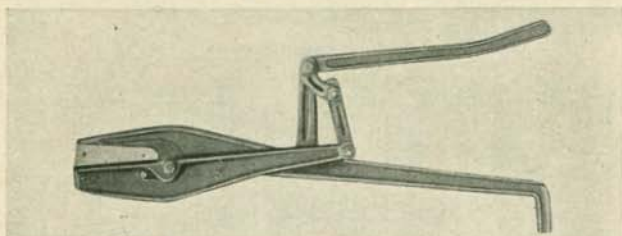
A very handy light weight shear, particularly valuable to the small shop for sheet and plate work. It may also be used to good advantage for cutting miscellaneous material such as belting, brake-band lining, etc., as well as small steel bars and band iron.

The pressed steel frame is offset to split sheets of any length or width. Shear blades are of high grade crucible steel and are readily removable when necessary for sharpening. Adjustable hold-down is provided. All parts are replaceable.

Capacity: No. 10 Ga. Sheets.

$\frac{3}{16}$ x 2" Flat Bars.

Weight, 22 pounds.

Viking Compound Shear

These shears are made of malleable iron with blades of $\frac{1}{4}$ " tempered tool steel. Blades are removable for replacement or adjustment. All bolts are milled from steel and screw into the body. Each bolt is fitted with a lock washer so that it can neither loosen nor tighten with the pivoted motion of the levers. The increased pressure brought about by the compound lever permits cutting of unusually heavy stock. Jaws are shaped to facilitate cutting angles and curves without bending material.

Each shear is thoroughly tested and inspected and therefore, guaranteed against defective workmanship or material.

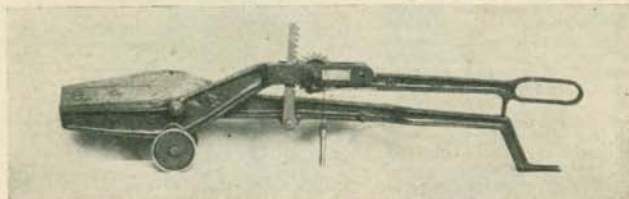
General Specifications

Capacity: No. 13 Gauge soft steel.

Length of Blade, $5\frac{1}{4}$ ".

Length overall, $33\frac{1}{2}$ ".

Net weight, 22 lbs.

Giant Economy Geared Compound Shear

A shear designed primarily to increase production and lessen manual exertion. A compound gear arrangement similar to the gearing in large power shears, makes it possible to cut greater thicknesses in less time and with less effort than is required with ordinary shears.

For light work, the compounding may be eliminated by disengaging the rack bar from the gear and inserting a pin through the moving members of the upper handle. For heavy cutting, the base may be attached to a bench.

The shear is regularly equipped with wheels, as illustrated, to facilitate moving it along the cut. If specified, however, a broad foot or base, attached to the lower jaw will be furnished instead of the wheels, without extra charge.

General Specifications

Capacity: $\frac{1}{8}$ " sheets.

$\frac{3}{8}$ " mild steel round or square bars.

$\frac{3}{16}$ x 2" flat bars.

Weight: 25 lbs.

Length overall: 36"

Length of blade: 10".

BELOIT HAND LEVER SPLITTING SHEARS

Light Type



These Splitting Shears are especially designed for cutting sheets and bars, and will be found particularly valuable in machine shops, garages, tin shops, etc., where a considerable amount of light work is handled.

They are direct acting, with the lever located at the front of the frame. This is a very convenient arrangement in cutting light materials.

The cast iron frame is offset, so that long or wide sheets will pass through freely without binding. The blades are adjustable and can be easily and quickly removed for sharpening when necessary.

For cutting round bars, a pair of circular blades is located in a hole in the frames just back of the king-bolt.

General Specifications

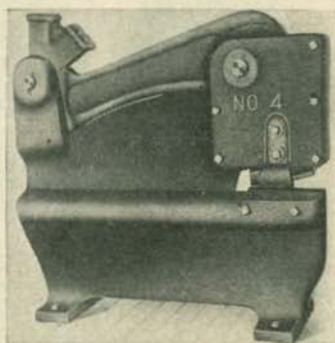
Size No.	Shearing Capacity.		Length of Blades, Inches	Weight, Lbs.
	Size Sheets, Inches	Size Rounds, Inches		
03	$\frac{1}{8}$	$\frac{1}{4}$	5	125
04	$\frac{3}{4}$	$\frac{3}{8}$	$5\frac{1}{2}$	300

Heavy Type

We list below a heavier series of Lever Splitting Shears, of substantial construction and designed for cutting heavy plates of any length or width. They are designed so that a great leverage is obtained, making them very powerful and easy to operate.

The frame is constructed of strong gray iron castings and is offset to allow the free passage of long or wide plates. The lever is located at the back of the frame, bringing the operator out of the way when cutting large plates.

The blades are adjustable and reversible, providing four cutting edges, and are easily and quickly removed for sharpening. A hand lever is furnished with each machine. Iron legs can be furnished when specified at an additional charge. These legs raise the shear to a convenient cutting height.



General Specifications

Size No.	Plate Shearing Capacity, Inches	Length of Blades, Inches	Weight, Lbs.
2	$\frac{1}{4}$	6	280
$2\frac{1}{2}$	$\frac{5}{16}$	6	350
3	$\frac{3}{8}$	$6\frac{1}{2}$	565
4	$\frac{1}{2}$	7	900

We are also able to supply various sizes and types of Rotary Splitting Shears, both hand and power operated. Specifications on request.

For Net Prices See Supplement

BUFFALO SHEARS



No. 22

These are heavy, substantial shears of excellent design and workmanship. The frame is made of a steel plate with an extremely high tensile strength, and is guaranteed against breakage. The use of a steel plate instead of cast iron for the frame eliminates danger of cracking under a heavy strain or in cold weather. These shears are much lighter in weight than cast iron shears. They occupy very little floor space and can easily be moved around the shop.

Furnished mounted on special two-piece angle iron legs, which hold the machine rigid under heavy cutting.

Size No. 22 has a capacity for cutting $\frac{1}{4}$ inch plates and flat bars $2\frac{1}{2} \times 3\frac{3}{8}$ ". The shipping weight is 115 lbs.

Size No. 23 has two levers, one being direct acting for light work and the other providing compound leverage for heavy work. This leverage is obtained by means of a ratchet keyed to the shaft and operated by the lever and pawl. Capacity: plates $\frac{3}{8}$ ", flats $2\frac{1}{2} \times \frac{1}{2}$ ", angles $1\frac{1}{2} \times \frac{1}{4}$ ", rounds $1\frac{1}{2}$ " and squares $\frac{3}{4}$ ".



No. 23

Buffalo "Armor Plate" Punch and Shears



This machine, though combining a punch and shear, is built with a separate lever at either end so that the punch as well as the shear can be operated independently—a convenient arrangement often a necessity in many shops. The lever action is simple but powerful. All fittings are accurately machined from drop forgings, and the knives, punches and dies are of best quality crucible steel, carefully ground and tempered.

This machine will make absolutely clean, accurate cuts to its full capacity.

The frame is made up of "Armor Plate" guaranteed forever under any conditions. It can be relied upon under the heaviest strains. "Buffalo" two-piece angle iron legs are included.

General Specifications

No.	Punches	Cuts Flats	Cuts Rounds	Depth Throat	Punches Furnished	Net Weight	Crated Weight
2A	$\frac{1}{4} \times \frac{1}{4}$ "	$2 \times \frac{5}{16}$ "	$\frac{5}{8}$ "	$3\frac{3}{4}$ "	$\frac{1}{8}, \frac{3}{16}, \frac{1}{4}$ "	110 lbs.	115 lbs.
3A	$\frac{3}{8} \times \frac{3}{8}$ "	$3 \times \frac{3}{8}$ "	$\frac{3}{4}$ "	4"	$\frac{1}{4}, \frac{5}{16}, \frac{3}{8}$ "	140 lbs.	145 lbs.

Buffalo "Armor Plate" Combination Special Punch, Slitting Shear and Bar Cutter

This ingenious device is a recently developed double end machine having slitting shear, punch and bar cutter all in one. The lever is very simple but exceedingly powerful. The frame, as in other Buffalo machines, is made of "Armor-Plate," guaranteed forever under any conditions.

The offset in the frame prevents the stock from binding when shearing plates, and guides the plate accurately along a straight line. The punches and dies are of the best crucible steel, ground and tempered. There are no parts to get out of order.

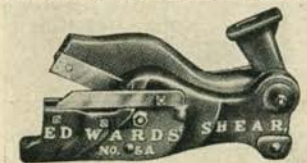
No. 22SP, illustrated, punches $\frac{3}{8} \times \frac{1}{4}$ " sheets, shears plates $\frac{1}{4}$ ", rounds $\frac{5}{8}$ ", flats (throat) $2\frac{1}{2} \times \frac{5}{16}$ ". Net weight 315 lbs. Crated for shipment, 320 lbs.

$\frac{1}{8}$ ", $\frac{1}{4}$ " and $\frac{3}{8}$ " punches with dies to fit are regularly furnished.



Edwards Bar Shears

These are constructed for heavy work and arranged for fastening to the floor at the front end only, so that the machine can be swung around for convenience. Handles are not regularly included with either No. 5 or No. 10 shear, but can be furnished when ordered.



Size	No. 5	No. 10
Flat Bar, Cap'y. Mild Steel	$4 \times \frac{1}{2}$ "	$4 \times \frac{3}{4}$ "
Rd. Bar, Cap'y. Mild Steel	$\frac{3}{4}$ "	1"
Length Shear Blades	7'	7'
Recommended Handle Weight, lbs.	200	440

BUFFALO SHEARS

Bench Slitting Shears No. 14

Every shop can use several of these powerful little shears. They save time and tools and take up very little space. This new No. 14 Buffalo Slitting Shear is intended for bench use. It is operated by hand, yet it has a leverage so powerfully compounded that it can easily cut 14 gauge plates with a cutting stroke of $1\frac{3}{4}$ ". It will also shear $\frac{3}{4} \times \frac{1}{8}$ " flats in one stroke. The body of the shear is 6" long and $5\frac{1}{2}$ " high and weighs $5\frac{3}{4}$ lbs. It is a high grade drop forging and the materials throughout are of such quality as to constitute a high grade tool.



No. 14

Bench Slitting Shears No. 19



No. 19

This sturdy hand operated slitting shear will be found very useful in the shops of the tinsmith, general repairman, and in other places where a considerable quantity of flats and rounds are cut. The outstanding features of this shear are its leverage; the pressed steel frame; its compactness and light weight. It has a stripper which prevents binding of the metal. The tee iron base allows shear to be bolted to a table. The steel lever is of the proper length for easy operation. It shears and slits No. 10 gauge metal, cuts $\frac{1}{8}$ " rounds, cuts $1\frac{1}{4} \times \frac{1}{4}$ " flats. Net weight 29 lbs., crated 34 lbs.

Buffalo Steel Frame Hand Slitting Shears

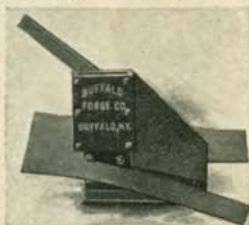
A low priced but substantial shear of light capacity, quite capable of handling the occasional needs of the average shop. Built along the same lines as the larger, more expensive sizes.

Furnished without legs for bench use, or mounted on angle iron legs for floor use, as preferred.

General Specifications—Size No. 20

Capacity: $\frac{1}{8}$ " Sheets and lighter.
 $2\frac{1}{2} \times \frac{1}{8}$ " Flat Bars and lighter.

Shipping Wt.: No. 20 (Bench Type), 35 lbs.
No. 20-C (With Legs), 70 lbs.



No. 20

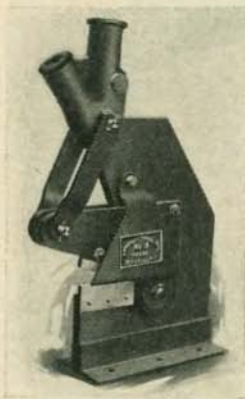
Buffalo Steel Frame Hand Bar Shears

Heavy Type

A very popular shear in bench or floor type as desired. This machine is ideal for erecting jobs where quantities of rounds and flats are to be cut. Can be left outside in all kinds of weather without damage.

The frame is of the unbreakable armor plate variety, which is stronger than cast iron. The leverage is compounded to enable cutting with a minimum of effort. A stripper on the side prevents binding.

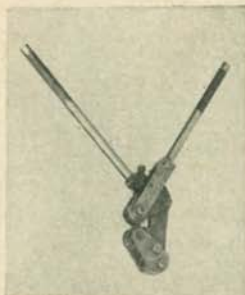
Stands for floor types are made of angle iron giving maximum rigidity with light weight.



No.	Type	Cuts Flats up to Ins.	Cuts Rds. up to Ins.	Net Wgt. Lbs.	Shpg. Wgt. Lbs.
3	Bench.....	$3 \times \frac{1}{2}$	$\frac{3}{4}$	95	100
3C	Floor (with Stand)....	$3 \times \frac{1}{2}$	$\frac{3}{4}$	140	145
4	Bench.....	$3 \times \frac{3}{8}$	1	243	250
4C	Floor (with Stand)....	$3 \times \frac{3}{8}$	1	288	295

For Net Prices See Supplement

RYERSON TANGENT SHEAR For Cutting Corrugated Sheets



Heretofore when corrugated sheets have been cut on the job, the corrugations were distorted and had to be bent back again by hand. Getting all the distortion out was almost an impossibility and a poor looking job usually resulted.

This new Tangent Shear is the only tool for cutting corrugated sheets that can be carried around—taken out on the job, and used any place. In fact, it is almost light enough to be carried around in the pocket. And, it quickly cuts, either straight, on a curve, or obliquely-across the corrugations without distortion.

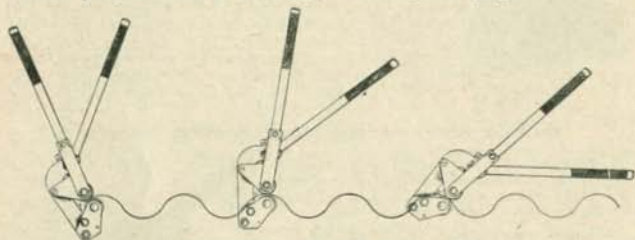
Very little power is required to operate this tool. It is self-feeding and once the cut is started the feed and relative movement between the sheet and shear is quite automatic.

The cutting is done by two rotary double-edged cutters, knurled on the shearing edges. The upper cutter is driven by an internal ratchet

which is operated by the handle while the lower one runs free. A twist of a cap screw adjusts the cutter to grip the various sheets thus assuring a continuous, even feed on all gauges within its capacity.

When making a cut, the tool may be withdrawn from the sheet at any point by simply loosening the adjustment screw. This feature permits cutting out corners or angular pieces.

Makes quick, clean cuts on all corrugated sheets up to 20 gauge.



BERTSCH LEVER SHEARS

These lever shears are equipped with unusually long blades, and are intended for slitting and trimming light or heavy sheet metal of any length or width. The leverage is compounded thereby insuring sufficient power for any job for which the machine is rated. The construction is of high grade semi-steel. It is mounted on substantial iron legs giving a height suited to the most efficient working conditions.

The body is constructed with proper offset to allow the material to pass through without any difficulty. The blade holder has a solid bearing on the rear side to prevent springing. A slitting gauge, adjustable for various widths of material and also a back gauge, are furnished for shearing to length.



No. 4 Shear

Number	Blades	Cuts	Bars	Rounds	Weight
1	15"	No. 14	$\frac{1}{4}$ " x 2"	$\frac{1}{2}$ "	300 lbs.
2	15"	No. 10	$\frac{3}{8}$ " x 2"	$\frac{5}{16}$ "	375 lbs.
2C	15"	No. 8	$\frac{1}{2}$ " x 2"	$\frac{3}{8}$ "	410 lbs.
3	10"	No. 6	$\frac{1}{2}$ " x 2"	$\frac{5}{8}$ "	350 lbs.
4	12"	$\frac{1}{4}$ Inch	$\frac{1}{2}$ " x 3"	$\frac{3}{4}$ "	550 lbs.
4D	12"	$\frac{5}{16}$ Inch	$\frac{5}{16}$ " x 3"	$\frac{3}{8}$ "	650 lbs.

BELOIT HAND LEVER BAR SHEARS

Steel Frame Type



These Steel Frame Shears are especially designed for cutting reinforcing bars, and will be found particularly valuable by contractors on the job. The frame is a steel casting so that there is no danger of it cracking during the cold weather. These shears are built with an open throat to allow inserting material from the front without passing it through the machine, thus saving considerable time.

Operation is by means of a ratchet. The blades are reversible, being furnished with one straight edge for shearing flat bars and with the other edge notched for round or square bars.

They are easily moved from one job to another and can be mounted on trucks, if desired, at a low initial cost.

General Specifications

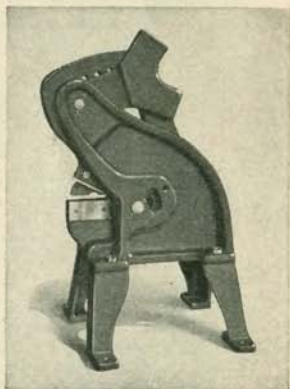
Size No.	Bar Shearing Capacity	Length of Blades	Weight, Lbs.
65	1" Square or Round	3½"	270
66	1¼" Square or Round	4"	360

Cast Iron Type

These Lever Shears are of substantial construction, being built of cast-iron with the frame or body cast in one piece. They are designed with an open jaw for cutting flat bars, and some of the sizes are arranged with a separate pair of blades for cutting round bars.

To cut round bars it is necessary to insert them lengthwise through an opening in the frame just back of the king-bolt. The shear blades for round bar cutting are entirely independent of the flat cutting blades, so that either may be replaced at any time. The operation is by means of a hand lever which works to the front for cutting both flats and rounds.

Illustration shows the No. 5-B Shear mounted on iron legs which are only furnished when specified, and at an additional charge.



No. 5-B

General Specifications

Size No.	Shearing Capacity		Length of Blades	Weight, Lbs.
	Flats	Rounds		
5A	3/8" x 4"	.....	4½"	250
5B	3/8" x 4"	1"	4½"	250
5C	3/8" x 3"	.....	4½"	230
5D	3/8" x 3"	7/8"	4½"	230
5E	5/8" x 4"	1"	5"	575
5F	5/8" x 5"	.....	6¼"	700
5G	5/8" x 5"	1¼"	6¼"	700

We can also supply Power Bar Shears, both Guillotine and Alligator Types. Specifications on request.

For Net Prices See Supplement

BUFFALO COMBINATION ANGLE AND TEE CUTTER



Open Throat
Type No. 2

furnished with angle shearing blades only. Tee shearing blades are extra.

Unless otherwise specified Nos. 1 and 2 "closed throat" and No. 3 "open throat" will be furnished.

Buffalo Hand Operated Angle and Tee Shears are made in two different types, namely, open and closed throat.

Sizes Nos. 1, 2, and 3 are all offered in the open throat design as shown in the upper illustration. The principal advantage of this style is that material may be admitted at the front of the machine, and it may also be fitted with a punching attachment at an extra charge.

Sizes 1 and 2 may also be had in the closed throat design illustrated to the right. This style is recommended where it is not absolutely necessary to have the open throat features.

Both types are regularly mounted on angle iron stand, and



Closed Throat

General Specifications

No.	Cuts Angles	Cut Tees	Cuts Flats	Punches Holes	Shipping Weight
1	1 $\frac{3}{4}$ x1 $\frac{3}{4}$ x $\frac{3}{16}$ "	1 $\frac{1}{4}$ x1 $\frac{1}{4}$ x $\frac{3}{16}$ "	1 $\frac{1}{4}$ x $\frac{3}{4}$ "	$\frac{1}{2}$ x $\frac{3}{16}$ "	118 lbs.
2	2 $\frac{1}{2}$ x2 $\frac{1}{2}$ x $\frac{1}{4}$ "	1 $\frac{3}{4}$ x1 $\frac{3}{4}$ x $\frac{3}{16}$ "	1 $\frac{3}{4}$ x $\frac{1}{2}$ "	$\frac{1}{2}$ x $\frac{3}{16}$ "	180 lbs.
3	3x3x $\frac{3}{8}$ "	2 $\frac{1}{4}$ x2 $\frac{1}{4}$ x $\frac{1}{4}$ "	2 $\frac{1}{2}$ x $\frac{3}{16}$ "	$\frac{3}{8}$ x $\frac{3}{8}$ "	448 lbs.

No. 3 LITTLE BLACKSMITH ANGLE SHEAR

(With Notching Attachment)



The No. 3 Little Blacksmith Angle Shear is the only hand lever machine now on the market designed particularly for shearing angles to length, and provided with a notching attachment. The notching attachment merely consists of an extra set of blades interchangeable with the shearing blades, and with these in place a ninety degree notch can be made in the leg of any size angle up to maximum capacity, so that it can be bent square. This attachment can also be used for trimming off the ends of angles and other bars on a mitre to make them fit other pieces in fabricated work. The blades regularly supplied with the notching attachment have an included angle of ninety degrees so that the notch removed is correct for bending the material to a right angle.

Will Shear Angles Inches	Will Notch Angles Inches	Will Shear Flat Bars Inches	Weight Pounds	List Price	
				With Either Shearing or Notching Attachment	With Both Shearing and Notching Attachments
2x2x $\frac{1}{4}$	2x2x $\frac{1}{4}$	2x $\frac{1}{4}$	325	\$90.00	\$120.00

If only one attachment is required, be sure to specify WHICH. Unless otherwise specified, will be furnished complete with BOTH attachments.

For Net Prices See Supplement

WHITNEY ANGLE SHEAR, NOTCHER AND BENDER

No. 4 Shear

The No. 4 Whitney Hand Angle Shear has a patented eccentric gear, which gives a uniform distribution of leverage over the entire surface of the blades. Built with a rest pad for the angle, so that clamping is not necessary.

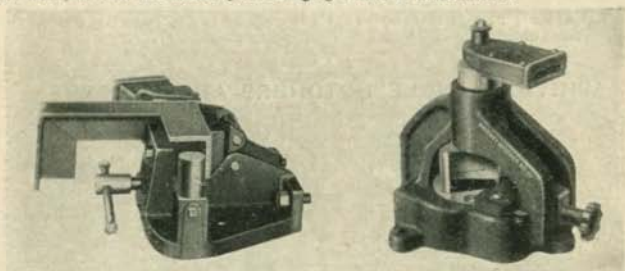
Light in weight, yet strong and durable. The frame is made of cast steel with inserted tool steel blades. All wearing parts hardened.

It has a capacity for 2"x2"x $\frac{1}{4}$ " angle iron.



Notcher and Bender

The No. 50 Whitney Angle Notcher and the No. 51 Whitney Angle Bender can be furnished separately or in a combined unit, as desired. The notcher has tapped holes in the back to receive the bender, which is readily attached by means of two cap screws. These tools are intended solely for angle work. They are always ready for work, without the necessity of changing blades or attachments.



No. 51 Bender

No. 50 Mitre Notcher

In using the No. 50 Notcher, the angle is held in position by a screw clamp to insure accurate work. The upper notching blade has a special pilot to guide it in entering the lower die, eliminating breakage and undue wear on the blade, and further insuring accuracy. Operation is by means of a rotary motion of the lever, pressure being transmitted through a steep pitch ball bearing screw.

This tool is strongly built, with all wearing parts hardened. The inserted upper notching blade is made of tool steel.

The No. 51 Bender is provided with a screw clamp to hold the angle firmly against a solid jaw, insuring accuracy of bends. The bending anvil swivels on the handle socket, providing a flat pressure surface against the angle in bending.

This Bender can be supplied at any time for attachment to the No. 50 Notcher.

No. 455 Combination Outfit

This combination outfit greatly facilitates work by its convenient grouping of all the tools which are needed on angle iron work.

It consists of the No. 50 Notcher and No. 51 Bender, combined in a single unit and mounted on top of a substantial angle stand, with the No. 4 Angle Shear conveniently attached to an extension of the base.

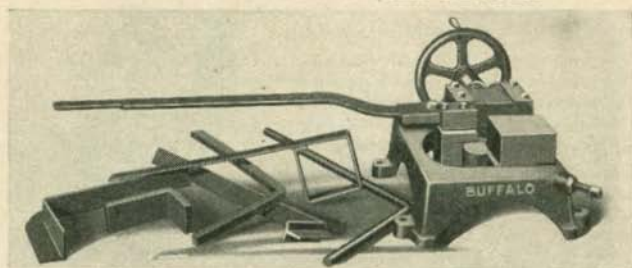
General Specifications

Capacities for 2"x2"x $\frac{1}{4}$ " Angles and Smaller	Wt. Lbs.	List Price
No. 4 Shear	44	\$50.00
No. 50 Notcher	55	100.00
No. 51 Bender	43	41.70
No. 455 Combination		225.00



For Net Prices See Supplement

BUFFALO TEE AND ANGLE BENDER



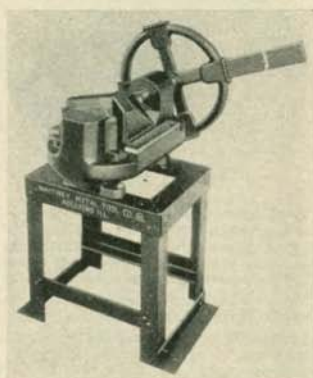
Note the Various Sections Bent on This Machine

This machine was designed to improve substantially, the method of bending tees and angles thru the introduction of a self-aligning and more rigid forming block together with a simpler block adjustment. These changes permit greater accuracy in bending; make it possible to bend squares, as small as 12 inches on the inside; and save time by using the same blocks for both tees and angles. General Specifications: Bends Tees (hot) leg in or out, up to $2\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{4}$ "; bends Angles (hot) leg in or out, up to $2\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{4}$ "; bends Flats up to 3×1 "; Rounds up to $1\frac{1}{4}$ "; and Squares up to $1\frac{1}{4}$ ". Width of machine 22", length 30". Shipping weight 400 lbs.

WHITNEY ANGLE NOTCHERS AND BENDERS



Notcher No. 60



Bender No. 61

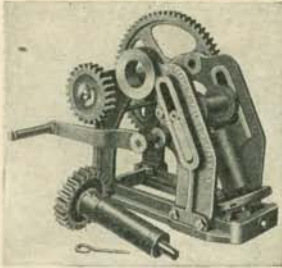
The Whitney Angle Iron Notcher No. 60 is made to cope all sizes of angles up to $2 \times 2 \times \frac{1}{4}$ ". It is equipped with ball-bearing spindle, ratchet operating handle, ball-bearing end thrust, screw clamping device, and inserted Tool Steel shearing blades. The punch enters the die by means of guide pins. Parts are interchangeable. Capacity: $3 \times 3 \times \frac{3}{8}$ " angle iron or smaller. Weight 250 lbs. List price, complete with stand \$190.00.

Whitney Angle Iron Bender No. 61 has a capacity of $3 \times 3 \times \frac{3}{8}$ ". This machine can bend not only angle iron, but by means of special jaws can bend pipes, flats, rounds, T-iron, etc. It is furnished complete with stand, and hand wheel which greatly aids production. The list price is \$110.00 and the weight 300 lbs.

HEAVY METAL-WORKING EQUIPMENT

Ryerson Machinery includes standard machine tools and metal working equipment of all kinds. Many of the heavier power machines are shown on pages 236 to 268. Others are shown in a larger and more complete catalog, copy of which will be sent gladly at your request.

BUFFALO TIRE BENDING ROLLS



No. 6 to 10

This machine is made for hand or power operation. By a few simple turns on the hand wheel below the carriage, quick adjustments can be made for bending tires of any diameter within its rated capacity. Nos. 6 to 9 are single back geared machines, with carefully machined rolls of cast iron. Fast speed for light work and slow speed for heavy work can be obtained by inserting the crank on the lower or upper shaft. To facilitate heavy work, two cranks are provided, one for each side.

No. 10 is built for power application but it can also be operated by hand, since it is double back geared at a ratio of 1 to 20, giving a powerful leverage. The rolls are made of steel, case hardened and grooved lengthwise, to prevent slipping of tire.

This machine can be furnished on a stand if desired.

General Specifications

No.	Bends Tires	Diameter of Wheel	Size of Pulleys	Shipping Weight
6	3x 3/4 in.	12 in. and up	16x3 in.	190 lbs.
7	3x1 in.	12 in. and up	16x3 1/2 in.	215 lbs.
8	4x1 in.	20 in. and up	18x4 in.	350 lbs.
9	6x1 in.	24 in. and up	20x4 in.	410 lbs.
10	8x1 1/2 in.	24 in. and up	24x6 in.	1325 lbs.

BUFFALO BANNER TIRE AND AXLE UPSETTER

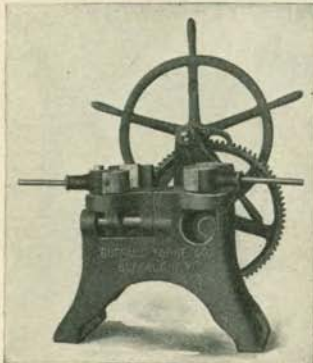
The great demand for a modern machine capable of setting tires of any size up to 4x1 inches is filled by this Buffalo Tire Setter. It handles this work with the greatest ease and accuracy. It grips the tires on the flat sides of top and bottom, and is therefore particularly well adapted for round edge tires. The refined Tool Steel jaws are easily set and released by the hand. The heavy, sturdy box frame will stand all the pounding to which such a machine may be subjected. Both jaws are opened or closed at one time by the long lever connecting them, making the operation possible for one man.

No. 1 upsets tires up to 4x1 inches around edge, and upsets axles up to 1 1/4". Travel of table is 1 inch. Shipping weight 350 lbs.



No. 1

BUFFALO TIRE AND AXLE UPSETTER



No. 3-G

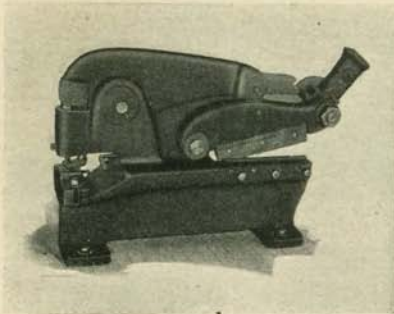
This machine which comes in larger sizes than the one shown above is constructed somewhat differently as can be seen in the accompanying illustration. In all four sizes the frame and legs are heavy substantial castings of tough material that will withstand unusually heavy pounding and rough handling. The very large gear reduction provides a powerful leverage which makes operation very easy. The handwheel, shaft, pinion, and eccentric are made of the best quality steel accurately finished and fitted. The pinion is machine cut and the connecting rod is of cast steel. The jaws are made of high grade steel and are adjustable to varying widths of tires and thicknesses of axles. The grips are milled to hold the work firmly.

No. 4G is mounted on wheels.

General Specifications

No.	Upsets Tires Up to	Upsets Axles Up to	Travel of Table	Weight
1-G	4 x1 in.	2 in.	1 1/4 in.	440 lbs.
2-G	5 x1 in.	2 1/4 in.	1 1/2 in.	600 lbs.
3-G	7 x1 1/4 in.	3 in.	2 in.	1136 lbs.
4-G	8 1/2 x1 3/4 in.	3 1/2 in.	2 in.	1250 lbs.

BELOIT HAND LEVER COMBINED PUNCHES AND SPLITTING SHEARS



No. 3A Shear

Each machine furnished with one punch and die, hand lever, and an adjustable gauge.

A very handy combination of a punch with a splitting shear, particularly valuable in sheet and plate work.

The frame is offset to allow material to pass through freely, when splitting long or wide sheets. Blades are adjustable and reversible, providing four cutting edges, and are easily removed for sharpening when necessary.

All sizes except No. 3-D have a single lever, located at the shearing end, for operating both the punching and shearing attachments. No. 3-D has separate levers for each end, one for operating the punching attachment, and the other for the shearing attachment.

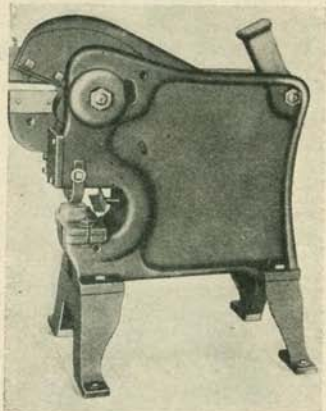
General Specifications

Size No.	Punching Capacity, Inches	Depth of Throat, Inches	Plate Shearing Capacity, Inches	Length of Blades, Inches	Weight, Lbs.	List Price
3A	$\frac{1}{4}$ thru $\frac{1}{4}$	4 $\frac{1}{2}$	$\frac{1}{8}$	9	250	\$ 80.00
3B	$\frac{5}{16}$ thru $\frac{3}{4}$	4 $\frac{1}{2}$	$\frac{1}{4}$	9	340	100.00
3C	$\frac{3}{8}$ thru $\frac{3}{8}$	4 $\frac{1}{2}$	$\frac{5}{16}$	9	625	150.00
3D	$\frac{3}{8}$ thru $\frac{3}{8}$	4 $\frac{1}{2}$	$\frac{3}{8}$	9	700	160.00

BELOIT HAND LEVER COMBINED PUNCHES AND BAR SHEARS

Useful in the shop for small miscellaneous jobs which do not warrant setting up a heavy power machine to handle them. Can be supplied with an angle shearing attachment at an additional charge, this being interchangeable with the punching attachment. No. 13 has an additional blade at the top of the frame for cutting wide thin bands or strips.

Round bar cutting capacities given in table are based on handling such cutting by means of a separate pair of circular blades, located in a hole in the frame just back of the king-bolt. Large rounds must be passed through this hole in order to cut them, although small rods can be cut by the flat blades in the front jaw.



General Specifications

Size No.	Punching Capacity Inches	Depth of Throat Inches	SHEARING CAPACITY			Weight, Lbs.
			Round Bars Inches	Flat Bars Inches	Angles Inches	
11	$\frac{3}{8}$ thru $\frac{3}{8}$	4	$\frac{7}{8}$	$\frac{1}{2}$ x2 or $\frac{3}{8}$ x4	1 x1 x $\frac{1}{4}$	450
12	$\frac{1}{2}$ thru $\frac{1}{2}$	6	1	$\frac{5}{8}$ x2 or $\frac{1}{2}$ x4	1 $\frac{1}{2}$ x1 $\frac{1}{2}$ x $\frac{1}{4}$	700
13	$\frac{3}{8}$ thru $\frac{1}{2}$	8	1 $\frac{1}{4}$	$\frac{1}{2}$ x5 or $\frac{1}{4}$ x8	2 x2 x $\frac{1}{4}$	950

For Net Prices See Supplement

BUFFALO "ARMOR PLATE" CUTTERS

**Buffalo Improved Combination
Punches and Shears**

The accompanying illustration shows the most popular combination machine in the Buffalo line of hand power cutters. Recent improvements have made this machine easy to operate, practically eliminated wear on the various parts of the linkage, and have made the whole more compact than ever.

The frame is made of Buffalo "Armor-Plate" having a remarkably high tensile strength, which accounts for the durability, light weight, capacity, and low price of this machine.

Clean, accurate cuts can be made up to the full rated capacity of the machine. Adjustable strippers prevent binding of the stock when the metal leaves the cutter. The twin socket lever operates both punch and shear.



No.	Punches	Cuts Rounds	Flats	Punches Furnished	Throat	Net Weight	Crated Weight
102B	3/4 x 3/4"	5/8"	2 x 7/8"	3/8, 3/8, 3/4"	3 3/4"	118 lbs.	123 lbs.
103B	3/8 x 3/8"	3/8"	3 x 3/8"	3/4, 3/8, 3/8"	4"	210 lbs.	215 lbs.
104B	1/2 x 1/2"	1"	3 x 3/8"	3/4, 3/8, 3/8"	5 3/4"	395 lbs.	400 lbs.

BUFFALO PUNCH, SHEAR AND BAR CUTTER



This is a very powerful hand operated punch, shear and bar cutter all in one. The frame is made of the well known Buffalo "Armor Plate" which is much stronger than cast iron, and it is strengthened below the die with reinforcing plates, bolted to both sides. The working parts are of forged steel and the shear-jaws, punch and die are crucible steel. A double socket lever gives the most efficient application of power, the back brace preventing the possibility of up-ending. The heavy angle irons form a rigid base. No. 5 punches up to 3/4 x 1/2", cuts flats 6 x 3/8", rounds 1". Can be furnished with or without truck. Punches furnished 3/8, 1/2, 3/4". Depth of throat is 7". Net weight is 725 lbs. Weight mounted on truck 850 lbs.

BUFFALO SLITTING SHEAR PUNCH AND BAR CUTTER

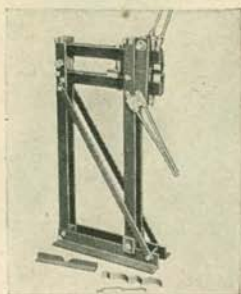
This most handy combination machine can perform eight operations without change of tools. The frame is guaranteed unbreakable and the entire machine is rigidly constructed, with architectural jaw provided for punching beams, channels and angles. Knives are made of the best grade crucible steel and will cut rounds, squares, and angles, square or on the mitre, or shear plates of any length without changing blades.

Contractors and iron workers will find this a very efficient machine for general work.



	22 H. U.	23 H. U.	24 H. U.
SHEAR			
Plates.....	3/8	3/8	1/2
Flats.....	2 x 7/8	2 1/2 x 1 1/2	3 1/4 x 1 1/2
Flats.....	2 x 1 1/4	2 1/2 x 7/8	3 1/2 x 3/8
Length Knives.....	6 1/2	6 1/2	7
Height Stroke.....	3/8	3/8	1
BAR CUTTER			
L-Square.....	1 1/2 x 1 1/4	2 1/2 x 1 1/4	3 x 3/8
L-45° Mitre.....	1 x 1 1/8	1 1/2 x 7/8	2 1/4 x 1/4
Tees.....	1 1/2 x 1 1/8	2 1/2 x 3/4	3 x 3/8
Rounds.....	3/8	1	1 1/4
Squares.....	3/8	3/8	1 1/8
PUNCH			
Dia. x Thickness.....	3/8 x 3/4	1/2 x 3/8	3/8 x 1/2
Height Stroke.....	1 1/2	1 3/8	1 3/4
Reams From.....	3" 5.5 lbs.	3" 5.5 lbs.	4" 7.5 lbs.
To.....	6" 12 1/4 lbs.	9" 21 lbs.	12" 35 lbs.
Throat.....	7	9	10 1/2
Weight, Net.....	350 lbs.	775 lbs.	1250 lbs.
Weight, Crated.....	360 lbs.	785 lbs.	1265 lbs.

MARVEL ALL-STEEL COMBINATION PUNCHES, SHEARS AND BENDERS



Size No. 22.

Size No. 22 is a single-end machine, having the eccentric and link action on one end only.

Size No. 23 is a double-end machine of somewhat heavier capacity than size No. 22, and capable of a wider range of work because of its double end arrangement.

In both machines the open end throat is adjustable as to depth, by shifting the eccentric and link-action forward or backward along the parallel tool-holding bars.

The punch and die holders, and the various tools for shearing, bending and notching, are interchangeable on the two sizes of machines.

These are hand operated machines of all-steel construction. They have great power, and capacities for a very wide range of work. They provide a particularly valuable combination of operations for sheet metal and ornamental iron shops, and for plant maintenance work.

Will punch holes in bars and angles, punch holes in sheets at a considerable depth from the edge, shear bars, split sheets, shear and notch angles, and bend bars and angles. They will do many classes of work not possible on other types of machines, such as punching holes close to the leg of an angle, splitting angles lengthwise, notching corners of sheets, etc.

The all-steel construction makes these machines practically unbreakable. Pressure or leverage for the different operations is applied by means of the upper lever. The lower lever is used to properly space the parallel bars to secure maximum pressure for the particular work being handled, and to increase or decrease the throw of the upper lever according to the amount of stroke required.



Size No. 23.

Capacities

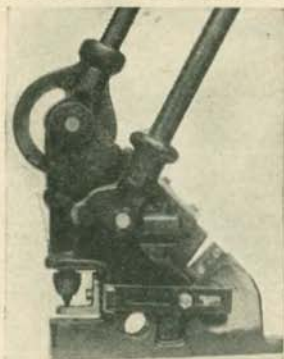
Operation	Size No. 22	Size No. 23
Punching.....	$\frac{3}{8}$ " thru $\frac{1}{2}$ " with 2' open end throat. $\frac{1}{4}$ " thru $\frac{3}{4}$ " with 6' open end throat. $\frac{1}{2}$ " thru $\frac{3}{4}$ " back of link action.	$\frac{3}{8}$ " thru $\frac{1}{2}$ " with 2' open end throat. $\frac{1}{4}$ " thru $\frac{3}{4}$ " with 9' open end throat. $\frac{3}{8}$ " thru $\frac{1}{2}$ " in center between uprights will punch to center of 36" width.
Shearing.....	$\frac{3}{8}$ " x 2' flat bars. $1\frac{1}{2}$ " x $1\frac{1}{2}$ " x $\frac{1}{8}$ " angles.	$\frac{1}{2}$ " x 2' flat bars. $1\frac{1}{2}$ " x $1\frac{1}{2}$ " x $\frac{1}{4}$ " angles. $\frac{1}{4}$ " x 36" plates lengthwise.
Notching and Coping.....	$1\frac{1}{2}$ " x $1\frac{1}{2}$ " x $\frac{1}{8}$ " angles. 2" x 2" x $\frac{1}{8}$ " angles.	$1\frac{1}{2}$ " x $1\frac{1}{2}$ " x $\frac{1}{4}$ " angles. 2" x 2" x $\frac{1}{8}$ " angles.
*Bending.....	$1\frac{1}{2}$ " x $1\frac{1}{2}$ " x $\frac{1}{8}$ " angles to 90° 2" x 2" x $\frac{1}{8}$ " angles to 90° $1\frac{1}{2}$ " x $\frac{1}{4}$ " flat bars to 90° 2" x $\frac{1}{8}$ " flat bars to 90°	$1\frac{1}{2}$ " x $1\frac{1}{2}$ " x $\frac{1}{4}$ " angles to 90° 2" x 2" x $\frac{1}{8}$ " angles to 90° 2" x $\frac{1}{4}$ " flat bars to 90° $1\frac{1}{2}$ " x $\frac{3}{8}$ " flat bars to 90°.

*Angle Bending Capacity based on 90° notch being cut in leg of angle prior to bending.

General Specifications

Size No.	22	23
Size of Parallel Bars—Two upper and two lower, ins.	$\frac{3}{4}$ " x $2\frac{1}{2}$ " x 24	$\frac{3}{4}$ " x 4 x 48
Height of Machine, inches.....	48	50
Length of Machine, inches.....	24	48
Width of Machine, inches.....	10	17
Length of Stroke—With upper lever only, inches..	$\frac{1}{2}$ "	$\frac{1}{4}$ "
With both levers, inches.....	$\frac{3}{4}$ "	$\frac{1}{2}$ "
Distance between upper and lower bars, closed, ins..	$3\frac{1}{4}$ "	$3\frac{1}{4}$ "
Length of upper lever, inches.....	40	40
Length of lower lever, inches.....	22	22
Shipping weight, lbs.....	310	550

LITTLE BLACKSMITH PUNCH, SHEAR AND BENDER



A combined punch, shear and bender, performing these three different operations without readjustment or interference.

Punching and Shearing is accomplished on one lever. The Bending device is equipped with an adjustable gauge, and two adjustable set screws are provided for material of various thickness. Forms for bending small circles, O's, G's, etc., can be inserted in a hole near the base of the machine.

Capacity—Wrought Iron and Soft Steel

No.	Punch Inches	Shear Inches	Bend Inches	Wt. Lbs.	Price
OA	$\frac{1}{4} \times \frac{3}{16}$	$\frac{3}{16} \times 1 \frac{1}{2}$	$\frac{1}{8} \times 1 \frac{1}{4}$	35	\$ 60.00
1	$\frac{3}{16} \times \frac{1}{4}$	$\frac{1}{4} \times 2$	$\frac{1}{4} \times 2$	70	70.00
2	$\frac{3}{8} \times \frac{3}{8}$	$\frac{3}{4} \times 3$	$\frac{3}{4} \times 3$	280	120.00

VERSON ANGLE SHEAR AND NOTCHER

This combination hand operated machine is intended for shearing, notching and coping. It is of steel construction and therefore unbreakable. Operation is by means of a single lever conveniently located at the center of the frame and is entirely direct acting. The body is mounted on an angle frame stand of proper height to insure efficient handling of stock to be worked. Workmanship and materials are of the very best throughout, resulting in a strong durable machine for the purposes intended.

A complete set of dies for notching and shearing angles are furnished with the machine. They are easily and quickly changed as each set is equipped with leader pins, and therefore do not require setting. It is not necessary to change dies for either notching and shearing angles or for shearing flat bars. Separate sets of dies are required for both angle coping and punching. These can be supplied at an extra charge.



No. 2 AS

General Specifications

Size No.	Will Shear Angles Inches	Will Notch Angles Inches	*Will Cope Angles Inches	Will Shear Flat Bars Inches	*Will Punch Inches	Weight Lbs.
2 AS	$2 \times 2 \frac{1}{4}$	$2 \frac{1}{2} \times 2 \frac{1}{2} \times \frac{1}{4}$	$1 \frac{1}{2} \times 2 \frac{1}{4} \times \frac{3}{16}$	$2 \times \frac{3}{8}$	$\frac{3}{8}$ thru $\frac{3}{8}$	325

*Punching and coping attachments furnished at an extra charge.

VERSON COMBINATION SHEAR AND PUNCH

No. SPH-1



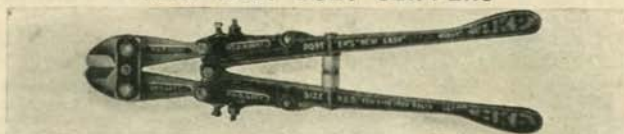
This machine is especially adapted for manufacturers of automobile and wagon bodies, and trailers, in punching out holes in metal sheets for making stake sockets, but it is equally serviceable in all shops where similar combined shearing and punching or angle notching is required.

Durability is one of its outstanding features on account of its sturdy all-steel construction.

It is hand operated by means of a powerful lever to cut $\frac{3}{16}$ " sheets six inches wide, to punch $1 \frac{3}{4} \times 4$ " in $\frac{3}{16}$ " sheets, and to notch angles $2 \frac{1}{2} \times 2 \frac{1}{2} \times \frac{1}{4}$ ". Any kind of die can be used in this machine.

The regular equipment includes shearing attachment, and one set of dies kind and size of which must be specified with order. Weight 300 lbs.

NEW EASY BOLT CLIPPERS



Size No.	Capacity Bolts or Rivets Inches	Size Opening Inches	Length Inches	Weight Lbs.	List Price Each
0	$\frac{3}{16}$	$\frac{1}{2}$	18	3	\$3.75
1	$\frac{3}{8}$	$\frac{9}{16}$	24 $\frac{1}{2}$	5 $\frac{3}{4}$	5.00
2	$\frac{1}{2}$	$\frac{3}{4}$	30	9	7.00
3	$\frac{5}{8}$	$\frac{7}{8}$	36	13	9.00

When ordering always specify whether side-cut or center-cut jaws are desired. Side-cut jaws furnished unless otherwise specified.

MARVEL ALL-STEEL PUNCH No. 13

This punch is made of heat-treated steel throughout and can be bolted to a bench, wall or post. It will punch a hole $\frac{1}{2}$ " from the inside corner of an angle iron, to the center of the punch.

Capacity: $\frac{3}{8}$ " through $\frac{5}{16}$ ", or $\frac{1}{2}$ " through $\frac{3}{4}$ ". Depth of the throat, 2 $\frac{1}{4}$ "; net weight, 43 lbs.

Unless otherwise specified, $\frac{3}{16}$ ", $\frac{1}{4}$ ", and $\frac{5}{16}$ " punches and dies are furnished, also strippers and gauges. Special punches and dies up to 1 $\frac{1}{4}$ " diameter can be supplied.

An all-steel floor stand can also be furnished if desired but is not regular equipment and must be ordered extra. Shipping weight with stand is 125 lbs.



MARVEL ROD CUTTER



Three Sizes

The Marvel Rod Cutter is made in three different cutting capacities each having special alloy tool steel cutting-blades which do not deform rod ends while cutting and are replaceable when dull or worn out. The tool is designed so as to be powerful, convenient and safe for bench operation. No. 7 can be furnished with heavy iron legs. The round steel lever can be instantly removed when desired. Net weight with legs, 155 lbs.

No.	Capacity, Inches	Wt. Lbs.
5	$\frac{3}{8}$, $\frac{5}{16}$, $\frac{1}{4}$, $\frac{3}{16}$, $\frac{1}{8}$	12
6	$\frac{5}{8}$, $\frac{3}{16}$, $\frac{1}{2}$, $\frac{1}{16}$, $\frac{3}{8}$	35
7	$\frac{7}{8}$, $\frac{3}{4}$, $\frac{5}{8}$, $\frac{1}{2}$, $\frac{3}{8}$	95

MARVEL SPLITTING SHEAR

This is a strong, well made, machine. Its upper shear bearing is set at an angle to lessen the strain. The stripper is placed so that a line drawn on the material can be easily followed. There are two sizes. No. 1 can shear sheets $\frac{1}{8}$ " thick or less, any length or width, and will also cut off $\frac{3}{16}$ " flat bars. The blade is 4"; weight 65 lbs.

No. 2 will shear sheets up to $\frac{1}{4}$ " thick any length or width, and will also cut off $\frac{3}{8}$ " flat bars. No. 2 can be furnished with heavy iron legs when specified; weight with legs, 320 lbs. The blade is 6"; weight 220 lbs.



Two Sizes

MARVEL COMBINED SHEAR AND PUNCH No. 9



This combined punch, shear, and rod cutter is of value in almost any shop. It has a special arrangement of compound eccentrics for adjustment to speed or power required according to the weight of the material being handled.

Capacity: Punches $\frac{3}{8}$ " hole in $\frac{3}{4}$ " stock, $\frac{1}{2}$ " hole in $\frac{1}{4}$ " stock; shears $\frac{1}{2}$ x 2" flats, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{5}{8}$, $\frac{3}{4}$ rounds, $\frac{1}{4}$ x 2 x 2" angles in two cuts.

Blades are 3 $\frac{3}{4}$ " long; punch throat 2 $\frac{5}{8}$ "; net weight 155 lbs. Heavy iron legs can be supplied if desired. Weight with legs is 210 lbs.

BELOIT LEVER PUNCHES



No. 84

Angle and notching attachments furnished when specified, at extra charge.

These machines are designed for heavy hand power punching, notching and angle shearing. Maximum power is insured by long double leverage. This series is particularly serviceable where a heavy and more expensive boiler-maker's punch is not required and a bench punch will not do. Regular equipment includes punching attachment only.

General Specifications

No. 82 Punches to center of 10 inches. Weight 350 lbs.

No. 83 Punches to center of 20 inches. Weight 540 lbs.

Will shear and notch $\frac{3}{8} \times 2$ angles.

Will punch $\frac{3}{8}$ " hole in $\frac{3}{8}$ " material.

No. 84 Punches to center of 10 inches. Weight 560 lbs.

No. 85 Punches to center of 20 inches. Weight 840 lbs.

Will shear and notch $\frac{1}{4} \times 2$ " angles.

Will punch $\frac{1}{2}$ " hole in $\frac{1}{2}$ " material.

BELOIT TRIPLE BENCH PUNCHES

These Bench punches have three sets of punches and dies which can be used at one time or separately. They are very handy and serviceable for light work. The improved lever socket allows operator to work from either the front or rear of the machine.

There are four sizes of these punches, varying in depth of throat from 5 to 20 inches. All sizes have a capacity of punching $\frac{3}{16}$ inch hole in $\frac{3}{4}$ inch iron or its equivalent. A steel stripper; back gauge adjustable for regulating distance between the holes punched and the edge of the material; three punches and die; and a hand lever bar are regular equipment.



Built in Four Sizes

General Specifications

No.	Depth of Throat	Weight
70	5 inches	150 lbs.
71	10 inches	300 lbs.
72	15 inches	450 lbs.
73	20 inches	600 lbs.

BELOIT BOILERMAKER'S LEVER PUNCH



Built in Six Sizes

Having been designed and made with a view to simplicity, this machine consists of very few parts. The body is cast in one solid piece, giving it greater strength than ordinary machines of this type. The lever is embedded and out of the way, and all king bolts and pins are made of steel. The mandrel or plunger which holds the punch is made square to avoid turning, in order that square or irregular punches may be used.

The distance from center of punch to front of machine is only one inch in order that the machine may be used to punch flanges, angles, etc.

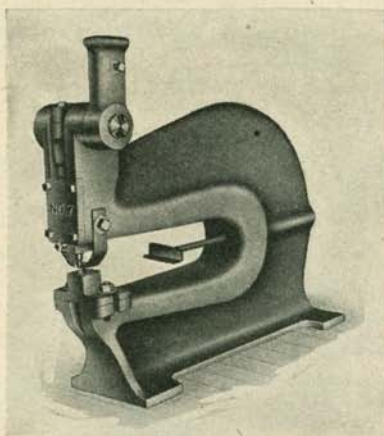
Machines are regularly equipped with one punch and die, lever bar, and stripping attachment.

General Specifications

No.	Capacity	Punch to Center	Weight
34	$\frac{5}{16}$ inch hole in $\frac{1}{2}$ inch iron	15 inches	900 lbs.
35	$\frac{3}{4}$ inch hole in $\frac{1}{2}$ inch iron	15 inches	1050 lbs.
36	$\frac{1}{2}$ inch hole in $\frac{3}{4}$ inch iron	30 inches	1500 lbs.
37	$\frac{3}{4}$ inch hole in $\frac{1}{2}$ inch iron	30 inches	1700 lbs.
38	$\frac{3}{8}$ inch hole in $\frac{1}{2}$ inch iron	36 inches	2300 lbs.
39	$\frac{3}{4}$ inch hole in $\frac{1}{2}$ inch iron	36 inches	2500 lbs.

BELOIT HAND LEVER PUNCHES

Plain and Ratchet Types



No. 7 Punch

These small Hand Lever Bench Punches are strongly built and are designed with as few parts as possible. The frame is of cast-iron and of sufficient strength to prevent any strain. The mandrel is square so that irregular shaped punches and dies may be used without danger of their turning. Operation is by means of a lever working either to the front or to the back.

In view of the unusual depth of throat obtainable in the larger sizes, these machines are especially desired by sheet metal workers, and specialty manufacturers. They are readily adaptable for electric sign socket, hole punching, close corner work, etc. Many other special arrangements can be supplied upon receipt of proper specifications.

Each machine is furnished with one punch and die, hand lever and an adjustable gauge.

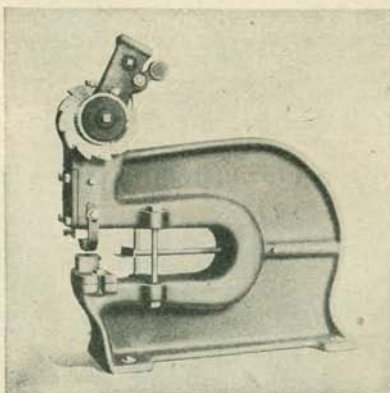
General Specifications—Plain Type

CAPACITY— $\frac{1}{4}$ " Hole thru $\frac{1}{4}$ " Material

Size No.	4½	5	6	7	8	9
Depth of Throat	4"	6"	10"	15"	18"	24"
Weight, lbs.	100	150	200	300	400	900

These Lever Punches are of a heavier capacity than those shown at the top of the page. They are provided with a ratchet for punching up to their full capacity, but will handle lighter work direct by inserting a pin which locks the ratchet to the lever. When used with the ratchet, the lever works to the rear. When used direct, it works towards the front.

Each machine is furnished with one punch and die, hand lever and an adjustable gauge.



No. 24 Ratchet Punch

General Specifications—Ratchet Type

CAPACITY—With Ratchet— $\frac{1}{2}$ " Hole thru $\frac{3}{8}$ " Material.
Direct Acting— $\frac{1}{2}$ " Hole thru $\frac{1}{4}$ " Material.

Size No.	21	22	23	24
Depth of Throat	4"	6"	10"	15"
Weight, lbs.	275	350	450	550

We can also supply other types and heavier capacity Hand Lever Punches. Specifications on request.

For Net Prices See Supplement

WHITNEY PORTABLE HAND LEVER PUNCHES

These portable punches have a straight up-and-down lever action.

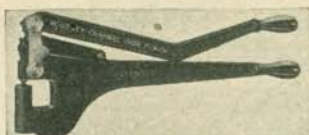


Size No. 2

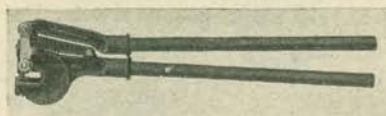
standard size. Extra punches and dies supplied in sizes from $\frac{1}{8}$ " to $\frac{1}{2}$ ", varying by 32nds.

Channel Punch

This punch is the same as the No. 2 Punch shown above, but furnished with a special jaw and lower lever for punching small channels and other structural shapes. Will punch to the center of 4" channels with flanges not exceeding $1\frac{1}{2}$ ". Equipped with one punch and die of any standard size. Takes same punches and dies as No. 2 Punch.



Channel Punch



Size No. 1

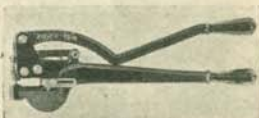
punches and dies supplied in sizes from $\frac{5}{32}$ " to $\frac{9}{16}$ ", varying in 32nds.

A close corner punch of such construction that the upper lever does not have to be raised straight up for insertion of the material to be punched.

Especially valuable on work where a 90-degree motion of the lever would interfere with the work.

Punches are easily and quickly changed by similar method to that used on the No. 4 Punch. Equipped with three punches and dies, side gauge and key to adjust dies.

Extra punches and dies supplied in sizes from $\frac{1}{8}$ " to $\frac{3}{16}$ ", varying by 64ths.



Size No. 8



Size No. 4

No tools needed to change punches—simply unscrew two large knurled thumb screw studs, throw back upper lever and raise hinged intermediate. The punch can then be removed and a new punch inserted without difficulty. Equipped with three punches and dies, side gauge, and key, to adjust dies to proper height. Extra punches and dies supplied in sizes from $\frac{1}{16}$ " to $1\frac{1}{4}$ ", varying by 64ths.

General Specifications

Size No.	Capacity	Depth Throat, Inches	Height of Gap, Inches	Length, Inches	Weight, Lbs.
2	$\frac{5}{16}$ " thru $\frac{1}{4}$ "	$1\frac{11}{16}$	$\frac{5}{16}$	23	13
Channel Punch	$\frac{1}{4}$ " thru $\frac{1}{4}$ "	2	$1\frac{1}{2}$	23	$16\frac{1}{2}$
1	$\frac{3}{8}$ " thru $\frac{1}{4}$ "	$1\frac{7}{8}$	$\frac{1}{2}$	34	22
8	$\frac{1}{4}$ " thru $\frac{3}{8}$ "	2	$\frac{5}{16}$	$18\frac{1}{2}$	$7\frac{1}{2}$
4	$\frac{1}{4}$ " thru 16 ga. . . .	$1\frac{7}{8}$	$\frac{3}{16}$	$8\frac{1}{2}$	3

For information regarding punches and dies see page 156.

WHITNEY BENCH VISE

A light bench vise having sufficient adjustment to hold any of the above punches can also be furnished. It is made of malleable iron and weighs only 5 lbs. so that it can easily be taken along on the job when desired.



WHITNEY BALL BEARING PORTABLE PUNCHES

These punches operate with a rotary motion of the Upper Handle requiring a turn of less than 180 degrees, thereby making it possible to use them on work where the room is limited. Ball bearings used in connection with the steep pitch screw greatly reduce friction and insure speed and ease of operation.

They are used by sheet metal and specialty manufacturers for punching band iron and the edges of metal sheets or such work that does not require a deep throat punch.



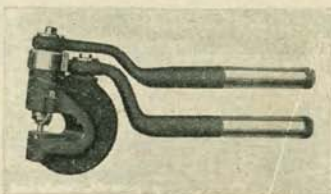
No. 10.

Furnished with two handles as illustrated. Equipped with one punch and die of any standard size. Extra punches and dies supplied in all sizes from $\frac{1}{8}$ " to $\frac{1}{16}$ ", varying by 32nds. Base for mounting on bench supplied at an extra charge.

Especially suitable for sheet metal workers for punching light gauge material, same as the No. 10 Punch, but has short length, hollow handles with removable ends for carrying extra punches and dies. Can be used for light riveting, when equipped with special riveting dies.

Equipped with one punch and die of any standard size. Takes same punches and dies as No. 10 punch. Base for mounting on bench supplied at an extra charge.

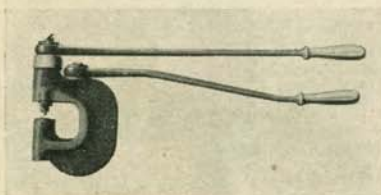
The No. 10 is made of special alloy steel, with all wearing parts hardened. Proportioned to give ample strength for the full rated capacity of $\frac{3}{8}$ " hole through $\frac{1}{4}$ " material. Can also be used for light riveting when equipped with special riveting dies.



No. 11.

The 12 punch is particularly suitable for punching small channels and angles up to 4 inches. It can also be used for light riveting, when equipped with special riveting dies. Furnished with two handles as illustrated. Equipped with one punch and die of any standard size.

Takes same punches and dies as No. 10 Punch. Base for mounting on bench supplied at an extra charge.



No. 12.

The No. 15, a deep throat punch, intended particularly for punching holes at some distance from the edge of the material. It has a ratchet head arrangement, convenient for operating in close quarters, and is equipped with one punch and die of any standard size. It takes the same punches and dies as the No. 10 punch. Base for mounting on bench supplied at an extra charge.

See Page 156 for description of punches and dies for all machines on this page.



No. 15

General Specifications

Size No.	Capacity Inches	Depth of Throat, Inches	Height of Gap, Inches	Length Overall, Inches	Weight Pounds	List Price	Extra for Base
10	$\frac{3}{8}$ through $\frac{1}{4}$	1 $\frac{1}{2}$	$\frac{3}{8}$	18	8 $\frac{1}{2}$	\$25.00	\$2.50
11	$\frac{3}{8}$ through $\frac{1}{4}$	1 $\frac{1}{2}$	$\frac{3}{8}$	16	8	25.00	2.50
12	$\frac{3}{8}$ through $\frac{1}{4}$	2	2	18	11	30.00	2.50
15	$\frac{3}{8}$ through $\frac{1}{4}$	4	$\frac{3}{8}$	..	24	65.00	3.10

RATCHET HANDLE No. 10



This drop-forged handle is interchangeable with the regular handle of the Nos. 10, 11 and 12 punches, by simply removing a cap screw. It ratchets in any direction. Can also be used as a plain lever handle.

For Net Prices See Supplement

WHITNEY BALL BEARING PORTABLE PUNCHES

Size No. 20

These ball bearing punches are much faster than the ordinary screw punches. One revolution of the handle moves the punch one-half inch.

Style No. 20 is made of alloy steel and heat treated throughout. Can be used for light riveting, when equipped with special riveting dies. Provided with short handle socket into which bar or pipe can be inserted for a lever.

Equipped with one punch and die of any standard size. Extra punches and dies supplied in all sizes from $\frac{3}{16}$ " to $\frac{1}{2}$ ", varying by 32nds. Base for mounting on bench supplied at an extra charge.



Size No. 24

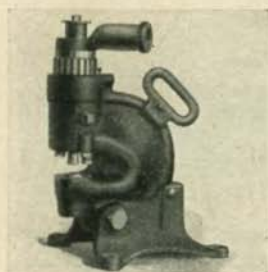
This is a bench punch with special cast steel body. It has a greater capacity than the No. 25 punch shown below, but since the throat is not as deep it will punch only up to $3\frac{1}{2}$ " from the edge, whereas the punch No. 25 will reach to 8" from the edge of the work. The die holder or jaw is not even with the throat as in No. 20 but is raised so as to punch angles, channels and other structural shapes.

The punches and dies used in this machine are the same as for No. 20 illustrated above. Each tool is shipped complete with one punch and die of standard size. Additional punches and dies in sizes from $\frac{3}{16}$ " to $\frac{1}{2}$ " by 32nds can be supplied at an extra charge.



Size No. 25

A Bench Punch with a high gap and deep throat, adaptable for punching light structural shapes such as I-beams, channels, angles, etc. The body is made of a steel casting. The spindle is cut with unusually coarse threads in which ball bearings are inserted to eliminate friction and facilitate ease of operation. Equipped with one punch and die of any standard size. Takes same punches and dies as No. 20 Punch.



Size No. 40

A Portable Punch similar to size No. 20, but of larger capacity. Can be used for light riveting, when equipped with special riveting dies.

Provided with a ratchet head arrangement and handle socket. Equipped with one punch and die of standard size.

Extra punches and dies supplied in all sizes from $\frac{3}{8}$ " to 1", varying by 16ths. Base for mounting on bench supplied at an extra charge.

General Specifications

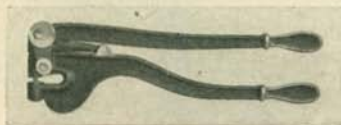
Size No.	Capacity Inches	Depth Throat	Height of Gap	Weight Lbs.	List Price	Extra For Base
20	$\frac{1}{2}$ thru $\frac{1}{2}$	2"	$1\frac{3}{8}$ "	20	\$50.00	\$3.35
24	$\frac{1}{2}$ thru $\frac{3}{8}$	$3\frac{1}{2}$ "	4"	45	60.00	.....
25	$\frac{3}{8}$ thru $\frac{3}{8}$	8"	4"	120	100.00	.....
40	$\frac{3}{8}$ thru $\frac{3}{8}$	3"	2"	87	142.00	4.50

Specify size of punch and die required.

See page 156 for description of punches and dies.

WHITNEY HAND PUNCHES**No. 5 Junior Punch**

This punch is able to make $\frac{1}{4}$ " holes with minimum effort in 16 gauge metal. It punches to the center of a 3" circle and its entire length is $8\frac{1}{4}$ ", height of gap $\frac{1}{4}$ ", and is shipped complete with three sets of punches and dies. $\frac{1}{8}$ ", $\frac{3}{16}$ ", and $\frac{1}{4}$ ", unless otherwise specified. Punches and dies from $\frac{1}{16}$ " to $\frac{17}{64}$ " by $\frac{1}{64}$ "ths can be furnished. Weight $2\frac{1}{2}$ lbs. List price \$10.00.

**No. 7 Roller Bearing Punch**

This illustration shows the roller bearing type punch for heavier work than the above. It is capable of making $\frac{1}{4}$ " holes in $\frac{1}{8}$ " metal in the center of a $3\frac{1}{2}$ " circle. The total length of this tool is 18"; height of the gap $\frac{1}{2}$ ". It is shipped complete with three sets of punches and dies, sizes $\frac{3}{16}$ ", $\frac{1}{4}$ ", and $\frac{5}{16}$ ", or any

other stock size from $\frac{1}{8}$ " to $\frac{3}{16}$ " by $\frac{1}{64}$ "nds.

The weight is $6\frac{1}{2}$ lbs. and list price \$17.50.

A swivel base for the No. 7 punch similar to that illustrated below for the No. 8 Imperial can also be supplied. The list price is \$5.00.

No. 8 Imperial Punch**Punch Base**

This punch is suited for heavier work than the two types shown above, and is also adapted for close corner work because the gap opens to its maximum width without swinging the handle beyond 90°.

It will punch to the center of a $4\frac{1}{2}$ " circle; length over all is $25\frac{1}{2}$ "; height of gap $\frac{3}{8}$ "; depth of throat $2\frac{3}{4}$ ".

It is shipped with three punches and dies; unless specified, $\frac{7}{16}$ ", $\frac{9}{16}$ " and $1\frac{1}{16}$ " will be sent with each machine.

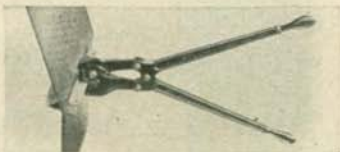
Stock sizes are from $\frac{1}{8}$ " to $\frac{1}{2}$ " by 32nds. Weight 16 lbs. List price \$25.00.

A swivel base for this punch as shown in the accompanying illustration can also be furnished. It has a $3\frac{3}{4}$ " x 5" table with a series of tapped holes for clamping locating stops to be used for making duplicate parts, to fit $\frac{1}{4}$ " No. 20 USS Screws. The list price is \$6.00.

Skylight Punch

The construction of this punch makes it suitable for close corner work, especially on skylights, template work, and center tank flange punching. The throat is $1\frac{3}{4}$ " in depth; length $26\frac{1}{2}$ "; capacity $\frac{1}{4}$ " x $\frac{3}{16}$ " in soft steel; weight 10 lbs. Three punches and dies are furnished with each.

Stock sizes are $\frac{1}{8}$ " to $\frac{3}{16}$ " by 32nds.

**For Close Corner Work****No. 16 Bench Punch**

This bench punch has a liberal throat clearance and is convenient and desirable, because the operator works at the front of it. It has a capacity of $\frac{3}{8}$ " through $\frac{1}{4}$ " iron; depth of throat is $3\frac{1}{2}$ "; height $\frac{3}{8}$ ". The handle is 22" long and the net weight is 33 lbs. A 6" x 8" table having tapped holes for $\frac{1}{4}$ " No. 20 machine screws can be supplied at extra charge. Weight with table is 38 lbs.

Tool is shipped with three punches and dies; unless specified, $\frac{7}{16}$ ", $\frac{9}{16}$ ", $1\frac{1}{16}$ " will be sent with each machine. Stock sizes are from $\frac{1}{8}$ " to $\frac{17}{64}$ " by $\frac{1}{64}$ "nds.

List price with work table is \$46.00; without table, \$40.00.

See page 156 for description of punches and dies.

For Net Prices See Supplement

TINNER'S HOLLOW PUNCHES

List Prices—Hollow Punch Set No. 1

Bit Sizes	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{5}{8}$ "	$\frac{3}{4}$ "	$\frac{7}{8}$ "
Price of Bits	\$0.60	\$0.70	\$0.90	\$1.10	\$1.25
Handle only	.....\$2.10				
Complete Set	.....\$6.00				



List Prices—Hollow Punch Set No. 2

Bit Sizes	..... 1"	..... 1 $\frac{1}{4}$"	..... 1 $\frac{1}{2}$"	..... 1 $\frac{3}{4}$"	..... 2"
Price of Bits	.....\$1.50	.....\$1.65	.....\$2.00	.....\$2.30	.....\$ 2.70
Handle Only	.....\$ 4.20				
Complete Set	.....\$14.00				

List Prices—Hollow Punch Set No. 3

Bit Sizes	..... 2 $\frac{1}{4}$"	..... 2 $\frac{1}{2}$"	..... 2 $\frac{3}{4}$"	..... 3"
Price of Bits	.....\$3.00	.....\$3.35	.....\$3.70	.....\$ 4.00
Handle Only	.....\$ 6.25			
Complete Set	.....\$19.00			

Above sets furnished complete in wood case and handle with Punch.

MARVEL METAL HAND PUNCH No. 17



A powerful hand punch, easily and conveniently operated with one hand. It does not require both hands when stripping. An excellent punch for light sheet punching either in the shop or on erection work. Simplicity of action with few moving parts eliminates friction and lost motion, producing maximum power in a convenient sized tool that can be carried in the pocket.

The punch and die can be changed in a few seconds, by simply pulling handle in pin out as far as it goes and lifting out loose lever and punch. The die screws into place and is equally easy to remove.

A sliding pin directly in back of the punch acts as a depth gauge and is out of the way when not in use.

General Specifications

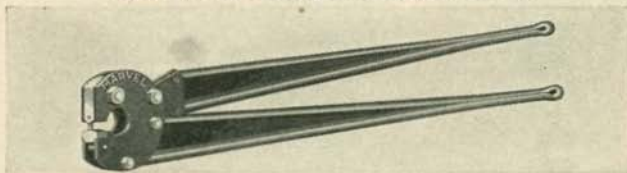
No. 17 Capacity— $\frac{1}{4}$ " hole through No. 16 Ga. Sheet Iron.

Depth of Throat—1 $\frac{1}{8}$ ". Weight 2 lbs.

Regularly furnished with a $\frac{3}{16}$ " punch and die unless otherwise specified.

No. 17-C (Set) This includes a No. 17 punch and complete set of punches and dies in the following sizes: $\frac{3}{32}$ ", $\frac{1}{8}$ ", $\frac{3}{32}$ ", $\frac{3}{16}$ ", $\frac{1}{4}$ ", $\frac{5}{16}$ " and $\frac{3}{8}$ " inches. This is furnished in a hardwood box as illustrated.

MARVEL PORTABLE PUNCH No. 20



General Specifications

Capacity— $\frac{1}{4}$ inch hole in $\frac{1}{4}$ inch stock.

Depth of Throat—2 inches.

Weight—16 lbs. Length Overall—38 inches.

One Punch and Die included. Unless otherwise specified, $\frac{1}{4}$ inch punch and die furnished with each No. 20 punch. Additional punches and dies in all sizes from $\frac{1}{8}$ " to $\frac{1}{2}$ " can be furnished.

This tool is especially valuable when holes are to be punched close to some obstruction—as in cornice, shelving and counter work. It will punch a hole $\frac{3}{8}$ " from an inside corner of an angle iron to the center of punch. When stripping, the upper lever does not go beyond a vertical position at right angles to the lower lever.

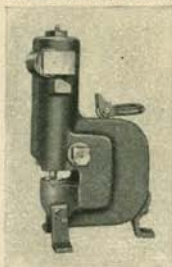
It can be fastened to a bench, by clamping the frame in any bench vise between the two lower nuts, the nuts acting as a brace.

This tool is made entirely of steel, and is therefore strong and light.

For Net Prices See Supplement

HENDERER HYDRAULIC PUNCHES**Head Punch**

This punch is an improvement over the old style hydraulic screw punch. It is constructed similar to a jack. The principle involved in this machine is such as to afford easy operation. It is fitted with a pinion meshed in a rack cut on the ram, to eliminate pumping the punch to and from the work. In addition to the listings shown below, other sizes for special requirements can be furnished.



Head Punch

In ordering punches and dies state whether the given size is the diameter of the hole to be punched or the size of the rivet or bolt for which they are to be used. The punches and dies are shown in rivet sizes, to facilitate ordering.

No.	Capacity	Gap	Wt. Lbs.	List Price
1	$\frac{5}{8}$ " through $\frac{3}{8}$ "	$1\frac{3}{4}$ "	55	\$ 60.00
2	$\frac{3}{4}$ " through $\frac{1}{2}$ "	2"	90	85.00
2 $\frac{1}{2}$	$\frac{3}{4}$ " through $\frac{1}{2}$ "	$5\frac{3}{4}$ "	190	120.00
3	$\frac{3}{4}$ " through $\frac{3}{8}$ "	5"	140	100.00
3 $\frac{1}{2}$	$\frac{3}{4}$ " through $\frac{3}{8}$ "	$2\frac{3}{4}$ "	140	120.00
3 $\frac{1}{4}$	$\frac{3}{4}$ " through $\frac{3}{8}$ "	6"	180	140.00
4	$\frac{3}{4}$ " through $\frac{3}{8}$ "	4"	170	140.00
6	1" through $\frac{3}{8}$ "	3"	195	140.00
8	1" through 1"	$4\frac{1}{2}$ "	250	165.00
		$3\frac{1}{2}$ "	230	165.00

Screw Punch

The illustration shows the screw hydraulic punch which differs from the Head Punch above in that it has no valves and force pump thus permitting its use in any position. Unlike the ordinary punch this machine is fitted with a pinion meshed into the ram for a quick method of withdrawing the punch from the work, thus dispensing with the need of a pry bar.

The screw is packed in an improved manner and fitted with a gland nut for adjustment to wear of the packing.

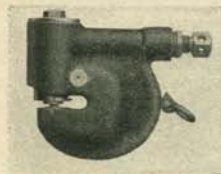
This machine is satisfactory for light work, while the Head Punch is recommended for heavy punching.



Upright Screw

No.	Capacity	Gap	Wt. Lbs.	List Price
1	$\frac{5}{8}$ " through $\frac{3}{8}$ "	$1\frac{3}{4}$ "	50	\$ 60.00
2	$\frac{3}{4}$ " through $\frac{1}{2}$ "	2"	90	85.00
2 $\frac{1}{2}$	$\frac{3}{4}$ " through $\frac{1}{2}$ "	5"	130	100.00
3	$\frac{3}{4}$ " through $\frac{3}{8}$ "	$2\frac{3}{4}$ "	130	120.00
3 $\frac{1}{2}$	$\frac{3}{4}$ " through $\frac{3}{8}$ "	4"	170	140.00

In ordering, specify rivet sizes listed above, not actual sizes of holes to be punched.

Horizontal Screw Punch

For description and details of this punch, see above. The features of both are identical except that this type has the horizontal screw instead of the upright. A study of the illustration will reveal the advantages of this type of punch over the upright.

Punches and dies are according to rivet sizes.

No.	Capacity	Gap	Wt. Lbs.	List Price
1	$\frac{5}{8}$ " through $\frac{3}{8}$ "	2"	45	\$ 60.00
2	$\frac{3}{4}$ " through $\frac{1}{2}$ "	$2\frac{3}{8}$ "	70	85.00
3	$\frac{3}{4}$ " through $\frac{3}{8}$ "	$3\frac{1}{8}$ "	110	100.00

Henderer Hydraulic Shear

Except that it is fitted with blades for cutting instead of a punch and die this machine is the same in all respects as Hydraulic Head Punch illustrated above.

The ram has sufficient rise so that the blades can be opened wide enough to take in round bars from the front.

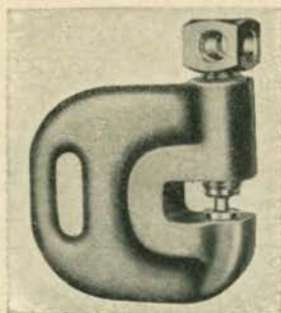
The blades are inserted in the bed and ram; the screws are not depended upon to resist the side strain.

These machines can be furnished mounted on wheels at no extra charge; weight of wheels is 20 lbs. List price includes one pair of blades, either round or straight.

No.	Capacity in Round Iron	Capacity in Steel Rope	Weight	List Price
1	1 in.	$1\frac{1}{2}$ in.	135 lbs.	\$150.00
3	$1\frac{1}{2}$ in.	2 in.	200 lbs.	180.00
5	$1\frac{3}{4}$ in.	$2\frac{1}{2}$ in.	235 lbs.	210.00



RYERSON HAND SCREW PUNCHES



Cast Steel Type



Forged Steel Type

Made of an excellent quality of steel castings and drop forgings. The screws are of large diameter, carefully machined, and fitted with a removable coupling nut, permitting the use of various sizes of punches. All sizes can be furnished with either Bar Head or Ratchet Head screw as desired. Bar Head Type furnished unless otherwise specified. One punch and die of any standard size furnished with each tool. Extra punches and dies of all standard sizes carried in stock.

Illustration of forged type shows No. 0, 1 and 2 sizes. No. 3 and 4 are similar except no hand hole is provided.

Cast Steel

Size	Capacity Inches	Depth of Throat Inches	Weight Pounds	List Price	Extra Punches Each	Extra Dies Each
A-00	★ thru ★	1½	15	\$20.00	\$2.10	\$1.40
B-0	½ thru ★	1½	17	24.00	2.10	1.40
C-1	½ thru ★	1½	27	30.00	2.40	1.60
D-2	¾ thru ¼	2¼	40	40.00	2.40	1.60
E-3	¾ thru ¾	3	60	60.00	3.00	2.00
F-4	¾ thru ¾	4	110	80.00	3.00	2.00

Forged Steel

Size	Capacity Inches	Depth of Throat Inches	Weight Pounds	List Price	Extra Punches Each	Extra Dies Each
0	¾ thru ¼	1½	5	\$12.00	\$1.00	\$1.00
1	½ thru ¼	1½	20	16.00	1.00	1.00
2	¾ thru ¼	2¼	48	25.00	1.25	1.25
3	¾ thru ¼	3¼	70	32.00	1.40	1.40
4	¾ thru ¼	4	100	40.00	1.40	1.40

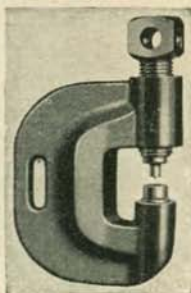
For details of punches and dies for these screw punches—See page 156.

RAIL AND STRUCTURAL TYPE

Cast Steel

This type is particularly valuable for bridge and structural work and for punching rails. Has raised die and large throat. Bar Head type furnished unless otherwise specified. One punch and die included in price.

Size No.	10	12	14	16
Capacity.....	¾" thru ¾"	¾" thru 1½"	1" thru 1½"	1" thru 1½"
Depth of Throat.....	2¼"	3"	4"	5½"
Height of Gap....	3½"	4½"	4½"	6½"
Weight, Lbs.....	55	80	150	180
List Price.....	\$25.00	\$30.00	\$44.00	\$50.00
Extra Punches, Ea.	1.40	1.75	2.00	2.00
Extra Dies, Ea...	1.25	1.60	1.80	1.80



RATCHET WRENCH



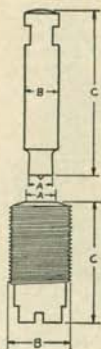
List Price.....\$15.00

This Ratchet Wrench will fit any of the above Cast or Forged Steel Screw Punches with Ratchet Head. The handle is of proper diameter to fit inside of a piece of 2½-inch pipe, which may be used as an extension to the handle.

For Net Prices See Supplement

PUNCHES AND DIES FOR WHITNEY HAND PUNCHES

Slotted Punches



A	B	C	Used With
$\frac{1}{8}$ " to $\frac{17}{64}$ " by 64ths	$\frac{3}{8}$ "	$1\frac{1}{8}$ "	No. 4
$\frac{1}{8}$ " to $\frac{1}{4}$ " by 64ths	$\frac{7}{8}$ "	$1\frac{3}{8}$ "	No. 5
$\frac{1}{8}$ " to $\frac{1}{4}$ " by 32ds	$\frac{7}{8}$ "	$1\frac{1}{2}$ "	No. 7
$\frac{1}{8}$ " to $\frac{1}{4}$ " by 32ds	$\frac{7}{8}$ "	$1\frac{15}{16}$ "	No. 8
$\frac{1}{8}$ " to $\frac{1}{2}$ " by 32ds	$\frac{1}{2}$ "	$2\frac{3}{8}$ "	No. 2, No. 8 Imperial No. 6 (Skylight) and Channel Punch
$\frac{1}{8}$ " to $\frac{3}{8}$ " by 32ds	$\frac{3}{8}$ "	$2\frac{7}{8}$ "	No. 1
$\frac{1}{8}$ " to $\frac{11}{16}$ " by 32ds	$\frac{9}{16}$ "	$3\frac{1}{8}$ "	No. 16

Threaded Dies

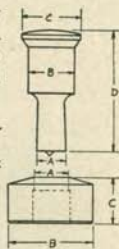
A	B	C	Used With
$\frac{1}{8}$ " to $\frac{17}{64}$ " by 64ths	$\frac{7}{8}$ "	$1\frac{15}{16}$ "	No. 4
$\frac{1}{8}$ " to $\frac{1}{4}$ " by 64ths	$\frac{7}{8}$ "	$1\frac{3}{8}$ "	No. 5
$\frac{1}{8}$ " to $\frac{1}{4}$ " by 32ds	$\frac{7}{8}$ "	$1\frac{1}{2}$ "	No. 7
$\frac{1}{8}$ " to $\frac{1}{4}$ " by 32ds	$\frac{7}{8}$ "	$1\frac{9}{16}$ "	No. 8
$\frac{1}{8}$ " to $\frac{1}{2}$ " by 32ds	$\frac{1}{2}$ "	$1\frac{3}{4}$ "	No. 2 and Channel Punch
$\frac{1}{8}$ " to $\frac{1}{4}$ " by 32ds	$\frac{7}{8}$ "	$1\frac{3}{4}$ "	No. 8 Imperial
$\frac{1}{8}$ " to $\frac{3}{8}$ " by 32ds	$\frac{7}{8}$ "	$1\frac{13}{16}$ "	No. 6 (Skylight)
$\frac{1}{8}$ " to $\frac{11}{16}$ " by 32ds	1 "	$2\frac{1}{8}$ "	No. 1

For Ball Bearing Machines

A	B	C	D	Used With
$\frac{1}{8}$ " to $\frac{1}{2}$ " by 32ds	$\frac{1}{2}$ "	$\frac{3}{8}$ "	$1\frac{3}{8}$ "	Nos. 10, 11, 12, 14, and 15
$\frac{1}{8}$ " to $\frac{11}{16}$ " by 32ds	$\frac{11}{16}$ "	$\frac{7}{8}$ "	$1\frac{3}{4}$ "	Nos. 20, 24, 25 and 40A
$\frac{3}{8}$ " to $\frac{13}{16}$ " by 32ds	1 "	$1\frac{5}{8}$ "	$2\frac{5}{8}$ "	Nos. 40 and 40B
$\frac{3}{8}$ " to 1 " by 32ds	1 "	$1\frac{5}{8}$ "	$2\frac{3}{8}$ "	Nos. 40 and 40B

Plain Dies (Not Threaded)

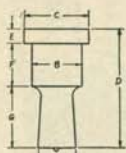
A	B	C	Used With
$\frac{1}{8}$ " to $\frac{1}{2}$ " by 32ds	$1\frac{1}{8}$ "	$1\frac{3}{8}$ "	Nos. 10, 11, 12, 14 and 15
$\frac{1}{8}$ " to $\frac{11}{16}$ " by 32ds	$1\frac{1}{4}$ "	$2\frac{1}{8}$ "	Nos. 20, 24, 25, 40A and 16
$\frac{3}{8}$ " to 1 " by 32ds	$2\frac{1}{8}$ "	$1\frac{3}{8}$ "	Nos. 40 and 40B



¹ The punches and dies for the Whitney Ball Bearing Hand Punches are interchangeable on two or more sizes of machines as indicated in the table above. It is possible to supply light riveting dies for these tools, but it is impractical to attempt to use square, oval, or rectangular punches and dies owing to the rotary action of the machines.

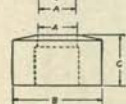
PUNCHES AND DIES FOR CAST STEEL HAND SCREW PUNCHES

Punch Dimensions



Size Machine	A	B	C	D	E	F	G
No. 00 or A & No. 0 or B	$\frac{5}{16}$ - $\frac{11}{16}$	$\frac{5}{8}$	1	$1\frac{11}{16}$	$\frac{9}{16}$	$2\frac{3}{8}$	$\frac{7}{8}$
No. 1 or C & No. 2 or D	$\frac{3}{4}$ - $\frac{15}{16}$	$\frac{7}{8}$	$1\frac{1}{8}$	$2\frac{3}{8}$	$\frac{9}{16}$	$\frac{7}{8}$	$1\frac{1}{16}$
No. 3 or E & No. 4 or G	$\frac{3}{4}$ - $\frac{15}{16}$	$1\frac{1}{8}$	$1\frac{5}{8}$	$2\frac{3}{8}$	$\frac{9}{16}$	$\frac{7}{8}$	$1\frac{1}{16}$

Die Dimensions



Size Machine	A	B	C
No. 100 or A & No. 0 or B	$\frac{3}{16}$ - $\frac{3}{8}$	$1\frac{1}{8}$	$\frac{3}{4}$
No. 1 or C & No. 2 or D	$\frac{3}{4}$ - $\frac{7}{8}$	$1\frac{5}{8}$	$\frac{7}{8}$
No. 3 or E & No. 4 or G	$\frac{3}{4}$ - 1	$1\frac{5}{8}$	$\frac{7}{8}$

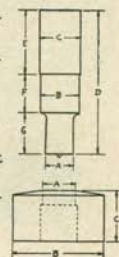
PUNCHES AND DIES FOR FORGED STEEL HAND SCREW PUNCHES

Punch Dimensions

Size Machine	A	B	C	D	E	F	G
No. 0	$\frac{3}{8}$ - $\frac{3}{8}$	$\frac{7}{8}$	$1\frac{9}{16}$	$1\frac{17}{16}$	$\frac{3}{4}$	$1\frac{9}{16}$	$\frac{11}{16}$
No. 1	$\frac{3}{4}$ - $\frac{15}{16}$	$1\frac{1}{8}$	$1\frac{11}{16}$	$2\frac{1}{2}$	$1\frac{3}{8}$	$2\frac{1}{8}$	$2\frac{1}{8}$
No. 2	$\frac{3}{8}$ - $\frac{3}{4}$	$1\frac{1}{8}$	$1\frac{5}{8}$	$3\frac{3}{4}$	$1\frac{1}{2}$	$2\frac{1}{8}$	$2\frac{1}{8}$
Nos. 3 and 4	$\frac{3}{8}$ - $\frac{15}{16}$	$1\frac{1}{8}$	$1\frac{9}{16}$	$3\frac{3}{8}$	$1\frac{1}{2}$	$2\frac{1}{8}$	$1\frac{3}{4}$

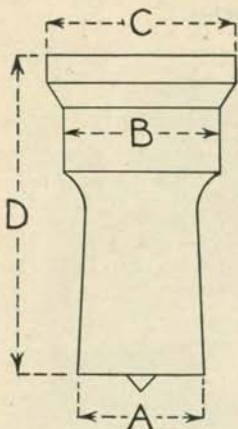
Die Dimensions

Size Machine	A	B	C
No. 0	$\frac{3}{8}$ - $\frac{3}{8}$	$\frac{7}{8}$	$1\frac{1}{16}$
No. 1	$\frac{3}{4}$ - $\frac{15}{16}$	$1\frac{3}{8}$	$\frac{7}{8}$
No. 2	$\frac{3}{8}$ - $\frac{3}{4}$	$1\frac{3}{8}$	1
Nos. 3 and 4	$\frac{3}{8}$ - $\frac{15}{16}$	$1\frac{3}{8}$	$1\frac{1}{16}$



PUNCHES

H. & J. (or P. & W.) Standard



On all standards, diameter A (size of hole to be punched) cannot exceed diameter B except by a very small amount, or the punch will not enter the coupling nut.

No. of Punch	DIMENSIONS, Ins.			
	A	B	C	D
2	1/8 to 3/8	3/4	3/4	1 1/8
3	1/8 to 3/8	3/4	3/4	1 1/8
4	1/4 to 1/2	1 1/8	1 1/8	1 1/2
5	3/8 to 1 1/8	1 3/8	1 3/8	1 9/8
6	1/2 to 1 1/4	1 3/4	1 3/4	2 1/8
7	5/8 to 1 3/4	1 3/4	1 3/4	2 1/8
8	3/4 to 1 3/4	1 3/4	1 3/4	3
9	1 1/8 to 2 1/4	2 1/4	2 1/4	3
10	1 1/2 to 2 3/8	2 1/2	2 1/2	3

Cleveland Standard

1	1/8 to 3/8	3/4	3/4	2 1/8
2	3/8 to 3/4	3/4	1	2 1/8
3	3/8 to 1 1/8	1 1/8	1 1/4	2 1/8
4	1/2 to 1 1/8	1 1/8	1 1/4	2 1/8
5	3/8 to 1 1/8	1 1/8	1 3/8	2 5/8
6	3/8 to 2 1/8	2 1/8	2 1/4	2 5/8
7	1 1/8 to 2 3/8	2 3/8	2 3/8	3 3/8

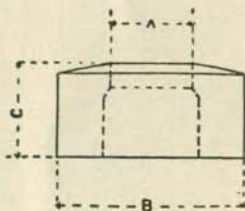
U. S. (or Richards) Standard

0	3/8 to 1 1/8	1 1/8	3/4	1 1/4
1	3/8 to 3/4	3/4	3/4	1 1/4
2	3/8 to 3/4	3/4	1	1 1/4
3	3/8 to 1 1/8	1 1/8	1 1/4	1 5/8
3S	3/8 to 3/4	3/4	1	1 7/8
4	3/8 to 1 1/8	1 1/8	1 1/4	2 1/4
4S	3/8 to 1 1/8	1 1/8	1 1/4	2 1/4
5	3/8 to 1 1/8	1 1/8	1 3/8	2 5/8
5S	3/8 to 1 1/8	1 1/8	1 3/8	2 5/8

DIES

H. & J. (or P. & W.) Standard

No. of Die	DIMENSIONS, Ins.		
	A	B	C
2	1/8 to 3/8	3/4	5/8
3	1/8 to 3/8	1	3/4
4	1/4 to 1/2	1 1/8	1
4-W	1/4 to 1 1/8	1 1/8	1 1/8
4-C	1/4 to 1 1/8	1 1/8	1 1/8
5	1/4 to 1 1/8	2	1
5-C	1/4 to 1 1/8	2	1 1/8
5-W	1/2 to 1 3/8	2 3/8	1 1/4
6	1/2 to 1 3/8	2 3/8	1 1/4
6-W	1/2 to 1 1/8	2 1/8	1 1/2
7	3/4 to 1 3/8	2 3/8	1 3/4
7-W	3/4 to 1 1/8	2 3/8	1 3/4



Cleveland Standard

No. of Die	DIMENSIONS, Ins.		
	A	B	C
00000	1/8 to 3/8	3/4	7/8
0000	1/8 to 3/8	1	7/8
000	1/4 to 1/2	1 1/4	7/8
00	1/4 to 1/2	1 1/2	7/8
0	1/4 to 1 1/8	1 1/8	1 1/2
1	1/4 to 1 1/8	2	1 1/8
2	3/8 to 1 1/8	2 1/2	1 1/4
3	3/8 to 2	3	1 1/4
4	1 1/8 to 3	4	1 1/4
5	2 to 4 3/4	6	1 5/8
6	2 to 6	8	1 5/8

U. S. (or Richards) Standard

No. of Die	DIMENSIONS, Ins.		
	A	B	C
1	1/8 to 3/8	1 1/4	3/4
2	1/4 to 7/8	1 3/8	7/8
3	1/4 to 1 1/8	2	1
5	3/8 to 1 1/8	2 3/8	1 1/8
7	1/2 to 2 3/8	3 3/8	1 1/4
9	2 to 3 1/2	5 1/8	1 3/8
10	3 to 4 3/8	6 3/8	1 1/2

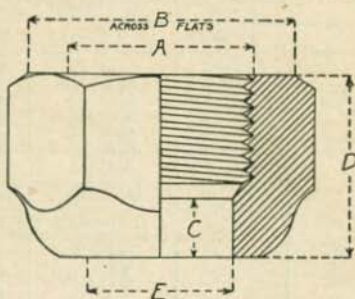
All dies are counterbored from the bottom to allow the slugs to drop through, hence the hole is larger in diameter at the bottom of the die than at A.

Punches furnished in exact sizes unless otherwise specified. For punching holes for rivets or bolts, order 1/8" oversize for sizes under 1/2", and 1/16" oversize for sizes 1/2" and larger. For punches under 1/2", dies will have hole (A) 1/8" larger than punch size, and for punches 1/2" and larger, hole will be 1/16" larger than punch size. Dies with these standard clearances furnished unless otherwise specified.

If punches or dies required do not conform to dimensions of any standard, give us dimensions A, B, C, etc., and we can fill your order.

Order PUNCHES by exact size of hole to be punched. Order DIES according to punch size. Order both PUNCHES and DIES by NUMBER and STANDARD—Thus: 12 only 5/8" Punches No. 4 H. & J., and 6 only 3/8" Dies No. 5 H. & J.

COUPLING NUTS For Standard Punches



H. & J. (or P. & W.) Standard

No. of Coupling	Threads per Inch	DIMENSIONS, Ins.				
		A	B	C	D	E
2	12	$\frac{1}{2}$	$1\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{8}$
3	12	$\frac{7}{8}$	$1\frac{1}{2}$	$\frac{3}{8}$	$1\frac{1}{8}$	$\frac{5}{8}$
4	12	$1\frac{1}{8}$	$1\frac{3}{4}$	$\frac{3}{8}$	$1\frac{3}{8}$	$\frac{5}{8}$
5	12	$1\frac{3}{8}$	2	$\frac{3}{8}$	$1\frac{3}{4}$	$1\frac{1}{8}$
6	12	$1\frac{3}{8}$	$2\frac{1}{4}$	$\frac{3}{8}$	$1\frac{3}{2}$	$1\frac{1}{4}$
7	12	$1\frac{7}{8}$	$2\frac{1}{2}$	$\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{1}{8}$
8	12	$2\frac{1}{4}$	3	$\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{1}{8}$
9	12	$2\frac{3}{4}$	$3\frac{3}{4}$	$\frac{3}{8}$	$1\frac{3}{8}$	$2\frac{1}{8}$
10	8	$3\frac{1}{4}$	$4\frac{3}{4}$	$\frac{3}{8}$	$2\frac{3}{8}$	$2\frac{1}{8}$
11	8	$3\frac{7}{8}$	5	$\frac{3}{8}$	$2\frac{3}{8}$	$3\frac{1}{8}$
12	6	$4\frac{7}{8}$	$6\frac{1}{8}$	$\frac{3}{8}$	$2\frac{3}{4}$	$4\frac{1}{8}$

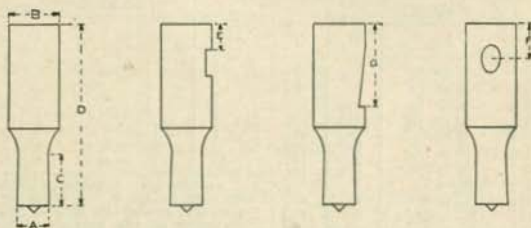
Cleveland Standard

1	10	$1\frac{1}{8}$	$1\frac{3}{4}$	$\frac{3}{8}$	$1\frac{3}{8}$	$\frac{1}{2}$
2	10	$1\frac{3}{8}$	2	$\frac{3}{8}$	$1\frac{3}{8}$	$\frac{1}{2}$
3S	10	$1\frac{3}{8}$	$2\frac{1}{2}$	$\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{1}{8}$
3	10	2	$2\frac{1}{2}$	$\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{1}{8}$
4	10	2	$2\frac{1}{2}$	$\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{1}{8}$
5	10	$2\frac{5}{8}$	$3\frac{1}{2}$	$\frac{3}{8}$	$2\frac{1}{8}$	$1\frac{1}{8}$
6	10	$2\frac{5}{8}$	$3\frac{1}{2}$	$\frac{3}{8}$	$2\frac{1}{8}$	$2\frac{1}{8}$
7	10	3	4	$\frac{3}{8}$	$2\frac{3}{8}$	$2\frac{1}{8}$

U. S. (or Richards) Standard

0	14	$\frac{1}{2}$	$1\frac{1}{8}$	$\frac{1}{4}$	$1\frac{1}{8}$	$\frac{1}{2}$
1	12	$\frac{7}{8}$	$1\frac{3}{8}$	$\frac{3}{8}$	$1\frac{1}{8}$	$\frac{1}{2}$
2	10	$1\frac{1}{8}$	$1\frac{3}{4}$	$\frac{3}{8}$	$1\frac{1}{8}$	$\frac{1}{2}$
3	10	$1\frac{1}{8}$	2	$\frac{3}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$
4	10	$1\frac{1}{8}$	$2\frac{1}{8}$	$\frac{3}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$
5	10	2	$2\frac{3}{4}$	$\frac{3}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$

STRAIGHT SHANK PUNCHES



This style of punch is largely used in hand lever and bench punches, and also in gang punch presses where the short distances between the holes prohibit the use of the regular styles.

Because of the variety of combinations in sizes of shank diameter and length overall, it is impractical to carry a complete stock of this style punch. Prompt shipment however can be made on $\frac{1}{8}$ " diameter by $2\frac{3}{4}$ ", straight shank punches in sizes of $\frac{1}{8}$ " to $\frac{3}{16}$ " by 32nds. These have a set screw spot as shown above by letter G.

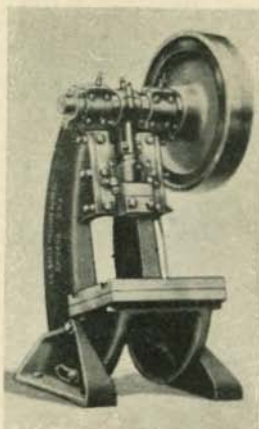
Other sizes and styles can be furnished, but must be made up to the users specifications, and take special prices.

In ordering—state exact size of hole to be punched, diameter and length of punch, also style of set-screw spot desired, if any; or send sketch giving complete data.

For Net Prices See Supplement

VERSON BENCH PRESSES

Open Back



No. 1 Press

These Bench Presses are adapted to a wide variety of operations in blanking, forming, bending, and will handle much light foot press work with a saving of time.

The workmanship and material is high grade in every respect, and as they are built on a production basis, perfect interchangeability of parts is assured.

The clutch is made of tool steel, properly hardened and tempered for long wear, and is of an improved non-repeat safety type. By removing one screw the safety device can be disengaged where it is desirable to have the press repeat.

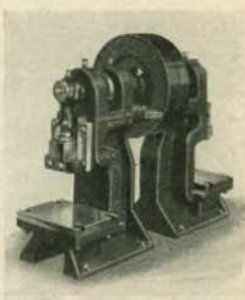
All three sizes are of open back style, Nos. 0 and 1 being inclinable while No. 00 is non-inclinable. The No. 1 is furnished with a ball and socket connection between the connecting rod and the slide. It also has an automatic cross bar knock-out in the slide.

Solid Back

The No. 1 B press is also adapted to a wide range of heavy punching, blanking, trimming, forming, and bending, and is designed for strength, compactness, and rigidity. Its large die space and deep throat permits the handling of a great variety of work ordinarily requiring a larger machine.

It is equipped with non-repeat safety clutch and can be used as a single unit or with two doubled up back to back as shown in the illustration. When arranged in this manner the two presses can be driven by a single belt giving each press the advantage of the weight of two fly wheels at a saving of considerable floor space.

While dies are not regularly included with any of these presses, they can be furnished at an extra charge if required. Price of these dies will be quoted upon receipt of a detailed drawing of work or a sample of it.



No. 1B Press

General Specifications

	No. 00	No. 0	No. 1	No. 1 B
Capacity, about.....	1½ tons	2½ tons	5 tons	7½ tons
Standard Stroke of Slide.....	7½"	11"	13½"	13½"
Maximum Stroke of Slide.....	11½"	2"	2½"	2½"
Adjustment of Slide.....	1"	1"	2"	2"
Bolster to Slide Stroke Down Adj. Up..	3½"	5"	6"	5½"
Area, Top of Bolster.....	5½x7" Bed	6x8"	8x12"	13x10"
Thickness of Bolster.....	3½"	3½"	1½"	1½"
Recess for Punch Stem.....	3½"	1"	1½"	1½"
Width of Opening through Back.....	3½"	4"	5"	.....
Height, Bed to Center of Shaft.....	12½"	15½"	19½"	19"
Height Bench and Bed.....	2½"	5½"	8"	7"
Depth of Throat from Center of Slide.	2½"	2½"	4"	6½"
Opening in Bed.....	1¾" Round	3x3½"	5½x4"	5½x4"
Bench Space FB-RL.....	12x10"	12x12"	16x17"	20x13"
Weight of Fly Wheel.....	25 lbs	50 lbs.	100 lbs.	150 lbs.
Diameter of Fly Wheel.....	10"	12"	16"	20"
Diameter of Crank Pin.....	1½"	1½"	1½"	1½"
Diameter of Shaft Bearings.....	2"	2½"	1¾"	3½"
Face of Fly Wheel.....	2"	2½"	2½"	3½"
Speed of Fly Wheel, R.P.M.....	250	175	150	150 lbs.
Weight complete.....	125 lbs.	190 lbs.	400 lbs.	650 lbs.

Tables and Legs suitable for mounting above presses can be furnished if desired.

For Net Prices See Supplement

GREENERD ARBOR PRESSES



No. 2 on Stand



No. 3 on Lathe



No. 3 1/2 on Post

Arbor Press No. 2

In specialized manufacturing it is desirable to have a press of the right size and power. Job shops can use large presses for all kinds of work, but constant repetition of the same size work calls for a press to suit the case for maximum efficiency. Arbor Press No. 2 is particularly advantageous in the manufacture of small products. See specifications below.

Arbor Press No. 3

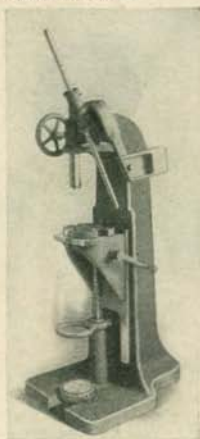
This is the press commonly used for 14 to 16 inch lathes driving arbors up to 1 1/2 inches in diameter. It is as indispensable to a lathe doing arbor work as a vise is to a bench. The time saved in going to a press some distance away will soon pay for this additional machine. The leverage is 45 to 1, so that one man can easily exert 5,000 to 6,000 lbs. pressure. See specifications below.

Arbor Press No. 3 1/2

This size and all larger presses have a ratchet and pawl between the lever and pinion; by this means the lever may be used where most advantageous. The weight returns the lever to an upright position and holds it there against a stop. While in this position, the pawl is shed from the ratchet and the ram is free to be moved up or down by the hand wheel. The lever can be lengthened or shortened.

Arbor Press No. 4

The No. 4 press has an adjustable knee tongued into the planed surface on the frame. Two studs with nuts hold the knee against the frame, and a square threaded course pitch of the screw is such that the knee will not "run down" under pressure. The babbitted cushion bolted to the base under the ram protects the mandrel when falling; the retaining ring holds the mandrel or shaft from falling lengthwise.



No. 4

No. 4F is similar to No. 4 but is 79 inches high and weighs 1350 lbs.

No. 5 press has the same frame and knee construction as No. 4, but the leverage is considerably greater, being 150 to 1 accomplished by gearing. Power is applied through two pinions which engage the rack. All gears are heat-treated and those bearing the greatest strain are made of Chrome Vanadium Steel.

The No. 7 is a heavy, powerful press of the same design as No. 5. With this press one man is able to exert 20 tons pressure, two men, 35 tons.

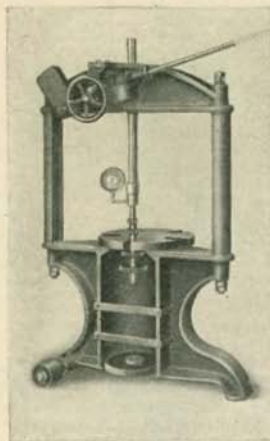
General Specifications

No.	Receives Diam. Inches	Largest Mandrel Inches	Ht. over Plate Inches	Size of Rack or Ram	Move. of Rack or Ram In.	Leverage	Pressure-Tonnage	Ht. Inches	Wt. Lbs.
2	8	1	7 1/4	12x1 11/16	8	35-1		16	80
3	12	1 1/2	11	17x1 3/4	11 1/4	45-1		22	140
3A	24	1 1/2	11	17x1 3/4	11 1/4	45-1		24	235
3 1/2	18	3	15	19x2 1/2	14	55-1	3 3/4	28	380
3 3/4	22	3	20 1/2	24x2 1/2	19	55-1	3 3/4	36	480
4	18	3	30	22x2 1/2	16 3/4	60-1	4	60	1000
4F	18	3	39	22x2 1/2	16 3/4	60-1	4	79	1350
5	26	4	30	24x2 7/8	15 1/2	150-1	12	66	1550
7	36	5	34	32x3 7/8	20	250-1	20	76	2800

Stands can be furnished for Nos. 2, 3, 3A, 3 1/2, and 3 3/4 presses.

For Net Prices See Supplement

GREENERD ARBOR PRESSES



No. 15

All Greenerd arbor presses can be used for pressing arbors or mandrels, broaching, assembly, punching, bending with dies and a great many other purposes.

The pressure in every machine is applied in line with the resistance.

The frame is made of semi-steel cast iron, and Low Carbon steel. The rack is made of special alloy steel and is heat-treated in the bar; pinions are also of alloy steel and ground. Specially made stub gear teeth have an angular clearance of $22\frac{1}{2}$ degrees.

Nos. 14 and 15

The design of the No. 15 is plainly shown in the accompanying illustration. The gearing is the same as that used on the No. 5, shown on the opposite page, with two pinions engaging the rack.

No. 14 is of the same design but somewhat lighter. The gearing is the same as that used on the No. 4, but with one pinion engaging the rack.

Pressure obtained by one man with the No. 14 is 3 to 4 tons while with No. 15 one man can obtain 10 to 12 tons pressure.

The dimensions are common to both presses; Floor to top of plate 28 inches; distance between uprights 36 inches; opening under plate $12\frac{1}{2}$ inches; height over slotted plate $27\frac{1}{2}$ inches. See other specifications below.

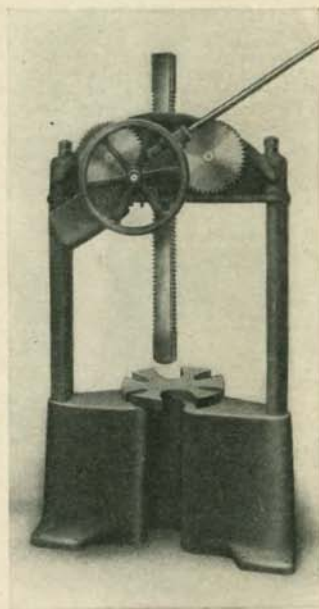
Presses Nos. 8 and 9

The Nos. 8 or 9 Greenerd press is considered an improvement over the method heretofore used in forcing pins and bushings, as it does away with the necessity of all rigging where the hydraulic press is used.

Both Nos. 8 and 9 have the same leverage, thus giving the same pressure. With one man operating either press a pressure of 20 to 25 tons can be obtained; two men can exert a pressure of 35 to 40 tons.

The nature of the work this type of press is intended for, is often very severe and taxing to the construction of the machine, but being made of the best material, and well constructed, these presses are capable of withstanding the hardest kind of service.

The only difference between these two presses is in the distance between the uprights; No. 8 is 36 inches, No. 9 is 48 inches. The height over plate as usually furnished is 35 inches, although this may be changed to suit requirements at small cost. The opening under the plate is 7 inches, height of base 24 inches. The rack or ram is approximately $4 \times 4 \times 54$ inches long. The form of gear teeth is the same as with the smaller presses. For other specifications see table below.



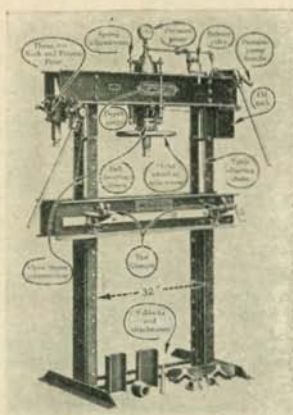
No. 8

General Specifications

No.	Receives Diameter Inches	Largest Mandrel Inches	Hgt. Over Plate Inches	Size of Ram or Rack, Inches	Movement of Rack or Ram, Ins.	Leverage Ratio	Tonnage	Hgt. Inches	Weight Lbs.
14	36	3	27	$34 \times 2\frac{1}{2}$	$25\frac{3}{4}$	60-1	4	65	1175
15	36	4	27	$34 \times 2\frac{1}{2}$	$25\frac{3}{4}$	150-1	6	66	1300
8	36	7	35	$56 \times 4 \times 4$	35	250-1	25	76	2450
9	48	7	35	$56 \times 4 \times 4$	35	250-1	25	78	2800

For Net Prices See Supplement

MANLEY HYDRAULIC PRESSES



40 Ton Press, No. 28-49

The main frame is made of steel and is bolted to give a high degree of durability and rigidity. The clearance between the uprights is sufficient for all garage work and the sides are open so work may be placed centrally between the frames and not on angle. See illustration below.

The hand wheel and contact screw are suspended on ball bearings; by spinning the wheel the nose is brought into contact with the work before applying the pressure and by spinning the wheel in the reverse direction the nose may be quickly raised from the work after the release valve has been opened.

When the desired pressure has been obtained it is only necessary to open the release valve and the pressure is released instantly, the plunger going back into position automatically.

Each press is provided with a winch and chain operated table, which can be raised or lowered by one operator in a few seconds.

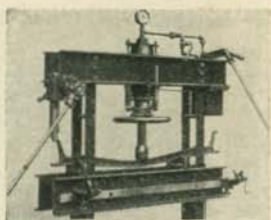
The vertical rod at the front of the ram is notched one inch apart and used as a depth gauge when pressing bushings into bearings, etc. A pressure gauge is furnished which shows, in tons, the force exerted on the work. The Manley test centers applied directly to the Manley Press is an efficient device for testing for accuracy on all straightening work.

Three capacities of presses are available—30, 40, 60 tons.

The hydraulic press is used universally where very heavy pressures are needed. The garage and the machine shop have frequent use for presses of this kind for bending, straightening, pressing and other work. The hydraulic principle insures easy pressure application, instant release, and a great reduction of frictional loss; power and speed are thus obtained.

This line of presses embodies all the characteristics of the best hydraulic machines. Though massive and powerful they have all the features of the lighter presses adaptable to light or very heavy work. The 60 ton size has two pumps, one for fast and moderately heavy pressure and one for heavy work.

Much of the press work in automobile repairing is in light jobs such as small bushings where only a few tons of pressure is required. The rack and pinion press with 12" stroke which is suitable for such work is a separate and distinct unit from the power press and may be included or omitted as desired. This unit allows two men to work at the same time on two separate jobs without interfering with each other. The leverage is 44 to 1, the capacity is 3 tons.



Open Frame Permits Long Work to Be Located Centrally

General Specifications

No.	9	8	6-A
Capacity, tons	30	40	60
Height overall, Ins.	77½	82½	84
Size of Table Channels, Ins.	6	8	12
Size of Upper Channel, Ins.	6	7	10
Travel of Table, Ins.	35½	36½	29½
Travel of Piston, Ins.	7	7	6
Travel of Screw, Ins.	7	6½	7
Width between Frames, Ins.	27	32	42
Width between Table Channels, Ins.	5½	6½	8½
Floor space occupied, Ins.	30x47½	30x52½	36x63
Weight, lbs.	543	684	1259

Presses with Attachments

Capacity	30 Tons		40 Tons		60 Tons	
	No.	Wt. Lbs.	No.	Wt. Lbs.	No.	Wt. Lbs.
Hydraulic Press with gauge	9	543	8	684	6-A	1261
Press with Rack and Pinion Attachment	29	592	28	735	26A	1324
Press with Rack and Pinion and Test Centers	29-49	624	28-49	767	26A-49	1356

For Net Prices See Supplement

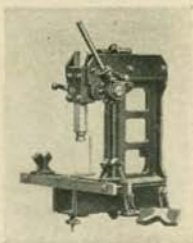
MANLEY PRESSES

Rack and Pinion Type

This three-ton rack and pinion press is widely used for straightening jobs in the machine shop, pattern shop in the garage for straightening the smaller crank shafts, cam shafts, etc., and also in electrical work. The 5-inch gap in the table allows a complete armature to be placed under the ram, and it is therefore ideal for this kind of work. The sensitive pressure possible only with the rack and pinion method is almost essential for light, delicate work.

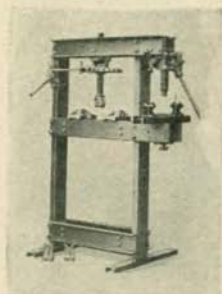
The rack has coarse pitched teeth and the pinion is high carbon steel. The handle is also steel and 30 inches long. A V block is furnished which automatically adjusts itself to all sizes of arbors, hubs and bushings. Clearance under the ram is 13 inches; travel of ram is 12 inches. A straightening attachment as shown in illustration can be furnished at an additional charge.

No. 12 press without straightening attachment weighs 200 lbs. Attachment weighs 25 lbs.



No. 12 with Attachment

20-Ton Screw Press



No. 23-35-38

This press with the attachments as shown make a very efficient and sturdy machine for the lighter press work. It is built on the unit principle; the rack and pinion press and straightening device may be added at any time if not purchased with the press. The independent arbor press is indispensable for starter and generator work and other work requiring sensitive operation.

The double table saves time and labor on axles and shafts, etc., as it eliminates lowering and raising. The ball-bearing hand wheel spins the nose down to or up from its work. Speed and power may be easily adjusted according to the job.

No. 3 Plain press without lower table.....	325 lbs.
23 With Rack and Pinion attached but without lower table.....	375 lbs.
38 Crank Shaft straightening attachment	25 lbs.
35 Extra lower table.....	54 lbs.
34 Rack and Pinion attachment.....	45 lbs.

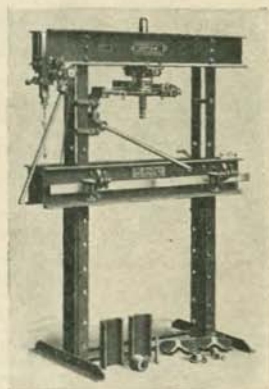
35-Ton Screw Press

This press is similar to the 20-ton press as shown above, but is of heavier construction throughout, has winch-operated table and is adapted for work up to 35 tons capacity. It has the open side construction to permit the handling of long work such as axles and shafts, etc.

The hand wheel is counterweighted so as to spin easily, while the table is winch operated similar to the hydraulic press.

There are five speeds and leverages instead of four and in order to change from one leverage to another, it is only necessary to slide the retaining collar forward, lift the connecting link and drop the pin in different holes; this is done very quickly. This press is capable of doing fast and accurate work.

No. 2 Straight-side 35-ton Screw Press	624 lbs.
22 Press with Rack and Pinion Attachment.....	673 lbs.
22-49 Press with Rack and Pinion Test Centers.....	705 lbs.
20-B Rack and Pinion Attachment only.....	49 lbs.
49 Test Centers.....	32 lbs.

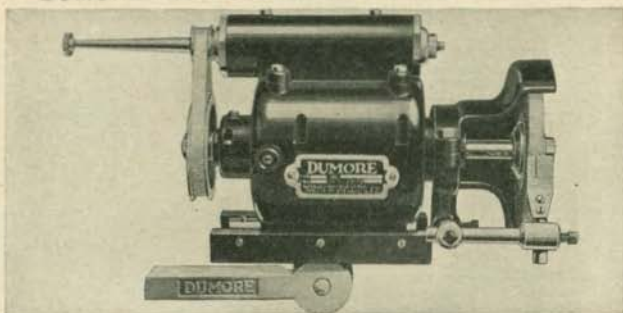


No. 22-49

IMMEDIATE STEEL

For more than 84 years Ryerson has been meeting the steel requirements of industry, with immediate shipment of steel products of all kinds. Bars, shapes, plates, sheets, bolts and nuts, rivets, etc., are carried in stock at all plants.

DUMORE HIGH SPEED TOOL POST GRINDERS



Size 2-AG

Dumore Grinders embody many features of superiority which are responsible for their popularity. To eliminate vibration and to insure maximum accuracy the motor armature is dynamically balanced and mounted in self-aligning ball bearings, with no possibility of end or side play. On sizes No. 2-AG and No. 2-CG, the secondary spindle for internal grinding is mounted in ball bearings having an adjustment for end thrust.

These are high speed grinders—all sizes operate at the proper speed to provide the correct peripheral of surface speed for the grinding wheel enabling the wheel to clear itself, increasing the life of the wheel, and insuring smooth accurate work free from all chatter marks.

Six sizes or types provide a Dumore Tool Post Grinder for every need. They can be set up for use in a lathe, milling machine or shaper in a few minutes, and are ready for work simply by attaching to an ordinary lamp socket.

Furnished with universal Motor for either 110 or 220 volts. Be sure to state voltage in ordering.

The Base shown in the illustration to the right is regularly included in the Nos. 2-AG, 20-G, 2-BG and 2-CG grinders and they can be set in it and used as small bench grinders when not otherwise in use.



Size No. 2-AG For General Tool Room Use

Size No. 2-AG is equipped with a $\frac{1}{8}$ H. P. Motor. Speed of motor spindle—10,000 R. P. M. Speed of internal spindle—30,000 R. P. M. Reach of motor spindle— $2\frac{1}{2}$ ". Reach of internal spindle—3". Length of cross-travel— $2\frac{1}{2}$ ". Bearings—Selected, concentric ball bearings. Equipment—Complete with set of seven grinding wheels, canvas belt, wheel guard and cutter grinding attachment, cross-feed lever, base, steel carrying case, 10 ft. cord, switch and plug. Net weight—15 $\frac{1}{2}$ lbs. Shipping weight—30 lbs.

Size No. 2-OG For Center and External Grinding Only



This grinder is the same as Size No. 2-AG, except that the secondary or internal grinding spindle is omitted.

Motor— $\frac{1}{8}$ H. P. Speed—10,000 R. P. M. Reach of motor spindle— $2\frac{1}{2}$ ". Length of cross-travel— $2\frac{1}{2}$ ". Bearings—Self-aligning ball-bearings. Equipment—Complete with set of two emery wheels, $2\frac{1}{2}$ " and 4" diam., wheel-guard and cutter-grinding attachment, cross-feed lever, base, steel carrying case, cord, switch and plug. Net weight—12 $\frac{1}{2}$ lbs. Shipping weight—28 lbs.

Size No. 2-BG For Deep Internal Grinding

Size No. 2-BG is the same as Size No. 2-OG, except that it has an extension arm.

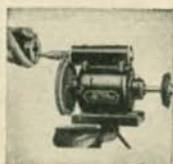
Motor— $\frac{1}{8}$ H. P. Speed—10,000 R. P. M. Reach of extension arm—10". Length of cross-travel— $2\frac{1}{2}$ ". Bearings—Self-aligning ball-bearings. Equipment—Complete with set of two emery wheels, $2\frac{1}{2}$ " and 4" diam., wheel-guard and cutter-grinding attachment, cross-feed lever, base, cord, switch and plug. Net weight—18 lbs. Shipping weight—29 lbs.



Size No. 2-CG For Grinding Button Dies

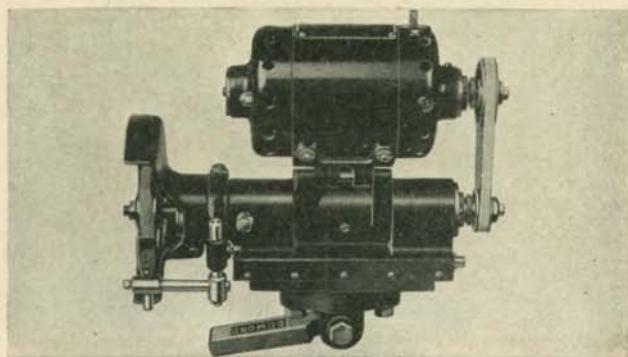
This grinder is the same as Size No. 2-AG, but has special high speed secondary spindle.

Motor— $\frac{1}{8}$ H. P. Speed of motor spindle—10,000 R. P. M. Speed of attachment spindle—50,000 R. P. M. Reach of motor spindle— $2\frac{1}{2}$ ". Length of cross-travel— $2\frac{1}{2}$ ". Bearings—Self-aligning ball-bearings. Equipment—Complete with special balanced spring chuck and two $\frac{3}{8}$ " round emery pencils, set of two emery wheels, $2\frac{1}{2}$ " and 4" diam., wheel guard and cutter grinding attachment, cross-feed lever, base, steel carrying case, cord, switch and plug. Net weight—15 $\frac{1}{2}$ lbs. Shipping weight—30 lbs.



For Net Prices See Supplement

DUMORE HIGH SPEED TOOL POST GRINDERS



Size No. 3—Multi Speed Grinder
(A Spindle and Speed for Every Need)

A portable tool post grinder with complete equipment for every grinding requirement—unequalled for tool-room work as well as for production grinding where accuracy within close limits is demanded. The combination of interchangeable-spindles and quick-change pulleys provides the correct speed for any job.

Spindles made of tool steel and mounted in selected, adjustable, dust-proof ball-bearings. Vibration eliminated by dynamically balanced armature, and motor mounted on rubber insulators. Motor swivels to five angles, providing easy access of spindle to difficult grinding positions.

Motor— $\frac{1}{4}$ H. P. Spindle speeds—3,600 to 50,000 R. P. M. Length of cross travel— $5\frac{1}{2}$ ". Equipment—complete with twelve emery grinding wheels from $\frac{1}{4}$ " to 5" diameter, two $\frac{3}{8}$ " round emery pencils, four extension spindles for internal grinding, wheel arbor with two sets of wheel collars, wheel arbor with special chuck and extension spindle for emery pencils, wheel guard and cutter grinding rest, cross-feed lever, four endless canvas belts, two tool post shanks, cord, switch and plug, and steel carrying case for wheels and equipment.

Size No. 1-JG—A Small Light Weight Tool Post Grinder

A small inexpensive tool post grinder especially useful in small shops and tool rooms. Built with same care and accuracy as the larger sizes.

Motor— $\frac{1}{8}$ H. P. Speed—15,000 R. P. M. Reach of arm— $4\frac{1}{4}$ ". Reach of extension—2". Bearings—Self-aligning ball bearings. Equipment—complete with set of six grinding wheels, 10 ft. cord, switch and plug. Net weight—8 lbs. Shipping weight—11 lbs.



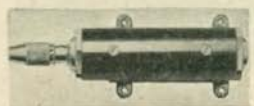
Extra Equipment for Dumore Grinders



Equipment A. Converts No. 2-BG, No. 2-OG, or No. 2-CG grinder into No. 2-AG. Consists of 3" internal spindle, five grinding wheels, canvas belt and pulley. Readily attached or detached.

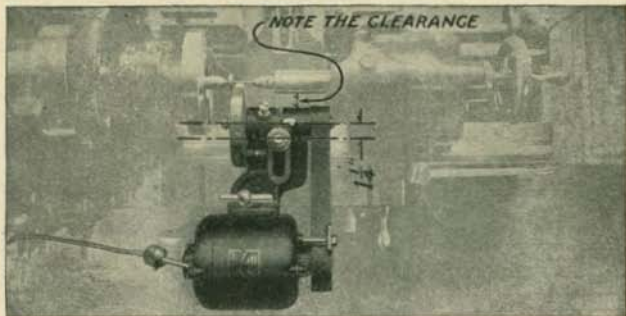


Equipment B. Converts No. 2-AG, No. 2-OG, or No. 2-CG grinder into No. 2-BG. Consists of 10" extension arm with coupling, and two emery wheels, $2\frac{1}{2}$ " and 4" diameter. Readily attached or detached.



Equipment C. Converts No. 2-AG, No. 2-OG, or No. 2-BG grinder into No. 2-CG. Consists of high speed spindle attachment, with spring chuck, pulley, wrench and two $\frac{3}{8}$ " round emery pencils. Readily attached or detached.

GRINDERS



No. 1 Mounted on Lathe

The Gilbert Portable Precision Grinders are built in the following sizes; No. 1, No. 201 Type T. G. and No. 501. The No. 1 is equipped with either a $\frac{1}{4}$ h. p., or $\frac{1}{2}$ h. p. motor, the No. 201 type T. G. with either a $\frac{1}{4}$ h. p., $\frac{1}{2}$ h. p., $\frac{3}{4}$ h. p. or 1 h. p. motor, and the No. 501 with either a 1 h. p., $1\frac{1}{2}$ h. p., 2 h. p., 3 h. p. or 5 h. p. motor. Special attention is given to dynamic balance. Motors are D.C. with any desired voltage, or A. C. of any standard cycle, phase or voltage. The rated speed is therefore always maintained under load conditions.

The grinder is as universal in its application as it is possible for a machine of this kind to be. It is built of the best material by skilled tool makers, and can be mounted on any machine tool. It is capable of grinding external, internal, flat surfaces, or thread grinding; and when mounted on a floor stand, may be equipped with a flexible shaft or discs for disc grinding.



Surface Grinding

The accuracy of the work done depends only upon the skill of the operator and the quality of the machine upon which the grinder is mounted. It is a tool substantially built, and capable of doing real production and precision work.

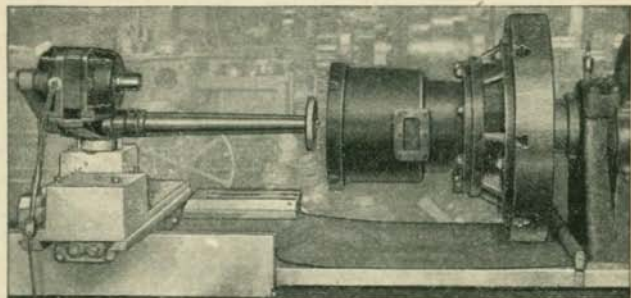
The No. 201 Type T. G. Grinder is especially designed for grinding threads on long taps, lead screws, thread gauges, and all high grade thread grinding where accuracy is an important factor.

The main spindle carries an adjustable sliding spindle for internal grinding and is easily adjustable to any depth within its capacity. These internal spindles are either $\frac{3}{8}$ " in diameter or $\frac{1}{2}$ " in diameter for the No. 1 and the No. 201 Type T. G. Grinder, and $\frac{3}{4}$ " in diameter for the No. 501 Heavy Duty Grinder. Special extensions, which are attached to the main housing, are made for extra deep internal grinding. At-

tachments may be had with the No. 1 to grind to a depth of 15° and with the No. 501 to 36° .

The locking device is arranged to instantly lock the main spindle by simply pressing the knurled stud. The feature has special merit and is embodied in all sizes.

A floor stand on which these grinders may be mounted can be furnished thus making the tool available for disc and tool grinding when not otherwise employed.



Showing Extension Spindle for Internal Grinding

BLACK AND DECKER PORTABLE AND BENCH GRINDERS

Portable Electric Grinders

These grinders embody all the essential characteristics of the Black & Decker Portable Electric Drills, together with best standard practice in grinder design and construction. Built with specially designed motors of the Universal Type, operating both on Direct Current and on Single Phase Alternating Current of any frequency from 25 to 60 cycles.



With the Pistol Grip and Trigger Switch

Excellent for shaping castings and forgings and smoothing rough spots and welds, for cleaning sand from castings, for removing rust and paint, and for all sorts of cleaning and polishing work when used with wire brush wheel or rag buffing wheel. 5" and 6" sizes can be supplied with aerial spring and eyebolt for overhead suspension, at extra charge.

Complete with 15 feet of duplex electric cable with split attachment plug, grinding wheel and wheel guard, except 4" Grinder, which is supplied without wheel guard.

General Specifications

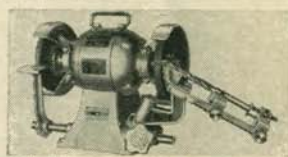
SIZE	4-inch	5-inch	6-inch
Size of Motor, H. P.	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$
Size Grinding Wheel, In.	$4 \times \frac{3}{4} \times \frac{1}{2}$ hole	$5 \times \frac{3}{4} \times \frac{1}{2}$ hole	$6 \times 1 \times \frac{3}{8}$ hole
No Load Speed, R.P.M.	4800	3800	3300
Net Weight, pounds	10	15	24
Length overall, Inches	17	22	$23\frac{1}{4}$
Greatest Diam., Inches	4	5	6
Extension (Gear Case to center of Wheel) Inches	$7\frac{3}{4}$	$8\frac{1}{4}$	9

Furnished for 110, 220, or 250 volts.

Electric Bench Grinders



6-Inch Grinder



With Twist Drill Attachment

These grinders do not have Universal Motors, and current must be specified in ordering. Supplied either for Direct Current or Single Phase Alternating Current of 25, 40, 50 or 60 Cycles.

The 6" size is a substantial two-wheel electric ball bearing bench grinder. It is equipped with a $\frac{1}{2}$ horsepower motor, with the grinding wheels mounted directly on the motor shaft, and is furnished with attachment cord and plug for connection to an ordinary electric lamp socket.

The 8" size is an exceptionally heavy duty grinder, equipped with a sturdy $\frac{1}{2}$ horsepower motor, carrying the grinding wheels directly on the motor shaft. This grinder is provided with improved adjustable tool rests, and can be supplied with pedestal for floor use at an extra charge.

The 6" size may be used to excellent advantage for sharpening twist drills from $\frac{3}{16}$ " to $\frac{5}{8}$ ", when equipped with the Twist Drill Grinding Attachment. This attachment has a micrometer screw feed, and is so designed that no adjustment is necessary for grinding different diameters of drills. Furnished only when so specified, and at an extra charge.

Both sizes have totally enclosed motors to keep out the abrasive dust, and are equipped with ball bearings. Furnished complete as illustrated, with two grinding wheels, one coarse and one fine, two wheel guards, two tool rests and switch mounted in base.

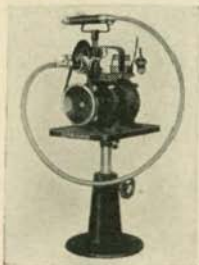
General Specifications

Size of Grinder	6-Inch	8-Inch
Size of Motor, H. P.	$\frac{1}{2}$	$\frac{1}{2}$
Size of Grinding Wheels, Inches	$6 \times \frac{1}{2} \times \frac{1}{2}$ hole	$8 \times \frac{3}{4} \times \frac{3}{8}$ hole
Distance Between Wheels, Inches	$11\frac{1}{2}$	$14\frac{1}{2}$
No Load Speed, R. P. M. at 60 cycles	3600	3600
Net Weight, Pounds	38	87

For Net Prices See Supplement

STRAND FLEXIBLE SHAFT MACHINES

Type M-2



Type M-2

For all kinds of small work this machine is very convenient and reliable. It is regularly mounted on an adjustable column as shown in the illustration. It has a grinding wheel capacity of $2'' \times \frac{1}{4}'' \times \frac{1}{4}''$ and the speeds are 3800, 4500, and 6000 R.P.M.

This type is equipped with a 1-10 H. P. motor, 110 or 220 volts; D. C. or A. C. 60 cycle single phase; a flexible shaft having a core $\frac{3}{16}'' \times 4'$ with an outside diameter of $\frac{1}{2}''$. Regular equipment also includes countershaft, hand grinding spindle, switch, cord, and plug. Extra attachments furnished at extra charge are: Grinding wheels; $\frac{3}{16}''$ drill chucks; scratch brush; buffing wheel; and rotary files.

When ordering, state correct current and voltage desired; motors of different voltage than shown above are subject to special prices. The shipping weight is 65 lbs.

Type MS-4

This flexible shaft machine is mounted on a plain cast iron base as shown in the illustration. It has a greater grinding wheel capacity than the type described above, being $4'' \times \frac{3}{8}'' \times \frac{3}{8}''$. The motor which is $\frac{1}{4}$ H. P. runs by 110 or 220 volts D. C. or A. C. 60 cycle, single phase, giving through the countershaft speeds of 3400, 4500, and 6000 R.P.M. Flexible shaft core is $\frac{5}{16}'' \times 5'$; and outer casing $1\frac{1}{8}''$ in diameter. Other included equipment is: regular and internal grinding spindle, extension cord, switch and plug. It may also be furnished with a 30' stand as well as the following attachments at extra charge: grinding wheels, $\frac{3}{16}''$ drill chuck, cloth buffing wheel, wire scratch brush, scraping burrs, rubber polishing drum, screw-driving attachment, and rotary files. Shipping weight is 65 lbs., with stand.



MS-4 on Base



Type M-5

Type M-5

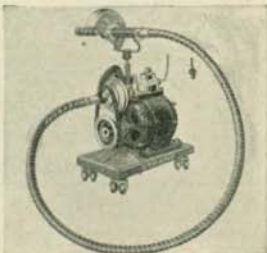
This machine is used extensively for all kinds of external and internal grinding, polishing, drilling, sanding, buffing. It is somewhat heavier than type MS 4, having a grinding wheel capacity of $5'' \times \frac{1}{2}'' \times \frac{3}{8}''$ and a flexible shaft core $\frac{3}{16}'' \times 5'$, casing $\frac{7}{8}''$. It runs at 900, 1800, and 3600 R.P.M. The regular equipment includes a $\frac{1}{4}$ H. P. motor, operating on 110 or 220 volts D. C. or A. C. 60 cycle, single phase; stand; countershaft; flexible shaft; spindle; detachable handle; switch; and extension cord.

The extra attachments are not included in the equipment, but may be secured when ordered at an extra charge. These are grinding wheels, drill chuck, polishing drum, scraping burrs, tool post attachment, wire scratch brush, cloth buffer, surface and screw-driving attachments and rotary files.

Voltage of motor should be specified when ordering; motors of different voltage from that shown above take special prices. Shipping weight is 70 lbs.; with stand, 115 lbs.

Type M-6

This type has a grinding wheel capacity of $6'' \times \frac{3}{4}'' \times \frac{1}{2}''$, a drilling capacity of $\frac{3}{4}''$ and operates at 1,000, 1800, and 3200 R.P.M. The $\frac{1}{2}$ H. P. motor runs on 110 or 220 volts D. C. or A. C. 60 cycle single phase and the flexible shaft core is $\frac{1}{2}'' \times 6'$ with outside casing diameter of 1". It can be mounted on 30' stand or truck as shown on the opposite page or on a portable swivel column. The equipment is similar to the above machines. Attachments are extra. Shipping weight 135 lbs.



Type M-6

STRAND FLEXIBLE SHAFT MACHINES**Alternating Current Type M-7**

This type of machine is made for heavier duty than those shown on the opposite page, having a grinding wheel capacity of $8 \times 1 \frac{1}{2} \times \frac{3}{4}$ " and drilling capacity of $1 \frac{1}{4}$ ". The three speeds of this machine are 1200, 2400, and 2700 R. P. M. The following attachments can be furnished at extra charge: Rotary files, grinding wheels, drill chuck, polishing drum, scraping burrs, tool post attachment, wire scratch brush, cloth buffing wheel, drilling, surfacing, and screw-driving attachments.

It is regularly equipped with wire core shaft $\frac{3}{8} \times 7'$ but $\frac{3}{4}$ " shaft No. 7-A for heavier work can be secured at an additional charge; a 1 H. P. motor operating on 110 or 220 alternating current; a switch; spindle; detachable handle; guard; truck and swivel base. It can also be furnished mounted on caster base as shown on Type M-6. Voltage and current of motor must be specified in order; different voltages than the above are subject to special prices. Shipping weight is 175 lbs., with caster base; with truck, 275 lbs.

**Direct Current Type M-7**

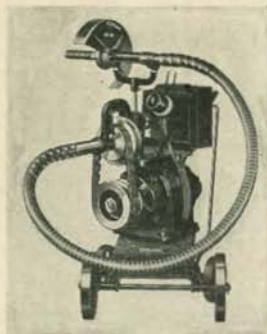
This machine is similar to the above type except that it operates on direct current. It also can be furnished on either caster base or mounted on truck. The shipping weight with caster base is 185 lbs. and 285 lbs. with truck.

Type M-8

This machine is used extensively in foundries for grinding heavy castings and is also recommended for street railway track work for grinding welds, frogs, and switches, and rail drilling when used with the proper attachment. This machine has a grinding wheel capacity of $10 \times 1 \frac{1}{2} \times \frac{3}{4}$ " and has two speeds, 1750 and 2400 R. P. M. The flexible shaft core is $\frac{3}{8} \times 7'$, casing $1 \frac{1}{2}$ " O. D. and the motor is 2 H. P. operating on 220 D. C. or A. C. 60 cycle, 3 phase.

Regular equipment includes besides motor, suitable starter, countershaft and flexible shaft; a grinding spindle, wheel guard, detachable handle, base, switch, and truck.

The following attachments which are extra may be used. Grinding wheels, polishing wheels, wire scratch brushes, drilling, screw-driving, and nut setting attachments. Motors of other voltages than the regular type mentioned are special. Shipping weight is 310 lbs. for A. C. and 400 lbs. for D. C. motor.

**Metal Pattern Maker's Equipment Type M. P. 5**

An outfit is made for special use for the patternmaker that includes a $\frac{1}{4}$ H. P. motor with drilling capacity of $\frac{3}{8}$ " and which will handle grinding wheels from $\frac{1}{2}$ " to 5" in diameter. It will do rotary filing, reaming, grinding, polishing, drilling, buffing and similar work. Additional information regarding this equipment will be sent on request.

Attachments for Flexible Shaft Machines

In addition to the motor driven outfits shown on this and the opposite page, belt driven units of similar design can be supplied for operation from line shafts. These may be either for bench use or with floor pedestal and inquiries should mention which style is preferred, also complete data regarding nature of work and kind of attachments desired.

Either motor or belt driven machines may be specially arranged to conform to special requirements and the following can be furnished when required:

- Screw driving and nut tightening attachments.
- Rail drilling attachment.
- Surfacing attachment with worm drive.
- Bench and floor swivel columns or pedestals.
- Adjustable suspension bases for overhead mountings.
- Tool post grinding spindles.
- Drilling attachments.
- Rotary files, grinding wheels, wire brushes.

Extra flexible shafts, complete or in part may also be had if desired and further data will be sent on request.

For Net Prices See Supplement

GRINDING WHEELS



The following table gives list prices of straight wheels only, although we are in a position to supply other types, such as cup, cylinder, taper, and special wheels.

In ordering be sure to give all dimensions, or send sketch, and information as to grit and grade desired. If unable to specify grade, describe work to be done and also kind of material to be ground so that the most suitable wheel can be furnished.

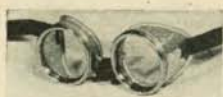
Wheels for general grinding of steel furnished unless otherwise specified.

General Specifications
LIST PRICES—STRAIGHT WHEELS
(Vitrified and Silicate)

Diameter	Thickness of Wheels in Inches							
	¼	½	¾	1	1¼	1½	1¾	2
1	\$.55	\$.70	\$.85	\$ 1.00	\$ 1.15	\$ 1.25	\$ 1.40	\$ 1.55
1½	.60	.80	.95	1.10	1.30	1.45	1.65	1.80
2	.80	1.00	1.20	1.40	1.60	1.80	2.00	2.20
2½	.90	1.15	1.35	1.55	1.80	2.00	2.25	2.45
3	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75
3½	1.15	1.45	1.70	1.95	2.25	2.50	2.80	3.05
4	1.40	1.70	2.00	2.35	2.70	3.00	3.35	3.70
4½	1.60	2.00	2.35	2.80	3.20	3.55	3.95	4.35
5	1.80	2.30	2.70	3.20	3.65	4.10	4.55	5.00
6	2.30	2.90	3.50	4.10	4.70	5.30	5.90	6.50
7	2.75	3.55	4.30	5.15	5.85	6.70	7.50	8.25
8	3.25	4.25	5.30	6.25	7.25	8.30	9.30	10.30
9	3.70	5.00	6.25	7.45	8.70	10.10	11.40	12.70
10	4.30	5.90	7.45	9.00	10.50	12.25	14.00	15.75
12	5.50	7.25	9.35	11.50	13.75	15.75	17.85	20.00
14		9.30	12.30	15.25	18.25	21.20	24.20	27.15
16			15.75	19.75	23.75	27.70	31.70	35.70
18				24.35	29.40	34.50	39.50	44.50
20					36.10	42.00	47.85	53.75
22					44.45	51.60	58.75	65.90
24					53.00	61.00	70.00	78.00
26					60.00	70.00	80.00	90.00
28					69.00	83.00	97.00	111.00
30					78.00	92.00	107.00	121.00
32						107.00	124.00	141.00
34						123.00	143.00	162.00
36						142.00	164.00	185.00

Diameter	Thickness of Wheels in Inches							
	2¼	2½	2¾	3	3¼	3½	3¾	4
1	\$ 1.70	\$ 1.85	\$ 2.00	\$ 2.15	\$ 2.25	\$ 2.40	\$ 2.55	\$ 2.70
1½	2.00	2.15	2.35	2.50	2.70	2.85	3.05	3.20
2	2.35	2.55	2.75	2.95	3.15	3.35	3.55	3.75
2½	2.70	2.90	3.15	3.35	3.60	3.80	4.00	4.25
3	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75
3½	3.35	3.60	3.90	4.15	4.45	4.70	5.00	5.25
4	4.10	4.45	4.80	5.10	5.45	5.75	6.10	6.50
4½	4.80	5.20	5.60	6.00	6.40	6.75	7.15	7.60
5	5.45	5.90	6.35	6.85	7.30	7.70	8.15	8.65
6	7.10	7.70	8.40	9.00	9.60	10.20	10.80	11.40
7	9.00	9.85	10.70	11.50	12.25	13.00	13.75	14.75
8	11.30	12.35	13.35	14.40	15.40	16.45	17.50	18.60
9	14.00	15.25	16.50	18.00	19.50	21.00	22.50	24.00
10	17.50	19.25	21.00	22.75	24.50	26.25	27.50	29.25
12	22.35	24.75	27.25	29.50	31.90	34.25	36.50	39.00
14	30.35	33.60	36.85	40.00	43.30	46.50	49.75	53.00
16	39.60	43.55	47.45	51.35	55.25	59.20	63.10	67.00
18	49.20	53.90	58.55	63.25	68.00	72.65	77.30	82.00
20	59.40	65.00	70.70	76.40	82.00	87.70	93.35	99.00
22	73.00	80.00	87.00	94.00	101.00	108.00	115.10	122.10
24	87.00	95.00	104.00	112.00	120.00	129.00	137.00	145.00
26	101.00	111.00	122.00	133.00	143.00	154.00	165.00	176.00
28	123.00	136.00	148.00	160.00	171.00	183.00	194.00	205.00
30	135.00	149.00	164.00	178.00	192.00	206.00	221.00	235.00
32	158.00	175.00	192.00	210.00	225.00	240.00	255.00	270.00
34	182.00	201.00	221.00	240.00	256.00	273.00	289.00	305.00
36	207.00	229.00	248.00	266.00	285.00	303.00	322.00	340.00

INDUSTRIAL GOGGLES



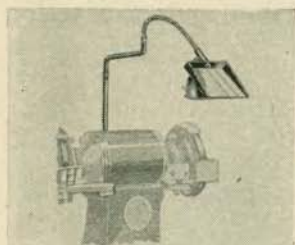
These goggles, No. 505-R (with lug sides) and No. 505-S (with perforated sides) are made so as to allow a wide range of vision. They are fitted with safety flanges to prevent the lens, if broken, from flying into the eye. The adjustable leather strap bridge insures a perfect fit to every user. Either rubber or leather binding can be furnished.

Goggles Fitted With	List Price per Doz.
"ESSENTIALITE" lenses and cover glasses.....	\$31.50
Smoke Green, Blue or Amber lenses and cover glasses.....	25.00
Super-Safety lenses.....	27.50
Amber Non-shattering lenses.....	25.00
Clear Non-shattering lenses.....	23.00
Wire Screen lenses.....	23.00
Clear Industrial lenses.....	18.10

Extra Lenses

Size 46½ MM Round	List Price per Doz.
"ESSENTIALITE" lenses.....	\$15.00
Smoke Green, Blue or Amber lenses.....	8.50
Super-Safety lenses.....	13.00
Amber Non-shattering lenses.....	10.50
Clear Non-shattering lenses.....	8.50
Wire Screen lenses.....	8.50
Clear Industrial lenses.....	3.60
Cover glasses.....	2.00
Metal cases.....	1.50

ACME EYE SHIELD



The use of Acme Eye Shields on grinding machines insures absolute protection for the operators' eyes, entirely eliminating the necessity of goggles. Eye injuries are costly to both employee and employer, yet they form a large percentage of industrial accidents owing to the fact that the men cannot be depended upon to use the goggles which have been provided them. By many operators, goggles are regarded as a nuisance. They are inconvenient and unhandy, they are frequently mislaid so that they cannot be found readily when wanted, they are subject to considerable loss through breakage and theft—in fact, they are generally not available when needed.

Danger of eye accidents is removed by the Acme Eye Shield. When attached to the grinder, it is always in position for use. It can be installed on any type of grinder in just a few minutes. One shield can be used to cover both wheels of a double grinder, although where both wheels are in constant use, a separate shield is recommended for each wheel. While primarily designed for grinders and buffers, it will afford equal protection in connection with saws, spot welders, lathes, planers and other machines.

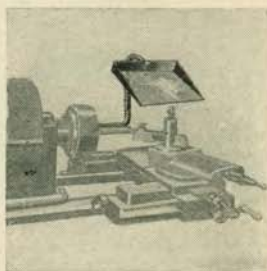
The special triplex glass is not easily broken, and will not scatter even when struck an unusually heavy blow. It is mounted in a steel frame and is readily replaced.

A special heavy flexible arm permits instant adjustment to any desired position, and the shield will automatically remain in such position. There are no nuts, bolts or screws to be loosened or tightened in adjusting.

Equipment includes adjustable steel bracket, wall brackets, pipe support, lock nuts, 18" special heavy flexible arm, steel frame and laminated glass.

If desired these shields can be supplied with an electric light attachment as shown in the upper illustration. This attachment however is not a part of the regular equipment and takes an additional charge when specified.

Size of Glass 7" x 9". Shipping weight 7 lbs.



REELITES

No. 1523
For Power

There are a great number of places in all industries that required a special form of electric power arrangement to furnish a power outlet or light that can be put out of the way when not in use and readily produced close to the work when needed. This arrangement of reeling the electric cord fills this need remarkably well. It keeps the cord clean, uninked, and out of the way.

Machine Tool Type No. 1523

This Reelite is made with a connector body attached to a 20 foot extra heavy cord which is wound by a plural-spring reel to insure long time service. It is $7\frac{1}{4}$ " in diameter, black enameled, and has a base for attaching to $3\frac{1}{4}$ " or 4" outlet box. The list price is \$12.50.

Portable Type

The Portable Type is constructed similar to the above except that it has a 25 foot cord with either brass or porcelain key socket and heavy wire open guard or Loxon type guard which will take lamps up to and including 60 watts.

Portable
Type with
Socket

General Specifications

No.		Length of Cord	List Price
1522	Heavy Wire Guard Keyless Socket	25 ft.	\$15.00
1524	Without Socket or Guard	25 ft.	12.00
*1524½	Keyless Socket (Cord Grip)	25 ft.	13.00
1525	Brass Key Socket (Less Guard)	25 ft.	12.50
1526	Composition Key Socket (Less Guard)	25 ft.	12.50
1527	Loxon Guard Key Socket	25 ft.	13.50
1528	Heavy Wire Guard Key Socket	25 ft.	15.00

*This Type is 660 Watts, 600 Volts.

Constant Duty Types

The Constant Duty Reelites solve one of the most troublesome problems of industry—electrical current for portable machines. Many unsatisfactory devices such as bare conducting rails are often unsafe and unpractical. Its sturdy rubber covered flexible cable does away with all inefficient and hazardous methods. It acts as a caretaker for the ever important current conducting cables. It releases them and winds them up as needed—never too little, never too much, neither slackness nor undue tension; a protector from kinks, breaks and tangles. The entire action is automatic.

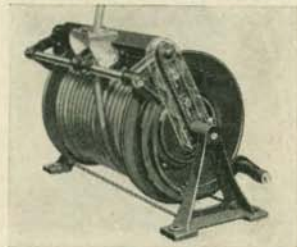
Practically all types of machinery such as cranes, dredges, elevators, stacking and tiering devices, electric magnets and mining machinery can be operated with more convenience, economy, and safety with these Reelites. A number of conductors may be used in various lengths, depending on the size of the cables.

They are made up of standardized parts to simplify ordering. When requesting quotations, specify the use to which the Reelite is to be applied; give length of cable, gauge, and number of conductors. It is also advisable in the case of special machinery, to enclose a photograph or sketch so that the best method of mounting can be determined.

Type "F" Constant Duty Reelite has screw feed as shown in the illustration below.



Type C



Type F

MARVEL PORTABLE BLOWERS



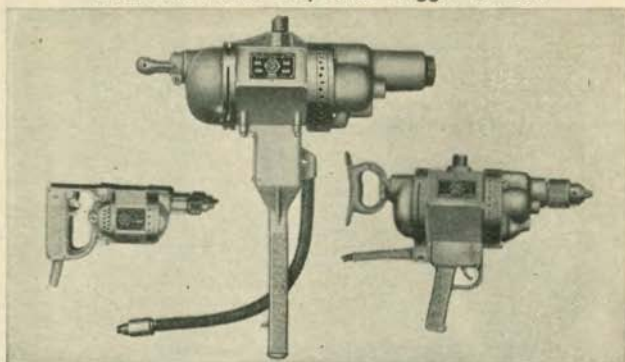
This portable electric blower is designed for blowing out dust and dirt from motors, generators, switchboards, all kinds of wood, and textile working machinery. It is used also for blowing gas blow pipes for brazing, or soldering, in gas furnaces for annealing, tempering, or forging. The pressure produced by this blower is 8 to 9 ounces (or will support a water column of 15 to 18 inches.)

It is made of aluminum, is one-hand operated and has a toggle switch control in the handle. The air-cooled motor is fitted with Norma precision bearings, has 1/9 H. P. and runs at 10,000 R. P. M., by 110, 220, or 250 volts according to requirements of the user.

Equipment includes 20 ft. high grade electric cable, armored plug, and soft rubber extension nozzle; net weight 6½ lbs. List price \$45.00. In ordering voltage and current should be specified.

For Net Prices See Supplement

BLACK AND DECKER PORTABLE ELECTRIC DRILLS With the Pistol Grip and Trigger Switch



1/4-Inch Drill

Size No. 8

5/8-Inch Drill

A wonderfully well made line of electric drills, with very powerful motors. All sizes except the No. 8 have the famous Pistol Grip and Trigger Switch, an exclusive feature, making them easier to handle, increasing accuracy and production, and preventing a considerable percentage of drill bit breakage.

Motors are of the Universal type, operating equally well on Direct Current or Single Phase Alternating Current of any frequency from 25 to 60 cycles. A centrifugal fan mounted on the armature shaft cools the motor outside of the field windings as well as between the armature and the field. Gears are made of special heat treated alloy steel, and run in a grease tight compartment. Bearings are unusually large, and a ball thrust bearing is provided for the spindle.

Various sizes are equipped as outlined below. All sizes from $\frac{3}{8}$ " to $\frac{7}{8}$ " inclusive have a combination spade handle and breast plate. All sizes larger than $\frac{3}{8}$ " have a detachable side handle.

Universal Type

For Direct Current and Single Phase Alternating Current 25 to 60 cycles. Will operate satisfactorily on voltages 10% over or under those specified. Furnished for 32, 110, 220, or 250 volts.

General Specifications

Size Capacity in Steel	No Load Speed R.P.M.	Net Weight Lbs.	Equipment
$\frac{1}{8}$ " Lt. Duty	2000	5	3 Jaw Chuck, 7 $\frac{1}{2}$ ft. Cable.
$\frac{1}{4}$ " Std.	2000	6	Ettco 3 Jaw Keyless Chuck, 15 ft. Post Cable.
$\frac{1}{2}$ " H.D.	2500*	7 $\frac{1}{4}$	Ettco 3 Jaw Keyless Chuck, 15 ft. Cable.
$\frac{5}{8}$ " Std.	1400*	7 $\frac{1}{2}$	3 Jaw Chuck, 15 ft. Cable.
$\frac{5}{8}$ " H.D.	1300*	10 $\frac{1}{2}$	Ettco 3 Jaw Keyless Chuck, 15 ft. Cable.
$\frac{3}{4}$ "	900*	12	3 Jaw Chuck, 15 Ft. Cable, Combination Spade Handle and Breast Plate.
$\frac{1}{2}$ " Spec.	475	15	3 Jaw Chuck, 15 ft. Cable Comb. Spade Handle and Breast Plate. Side Handle.
$\frac{1}{2}$ " H.D.	600*	21	Same as above.
$\frac{5}{8}$ " Spec.	400	17 $\frac{1}{2}$	Same as above.
$\frac{5}{8}$ " H.D.	475*	22	Same as above.
$\frac{3}{4}$ "	600	21	No. 1 Morse Taper Socket, 15 ft. Cable, Side Handle, Comb. Spade Handle and Breast Plate.
$\frac{3}{8}$ "	350*	25	No. 2 Morse Taper Socket, 15 ft. Cable, Comb. Spade Handle and Breast Plate. Side Handle.
No. 8 Cap. 1 $\frac{1}{2}$ "	350*	66	No. 4 Morse Taper Socket, 15 ft. Cable, Spade Handle and Side Handle.
No. 81	200	66	Same as No. 8 above.

In ordering, be sure to specify VOLTAGE. Unless otherwise specified, drills will be sent for operation on 110 volts, but can be supplied for 32, 220 and 250 volts if required.

*These drills can be furnished with special speeds, see price supplement.

For Net Prices See Supplement

BLACK AND DECKER DRILL STANDS

Grinding Outfit for 1/4" Drills

The 1/4" drill can be converted into a small electric bench grinder by the use of this outfit. It consists of a small stand in which the drill may be quickly and easily fastened, an arbor to fit in the chuck, and a 3" grinding wheel.



Bench and Post Drill Stands



Heavy Duty

8 inch brackets, and vertical columns longer than standard can be supplied on special order subject to extra charge.

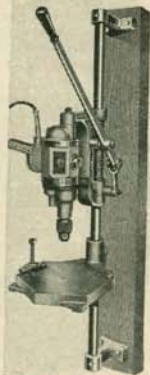
These stands are intended for use with the electric drills shown on preceding page. They provide a simple method of converting a portable drill into a bench or post drill.

The bracket on which the drill is carried can be raised, lowered and swung around on the vertical column and quickly fastened in any desired position by means of a split collar and clamping screw.

The Heavy Duty stands, illustrated, will hold all sizes of Black and Decker electric drills from 3/8" to 3/4" inclusive when the proper adapter is used. In ordering be sure to specify the size of the drill for which the stand is required, so that a suitable adapter can be provided.

The No. 4 bench stand will take a 1/4" light duty standard drill, No. 1 screw driver and No. 1 tapper. No. 5 will take a 3/4" heavy duty, 5/16" standard drills, No. 2 screw driver and No. 2 tapper.

The Standard brackets supplied with Heavy Duty Post Drill stand hold the vertical column 5" from post or wall.

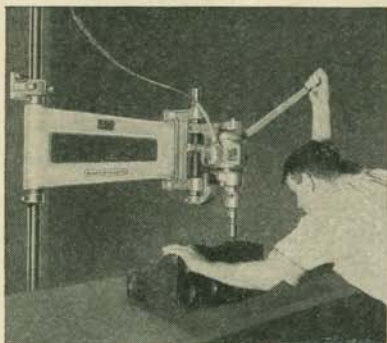


Post Stand

General Specifications

Style.....	Bench Drill Stands			Post Drill Stands
	No. 4	No. 5	Heavy Duty	Heavy Duty
Height overall.....	20"	20"	30"	46"
Vert. Adj. of Drill.....	10"	10"	12"	25 1/4"
Feed with Lever.....	2"	2 1/16"	4 1/2"	4 1/2"
Dist. Spindle to Column.....	4 7/8"	5"	7"	7"
Swing about Column....	360	360	360	180
Net weight.....	14 lbs.	14 lbs.	50 lbs.	75 1/2 lbs.

BLACK AND DECKER RADIAL ARM



Radial Arm

The illustration shows the wide adaptability of the Black and Decker Radial Arm. It has a vertical adjustment, up and down the column, of 24", and the arm itself will swing through an arc of 180°. The bracket is so designed that it fits the adapter blocks for any Black and Decker Electric Drill from 3/8" to 3/4" inclusive, and Nos. 3, 4, and 41 Electric Screw Drivers or Socket Wrenches. The weight of the Radial Arm is carried by a ball thrust bearing on the column, making it very easy to swing in centering the tool.

The Radial Arm is particularly adaptable to chain production methods, as it relieves the operator of carrying the tool, eliminates the torque of the electric tool, and has an operating range great enough to enable the operator to get either ahead of the chain production or make up any loss in time due to emergencies. This is made possible by the fact that the Radial Arm gives an effective working area of from four to six feet along a production line. It is also adapted to setting studs when used in connection with Black and Decker No. 4 Electric Socket Wrench, also for driving nuts, cap screws, bolts, or for heavy drilling of the nature generally done by radial drill presses.

In ordering, type and size of the electric tool should be specified, so that the right adapter can be supplied with bracket. Drill is not furnished with arms. Weight without drill 180 lbs.

For Net Prices See Supplement

BLACK & DECKER PORTABLE ELECTRIC SCREW DRIVERS AND SOCKET WRENCHES



No. 1

Modern production methods of manufacturing and assembling necessitate the use of tools of this sort where any quantities of screws are to be driven, or nuts are to be tightened up. They can also be used to excellent advantage for numerous stud-setting applications, when equipped with automatic-opening friction-drive stud-setter jaws.

They are of the same basic design as the Black & Decker Portable Electric Drills, and embody all of the exclusive construction features of the drills including the Pistol Grip and Trigger Switch, which affords the operator instant control. The spindle is provided with a three-jaw positive clutch which engages and turns the screw-driver bit or socket wrench when forward pressure is applied, and which automatically and instantaneously disengages when the forward pressure is relieved. Screwdriver bits or socket wrenches of various sizes are held in place by a quick-acting chuck, provided with a sliding collar for instant release of the tool.

The driving of wood screws or lag screws necessitates first drilling the proper size of lead or pilot hole, and capacities are based accordingly. Sizes Nos. 1 and 2 are recommended for ordinary service; sizes 3 and 4 for heavy work. Size No. 4 is intended only for lag screws and nuts, and cannot be furnished with screw-driver bits except on special order.

All are of the Universal type, operating on Direct Current and on Single Phase Alternating Current.

Can be furnished for 32, 110, 220 or 250 volts. Supplied for 110 volts unless otherwise specified.



No. 3

Equipment

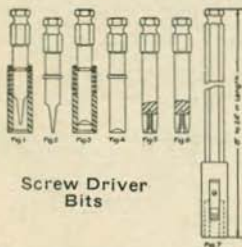
- Size No. 1—One each No. 8 and No. 12 Screw-driver Bits with Centering Sleeve.
 Size No. 2—One each No. 10 and No. 14 Screw-driver Bits with Centering Sleeve.
 Size No. 3—One Hexagon Socket Wrench for nuts $\frac{3}{8}$ " across.
 Size No. 4—One Hexagon Socket Wrench for nuts $\frac{1}{2}$ " flute.
 Nos. 3 and 4—Have Combination Spade Handle and Breast Plate, and Detachable Side Handle.

All Sizes—Have 15-Ft. Cable and Split Plug.

Size No.	Capacity		Nuts—Bolt Dia. In.	*No Load Speed R.P.M.	Net Wt. Lbs.
	Wood Screws	Lag Screws In.			
1	No. 12x2"	.....	.....	500	7
2	No. 16x3 $\frac{1}{4}$ "	$\frac{3}{8}$ x4	$\frac{3}{8}$	500	9
3	No. 20x4"	$\frac{3}{8}$ x4 $\frac{1}{2}$	$\frac{1}{2}$	500	18
4	.....	$\frac{3}{8}$ x5 $\frac{1}{2}$	$\frac{5}{8}$	500	27

- No. 41—Same as No. 4 except Spindle Speed has 350 R. P. M.
 *No. 1 can be furnished, when so specified, with special speed of 700 or 1000 R.P.M.
 No. 2 with Special Speed of 350, 700, 1000, or 1600 R. P. M.
 No. 3 with Special Speed of 350, 700, 900 R. P. M.
 No. 4 with Special Speed of 700 or 900 R. P. M.
 Special Speed Tools take Special Prices.

All sizes can be supplied at an extra charge on a special order with a reversing switch, to facilitate removing wood screws and running off nuts.



Screw Driver Bits

SCREW DRIVER BITS

- No. 1 Bit with centering sleeve.
 No. 2 Bit without centering sleeve; projects $2\frac{1}{2}$ " from chuck.
 No. 3 Blade Type bit with centering sleeve, for round head screws.
 No. 4 Blade Type bit without centering sleeve, for round head screws.
 No. 5 Socket Type Bit for small round head screws.
 No. 6 Socket Type Bit for Fillister head screws.
 No. 7 Screw Driver Bit extension, 8", 10", 12", 14", 16", 20" or 24" long.

SOCKET WRENCHES

Hexagon and Square Socket Wrenches for rivet and lag screws $\frac{1}{4}$ " to 1" across flats can be furnished in standard or 4", 6", 8", 10", 12", 14", 16", 20" and 24" lengths. Larger Sizes for the No. 4 machine can also be supplied.

In ordering Socket Wrenches always specify measurement across flats of nuts to be driven and mention number of tool on which they are to be used.

BLACK AND DECKER TOOLS**Hole Saws**

Hole Saws are used with $\frac{1}{2}$ " special or heavier Portable Electric drills for cutting clean round holes in cast iron, steel, copper, brass, wood and other material. Their adaptability to all kinds of work is obvious.

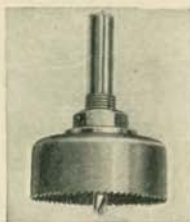
They are made of the best quality saw steel and carefully hardened for durability. The mandrel holds a $\frac{1}{4}$ " twist drill for making the pilot hole which serves as a guide for the saw.

No. F. 901 is the Automotive Set of Hole Saws suited for various purposes; assortment consists of $\frac{3}{4}$ ", 2", 2 $\frac{1}{2}$ ", 2 $\frac{3}{4}$ ", 3 $\frac{1}{2}$ " Saws together with No. F. 903 and F. 904 mandrels.

No. F. 902 is the Plumbers and Steamfitters Set with one saw each for $\frac{3}{4}$ ", 1", 1 $\frac{1}{4}$ ", 1 $\frac{1}{2}$ " and 2" pipe taps and mandrels Nos. F. 903 and F. 904.

No. F. 903 Mandrel for $\frac{3}{4}$ " to 1 $\frac{1}{2}$ " Saws (with pilot drill).

No. F. 904 Mandrel for 1 $\frac{1}{2}$ " to 3 $\frac{1}{2}$ " Saws (with pilot drill.)



Hole Saw

No.	Size	No.	Size	No.	Size	No.	Size
F. 906	$\frac{3}{4}$ "	F. 912	1 $\frac{1}{2}$ " (1" pipe tap size)	F. 918	2"	F. 924	2 $\frac{5}{8}$ "
F. 908	($\frac{3}{4}$ " pipe tap size)	F. 914	1 $\frac{3}{4}$ " (1 $\frac{1}{4}$ " pipe tap size)	F. 920	2 $\frac{1}{8}$ "	F. 926	3"
F. 910	1"	F. 916	1 $\frac{3}{4}$ " (1 $\frac{1}{2}$ " pipe tap size)	F. 922	2 $\frac{1}{4}$ " (2" pipe tap size)	F. 928	3 $\frac{1}{2}$ "

Note: Pilot drills may be replaced with $\frac{1}{4}$ " Std. Twist Drill.

Stud Setters

These setters are for driving hand rail screws and studs up to $\frac{3}{8}$ " diameter. Pressure upon the electric screw driver closes the jaws around the threads on the upper end of the studs or hand rail screws. The stud setter projects $\frac{3}{4}$ " from chuck and has a diameter of 1 $\frac{1}{2}$ " through the body.

When ordering, size of screw or stud and the number of threads per inch, should be specified, or sample sent. This tool can be furnished in different diameters, and different number of threads per inch at the same price. 0" to $\frac{3}{8}$ " are the sizes for Nos. 1, 2 and 3 screw driver; sizes for Nos. 4 and 41 screw drivers are $\frac{1}{2}$ " to $\frac{3}{4}$ ".

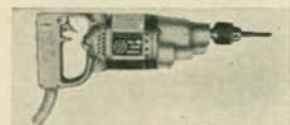
**Black and Decker Attachments**

The Auxiliary Side Handles can be quickly attached to $\frac{1}{4}$ " Heavy Duty and $\frac{1}{4}$ " Standard Portable Electric Drills, also the No. 2 Electric Screw Driver and No. 2 Portable Electric Tapper. These handles provide a very convenient and efficient means for holding these tools in operation, especially when suspended on a counter-balance.

By using the Suspension Clamps, Black and Decker electric tools may be suspended in such a manner as to be always convenient to the operator. Much time is saved in that the tools do not have to be put down and picked up for every operation—a very essential feature on assembly line in production plants.

No. 1 Horizontal Suspension clamps are for $\frac{1}{4}$ " drill, No. 1 screw-driver, and No. 1 tapper. No. 2 Horizontal Suspension clamps adapted for $\frac{1}{4}$ " H. D. and $\frac{1}{4}$ " drills, No. 2 screw-driver, and No. 2 tapper. Vertical suspension clamps are made for all drills, screw-drivers and tappers having switch handle in back.

The Aerial Spring and Eyebolt are made for suspending the 5" and 6" Portable Grinders to relieve the operator of the weight of the machine.

Portable Electric Tappers

These Tappers embody all of the features of the Black & Decker Drills, including the Pistol Grip and Trigger Switch. Mechanism so designed that the chuck automatically reverses when the operator gives a backward pull. Operates on Direct Current or Single Phase Alternating Current. Equipment in-

cludes Three-Jaw Chuck, 15 ft. Cable and Split Plug.

Size	Capacity			No Load R. P. M.	Net Weight Pounds
	Cast Iron	Steel	Brass or Aluminum		
No. 1	$\frac{5}{16}$ "	$\frac{3}{16}$ "	$\frac{3}{4}$ "	500	7 $\frac{1}{2}$
No. 2	$\frac{3}{8}$ "	$\frac{1}{4}$ "	$\frac{1}{2}$ "	300	9 $\frac{1}{2}$

Electric Valve Grinder

This machine has essentially the same design as the drills, except that the spindle oscillates back and forth instead of revolving.

It is made for general use in garages, service stations, and many production plants: no load speed per minute, 500 oscillations.

It is equipped with detachable bits, left spring, grinding compound, 7 $\frac{1}{2}$ ft. cable and split plug. Unless otherwise specified, tools will be sent for 110 volt current; net weight 6 lbs.

Furnished for 32, 110, 220, or 250 volts.



For Net Prices See Supplement

SPEEDWAY PORTABLE ELECTRIC HAMMERS

These portable electric hammers are built for heavy service. Many years of experience in the development and distribution of this tool by the manufacturer have resulted in a wide variety of uses in erection and installation work. Simple in construction yet unusually rugged, it cannot be forced or over-worked inasmuch as the force of the blow is always constant. Vibration and breakage is reduced to its minimum by means of the magnetic principle which simply consists of a magnetic cushion superimposed between the hammer element and the motor.

Built in a variety of sizes, types and voltages, some equipped with Universal Motors and others with D. C. Motors of special design.

Type No. 2 is a light duty machine intended for drilling holes in concrete for small expansion bolts, scaling paint or rust, breaking rock, light metals, etc. It is also widely used for channeling plaster, removing mortar between stone and terra cotta, and scaling condenser tubes.

The No. 6 and 4 hammers are average duty machines and are usually chosen for the requirements of contractors, installers and maintenance men. They have a drilling capacity in average concrete of one inch diameter holes at the rate of about one and one-half inches per minute. Intended for such jobs as the installation of elevators or elevator gates, piping for plumbing and steam systems or electrical installations. Also setting stair treads, railings and ornamental iron, in fact for any contracting operation where holes for piping or small openings must be cut in concrete, brick, or stone.

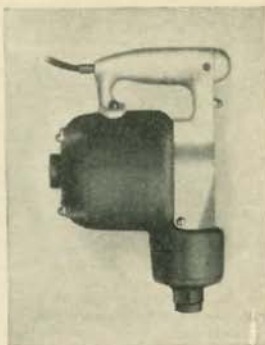
In the Type No. 9 hammers strength and ruggedness are the essential factors, for this tool is designed for the heaviest classes of service. They have a drilling capacity in concrete of 1½-inch diameter holes and are intended for such operations as breaking up foundations, trenching in soft rock, in coal mines for installing hangers, and street railway maintenance.

A good operator with a hand hammer strikes only 40 to 80 blows a minute. Compare this with 3,000 blows for the light Speed Way Hammer and 1,100 blows for the heavy one drilling 1½" hole.

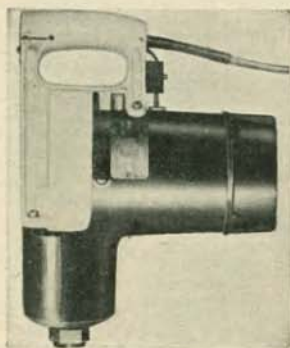
Because of their simplicity and ease of operation the operator does not have to be a skilled workman nor to have had any previous training handling tools. They are also very economical power users.

Tests show that they consume less power than any other type of tools for cutting brick, stone or concrete.

These hammers are truly portable—they can be carried around by hand and they operate from any standard socket or outlet.



Type No. 2



Types 4 and 6

General Specifications

Size No.	Drilling Capacity in Concrete, Inches	Blows per Minute	Motor	Net Weight, Lbs.
2	½	3000	Universal	16
6	1	1800	Universal	26
4	1	1800	D. C.	25
9	1½	1100	D. C.	75

Universal hammers operate on D. C. and A. C. 25, 30 or 60 cycle current.

Stands for various types of hammers, for overhead drilling, are furnished at an extra charge.

Each hammer is equipped with lead cord, plug wrench and one drill steel. The following table shows the standard drill steels of various sizes available for prompt shipment.

Diameter, Inches	Lengths, Inches	Diameter, Inches	Lengths, Inches
½	5, 8 and 12	¾	8, 12 and 18
⅝	5, 8 and 12	1	8, 12, 18 and 24
⅞	5, 8 and 12	1¼	8, 12, 18 and 24
1	5, 8 and 12	1½	8, 12, 18 and 24
1¼	8 and 12		
1½	8 and 12		

Star drills are furnished unless otherwise specified but Diamond drills can be supplied, when required for drilling granite, marble, hard rock or concrete.

Hollow drills, chisels, bull points, bush hammers and channeling tools can also be furnished when required.

For Net Prices See Supplement

SPEEDWAY PORTABLE ELECTRIC HAND SAWS

These portable electric hand saws introduce a new method of rip or cross-cut sawing especially on the job away from the shop. In substituting the slow hand method these machines not only do the work much faster but also minimize the labor of such work to a great extent.

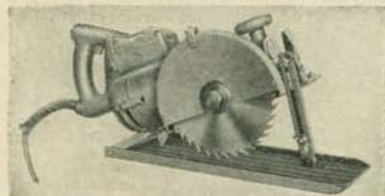
The carbuilder, carpenter, repair man and shipper will find them particularly useful. They are used in many shops and factories on account of their wide range of application to such materials as wood, light gauge, soft metal, wallboard, hard rubber and bakelite.

The motors in these saws are of the universal type for operation on direct or alternating current of 25, 30 or 60 cycles. The motor brushes and commutators are exposed by simply removing one screw.

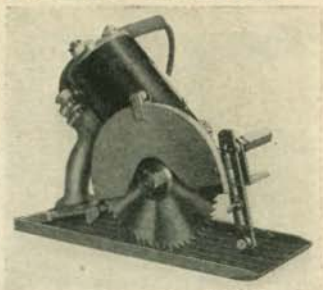
They are provided with removable dust shields and saw guards. Regular equipment includes a patented depth gauge, lead cord and attachment plug for any lighting socket.

The saw No. 176, shown in the illustration, gives a $1\frac{1}{2}$ inch cut with the 6 inch blade and can be equipped with a 7 inch blade for occasional cutting up to 2 inches. The weight of this tool is 15 pounds and the no load speed, 3600 R.P.M.

If the greater part of the sawing to be done is near 2 inch depth, type No. 179 is recommended. It carries an 8 inch blade and its maximum cutting depth is $2\frac{1}{2}$ inches with a no load speed of 1500 R.P.M. On this type as on the others, the convenient drop plate, hinged at the rear of the slipper plate, gives a sturdy, convenient depth gauge, as well as a complete safety guard. The blade is entirely covered and guarded until the catch on the drop plate is released stopping it at a pre-determined depth.



No. 179



No. 176

Type No. 180 is similar to No. 179 except that it has a 10 inch saw blade with the power and capacity to cut dressed 4 inch material. It fills the need of a heavy duty saw on construction jobs. Similar to the other types, operation is made for direct or alternating current at 25, 30 or 60 cycles.

General Specifications

Type	Depth Capacity Inches	Speed R.P.M.	Diameter Saw Blade Inches	Net Weight Pounds
176	$1\frac{1}{2}$	3600	6	15
179	$2\frac{1}{2}$	1500	8	15
180	$3\frac{1}{2}$	1500	10	26

SPEEDWAY SHOP

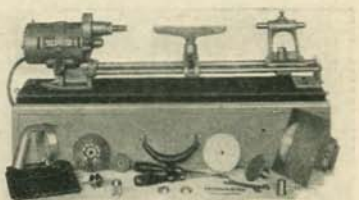
The Speedway line also embraces several shop assemblies, the most popular one of the series being the complete outfit Type F shown in the illustration to the right. With this outfit a wide range of work can be accomplished, making it the ideal set for the occasional repair job or the home work shop.

Equipment included is as follows:

Power Unit
Lathe bed, 6"x12" cap.
Tool rest complete
Tail stock and center pin
Head stock & clamp band
Saw table
Face plate
Handle for portable Use

$\frac{1}{4}$ " Cap. 3" Jaw chuck
Spur Center
Two Wrenches
Steel Carrying Case
Wood Base 25" x 6"
 $\frac{1}{8}$ " Carbon Drill
 $\frac{1}{4}$ " Carbon Drill
5" Circular Saw

4" Rag Buffer
2" Emery Wheel
4" Wire Brush
Gouge Chisel
Parting Tool
Arbor and Collars
Tool Case
Saw Collar and Nut

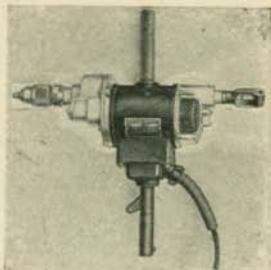


For Net Prices See Supplement

LITTLE GIANT ELECTRIC TOOLS



No. 252 Screw Driver



No. 1-B Drill

Little Giant Electric Tools have been developed and perfected through years of heavy-duty service in thousands of manufacturing plants in all lines of industry. They are furnished for operation on direct current; three-phase sixty-cycle alternating current; or for universal service—to operate interchangeably on direct or single-phase alternating current of sixty cycles or less.

Little Giant Electric Drills are made in many types and sizes with drilling capacities from $\frac{3}{16}$ inch to $1\frac{3}{4}$ inches in metal and $\frac{5}{16}$ inch to 2 inches in wood. They are made in weights light enough to meet all demands for a sturdy, economical, portable electric drill.

Little Giant Portable Electric Grinders are available in sizes and types to meet every general grinding requirement.

With such features as low temperature rise, easy control and unusual pulling power Little Giants are used with satisfaction in numerous industries requiring dependable, portable electric tools for constant service.

Information regarding other electric tools will be sent upon request.

Equipment

No. 25-B—Adjustable drill chuck to take straight shank drills 0 to $\frac{1}{4}$ inch in diameter and 10 ft. cable with connector.

No. 252—Screw Drivers—252-G 15 ft. cable with connector and one each, Nos. 8 and 12 bits with or without finders as specified. No. 252-H 15 ft. cable with connector and one each, Nos. 16 and 18 bits with or without finders as specified.

No. 250-M—Tapper—Three jaw adjustable drill chuck to take straight shank drills 0 to $\frac{3}{8}$ inch in diameter, and 15 ft. cable with connector.

All other sizes are supplied with suitable chuck or spindle to handle the work within their maximum capacity and 10 ft. cable with connector.

General Specifications
Universal Drills

Size No.	Drill Steel Inches	Drill Wood Inches	Reaming Capacity Inches	No Load Speed R.P.M.	Net Weight Lbs.
25-B	$\frac{1}{4}$	$\frac{1}{2}$	.....	2650	6 $\frac{1}{2}$
00-B	$\frac{5}{16}$	$\frac{9}{16}$	.....	1800	10
0-B	$\frac{3}{8}$	$1\frac{1}{16}$	$\frac{5}{16}$	1100	13
1-B	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{8}$	750	21

Direct Current Drills

1 -B	$\frac{1}{2}$	1	$\frac{3}{8}$	730	21
1 $\frac{1}{2}$ -B Spl.	$\frac{5}{8}$	$1\frac{1}{4}$	$\frac{1}{2}$	490	32
1 $\frac{1}{2}$ -B	$\frac{3}{4}$	$1\frac{1}{4}$	$\frac{1}{2}$	490	32
2 -B	$\frac{3}{8}$	$1\frac{1}{2}$	$\frac{5}{16}$	395	45
2 $\frac{1}{2}$ -B	1	$1\frac{1}{2}$	$\frac{3}{4}$	395	54
3 -B	$1\frac{1}{4}$	$2\frac{1}{2}$	$1\frac{1}{16}$	370	68
4 -B	$1\frac{3}{4}$	$3\frac{3}{4}$	$1\frac{1}{16}$	205	96

Screw Drivers and Nut Runners

Size No.	Capacity	No Load Speed R.P.M.	Net Weight Lbs.
252-G	No. 12 Screw	850	7 $\frac{1}{2}$
252-H	No. 20 Screw	470	7 $\frac{1}{2}$
252-J	$\frac{3}{8}$ " Nuts, Screws	470	7 $\frac{1}{2}$

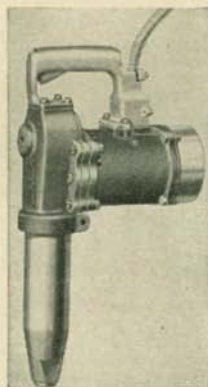
Tapper

250-M	$\frac{3}{16}$ "	470	9
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Note—Always give voltage and kind of current required.

For Net Prices. See Supplement

LITTLE GIANT ELECTRIC HAMMER DRILL



The Little Giant Electric Hammer Drill is extensively used for drilling concrete and soft stone as well as for light chipping of metals. It is equipped with a Universal Motor.

The hammer blow delivered on the drill steel, is the result of energy stored up by a rapidly moving piston which is mechanically free from the impelling force. The connection between the piston and the driving mechanism is by means of air which, at the instant the blow is delivered, restores energy to the piston through the expansion of the air which formed a cushion at the end of the upstroke.

A convenient trigger switch is located in the handle, the release of which opens the circuit. As the switch is located inside the handle the motor cannot be started accidentally by a blow from the outside.

Terminal block for the cable permits cable replacement without disturbing other connections.

Adjustable brush rigging permits the shifting of brushes for perfect commutation.

Armature, drum wound. Heavily insulated coils carried in insulated slots in armature core.

Laminated Stator (field) structure has distributed pole face windings.

General Specifications

Maximum capacity, in soft stone or concrete, in inches.....	1
Number of blows per minute.....	1450
Net weight, in pounds.....	21
Overall length, in inches.....	17½
Energy consumed, watts.....	310

Equipment:

Ten feet of cable with fused Edison connector.

Two drill steels. Orders should state diameter and drilling depth required.

One rotating wrench.

Note: If the tool is intended for chipping, two flat chisels will be furnished instead of drill steels and rotating wrench.

Standard Solid Steels, 6 and 8 inches long below the rotating wrench, are furnished in diameters from ¾ inch to 1 inch.

Standard Cold Chisels are six inches long.

Solid Four-Point Square Drill Steels with Shanks Integral with Steels.

Cutting Diameter Inches	No.	Drilling Depth, Inches	No.	Drilling Depth, Inches	No.	Drilling Depth, Inches
¾	6531	8	6360	12	.....	18
1	6533	8	6361	12	.....	18
1¼	5535	8	6362	12	.....	18
1½	6537	8	6363	12	.....	18
1¾	6539	8	6364	12	6372	18
2	6541	8	6365	12	6373	18
2¼	6543	8	6366	12	6374	18
2½	6545	8	6367	12	6375	18

Note: For Chipping use standard pneumatic chisel blanks and chisels with round shanks.

PEDWYN BALANCERS

This appliance is used where counterbalancing is required for pneumatic and electric tools or wherever it is desirable to have a device for lifting work and holding it in balance. All sizes have 5' lift and are equipped with a plunger locking device which prevents accidental dropping of load in the event of spring breakage.

Sizes

No. 7 balances loads up to 50 lbs.

No. 8 balances loads from 51 to 100 lbs.

No. 9 balances loads from 101 to 150 lbs.

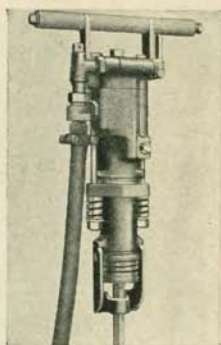


For Net Prices See Supplement

C. P. SINKERS OR ROCK DRILLS

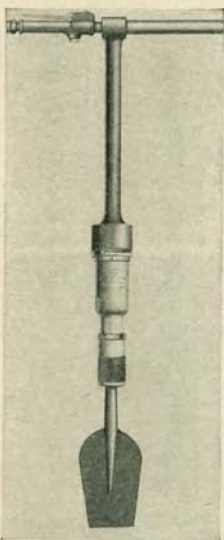
CP Sinkers being valve actuated, hold up in drilling speed despite wear and low air pressure. Bolted construction is employed, which eliminates screwed joints.

Rotation is effected on the upstroke of the piston, with the exception of the CP-8A Auger-Drill which has downstroke rotation. Some of the important features of CP Sinkers are: throttle valve located in back head; handle yoke is a separate piece; the fully balanced spool valve is housed in the cylinder wall in renewable valve bushings, thus eliminating the top-heavy, outside valve chest with attendant leakage and buffer trouble; ratchet ring and pawls are reversible, thus giving double life; chuck and chuck rotation nut are separate pieces; spring-cushioned steel retainer of heavy design that can be readily opened or closed; have exceptionally strong hole-cleaning capacity. CP Sinkers can be equipped with cradle and shell mounting, for light drifting.



Description	CP-8	CP-8W	CP-8A	CP-10	CP-10W
Type.....	Dry	Wet	Auger	Dry	Wet
Dia. of Cylinder, Inches.....	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4
Length of Stroke, Inches.....	2 1/2	2 1/2	2 1/2	2 5/8	2 5/8
Net Weight, Pounds.....	42	45	40	55	58
Length Overall, Inches.....	19	19	19	21 1/4	21 1/4
Size Air Hose, Inches.....	3/4	3/4	3/4	3/4	3/4
Size Water Hose, Inches.....	3/4	3/4	3/4	3/4	3/4
Size Hollow Hex. Drill Steel, Ins.	1/2	1/2	1/2	1/2	1/2
Economical Drilling Depth, Feet	10-12	10-12	6-8	14-16	14-16

*Takes various sections of solid, rolled spiral or twisted, auger steel.
 †3/8 inch hollow, hexagon steel also used quite generally.



BOYER NO. 2 CLAY DIGGER

The Boyer Clay Digger was designed to meet the needs of contractors requiring an improved method of digging or loosening hard clay or other similar materials not easily handled by ordinary pick and shovel methods, yet not hard enough to warrant drilling and blasting. Owing to the ease of handling in confined spaces it has come into general use for tunneling, foundations, (open and caisson), trenching, etc. While the illustration shows the extension handle type, the pistol grip type handle is most generally used and is furnished unless otherwise specified.

The Boyer Clay Digger is a one-man tool, but will loosen sufficient material to keep several shovelers busy. It will operate efficiently in cramped spaces where it is impossible to effectively wield a pick.

Blows per Minute.....	3050
Length Overall, Including Spade, Inches.....	31
Length of Extension Handle Type, Inches....	48
Net Weight, complete, Lbs.....	26
Shipping Weight, Lbs.....	40

CONCRETE BUSTERS

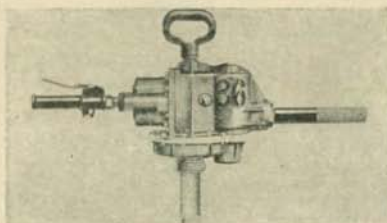
Concrete busters or demolition tools are made in two sizes, the BQ 46 for medium heavy work, and the CP 114 for heavy duty. Both are short, light and non-freezing.

BACK FILL TAMPERS

The BX Rammer is ideal for this work having a heavy blow with sufficient lifting power to prevent butt pieces from sticking.

For Net Prices See Supplement

LITTLE GIANT AND RED GIANT AIR DRILLS



The complete line of Little Giant and Red Giant Air Drills, one of the most extensive made, includes a size and type for every operation that can be performed by pneumatic drills. They are very low in upkeep and extremely economical on air consumption. Letter "R" in size number indicates reversible type.

General Specifications

Size No.	Speed Light R.P.M.	Capacity, Inches					Net Weight Lbs.
		Socket	Drill	Ream	Tap	Flue Roll	
10-A	2950	6-F	1/4				8 1/4
10-B	1950	13-F	3/8				8 1/4
10-C	1300	8-F	1/2				8 1/4
3-B	1450	0	1/2				14
3-RB	1450	0	1/2				12
3-C	720	0	1/2				12
3-RC	720	0	1/2				12
3-D	390	2	1/2				14
3-RD	360	2	1/2		1/2		14
3-A	1000	1	1/2				24
4	900	2	1/2				25
4-R	470	2	1/2		3/8		28
4-C	270	3	1 1/4			3/4	30
4-RC	145	3	1 1/4		1 1/4	2 1/2	43
2	530	3	1 1/4	1 1/8			46
2-R	290	3	1 1/4	1 1/8		2 1/2	49
2-C	150	4	2	1 1/4	1		52
2-RC	100	4	2	1 1/4	1 1/4	3	58
1	400	4	2	2			66
1-R	250	4	2	2	2	3	77
1-C	115	5	3	2 1/2		4	78
1-RC	72	5	3	2 1/2	2 1/2	3	79
15	200	4	2	2	2 1/4		84
15-C	80	5	3	3	3	4	85
15-RC	64	5	3	3	3	4	35
36	380	3	1 1/4				40
36-A	240	4	2	1 1/4			40
36-B	185	4	2	1 1/4			40
36-C	115	4	2	2			45
36-R	400	3	1 1/4		1	2 1/2	45
36-RA	270	4	2	2	1 1/4	2 1/2	45
36-RB	210	4	2	2	2	3	45
36-RC	120	4	2	2	2 1/4	3	45

Little Giant Close Quarters Drills

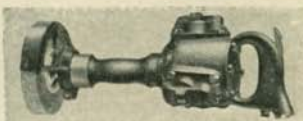
81	320	3	1 1/4	1			34
91	180	4	2	1 1/4			42
81-R	240	3	1 1/4	1	1 1/4	2 1/2	41
91-R	160	4	2	1 1/4	1 1/2	3	45
3	400	2	7/8	3/8			22

Little Giant Wood Boring Machines

10-AW	2950		1/2				8 1/4
10-BW	1950		3/8				8 1/4
10-CW	1350		1/2				8 1/4
3-BW	1450		1/2				12
3-CW	720		2				12
3-DW	360		3				12
4-W	900		2 1/2				24
14-W	730		4				35
14-SC	710		4				35

LITTLE GIANT AIR GRINDERS

Pneumatic grinders are used extensively on production work as well as for special jobs. A wire brush extends their usefulness into other fields, such as cleaning surfaces before painting, removing scale from plates, beams, etc. One or more of these tools can be used economically (if only occasionally) around almost any manufacturing plant, of whatever character, wherever a supply of compressed air is available.

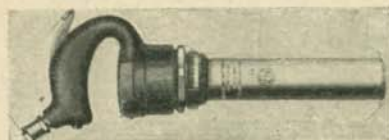


General Specifications

No.	Speed R. P. M.	Size of Emery Wheel, Wire Brush and Arbor, Inches	Net Weight Lbs.
10-A	4200	3 1/2 x 3/4 Wheel—1/2 Arbor	8 1/4
33	4000	6x1 Wheel—3/4 Arbor	15 1/2
4-G	3000	8x1 Wheel—3/4 Arbor	22

For Net Prices See Supplement

BOYER AND OLDHAM CHIPPING HAMMERS

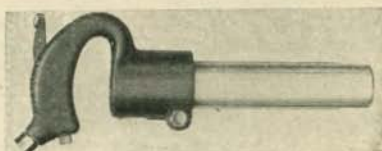


The Boyer-Keller Hammer is a well known tool for general duty, especially recommended for machine shop and boiler work.

Boyer-Superior Tools have the advantage of lightweight and shorter over-all length

as compared with other hammers of corresponding piston stroke, which make them advantageous for tank and structural work or wherever space is limited and lightweight is an important factor.

Oldham chipping hammers are practically the universal standard in steel foundries on account of their rugged design and their ability to withstand the most severe service.



General Specifications

Type	Size No.	Bore and Stroke Inches	Blows per Minute	Length Overall Inches	Net Weight Lbs.
B-K (Boyer-Keller)	1	1 $\frac{1}{8}$ x1	3850	12 $\frac{1}{2}$	12 $\frac{1}{4}$
	1-X	1 $\frac{1}{8}$ x1 $\frac{1}{2}$	3000	13	12 $\frac{1}{4}$
	2	1 $\frac{1}{8}$ x2	2850	13 $\frac{3}{4}$	12 $\frac{3}{4}$
	2-X	1 $\frac{1}{8}$ x2 $\frac{1}{2}$	2600	14 $\frac{1}{2}$	14
	3	1 $\frac{1}{8}$ x3	1850	15 $\frac{3}{4}$	14 $\frac{1}{4}$
	4	1 $\frac{1}{8}$ x4	1500	17 $\frac{3}{8}$	15 $\frac{1}{2}$
Boyer Superior	1	1 $\frac{1}{16}$ x2	2980	12	10 $\frac{1}{2}$
	2	1 $\frac{1}{16}$ x3	2300	12 $\frac{3}{4}$	11 $\frac{1}{2}$
	3	1 $\frac{1}{16}$ x3 $\frac{1}{2}$	1792	14 $\frac{3}{4}$	12 $\frac{1}{2}$
	4	1 $\frac{1}{16}$ x4	1652	15 $\frac{3}{4}$	13
Type A Oldham	00	3 $\frac{1}{4}$ x1 $\frac{1}{4}$	4000	10 $\frac{1}{2}$	7 $\frac{1}{4}$
	0	1 x1 $\frac{3}{4}$	3600	11	8 $\frac{1}{2}$
	1	1 $\frac{1}{8}$ x1 $\frac{1}{4}$	3600	11 $\frac{3}{4}$	12 $\frac{1}{4}$
	2	1 $\frac{1}{8}$ x1 $\frac{3}{8}$	3400	12 $\frac{1}{2}$	12 $\frac{1}{2}$
	3	1 $\frac{1}{8}$ x2	3000	13 $\frac{1}{4}$	13 $\frac{1}{4}$
	4	1 $\frac{1}{8}$ x2 $\frac{1}{2}$	2400	14 $\frac{1}{4}$	14 $\frac{1}{4}$
	5	1 $\frac{1}{8}$ x3	2100	15 $\frac{3}{4}$	14 $\frac{3}{4}$
6	1 $\frac{1}{8}$ x3 $\frac{1}{2}$	1850	16 $\frac{3}{4}$	15 $\frac{3}{4}$	

EQUIPMENT—Chisels and other tool blanks furnished are charged for extra. Specify whether round or hexagon bushing in cylinder is required. Round bushing will be furnished when not otherwise specified.

PNEUMATIC SCALING TOOLS

Pneumatic Scaling Tools are made for the breaking of light scale from boiler and condenser tubes, removing rust and old paint from structural iron work, ships' bottoms, bulkheads and other similar classes of iron and steel work.



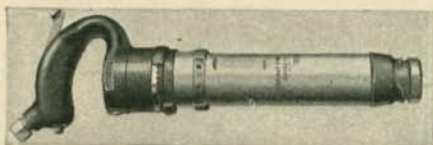
General Specifications

Type	Bore and Stroke Inches	Blows per Minute	Length Overall, Inches	Net Weight, Lbs.
Oldham	1 $\frac{1}{8}$ x1 $\frac{1}{2}$	7000	3 $\frac{3}{4}$	2 $\frac{1}{2}$
Boyer	1 $\frac{1}{8}$ x1 $\frac{3}{4}$	4075	8 $\frac{3}{4}$	6 $\frac{1}{2}$

Air hose, couplings, fittings, and accessories can also be supplied without delay.

For Net Prices. See Supplement

BOYER RIVETING HAMMERS



The Boyer is a fast operating tool with force of blow just right for successfully handling all classes of riveting. Being ideally balanced it is easily operated under all conditions

encountered. Even the inexperienced operators quickly become expert in the handling of it. Operating balance, dependability in action and the reliability of its work are responsible for the favor it enjoys.

In general terms it is a three-piece hammer—cylinder, handle, and valve. The piston in action passes through the valve, making possible a very short overall length in proportion to the stroke of piston. All moving parts operate in a straight line, and in line with the operator's arm, and the piston having a perfect air cushion on its return stroke, control is extremely easy; there is little or no tendency to fatigue the operator.

The throttle valve is of the self-seating type which retains its seat indefinitely. Valve is oil treated to toughen it, and is hard enough to resist excessive wear. Valve cage is furnished hardened and ground as standard equipment. Can be supplied medium hard so that oversize valves can be lapped in with comparative ease, if specified on order. Eight oversizes of valves are carried in stock in steps of .001 so that very little lapping is required. When a valve becomes loose and is replaced with one of these oversizes, the one removed will invariably fit some other valve case with little or no lapping. Consequently, the Boyer is an economical hammer to maintain. It is particularly liked by the men in the tool room.

Standard handle is of the open type with pistol grip and outside throttle lever. Closed handles with either inside or outside throttle lever, as well as an inverted handle for use in cramped spaces, will be furnished in place of standard open handle when specified on the order.

Laws in some States prohibit the use of a pneumatic hammer without safety features to prevent the piston being shot out of the cylinder in case the throttle lever is accidentally depressed when the tool is not against the work. The cylinder with piston retaining wall, or cylinder fitted with MS retainer can be supplied to meet these extra safety demands if called for on the order.

The hammer is made in two weights—Standard, and Heavy, in certain sizes. On heavy riveting the heavy type is recommended in line with economy. The life of the hammer is materially extended by this slight additional weight. If Parker taper is used to accommodate Parker taper shanked sets, the sets stand up much better. The Boyer is made in a variety of sizes to meet every riveting need. Adapter bushings can be furnished for any tool so that a light chisel can be used in cutting out rivets.

General Specifications

Standard Boyer Long-Stroke Riveting Hammers

No.	Bore and Stroke Inches	Capacity Rivets Inches	Blows Per Minute	Length Overall Inches	Net Weight Lbs.
40	1 $\frac{1}{2}$ x 4	$\frac{3}{8}$	1524	15 $\frac{1}{2}$	15 $\frac{1}{2}$
50	1 $\frac{3}{4}$ x 5	$\frac{3}{8}$	1400	15 $\frac{1}{2}$	17 $\frac{1}{2}$
60	1 $\frac{3}{4}$ x 6	$\frac{3}{8}$	1340	17 $\frac{3}{8}$	20
80	1 $\frac{3}{4}$ x 8	1 $\frac{1}{4}$	1050	19 $\frac{1}{2}$	21 $\frac{3}{4}$
90	1 $\frac{3}{4}$ x 9	1 $\frac{1}{4}$	910	20 $\frac{5}{8}$	23
80-X	1 $\frac{3}{4}$ x 8	1 $\frac{3}{8}$	850	21	26
11	1 $\frac{3}{4}$ x 11	1 $\frac{1}{2}$	700	21 $\frac{3}{4}$	28

Heavy Type Boyer Long-Stroke Riveting Hammers

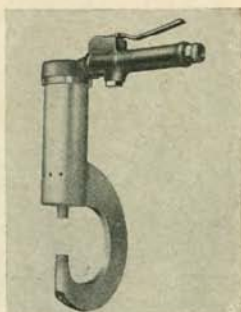
60	1 $\frac{3}{4}$ x 6	$\frac{3}{8}$	1340	17 $\frac{3}{8}$	23
80	1 $\frac{3}{4}$ x 8	1 $\frac{1}{4}$	1050	19 $\frac{1}{2}$	25
90	1 $\frac{3}{4}$ x 9	1 $\frac{1}{4}$	910	20 $\frac{5}{8}$	26 $\frac{1}{2}$

EQUIPMENT—None. Sets are charged for extra.

For Net Prices See Supplement

BOYER YOKE RIVETERS

The Boyer Yoke Riveter consists of a modified jam riveter and a dolly bar rigidly connected as a unit by means of a yoke. The movable cylinder, or riveting member of the tool, contains a rivet set. The cylinder is carefully fitted into the outer casing, air leakage around the cylinder being prevented by a leather gasket. This arrangement acts as an automatic feed and provides an effective air cushion absorbing all excessive shocks. The live air when admitted by the throttle forces the riveting cylinder against the work, thus rigidly clamping together the parts being riveted. Following this action the riveting takes place automatically.



General Specifications

No. Size Type	Without Yoke			
	Bore and Stroke Inches	Blows per Minute	Capacity Rivets Inches	Net Weight Lbs.
2	1 $\frac{1}{16}$ x3	2175	$\frac{1}{4}$	19
1	1 $\frac{1}{16}$ x4	1525	$\frac{3}{8}$	21
0	1 $\frac{1}{16}$ x5	1150	$\frac{1}{2}$	36
B-K (Boyer-Keller)	1 $\frac{1}{8}$ x4	1510	$\frac{1}{2}$	36
000	1 $\frac{1}{8}$ x5	800	$\frac{3}{4}$	68
1 $\frac{3}{4}$ x6	1 $\frac{3}{4}$ x6	775	1	114
No. Size Type	With Standard Yoke			
	Yoke Specifications			
	Material	Gap Inches	Reach Inches	Net Weight Lbs.
2	Forged	2 $\frac{13}{16}$	3 $\frac{1}{2}$	38
1	Forged	2 $\frac{1}{2}$	3 $\frac{3}{16}$	40
0	2 $\frac{1}{2}$ " Pipe	15	30	88
B-K (Boyer-Keller)	2 $\frac{1}{2}$ " Pipe	15	30	88
000	3 $\frac{1}{2}$ " Pipe	15	30	168
1 $\frac{3}{4}$ x6	4" Pipe	15	30	201

EQUIPMENT—When a riveter is ordered without a yoke the brackets for attaching the riveter and dolly to the frame are not furnished unless specified. If specified they are furnished without charge. Riveters are occasionally ordered for replacement and do not require new brackets. Two rivet sets, one for the hammer end and one for the dolly end, are furnished with each tool without extra charge, when specified on order. Order must state whether they are to be cupped or blank, and if to be cupped, type and size of cupping.



BOYER PEDESTAL RIVETERS

In shops where quantities of light parts are riveted together, the Boyer Pedestal Riveter has proven a distinct aid to increased production and lower costs. This machine is an adaptation of the Boyer Yoke Riveter mounted on a pedestal base which may be bolted securely to the floor; being foot controlled it leaves both of the operator's hands free to handle the work.

As this machine has a hammer blow, it is also adaptable to other work than riveting. Special dies can be furnished for peining, flattening or closing seams.

General Specifications

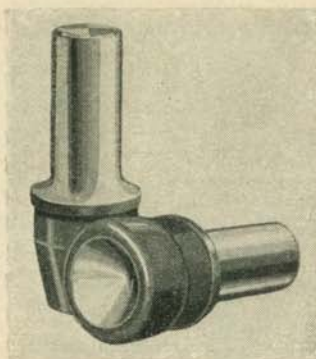
No.	Bore and Stroke Inches	Cap. Rivets Inches	Blows Per Min.	Gap, Ins.	*Reach Ins.	Shipping Wt. Lbs.
2	1 $\frac{1}{16}$ x3	$\frac{1}{4}$	2175	8	11	300
1	1 $\frac{1}{16}$ x4	$\frac{3}{8}$	1525	8	11	305
0	1 $\frac{1}{16}$ x5	$\frac{1}{2}$	1150	8	11	310

*These tools can also be supplied with either 15" or 24" reach frames where the standard 11" frame does not provide sufficient reach. Regularly furnished with single dolly or die but can be furnished with dolly capable of accommodating combinations of rivets up to four on special order. Round or button head dies furnished unless otherwise specified.

When ordering specify size of rivets to be driven.

For Net Prices See Supplement

PNEUMATIC RIVET SETS



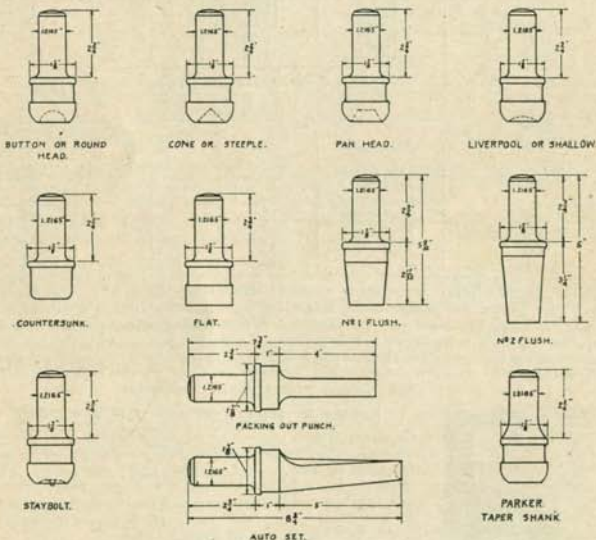
These standard rivet sets can be used in all makes of pneumatic riveting hammers. They are manufactured by improved methods and are equal or superior to other high grade sets.

The illustration below shows the common types of pneumatic rivet sets, button head, cone, pan, and Liverpool head,—grouped on the upper line. These four styles should be ordered according to rivet sizes, while the countersunk, flat and flush types according to the diameter of the face of the set.

All cupped sets have standard cupping. Rivet sets with special cupping can be supplied at special prices.

Pneumatic rivet sets are always supplied with standard straight shanks unless otherwise specified. Parker taper shanks can also be furnished.

Compression or bull riveter dies can be supplied but must be made up to special order on account of the wide variation in sizes and styles. Send complete details with information covering quantity, sizes and types of rivets required; prices will be quoted promptly.



Special rivet sets conforming to your blue prints can be supplied. Send detailed sketch or blue print with inquiry.

KING RIVET SET RETAINER



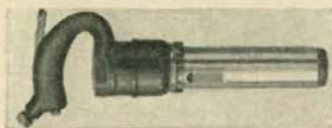
A Retainer or Clip of an improved type for the purpose of holding the rivet set in the hammer during operation.

It is made from a special heat treated steel wire, and will considerably outlast any form of clip now in common use. Consequently breakage is reduced to a minimum, and in addition it is easier to assemble and very handy in close quarters.

This device is standard equipment in many of the leading car and boiler shops. Its cost is about half that of the old style spring clip.

List price (per dozen)..... \$2.50

KING SLEEVE-VALVE PNEUMATIC RIVETING HAMMERS

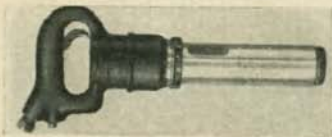


**Open Handle Type—With
Outside Trigger**

The King "Sleeve" Valve is a decided improvement in pneumatic hammer construction. This is a hollow type valve with rigid protecting sleeve, which provides an added bearing surface to keep the rapidly operating valve in perfect alignment at all times and thus greatly reducing lateral wear. This sleeve between the valve and the piston prevents these two moving parts from coming into contact with each other, and eliminates valve-breakage by protecting the valve from the wedging strains frequently caused by a worn piston.

This valve construction eliminates frequent oversizing of the block and installation of new valves, and also makes it possible to reclaim discarded valve blocks from hammers of other makes, by reboring them and fitting them with the King Sleeve and Valve.

A further improvement is in the throttle valve, which is a patented type of stem-control valve, employing a ball seat. The ball is made of stainless steel and its seat of bronze, preventing any rusting due to the moisture which is always present in compressed air. The control stem has three staggered grooves, one of which begins to admit air as the throttle is opened and then the other two in succession, both the cross area and depth of the grooves increasing as the throttle opens. This construction provides extremely sensitive control, eliminates wear and consequent upkeep costs and



**Closed Handle Type—With
Inside Trigger**

prevents any sticking of the valve. Any small particles in the air line will blow through the valve and out of the hammer. The arrangement of the throttle valve is such that it may be completely taken apart when necessary and reassembled in three minutes—a great reduction in the time required for this job in the ordinary hammer.

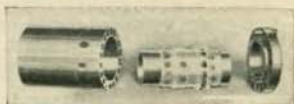
The King Hammers are hard-hitting, perfectly balanced hammers, made in four standard sizes or lengths of stroke. All four sizes furnished either in Open Handle Type with Outside Trigger or in Closed Handle Type with Inside Trigger, as preferred. Open Handle Type will be supplied unless otherwise specified. Can be furnished on special order with Closed Handle and Outside Trigger, or with Inverted Handle for close-quarter work.

When so specified, hammers can be equipped with the M. S. Safety Device to prevent the shooting out of the piston and rivet set, and with the Piston Retaining-Wall Cylinder, both at an extra charge.

General Specifications

Size	No. 5	No. 6	No. 8	No. 9
Rivet Capacity.....	Inches $\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{1}{4}$
Length of Stroke.....	Inches 5	6	8	9
Diameter of Piston.....	Inches $1\frac{1}{16}$	$1\frac{1}{16}$	$1\frac{1}{16}$	$1\frac{1}{16}$
Speed.....	Blows per Minute 1600	1400	1150	930
Air Consumption... ..	Cubic Feet per Minute 25	28	28	28
Length Overall.....	Inches $16\frac{3}{4}$	$17\frac{3}{4}$	$19\frac{3}{4}$	$20\frac{3}{4}$
Net Weight.....	Pounds 17	18	20	21

For Net Prices See Supplement



King "Sleeve" Valve

KING PNEUMATIC CHIPPING HAMMERS



Cylinder, piston, handle and other parts made of Mo-lyb-denum steel, like the riveting hammers shown on the preceding page—a steel of high tensile strength and elastic limit. All parts are heat-treated, and all bearing surfaces are ground and lapped.

Flexible control is provided by the extremely sensitive King Stem-Control Throttle Valve, the same as incorporated in the riveting hammers, allowing slow or rapid operation at will. This enables the operator to get into the work slowly at the start, preventing damage to the chisel.

A patented locking device automatically tightens the handle on the cylinder as the hammer is used. Breakage of cylinders and handles is thus practically eliminated, as the handle positively cannot become loose.

Proper valve design and timing make these hammers speedy, fast-hitting tools striking rapid, sharp, powerful blows. Capable of handling hard work under severe conditions.

General Specifications

Size	No. 1	No. 1½	No. 2	No. 2½	No. 3	No. 4
Class of Service	Very Light	Light	Medium	General	Heavy	Extra Heavy
Length of Stroke, Ins.	1	1½	2	2½	3	4
Diameter of Bore, Ins.	1½	1¾	1¾	1¾	1¾	1¾
Speed—Blows Per Min.	3650	3450	3200	2700	2400	2000
Air Consumption—Cu. Ft. Per Minute	21	21	21	21	21	21
Length Overall, Ins.	12	12¾	13½	14½	15½	16½
Net Weight, Pounds	10¼	10½	11¼	11¾	12½	13

In ordering Chipping Hammers, always state whether wanted with Round or Hexagon bushing. Hammers furnished with Round bushing, for round shank chisels, unless otherwise specified.

KING PNEUMATIC RIVET CUTTER



This is a high-grade, powerful pneumatic rivet cutter, especially recommended for railroad service, car repair work, ship repairs, and in any case where tank, bridge or structural work must be disassembled.

It is the lightest weight rivet cutter of this type on the market, weighing only 60 pounds—a decided advantage in portability and ease of operation.

A neutral position of the throttle valve lever allows the operator to shut off the air when the cutter is not in actual operation, affording considerable economy in air consumption. The King tapered valve is subject to practically no upkeep cost, being provided with an adjusting nut for taking up any wear. The long throttle valve handle aids ease of operation.

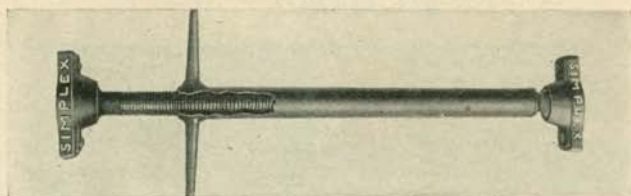
The by-pass tube has a flexible section to eliminate breakage and consequent delay of work. A handy bale is provided for the chisel end of the tool for ease of handling.

A special, positive chisel retainer can be supplied at an extra charge when desired. This is a quick-change type of retainer, requiring but a few seconds to change from chisel to backing-out punch or vice versa. A slight pressure of the finger on the safety lever quickly disengages the tool.

Capacity	1¼" rivets and smaller
Air Pressure Required	40 to 110 lbs.
Air Line Connection	¾"
Overall Length	54"
Weight	60 lbs.

For Net Prices See Supplement

SIMPLEX STEEL TRENCH BRACES



Made of Steel and Malleable Iron

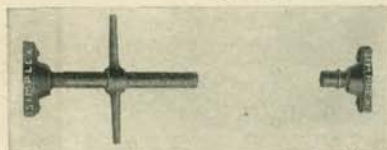
Safe, practical and economical bracing is secured in all trench work, with the application of these Simplex Trench Braces. Their initial cost is low, upkeep negligible, yet they pay by speeding up trench work and preventing costly cave-ins. The ball and socket joints at each end permit quick adjustment and tight gripping at all angles, they may be used on any width of trench by substituting a different length pipe or tube.

They are made substantially in every detail to give years of service.

General Specifications

No.	Pipe & Screw Diam. Inches	Length Screw Inches	Length Brace Closed Inches	Length Brace Open Inches	Length Pipe Inches	Safe Extension Screw Inches	Weight Per Dozen Pounds	List Price Per Dozen
1	1 1/4	10	16	22	8 1/2	6	190	\$ 46.00
2	1 1/4	12	18	25	10 1/2	7	198	46.00
3	1 1/2	14	21	30	13 1/2	9	215	48.00
4	1 1/2	14	24	33	16 1/2	9	224	48.00
5	1 1/2	16	27	37	19 1/2	10	240	52.00
6	1 1/2	16	30	40	22 1/2	10	246	52.00
7	1 1/2	18	36	47	28 1/2	11	270	54.00
8	1 1/2	18	42	53	34 1/2	11	285	56.00
9	1 1/2	18	48	58	40 1/2	10	300	58.00
10	2	18	36	46	26	10	517	102.00
11	2	18	42	52	32	10	538	104.00
12	2	18	48	58	38	10	560	106.00
13	2	18	54	64	44	10	590	108.00
14	2	18	60	70	50	10	604	110.00

Trench Brace Fittings



Screw End

Socket End

Any size brace can be made with these fittings by adding a piece of standard gas pipe, cut to the required length, and drilling a small hole at one end for the cotter pin. These fittings are made of malleable iron and steel.

General Specifications

No.	Diameter Screw Inches	Length Screw Inches	Safe Extension of Screw, Inches	Weight Per Doz. Lbs.	List Price	
					Complete Per Doz.	Screw Ends Only, Doz.
15	1 1/4	10	6	165	\$40.00	\$30.00
16	1 1/4	12	7	175	40.00	30.00
17	1 1/2	14	9	180	42.00	32.00
18	1 1/2	16	10	190	44.00	34.00
19	1 1/2	18	11	196	46.00	36.00
20	2	18	10	415	49.00	66.00

Timber Brace Fittings

Simplex Timber Brace Fittings are especially valuable and practical for wide and deep trenches, in foundation excavations, and mine work. The screw ends are similar to those in the braces mentioned above. Timber caps are regularly included, but timbers are not furnished. When ordering, size of screw and cap should be specified.

General Specifications

No.	Diam. of Screw Inches	Length of Screw Inches	Size of Timber Caps	Weight Per Dozen Pounds	List Price Per Dozen Sets	Extra Timber Caps Per Dozen
21	1 1/4	14	4 x 4	170	\$ 47.00	\$ 15.00
22	1 1/4	14	6 x 6	185	52.00	20.00
23	1 1/2	18	6 x 6	205	56.00	20.00
24	2	18	6 x 6	375	86.00	20.00
25	2	18	8 x 8	385	96.00	30.00



IMPERIAL OXY-ACETYLENE WELDING AND CUTTING OUTFITS

The Imperial Welding and Cutting Equipment is manufactured under the direction of cutting and welding engineers of long experience. These outfits are very easy to operate and any mechanic who follows the simple instructions can quickly master the art of oxy-acetylene welding and cutting.

The mixing principle of this equipment is scientific and practical; the regulator controls the gas delivery uniformly and safely from the lowest to the highest pressures; while the torch has an unusually wide working range.

All Imperial Welding and Cutting outfits, except No. 12, are contained in strong, light steel carrying cases like the one shown in the illustration. A smaller but similar carrying case can be had for the No. 12 outfit at an extra charge when specified.



No. 11 Set

No. 11 Welding Outfit

This outfit is designed for general welding work, from thin sheet metal to the heaviest castings. It does not include equipment for cutting.

It consists of type X Welding Torch with 10 Copper Welding Tips, Extension, Oxygen and Acetylene Regulators with 4 Gauges to indicate working pressure and cylinder pressure of both oxygen and acetylene, 12½ ft. of Oxygen Hose, 12½ ft. of Acetylene Hose, Hose Connections, Goggles, Wrench, Spark Lighter, supply of Welding Rods and Fluxes, and complete instruction book all packed in the Steel Carrying Case.

Shipping weight approximately 65 lbs.

No. 12 Light Duty Welding Outfit

While this is not a production outfit it will serve the every-day requirements of the average garage, sheet metal shop or small repair shop. It will take care of light Welding, Carbon Burning, Lead Burning, Radiator Soldering, Brazing and Pre-heating, and at a slight additional charge, a cutting attachment can be furnished.

It consists of Type 2X Welding Torch, 4 Welding Tips, Carbon Burning Tip, Lead Burning Tip, Radiator Soldering Tip, Brazing Tip, Oxygen and Acetylene, Regulators and Gauges, 12½ ft. Oxygen Hose, 12½ ft. Acetylene Hose, Hose Connections, Goggles, Spark Lighter, Supply of Welding Rods and Fluxes, and Instruction Book.

Cutting attachment furnished only when specified, and at extra charge.

Shipping weight approximately 16 lbs.

No. 17 Welding Outfit

This is the same as the No. 12 outfit described above except that two gauge regulators are included instead of the single gauge type and that this outfit is packed in a steel carrying case. The additional gauge shows the cylinder pressure.

The cutting attachment is furnished only when specified and then subject to extra charge.

Shipping weight approximately 18 lbs.

No. 13 Cutting Outfit

This outfit is designed for cutting only. It is intended for continuous service for wrecking contractors, in boiler shops, on structural steel work, etc. Will cut cast iron, wrought iron and steel from ½" to 12" in thickness.

The set consists of a Type R Cutting Torch with 4 Tips and a Roller Guide, Oxygen and Acetylene Regulators with 4 Gauges to indicate working pressure and cylinder pressure of both Oxygen and Acetylene, 25 feet of Oxygen Hose, 25 feet of Acetylene Hose, Hose Connections, Goggles, Wrench, Spark Lighter and complete Instruction Book, all packed in the Steel Carrying Case.

Shipping weight approximately 65 lbs.

For Net Prices See Supplement

IMPERIAL OXY-ACETYLENE WELDING AND CUTTING OUTFITS

No. 14 Combination Welding and Cutting Outfit

A splendid outfit for all general work, particularly where the work consists mainly of welding with only occasional cutting.

Outfit consists of Type X Welding Torch with Cutting Attachments, 10 Copper Welding Tips, Extension, 3 Cutting Tips, and a Roller Guide, Oxygen and Acetylene Regulators with 4 Gauges to indicate working pressure and of both Oxygen and Acetylene, 12½ ft. of Oxygen Hose, 12½ ft. of Acetylene Hose, Hose Connections, Goggles, Wrench, Spark Lighter, supply of Welding Rods and Fluxes, and complete Instruction Book, all packed in the Steel Carrying Case.

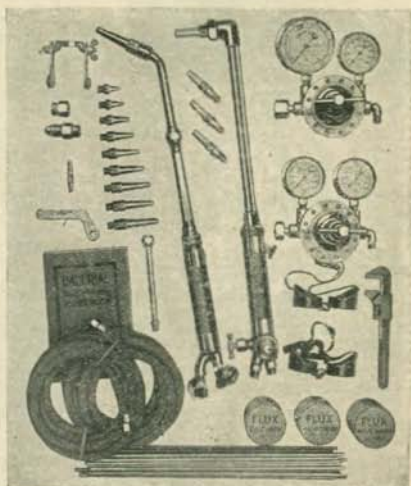
Shipping weight approximately..... 65 lbs

No. 15 Duplex Welding and Cutting Outfit

Most complete all-purpose apparatus obtainable. It is fully adequate for handling all welding and cutting jobs within the range of the Oxy-Acetylene process. Both welding and cutting torches are of the heavy duty type, and are equipped with a full range of tips for the lightest to the heaviest work. Will cut cast iron, wrought iron and steel from ½" to 12" in thickness. Special tips for cutting rivets and cast iron can be supplied upon request.

Consists of a complete No. 11 outfit described on preceding page, with the addition of a type "R" Cutting Torch with 4 Tips and a Roller Guide, 25-foot lengths of Oxygen and Acetylene Hose and an extra pair of Goggles, all packed in the Steel Carrying Case.

Shipping weight approximately..... 65 lbs.



Set No. 15

CYLINDER TRUCKS

A great convenience, especially when outfit is frequently moved around the shop or yard. Eliminates danger of cylinders being knocked over and consequent breaking of apparatus.

Made in three sizes, all having 11" diameter broad-tread wheels.

General Specifications

Size No.	51-H	52-H	53-H
Capacity.....	Two 100-ft. Cylinders	One 200 ft. and One 300-ft. Cylinders	One 100 ft. or One 200-ft. Cylinder
Size Platform.....	11"x19"	14"x23"	10"x10"
Height Overall.....	38"	46"	37½"
Weight, Pounds.....	45	55	34½

ELECTRIC ARC WELDERS

We can also furnish Electric Spot Welders and Electric Arc Welders.

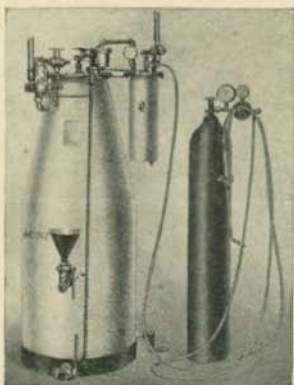
The Electric Spot Weld is used in place of rivets by many sheet metal shops and specialty manufacturers. It can be furnished with a welding capacity of 2 pieces of ¼" steel or lighter.

The Electric Arc Welding set is an economical outfit for welding iron and steel, for repairing fractures, for adding metal and for joining steel sections. Capacities cover all sizes and shapes from 16 gauge sheet up to sections 12" thick.

These sets are thoroughly covered in our Machinery Catalog—a copy of which will gladly be sent on request.

For Net Prices See Supplement

IMPERIAL AUTOMATIC ACETYLENE GENERATORS



50 Lb. Generator Connected to No. 11 Welding Outfit and 200 Cu. Ft. Oxygen Cylinder.

The Type A Imperial Automatic Acetylene Generators of all sizes are approved by the Underwriters' Laboratories of the National Board of Fire Underwriters.

These generators produce pure acetylene gas at a saving of from 2 to 4 cents per cubic foot over the cost of gas compressed in cylinders; with the added advantages of purer gas, no waste and having gas available just as needed.

Constant changing of cylinders, disconnecting hose lines, trucking, rolling and other work is eliminated as well as the danger of tipping or dropping cylinders. This is a decided saving in labor.

The Imperial generators are of the medium pressure, carbide to water type, with automatic feed and pressure regulation, dispensing with weights, clock work or other complicated mechanisms. Interlock safety levers, safety blow-off and a water seal make these generators dependable, safe and fool-proof.

The carbide feed mechanism is very simple, having but one moving part, and is operated automatically by the flow of gas through it. When the torch is turned on, the carbide automatically starts to feed, and when the torch is shut off, the feeding of the carbide is stopped automatically.

Inasmuch as there are no stuffing boxes and packing nuts the generators will stand over a period of several months without loss of gas.

Pressure in the generator is controlled by the tension of the springs in the diaphragm governor. Because of the automatic feed, an absolutely constant pressure is maintained so that frequent adjustment of the torch valves is eliminated, and an acetylene regulator in the service line is unnecessary.

A truck can be furnished to hold either the 25 lb. or the 50 lb. generator and a cylinder of oxygen, at an extra charge.

Chart showing saving per month and per year when using generator in place of cylinders sent on request.

General Specifications

Size of Generator—Carbide Capacity	15 Lb.	25 Lb.	50 Lb.	100 Lb.
Total Production of Acetylene per Charge—Cu. Ft.....	75	125	250	500
Production Acetylene per Hour—Cu. Ft....	15	25	50	100
Carbide Used per Hour—Lbs.....	3	5	10	20
Water Capacity—Gals.....	15	25	50	100
Approx. No. of Torches will Supply in use at same time	Light Work	2	4	10
	Medium Work	1	1	2
	Heavy Work	0	1	1
Height Overall.....	48"	56"	68"	84"
Diameter.....	19"	19"	24"	30"
Shipping Weights, Lbs.....	190	250	350	600

200 lb. and 300 lb. sizes quoted on request.

Type M Acetylene Generator

This type is similar in many respects to the Type A described above, the principal difference being the elimination of interlocking levers and every part not absolutely required. Type M is made only in the 50 pound size and is offered at a very low price.

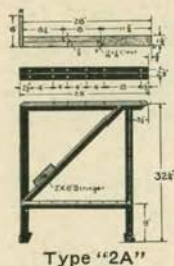
WELDING RODS

We can ship immediately from stock, all grades of welding rods for use with both acetylene and electric equipment. Our stock is carried in short lengths and in reels. Bare, copper-coated, flux-coated and flux-cored types can be furnished, depending upon the class of work and the requirements to be met. Send us a brief description of your work and the equipment used and let us quote you on the best rod for the purpose.

For Net Prices See Supplement

POLLARD BENCH LEGS

Steel Welded Type "A"



Type "A"

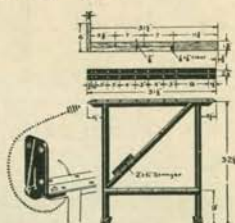
These steel welded bench legs are made of standard angles $2\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{8}$ " and $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{8}$ ". They are ready to fasten planks and make a solid, practical and space-saving bench. The top is pierced for planks; angle brace is pierced for stringer; cross brace ready for shelving; and feet pierced for bolting to floor. The finish is black enamel, air-dried.

Type	Std. Height Inches	Std. Width Inches	Wt. Lbs.	List Price Each
1-A	30	28	20½	\$4.00
2-A	32¼	28	21	4.00
3-A	35	28	21½	4.25

Steel Welded Types "B" and "D"

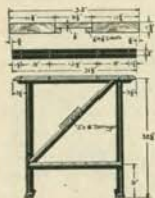
This bench leg is constructed the same as the above type except that there is a projection at the rear as well as at the front. The backboard bracket can be furnished at the list price of 60 cents each extra.

Type	Height Inches	Width Inches	Wt. Lbs.	List Price Each
1-B	30	23	19½	\$4.00
2-B	32½	23	20	4.00
3-B	35	23	20½	4.25
1-D	30	31½	20½	4.10
2-D	32¼	31½	22	4.10
3-D	35	31½	23½	4.35



Types "B" and "D"

Steel Welded Type "E"



Type "E"

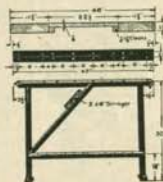
The construction is the same as type "A" except that it has a projection of $3\frac{1}{2}$ inches at front and rear. The placement of the lengthwise stringer is so arranged that workmen can get their knees under the bench when working on both sides.

Type	Height Inches	Width Inches	Wt. Lbs.	List Price Each
1-E	30	31½	20½	\$4.05
2-E	32¼	31½	22	4.05
3-E	35	31½	23½	4.30

Steel Welded Type "F"

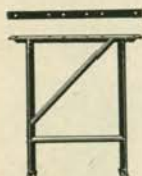
Type "F" bench legs are extra wide being used for double assembly benches. They are similar in character to type "A" except that like "E" they have the raised lengthwise stringer for convenience of workers when seated.

Type	Height Inches	Width Inches	Wt. Lbs.	List Price Each
1-F	30	45	28½	\$4.75
2-F	32¼	45	29	4.75
3-F	35	45	29¾	5.00



Type "F"

Steel Welded Types "L" and "M"



Type "L"

These types are particularly suited for light assembly work. In these, only top and feet are pierced. The finish is of air-dried enamel.

Type	Height Inches	Width Inches	Wt. Lbs.	List Price Each
1-L	30	23	13	\$2.50
2-L	32½	23	13½	2.50
3-L	35	23	14	2.75
1-M	30	28	14½	2.75
2-M	32½	28	15	2.75
3-M	35	28	15½	2.85

POLLARD ALL STEEL BENCH DRAWERS

These bench drawers are desirable for practically any kind of bench. They are well made of 16 and 18 gauge steel and slide easily on two wide channels; finished in black enamel. Attachment is very simple as can be seen from the illustration. Padlock attachment is included on all sizes. Trays 1 inch deep and 6 inches wide can be furnished at a small additional charge.



General Specifications

No.	Width Inches	Length Inches	Depth Inches	Shipping Wt., Lbs.	List Price
700	12	20	4	20	\$2.50
701	12	20	5	21	2.75
702	14	22	4	22	2.75
703	14	22	5	24	3.00
704	18	24	4	26	3.50
705	18	24	5	27	3.75
706	18	24	6	30	4.00

Trays, 3 lb. \$1.00
Cabinet Lock in place of padlock attachment, extra80

POLLARD ALL STEEL BENCHES



4 Foot Bench

For many purposes in many shops the all steel bench is replacing the wooden bench, because it is fireproof, does not become oil-soaked, or splintered and takes less room.

These benches can be had up to 46' wide and 9' long in several different heights. See table below. They are built with the same strong bench legs as shown on page 193, and can be equipped with the standard bench drawer as shown above when specified. For long benches or tables 4 to 6 foot spacing of legs is recommended. Continuous benches of any length can be furnished. Prices on these can be figured by deducting prices of parts as shown in the table below. Benches are shipped knocked down, with the necessary bolts for assembly. Finish is black enamel, air dried.

General Specifications and List Prices

Width Top	Height Legs	Thickness Top	Length of Bench				
			3' on 2 legs	4' on 2 legs	6' on 2 legs	8' on 3 legs	9' on 3 legs
24'	30"	1/8" (12GA)	\$18.26	\$21.30	\$27.38	\$33.48	\$35.03
	32 1/4"	1/8" (16GA)	16.72	19.22	*	27.97	31.72
	35"	1/8" (12GA)	18.76	21.80	27.88	34.23	35.78
29'	30"	1/8" (16GA)	17.22	19.72	*	28.52	32.47
	32 1/4"	1/8" (12GA)	19.10	22.40	30.14	37.18	38.22
	35"	1/8" (16GA)	17.78	20.78	*	33.00	34.36
32 1/2'	30"	1/8" (12GA)	19.60	22.90	30.64	37.93	38.77
	32 1/4"	1/8" (16GA)	18.28	21.28	*	33.75	35.11
	35"	1/8" (12GA)	19.92	23.82	31.64	37.86	41.06
46'	30"	1/8" (16GA)	18.69	22.59	*	33.21	36.41
	32 1/4"	1/8" (12GA)	20.42	24.32	32.14	38.61	41.81
	35"	1/8" (16GA)	20.92	24.82	*	33.96	37.16
46'	30"	1/8" (12GA)	24.06	29.84	38.41	45.68	49.32
	32 1/4"	1/8" (16GA)	24.56	30.34	38.91	46.43	50.07

Allowances from List Prices for Omission of Parts:

Back Plate	\$1.63	\$1.87	\$2.35	\$3.05	\$3.40
End Plates (Per Pair)	1.50	1.50	1.50	1.50	1.50
Shelf, from 24' top bench	2.24	3.00	5.35	4.68	5.26
Shelf, from 29' top bench	2.55	3.40	6.53	6.06	6.81
Shelf, from 32 1/2' top bench	2.85	3.80	6.84	6.53	7.34
Shelf, from 46' top bench	4.02	5.36	10.44	9.51	10.69

*Not recommended.

Shelf on 6' bench is 12 gauge steel; all others 16 gauge.

Backs, stringer and end plates 16 gauge.

List prices do not include bench drawers.

For Net Prices See Supplement

POLLARD TOOL STANDS AND TENDERS



Stand

A sturdy all steel tool stand or tender at the bench or near the job to provide orderliness is of great assistance to the mechanic. It can be used to advantage in any shop, in increasing the efficiency of the worker.

The stand differs from the tender in that it has no cover with hasp; the trays are not as deep; and it is one inch lower in overall height.

Both are made of $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{3}{8}$ " angle steel and No. 16 gauge sheet steel. The finish is black enamel, air-dried.

Bench drawer as shown in illustration, and casters, are not included in the list prices. They can be furnished separate or attached at extra cost; casters list at \$1.00 per set; steel drawers are shown on page 194.

Shipped knocked down, but set up for Chicago delivery at \$2.00 extra.



Tender

Stand

No.	Size, Ins. W L H	List Price	Wt. Lbs.
600	18x24x32	\$5.50	48
601	22x26x32	6.00	57
602	24x30x32	6.50	66
603	24x36x32	7.00	74

Tender

No.	Size, Ins. W L H	List Price	Wt. Lbs.
800	18x24x33	\$9.75	62
801	22x26x33	10.25	71
802	24x30x33	10.75	80
803	24x36x33	11.25	89

POLLARD SHOP DESKS

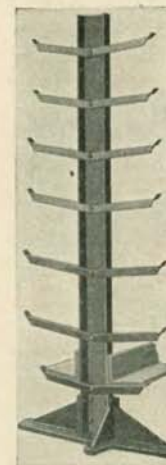


This shop desk is made entirely of No. 16 gauge sheet steel, and $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{3}{8}$ inch angles for legs. It is 42 inches high in front, sloping up to 47 inches high at the back; casters can be attached which increase the height about 2 inches. It is shipped knocked down to save freight, but is easily assembled with the furnished rivets, or $\frac{1}{4} \times \frac{1}{2}$ " stove bolts and lock washers. Set up for Chicago delivery at an additional charge of \$2.00. The finish is air-dried black enamel.

Casters can be furnished at \$1.00 per set, name plate \$1.25. Drawers are not included in the list price; see page 194 for description and prices.

No.	Width	Depth	Price	Weight
900	30 in.	24 in.	\$ 9.75	85 lbs.
901	36 in.	24 in.	10.75	90 lbs.

POLLARD BAR STOCK RACKS



Double Arm

These bar stock racks are made to meet the demand for a method of storing bars, rod, pipe, etc., that will save space, save time in looking for material, be convenient to move, yet rigid enough to hold a heavy load. The wood shelving as shown in the illustration is a suggestion for short lengths. This shelving is not furnished.

The base is made of cast iron; arms are angle steel $1\frac{1}{2} \times 1\frac{1}{4} \times \frac{5}{16}$ " turned up at the ends; length of lower arm from channel to tip is $6\frac{3}{4}$ "; the next two arms are 10 in., fourth and fifth are 9 in., and the sixth and seventh are 8 in. Total height 65 in., width of base of double arm, 28 in., single arm $16\frac{1}{2}$ in.

These racks are sent set up in Chicago but knocked down for freight shipment. They are easily set up with the machine-bolts and lock washers furnished.

The single arm rack weighs 73 lbs., and lists at \$11.00; double arm rack, weight 110 lbs., list price \$14.25.



Single Arm

POLLARD FACTORY STOOLS

Stationary Steel Welded

All the factory stools shown on this page are made of carefully welded $\frac{3}{4}$ x $\frac{3}{4}$ x $\frac{1}{8}$ " and $\frac{5}{8}$ x $\frac{5}{8}$ x $\frac{1}{4}$ " steel angles to insure a high degree of durability and rigidity. The seats are made of wood either $13\frac{1}{2}$ " or $14\frac{1}{2}$ " in diameter. Feet are ball shaped so that stool may slide easily over the floor, and the finish is black enamel. Series N-1 has a $13\frac{1}{2}$ " seat; series N-2 has a $14\frac{1}{2}$ " seat. In series N-1-B and N-2-B are included the stools with wood back-rests and a $13\frac{1}{2}$ " or $14\frac{1}{2}$ " seat respectively, in varying sizes. Two sets of braces are used for stools 28 inches or higher.



List Prices

Height, In.	N-1	N-2	N-1-B	N-2-B
12	\$2.54	\$2.70	\$3.74	\$3.90
14	2.54	2.70	3.74	3.90
16	2.54	2.70	3.74	3.90
18	2.54	2.70	3.74	3.90
20	2.61	2.77	3.81	3.97
22	2.68	2.84	3.88	4.04
24	2.75	2.91	3.95	4.11
26	2.82	2.98	4.02	4.18
28	2.95	3.11	4.15	4.31
30	3.06	3.22	4.26	4.42
32	3.17	3.33	4.37	4.53
34	3.28	3.44	4.48	4.64
36	3.39	3.55	4.59	4.75

Swivel Steel Welded

With the exception of having a swivel seat, these stools are made with the same material and careful welding as the above mentioned type. The swivel castings are made of malleable iron. As in the other type there are four series varying according to height and different seat sizes. In series N-S-1 the seat is $13\frac{1}{2}$ " wide, and in N-S-2 it is $14\frac{1}{2}$ ". N-S-1-B has the wood back rest (which can be seen on the stool in the illustration) and a $13\frac{1}{2}$ " seat. N-S-2-B is the same except that it has a $14\frac{1}{2}$ " seat.

List Prices



Height, Ins.	N-S-1	N-S-2	N-S-1-B	N-S-2-B
18	\$3.88	\$4.04	\$5.08	\$5.24
20	3.95	4.11	5.15	5.31
22	4.02	4.18	5.22	5.38
24	4.09	4.25	5.29	5.45
26	4.16	4.32	5.36	5.52
28	4.29	4.45	5.49	5.65
30	4.40	4.56	5.60	5.76
32	4.51	4.67	5.71	5.87
34	4.62	4.78	5.85	5.98
36	4.73	4.89	5.96	6.09

Adjustable Steel Welded

These stools have the same general description as the stationary stools shown above. Their height, however, can be adjusted up or down to the extent of six inches. Series A-1 has a $13\frac{1}{2}$ " seat; A-2 a $14\frac{1}{2}$ " seat; and series A-1-B, and A-2-B have wood back rests as shown in the illustration above. The adjustment is made by drilled inter-sliding legs, stove bolts holding the legs to the desired height.

List Prices

Height, Ins.	A-1	A-2	A-1-B	A-2-B
18-24	\$3.13	\$3.29	\$4.33	\$4.49
22-28	3.26	3.42	4.46	4.62
26-32	3.53	3.69	4.63	4.89
30-36	3.66	3.82	4.86	5.02



Adjustable Swivel Steel Welded

Swivel stools can also be furnished in the adjustable type with the same features as the other stools. They are made also with the back rests and two sizes of wood seats.

List Prices

Height, Ins.	A-S-1	A-S-2	A-S-1-B	A-S-2-B
18-24	\$4.47	\$4.63	\$5.70	\$5.86
22-28	4.60	4.76	5.83	5.99
26-32	4.87	5.03	6.10	6.26
30-36	5.00	5.16	6.23	6.42

POLLARD TRUCKS

Low Trucks

This is the basic truck from which all the following trucks are built. It is well constructed of $1\frac{1}{2}$ " Angles and No. 16 sheet steel with 5 inch swivel and 6 inch stationary wheels. It is shipped knocked down. With the supplied washers and bolts assembly is very simple. Finish is black enamel.

No.	Width Ins.	Length Ins.	List Price	Wt. Lbs.
101	20	30	\$14.00	53
102	20	36	16.00	55
103	24	40	20.00	58
104	24	48	22.00	61



Flat Top Trucks

No. 121 Series of Flat Top Trucks with handle is shown below. Platform height is $18\frac{1}{2}$ ", total height $33\frac{1}{2}$ ". Chicago set up price is \$1.35 extra.

No. 111 Series is similar, except no handle is furnished. Chicago set up price on this model is \$1.25 extra.

With Handle			Without Handle			Size of Top Inches	Metal Thick- ness of Top
No.	Wt. Lb.	List Price	No.	Wt. Lb.	List Price		
121	73	\$17.50	111	65	\$16.00	20 x 30	16 ga.
121A	74	19.50	111A	66	18.00	20 x 30	14 ga.
122	75	20.50	112	67	19.00	20 x 36	16 ga.
122A	76	23.50	112A	68	21.00	20 x 36	14 ga.
123	77	25.50	113	70	24.00	24 x 40	16 ga.
123A	80	27.50	113A	72	26.00	24 x 40	14 ga.
124	82	32.00	114	73	29.50	24 x 48	16 ga.
124A	84	33.50	114A	75	32.00	24 x 48	14 ga.



Flat Top with Handles



End Plate

Series 131 is illustrated at the right above. Chicago set up price of this model is \$1.60 extra, while the extra for the series 141 which is enclosed on sides as well as ends is \$2.00.

End Plate Truck			Closed Truck			Size of Top Inches	Metal Thick- ness of Top
No.	Wt.	List Price	No.	Wt.	List Price		
131	79	\$19.00	141	101	\$23.00	20 x 30	16 ga.
131A	80	20.00	141A	104	24.00	20 x 30	14 ga.
132	82	23.00	142	106	24.50	20 x 36	16 ga.
132A	83	25.00	142A	109	25.50	20 x 36	14 ga.
133	86	29.00	143	112	28.00	24 x 40	16 ga.
133A	88	31.00	143A	114	29.50	24 x 40	14 ga.
134	90	33.00	144	117	32.00	24 x 48	16 ga.
134A	92	36.00	144A	120	33.50	24 x 48	14 ga.

Box Truck

The Box Trucks are similar except they are $26\frac{1}{2}$ " deep and are braced all around the top with angle iron, also have diagonal braces on each side. Chicago set up price is \$2.00 extra.

No.	Size Inches	Plate	Wt. Lbs.	List Price Each
	W. L.			
151	20 x 30	16 ga.	105	\$24.00
151A	20 x 30	14 ga.	108	25.00
152	20 x 36	16 ga.	110	26.00
152A	20 x 36	14 ga.	113	27.00
153	24 x 40	16 ga.	117	30.00
153A	24 x 40	14 ga.	119	31.50
154	24 x 48	16 ga.	120	34.00
154A	24 x 48	14 ga.	125	35.50



BARRETT LIFT TRUCKS

Model "F"



Capacity 2500 to 5000 lbs.

For loads ranging from 2500 to 5000 lbs. the Model "F" will be found a sturdy durable and suitable conveyor. It is made in three standard widths: 17 $\frac{3}{8}$ ", 24" and the extra wide 27" which is not listed. They are made with two lifting heights, 1 $\frac{1}{2}$ " and 2 $\frac{3}{8}$ ".

These lift trucks require no treadles or manually operated latches to engage their lifting mechanism. The lifting latch is balanced in the handle bar so that when it is raised to the locking position the latch automatically engages with the hook. Likewise when the handle reaches the end of its lifting stroke, the release of the downward pressure also releases the latch and the load is ready to roll away.

The turn table is placed as close to the axle as possible to escape the shock in the forward movement of the load. The wheels are made of chilled cast iron, giving them surfaces as hard as glass, while the web and hub are soft enough to absorb severe shocks and prevent breakage. Where rubber tires are necessary they can be furnished at a slight additional cost. The axles are made of alloy steel hardened and ground. These models are equipped with heavy duty Hyatt roller bearings and Alemite lubricating system. The handle is of ample width, and forms a comfortable, easy grip. It is indestructible, being welded into a long, forged steel handle bar.

Model "G" trucks are not listed here, but information regarding them will be gladly sent upon request. These trucks are suited for lighter work than Model "F," having a lifting range of from 500 to 2500 lbs.

General Specifications

Model "F"

Capacity 5,000 lbs., 1 $\frac{1}{2}$ " lift, 17 $\frac{3}{8}$ " wide.

No.	F-636	F-648	F-736	F-748	F-936	F-948
Carrying frame length, In.	36	48	36	48	36	48
Handle platforms, min., In.	24x36	24x48	24x36	24x48	24x36	24x48
Handle platforms, max., In.	36x48	36x60	36x48	36x60	36x48	36x90
Wheel Diam. Ht., lowered.	6	6	7	7	9	9
Height when raised, In.	7 $\frac{1}{2}$	7 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	10 $\frac{1}{2}$	10 $\frac{1}{2}$
Wheel base, In.	42	46	42	46	41 $\frac{1}{2}$	45 $\frac{1}{2}$
Overall length, In.	51	62	51 $\frac{1}{2}$	62 $\frac{1}{2}$	52	63
App. weight, Lbs.	250	270	270	295	295	330

Model "FL"

Lifts 2 $\frac{3}{8}$ inches. Other specifications same as Model "F."

No.	FL-636	FL-648	FL-736	FL-748	FL-936	FL-948
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Special "F" and "FL" Models are made in any length carrying frame up to 72 inches.

Model "FK"

Lifts 1 $\frac{1}{2}$ " 24 inches wide.

No.	FK-742	FK-748	FK-760	FK-942	FK-948	FK-960
Carrying frame length, In.	42	48	60	42	48	60
Handle platforms, min., In.	29x42	29x48	29x60	29x42	29x48	29x60
Handle platforms, max., In.	44x54	44x60	44x72	44x54	44x60	44x72
Wheel Diam. Hgt., lowered.	7	7	7	9	9	9
Height when raised.	8 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	10 $\frac{1}{2}$	10 $\frac{1}{2}$	10 $\frac{1}{2}$
Wheel base, In.	42	46	54	41 $\frac{1}{2}$	45 $\frac{1}{2}$	53 $\frac{1}{2}$
Overall length, In.	56	62	74	57	63	75
App. weight, Lbs.	320	330	340	340	350	365

Model "FKL"

Lifts 2 $\frac{3}{8}$ inches. Other details same as Model "FK."

No.	FKL-742	FKL-748	FKL-760	FKL-942	FKL-948	FKL-960
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Special "FK" and "FKL" Models made in any length carrying frame.

BARRETT "STEELEG" PLATFORMS

These sturdy platforms made with steel angles, steel legs and high grade lumber can be readily adapted to the handling of many kinds of material by adding stakes, trays, etc. Top boards are clamped with a vise-like grip the full length of the platform to protect the ends of the boards. Length, width and quantity should be specified as well as materials to be handled and model of lift truck to be used when ordering.



Platform

For Net Prices See Supplement

BARRETT PORTABLE ELEVATORS

Hand and Electric Operated

The many uses for the Barrett Portable Elevator make it a very desirable piece of equipment for the plant or warehouse. Its primary purpose is for stacking materials of every description—utilizing space above the reach of ordinary methods of piling. There are many other uses which increase its value, such as installing heavy motors overhead, loading motor trucks, assembling heavy machines and so forth. Four important features are embodied in the construction of this elevator which make for mechanical efficiency and positive safety: A governor that absolutely prevents dropping the load; enclosed steel gears running in oil; positive floor locking device; and the riveted and welded construction that insures sturdiness.

Different type elevators are built to meet special requirements, varying in capacity, height, platform size, and kind of power, hand or motor.

All electrically operated light duty portable elevators can also be run by hand crank when desired. They use current while going up only. The governor provides for the use of a clutch which disconnects the electrical equipment when bringing the load down—permitting it to be brought to the floor without shock or danger. The frame in each elevator is built on a simple engineering principle and tested for 100% overload.

Sturdy channels are used as uprights diagonally braced, bolted, and welded at the joints to provide greater rigidity; base members and uprights are hot riveted together and reinforced by generous gusset plates. Machines over twelve feet high have trussed frames to provide the necessary strength and resistance to torque.

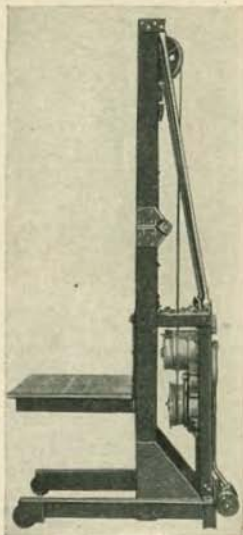
Each elevator is equipped with a removable steel platform, permitting the use of other platform types thereby giving greater flexibility to the machine if conditions require special platforms.

The hinge type portable elevator can be had either hand or electrically operated. The hinge permits dividing the machine at 6 or 8 feet so as to enable the passage from one place to another through doorways and under overhead obstructions.

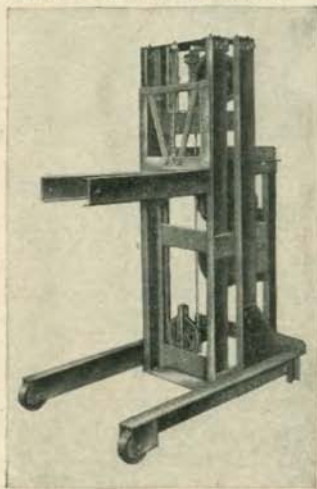
This machine is governor-controlled for safety and to assure lower operating cost. The cut steel gears are enclosed and run in oil.

Any piling height may be reached; standard elevators are available for capacities of 750, 1000, 1500, 2000 and 3000 lbs. capacities. There are standard platform sizes but smaller or larger platforms can be furnished.

The uses for the Barrett Telescope Portable Elevator are many, and are most generally found in plants where various heights of piling are desirable. The advantage of this type is in its adaptability to low places and high places as well, virtually doing the work of two elevators.



Hinge Type



Telescope Type

It is very useful in raising materials from the basement up to and alongside the loading edge of the wagon or motor truck at the street curb. In piling materials in the warehouse even though the roof slants and ordinarily causes piling trouble, this elevator makes possible the utilizing of all odd spaces. It is equally helpful in piling where joists or a balcony interfere, overcoming them by its flexibility in moving about.

This elevator consists of two sections, a main and an intermediate frame. The intermediate travels in the main frame while the platform travels in the intermediate frame. When the platform is in its lowered position the telescope elevator is collapsed. When the platform rises, it first travels as far as it can go in the intermediate frame and stops—then the intermediate frame starts to rise.

This elevator is constructed to meet any conditions or requirements—yet its parts are standardized and can be obtained at any time.

When ordering, state the work for which it is required, the kind of products, the range of weights to be handled and under what conditions. Additional information regarding these will be sent on request.

SIMPLEX INDUSTRIAL JACKS



No. 85



No. 29



No. 22

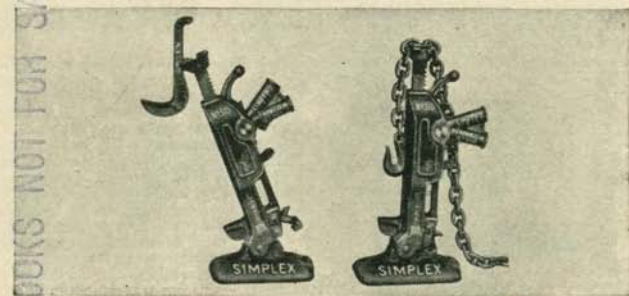
Nos. 84, 85 and 86 Simplex Jacks are single acting—automatic lowering. They are designed for shop and millwright use, mines, light railways, tractors, threshing machines, trucks, and concrete forms. Safe, simple, and durable. Furnished with 30" steel lever bar.

No. 22 Simplex Jack is single acting—automatic in raising and lowering. A powerful, sturdy jack designed for contractors, road builders, electric railways, oil well drillers, truckers, and general shop and industrial service. The working parts are all drop-forged steel. Supplied with 5 ft. steel lever pole.

The Nos. 24 and 29 Simplex Jacks and the Nos. 125, 126, and 135 are designed for heavier service.

General Specifications

Jack No.	Capacity, Tons	Lift, Inches	Height, Inches	Weight, Lbs.	List Price, Each
84	5	7½	14	21	\$ 14.00
85	5	10½	17	25	15.00
86	5	13¼	20¼	31	16.00
22	10	12	21¼	59	25.00
24	15	13	23¾	87	38.00
29	15	18	28½	110	40.00
125	25	16	26½	150	100.00
126	25	13	27½	182	100.00
135	35	16	26½	216	135.00



No. 310

The No. 310 Simplex Jack operates at an angle as well as vertically. It is designed for emergency, shop and repair service, road contractors, oil well drillers, truckers, fire departments, and for the handling of heavy machinery. Furnished with 5-ft. steel lever bar, 5-ft. steel chain, and steel auxiliary shoe.

General Specifications

Jack No.	Capacity, Tons	Lift, Inches	Height, Inches	Weight, Lbs.	List Price, Each
310	15	13	22¼	66	\$48.00

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SIMPLEX TRACK JACKS

Tripping Style



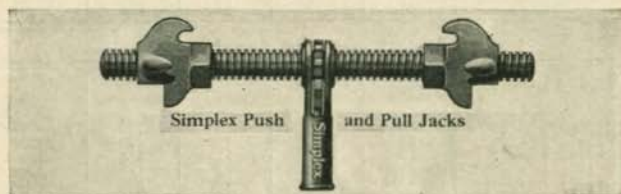
Simplex Track or Trip Jacks are designed for track or road repairing and maintenance. Light, durable and powerful. Certified by the Underwriter's Laboratory for safety capacities of 48,000 and 60,000 pounds, respectively. Built in double acting and single acting styles. Furnished with oval socket and 5-foot oval hickory pole, or square socket without poles. Square sockets permit use of standard lining bar as lever.



General Specifications

Jack No.	Capacity Tons	Lift Inches	Height Inches	Weight Lbs.	List Price Each Sq. Socket	List Price Each Oval Socket
101	12	12½	23	59	\$21.00	\$22.00
106	12	17½	29	78	27.00	28.00
216	15	8	17¼	46	19.00	20.00
217	15	12½	23	53	21.00	22.00
218	15	18	29½	74	27.00	28.00

SIMPLEX PUSH AND PULL JACKS



Simplex Push and Pull Jacks are for straightening steel cars, spreading sills, etc. Valuable in the erection of bridges, steel framed buildings, tanks, etc.

Jack No.	Capacity Tons	Operating Length, Inches	Weight Lbs.	List Price Each
1524	15	21	41	\$36.00
1528	15	25	44	38.00
1536	15	32	50	40.00

SIMPLEX AUTO AND LIGHT INDUSTRIAL JACKS

For passenger cars, trucks and industrial use. Similar in construction to the heavy duty Simplex Jacks. Built of steel drop forgings. Furnished with steel lever poles.

General Specifications

Jack No.	Capacity Tons	Lift Inches	Height Inches	Weight Lbs.	List Price Each
41	1½	6¾	10	11½	\$6.50
141	1½	6½	10¾	11½	6.50
42	2	8	11½	13	7.50
43	3	9½	13	15	8.50
44	4	9	13¾	20	12.00
145	5	7½	12	26	16.00



LOVEJOY BALL BEARING JACKS



25 Ton With Foot Lift



50 Ton

Specifications—Regular Type

Style	Capacity Tons	Height Inches	Rise Inches	Diameter of Base Inches	Weight Pounds	List Price
1520	15	20	9	12	100	\$60.00
1522	15	22	10	12	110	60.00
1524	15	24	12	12	120	65.00
1526	15	26	13	12	125	70.00
2520	25	20	9	12	110	80.00
2522	25	22	10	12	120	82.50
2524	25	24	12	12	130	85.00
2526	25	26	13	12	145	90.00
2530	25	30	17	12	175	95.00
2533	25	33	20	12	180	95.00

Specifications—High Speed Type

Style	Capacity Tons	Height Inches	Rise Inches	Diameter of Base Inches	Weight Pounds	List Price
HS 3520	35	20	6	12	165	\$145.00
HS 3524	35	24	10	12	170	150.00
HS 3526	35	26	13	12	175	150.00
HS 3531	35	31	18	12	195	160.00
HS 3533	35	33	20	12	205	160.00
HS 3538	35	38	25	12	225	170.00
HS 5020	50	20	6	14	250	175.00
HS 5024	50	24	10	14	265	180.00
HS 5026	50	26	13	14	275	180.00
HS 5033	50	33	20	14	300	210.00
HS 5038	50	38	25	14	310	220.00

Lovejoy Ball Bearing Heavy Duty Jacks

All Jacks shown on this page are made from highest grade materials, with best possible workmanship. The bearing plates are of Chrome Tool Steel, hardened and ground. By using ball bearings instead of roller bearings all side thrust is eliminated.

It is impossible for the load to force the jack down, neither are there any spring pawls or locking devices to get out of order. All gears are steel, drop forged and hardened.

These can be furnished in any size with foot lift at a small extra charge, but foot lift-type jacks are only good for fifty per cent of the regular rated capacity.



Heavy Duty Type

Specifications

Style	Capacity Tons	Height Inches	Rise Inches	Diameter of Base Inches	Weight Pounds	List Price
6026	60	26	12	14	330	\$175.00
6031	60	31	16	14	350	175.00
7526	75	26	12	14	350	200.00
10027	100	27	12	14	365	300.00

For Net Prices See Supplement

LOVEJOY INSPECTION AND JOURNAL JACKS

Cone-Bearing Ratchet Screw Jacks
For Car Inspectors

These jacks will save enough time in a month to pay for themselves. They are light, can be handled quickly, work rapidly and are always ready for use. The lifting screw rests and revolves on a tempered steel cone. No railroad can afford to be without them for short heavy lifting, putting in brasses and general yard work.

The frame is a special steel casting which combines ample strength with a minimum of weight. This reduction in weight means a savings of energy and time in moving and placing the jack.

General Specifications

Size No.	Capacity Tons	Height Inches	Rise Inches	Weight Pounds	List Price
1509-W	15	9 $\frac{3}{4}$	4	43	\$22.00
1510-L	15	10	4	35	22.00
1511-K	15	11	5	47	22.00

Ball-Bearing Journal Jacks

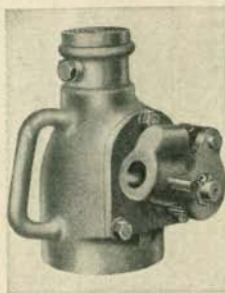
These jacks are especially designed for handling equipment. They are strongly made, with a generous factor of safety, and are equipped with efficient ball-bearings, providing ample power and insuring ease of operation.

The patented safety locking device, with which they are equipped, prevents any possibility of the standard being raised above its registered height limit, thereby preventing any accident by the falling of the load.



General Specifications

Size No.	Capacity Tons	Height Inches	Rise Inches	Weight Pounds	List Price
2509	25	9	3	50	\$56.00
2511	25	11	4 $\frac{1}{2}$	54	\$6.00



High Speed Journal Jack

A high-speed type of jack intended particularly for the modern heavy locomotives, and freight and passenger cars.

This jack is also provided with a patented stop which absolutely prevents the standard from being run out beyond its height, thereby eliminating injury to bronze bushing and other parts of the jack.

Electric steel castings for the frame combine ample strength with minimum weight. Light enough to be handled easily by one man, it is especially recommended as a time and labor saver.

General Specifications

Size No.	Capacity Tons	Height Inches	Rise Inches	Weight Pounds	List Price
2510	25	10	3 $\frac{1}{2}$	36	\$56.00

VULCAN LOCOMOTIVE JACK SCREWS



Jack Screws have been used as lifting devices for a great many years, and are still almost indispensable in many lines of work.

The Vulcan Locomotive Jack Screws are of the bell base type, designed and made of high grade materials. The screw is made from one solid piece of special steel, with square threads of proper width, depth and pitch to carry the load.

The head, made in one piece with the screw, is of proper height and diameter in relation to the other parts, and is provided with holes of sufficient diameter to admit the correct size of bar for turning. Instead of being cut square, the screw has a generous fillet where it enlarges to form the head, insuring additional strength at this point.

This construction is far superior to a bar iron screw with a separate collar riveted or welded on to form the head.

The stand and cap are made of strong gray iron castings, and are guaranteed not to break under loads twenty-five percent in excess of the normal carrying capacity.

Capacities

Size—Diameter of Screw, Inches	1¼	1½	1¾	2	2¼	2½	3
Normal Capacity..... Tons	10	12	16	20	24	28	36
Vulcan Guaranteed Capacity Tons.....	12½	15	20	25	30	35	45

General Specifications

*SIZE Inches	Height Overall With Screw Down Inches	Rise of Screw Inches	List Price Each	*SIZE Inches	Height Overall With Screw Down Inches	Rise of Screw Inches	List Price Each
1¼x 4	6½	2¼	\$ 2.90	2¼x10	13¾	6¾	\$ 8.25
1¼x 6	8½	4¼	3.10	2¼x12	15¾	8¾	9.00
1¼x 8	10½	6¼	3.40	2¼x14	17¾	10¾	10.00
1¼x10	12½	8¼	3.80	2¼x16	19¾	12¾	11.00
1¼x12	14½	10¼	4.20	2¼x18	21¾	14¾	12.00
1¼x14	16½	12¼	4.60	2¼x20	23¾	16¾	13.25
1½x 4	6¾	1¾	3.25	2½x22	25¾	18¾	14.50
1½x 5	7¾	2¾	3.50	2½x24	27¾	20¾	15.75
1½x 6	8¾	3¾	3.75	2½x 6	10	2¼	7.75
1½x 8	10¾	5¾	4.25	2½x 6½	10½	2¾	8.00
1½x10	12¾	7¾	4.75	2½x 8	12	4¼	8.75
1½x12	14¾	9¾	5.25	2½x10	14	6¼	9.75
1½x14	16¾	11¾	6.00	2½x12	16	8¼	10.75
1½x16	18¾	13¾	6.75	2½x14	18	10¼	12.00
1¾x 6	9	3½	4.50	2½x16	20	12¼	13.25
1¾x 8	11	5½	5.00	2½x18	22	14¼	14.50
1¾x10	13	7½	5.75	2½x20	24	16¼	15.75
1¾x12	15	9½	6.25	2½x22	26	18¼	17.00
1¾x14	17	11½	6.75	2½x24	28	20¼	18.25
1¾x16	19	13½	7.50	2½x26	30	22¼	20.00
1¾x18	21	15½	8.50	2½x28	32	24¼	22.00
2 x 5	8½	2	5.00	2½x30	34	26¼	24.00
2 x 6	9½	3	5.25	2½x32	36	28¼	26.00
2 x 8	11½	5	6.00	3 x 8	13	3½	17.50
2 x10	13½	7	6.75	3 x14	19	9½	19.50
2 x12	15½	9	7.50	3 x16	21	11½	20.75
2 x14	17½	11	8.25	3 x18	23	13½	22.00
2 x16	19½	13	9.25	3 x20	25	15½	23.25
2 x18	21½	15	10.25	3 x22	27	17½	24.50
2 x20	23½	17	11.50	3 x24	29	19½	25.75
2 x22	25½	19	12.50	3 x26	31	21½	27.00
2 x24	27½	21	13.50	3 x28	33	23½	28.50
2¼x 6	9¾	2¾	7.00	3 x30	35	25½	30.00
2¼x 8	11¾	4¾	7.50	3 x36	41	31½	36.00

*Size dimensions indicate diameter of screw and height of stand, not including screw. Order by size dimensions.

For Net Prices See Supplement

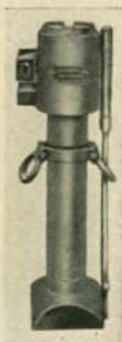
HENDERER'S SONS HYDRAULIC JACKS

Plain Hydraulic Jacks

This jack is particularly advantageous in close places where a firm foundation can be secured, but a large base cannot be admitted. This jack will operate in horizontal, vertical, and inclined positions.

General Specifications

Capacity Tons	Rise Inches	Height When Down Inches	Square Base, Size Inches	Wt. Lbs.	List Price
4	12	24 1/2	4 1/2	55	\$50.00
5	4	12	4 1/2	30	42.00
7	12	25 1/4	4 1/2	67	54.00
7	18	31 1/4	4 1/2	77	60.00
7	24	38	4 1/2	95	64.00
10	12	25 1/4	6	95	60.00
10	18	31 1/4	6	108	70.00
10	24	38 1/2	6	128	78.00
15	12	25 1/2	6 1/2	130	76.00
15	18	31 1/2	6 1/2	145	86.00
15	24	38	6 1/2	155	100.00
20	12	26 1/2	7	170	90.00
20	18	32 3/4	7	185	108.00
20	24	38 1/2	7	210	130.00
30	9	22 1/2	8 1/4	176	110.00
30	12	26	8 1/4	200	128.00
30	18	32	8 1/4	230	152.00
40	12	26 1/2	9	223	144.00
40	18	33	9	252	170.00
50	12	27	10	243	168.00



Broad Base Hydraulic Jack

The large base on this jack gives it a solid foundation making it suitable for work where steadiness is required. The valves are arranged so that this jack will also operate in a horizontal, vertical or inclined position.

General Specifications

Capacity Tons	Rise Inches	Height When Down Inches	Diam. of Base Inches	Weight Pounds	List Price
4	12	24 1/2	9 1/2	70	\$56.00
7	12	25	10	88	64.00
7	18	31 1/2	10	98	68.00
7	24	37 1/2	10	110	70.00
10	12	25	12	110	70.00
10	18	31 1/2	12	124	82.00
10	24	37 3/4	12	150	94.00
15	12	25 1/2	12	142	92.00
15	18	31 1/2	12	160	108.00
15	24	38	12	190	124.00
20	12	26 1/2	13	190	110.00
20	18	32 1/2	13	218	130.00
20	24	38 1/2	13	231	156.00
30	9	23	13 1/2	215	124.00
30	12	26 1/2	13 1/2	213	138.00
30	18	32 1/2	13 1/2	270	160.00
40	12	26 3/4	13 3/4	257	166.00
40	18	33	13 3/4	290	206.00
50	12	26 1/2	15	285	190.00
50	18	34 1/2	15	355	230.00
60	12	28	15	355	240.00



Claw Type Hydraulic Jack

The claw on this type jack as shown in the illustration being close to the ground, is made for raising loads that are not of sufficient height to admit the head of the jack. This type also operates inclined, horizontally, and vertically.

General Specifications

Capacity Tons	Rise Inches	Height, Down Inches	Height, Claw Inches	Weight Pounds	List Price
4	12	24 1/2	4 1/2	78	\$ 58.00
7	12	25	4 1/2	95	68.00
7	18	31	4 1/2	107	70.00
10	12	26	5	135	76.00
10	18	32	5	150	86.00
15	12	25 3/4	5 1/2	175	94.00
15	18	32	5 1/2	195	112.00
20	12	26 1/2	5 1/2	210	118.00
20	18	32 1/2	5 1/2	240	140.00
30	12	26 1/2	6	255	158.00
30	18	32 1/2	6	300	190.00
40	12	26 1/2	6 1/2	295	184.00



"Low" Hydraulic Jacks

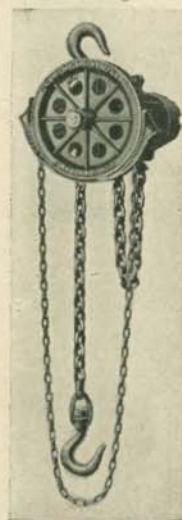
Claw Type

"Low" Jacks have an average height 5 inches less than the regular type of jacks. They are made in various capacities ranging from 7 to 100 tons. Weights range from 100 to 600 lbs. Further information and prices on request.

CYCLONE HIGH SPEED CHAIN HOISTS

An excellently built high-speed hoist of the spur geared type, for use in frequent or continuous service where speed and safety are essential in handling the load. Geared to lift the load at a high speed with a minimum amount of effort. Cut gears are used throughout reducing vibration and friction to a minimum, consequently increasing the efficiency and wearing qualities. Efficiency averages approximately 80%. All sizes are the single unit type, the capacity being increased by enlarging each part, thus retaining simplicity of construction while increasing the strength and power.

It is equipped with automatic friction brake, which will hold the load at any desired point, but which is released by a slight reverse pull on the hand chain. Each hoist tested to generous overload before leaving factory.



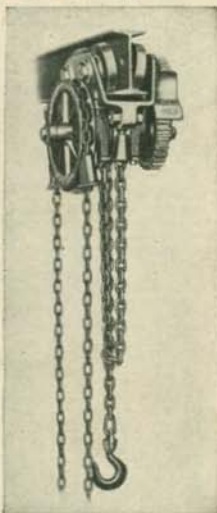
1/4 to 3 Ton

C-M TROLLEY HOIST (With Track Clamp)

A high speed hoist and built-in trolley combination resulting in a close headroom arrangement found necessary in many instances. In the shop or passage where headroom is limited the use of a trolley hoist of this nature is often essential.

The same high standard of workmanship and design found in the "Cyclone" High Speed hoists is followed, resulting in an excellent arrangement and maximum efficiency.

The trolley is equipped with flangeless, chiseled face, Timken Roller Bearing track wheels, insuring smooth operation and long wear. These trolleys will also pass freely around curves of small radius.



Rated Capacity Tons	List Price		St'd Lift A.	Minimum Distance Between Hooks and I-Beams Ins.	*Size I-Beam Ins.	Gear Ratio	Net Wt. Lbs.
	Complete Standard List	Extra Lift Per Ft.					
1/2	\$ 126.00	\$ 1.80	8	11	5	22 1/2-1	127
1	150.00	1.90	8	11	6	30 -1	132
1 1/2	200.00	2.00	8	12 3/4	6	38 -1	175
2	240.00	2.10	9	16	8	46 -1	210

*Size and Weight of I-Beam must be given when ordering.

If track clamp is not wanted, deduct \$20.00 from the List Price.

In ordering hoists be sure to state LIFT required if standard lift is not sufficient. Hoists with STANDARD LIFT furnished unless otherwise specified.

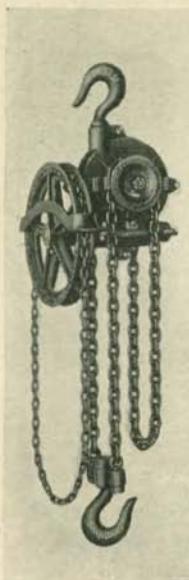
Prices on larger capacity trolley hoists or trolley hoists with hand geared trolleys upon request.

For Net Prices See Supplement

Rated Capacity Tons	List Price		Standard Lift Ft.	Minimum Distance Between Hooks In.	Chain Pull to Lift Full Load Lbs.	Ft. of Chain Overhauled to Lift Load One Foot	Net Wt. Lbs.
	Complete Standard Lift	Extra Lift Per Ft.					
1/4	\$ 60.00	\$ 1.80	8	14	70	9	62
1/2	70.00	1.80	8	15	55	24	72
1	90.00	1.90	8	17	78	33	92
1 1/2	120.00	2.00	8	19	101	39	116
2	140.00	2.10	9	21	108	47	162
3	180.00	2.60	10	23	115	70	226
4	220.00	3.20	10	34	118	91	295
5	280.00	4.20	12	38	105	123	379
6	330.00	5.00	12	41	109	140	448
8	400.00	5.00	12	43	137	159	484
10	480.00	6.00	12	47	147	191	652
12	600.00	6.00	12	50	165	195	695
*16	720.00	10.00	12	44	*75	*285	872
*20	850.00	12.00	12	50	*90	*336	1600
*30	1050.00	17.00	12	63	*90	*504	1860
*40	1300.00	22.00	12	82	*90	*670	2120

*16, 20, 30 and 40 Ton Hoists have two hand chains. Chain pull and amount of chain overhauled, as given in table for these sizes, is for each hand chain.

STANDARD SCREW GEARED CHAIN HOISTS



Recommended for use where a high speed hoist is not needed. Especially adapted to portable use, for riggers, for horizontal pulling and for temporary or occasional service.

Holds the load at any point. Will not lower until hand chain is pulled. All working parts are protected from dust and weather. The bronze worm wheel and steel worm run in oil thereby insuring smooth action and complete lubrication.

This type of hoist has about one-half the efficiency of the High Speed or Spur Geared type. It operates with a light chain pull but requires a relatively large overhaul of hand chain, thus making it slower in action.

General Specifications

Rated Capacity Tons	List Price		Standard Lift Ft.	Minimum Distance Between Hooks Ins.	Chain Pull to Lift Full Load Lbs.	Ft. Chain Overhauled to Lift One Ft.	Net Wt. Lbs.
	Complete Standard Lift	Extra Lift Per Ft.					
1/2	50.00	2.50	8	16	49	47	56
1	60.00	2.60	8	17	87	57	71
1 1/2	80.00	2.70	8	17	94	71	81
2	100.00	2.80	9	20	128	92	99
3	150.00	3.00	10	24	132	119	187

DIRECT DIFFERENTIAL CHAIN HOISTS

A well made hoist of the differential type for intermittent use where comparatively light loads must be handled quickly; it is quite fast in operation, requiring about the same overhaul of chain per foot of lift as the High Speed or spur-gear types, but necessitates two to three times the pull on the chain.

Will prove invaluable in small shops for lifting light castings, machine parts, etc. It is very light in weight and can be readily transported to any portion of the shop for emergency, or taken out on the job. Very simple in construction, having only one continuous chain which acts as both hand chain and load chain. Each hoist tested before leaving factory.

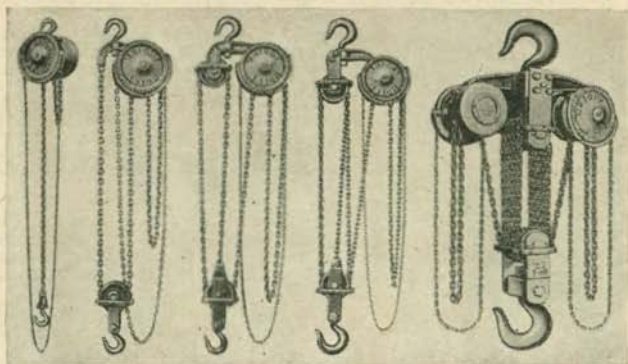
Rated Capacity Tons	List Price		Standard Lift Ft.	Minimum Distance Between Hooks Ins.	Chain Pull to Lift Full Load Lbs.	Ft. of Chain Overhauled to Lift One Ft.	Net Wt. Lbs.
	Complete Standard Lift	*Extra Lift Per Ft.					
1/4	\$36.00	\$4.80	6	17	64	18	22
1/2	42.00	4.80	7	21	102	24 1/2	30
3/4	50.00	4.80	8	25	158	25	35
1	56.00	5.00	8	26	190	29 1/2	50
1 1/2	72.00	5.40	8 1/2	32	243	35 1/2	81
2	90.00	5.60	9	38	314	38	125
3	120.00	6.00	10	41	530	37	180

*Each foot of extra lift, includes four lineal feet of chain.

In ordering hoists, be sure to state LIFT required, if standard lift is not sufficient. Hoists with STANDARD LIFT furnished, unless otherwise specified.



WRIGHT IMPROVED HIGH SPEED CHAIN HOISTS



1/4 to 2 Ton 3 and 4 Ton 5 to 8 Ton 10 Ton 12 to 20 Ton

The Wright High Speed Hoists are of the Spur-Gear type, which is the most efficient of the various types of chain hoists. This hoist is recommended for use where both speed and ease of operation are essential. It is particularly adapted to frequent or continuous service, and on work where the load is raised to an unusual height. The use of planetary spur-gearing and the mechanical construction of the Wright High Speed Hoists reduce frictional losses to the point where a maximum efficiency is secured.

All working parts and load-sustaining parts are made either of steel or malleable iron, increasing the factor of safety and greatly reducing breakage.

The Main Driving Shaft and Pinion are made in one piece from a high quality nickel carbon steel forging, and are mounted in ball bearings. This Ball Bearing Spindle increases the efficiency and ease of operation of the hoist, and reduces wear at the most vital points.

The Load Chain Wheel is an electric steel casting, guaranteed against breakage. Safety Load Chain Guard completely shrouds the upper half of load wheel, holding six links of the load chain in the wheel at all times.

The Non-Fouling Hand Chain Guide permits the chain to be operated from an angle, and prevents the customary jerking and catching of the hand chain.

Oil Tubes are provided to carry the oil directly to the inner bearings, eliminating all chance of insufficient lubrication.

The Steel Load Chain is of a special grade, with the links die-formed to insure uniformity, and electrically welded on the side. Steel Safety straps or arms connect the load sheave bearings directly with the upper hook, acting as a supplementary support and increasing the factor of safety.

One of the exclusive features of the Wright High Speed Hoists is the Detachable Ball Bearing Swivel Hook, furnished as regular equipment on sizes up to and including 3 tons. It is attached to the end of the load chain without riveting, and may therefore be detached very quickly when desired. It permits easy swiveling of the load, and insures the load chain hanging straight and feeding straight into the load sheave pockets. This insures longer life to the chain and wheel. All parts of this hook, including the ball bearings, are amply strong to withstand a heavy overload.

General Specifications

Rated Capacity Tons	List Price		Stand- ard Lift Feet	Min- imum Distance between Hooks Inches	Max- imum Reach Feet and Inches	Chain Pull to Lift Full Load Pounds	Feet of Chain Over- hauled to Lift Load One Foot	Net Weight Pounds
	Hoist with Standard Lift	Extra Lift per Foot						
1/4	\$70.00	\$ 1.80	8	12	9'	57	10	62
1/2	70.00	1.80	8	12	9'	57	20	62
1	90.00	1.90	8	15 1/2	9'-3 1/2"	77	31	92
1 1/2	120.00	2.00	8	17	9'-5"	104	35	137
2	140.00	2.10	9	21	10'-9"	111	42	200
*3	180.00	3.00	10	29 3/4	12'-5 3/4"	107	70	201
4	220.00	3.20	10	34	12'-10"	115	84	286
5	280.00	4.30	12	38 1/2	15'-2 1/2"	102	126	399
6	330.00	4.30	12	38 1/2	15'-2 1/2"	122	126	399
8	400.00	5.40	12	44 1/2	15'-8 1/2"	128	168	470
10	480.00	6.50	12	49 1/2	16'-1 1/2"	130	210	561
12	600.00	8.60	12	50	16'-2"	†130	†126	864
16	720.00	10.80	12	51	16'-3"	†128	†168	1000
20	850.00	13.00	12	53	16'-5"	†130	†210	1220

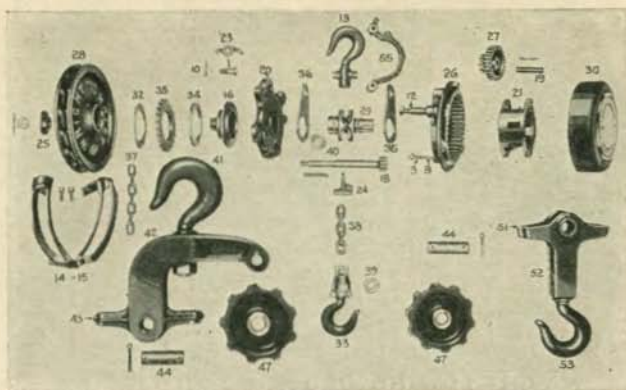
*When so specified, the 3-Ton Hoist can be supplied at the regular price with single load chain and Detachable Ball Bearing Swivel Hook, similar to the smaller capacities. Minimum distance between hooks on this type of hoist is 23 1/2 inches.

†12, 16 and 20 Ton Hoists have two hand chains. Chain pull and amount of chain overhauled, as given in table for these sizes, is for each hand chain.

In ordering hoists, be sure to state amount of LIFT required, if standard lift is not sufficient. All hoists furnished with STANDARD LIFT unless otherwise specified.

For Net Prices See Supplement

WRIGHT HIGH SPEED HOIST PARTS



List Prices

List No.	NAME	1/4 and 1/2 Ton	1 Ton	1 1/2 Ton	2 Ton	3 Ton Single Chain	3 Ton Double Chain	4 Ton	5 Ton
1	Pawl Stud.....	\$.50	\$.75	\$.90	\$.95	\$.95	\$.90	\$.95	\$.95
3	Small Separator Stud.....	.60	.75	.90	1.10	1.10	.90	1.10	1.10
4	Top Hook Cross Head.....	1.10	1.60	2.35	2.95	3.60	.....	.....	.....
55	Load Chain Guide.....	1.10	1.45	2.20	2.55	3.00	2.20	2.55	2.55
8	Load Chain Guide Bolt.....	.30	.55	.60	.75	.75	.60	.75	.75
10	Pawl Spring.....	.15	.25	.30	.30	.30	.30	.30	.30
12	Large Separator Stud.....	.95	1.10	1.35	1.45	1.45	1.35	1.45	1.45
13	Top Hook.....	1.85	2.95	3.65	4.40	8.80	.....	.....	.....
14-15	Hand Chain Guides.....	4.40	5.15	7.35	8.80	8.80	7.35	8.80	8.80
16	Disc Hub.....	3.50	4.40	6.60	8.10	8.10	6.60	8.10	8.10
18	Driving Pinion.....	4.40	5.15	7.35	8.80	8.80	7.35	8.80	8.80
19	Gear and Pinion Studs.....	.65	.90	1.10	1.35	1.35	1.10	1.35	1.35
19S	Gear and Pinion Studs.....	.....	.....	.....	.....	1.35	.....	.....	.....
†20	Ratchet Case.....	4.40	6.60	8.80	9.55	9.55	8.80	9.55	9.55
21	Pinion Cage.....	3.65	5.15	7.35	9.55	12.00	7.35	9.55	9.55
23	Pawl.....	.60	.75	.90	.90	.90	.90	.90	.90
24	Stripper.....	.50	.50	.75	.90	.90	.75	.90	.90
25	Cheek Washer.....	.65	.90	1.10	1.25	1.25	1.10	1.25	1.25
†26	Internal Gear.....	7.35	8.80	12.50	14.00	14.00	12.50	14.00	14.00
27	Gear and Pinion, each.....	2.60	3.30	4.40	5.90	5.90	4.40	5.90	5.90
27S	Gear and Pinion, each.....	.....	.....	.....	.....	5.90	.....	.....	.....
28	Hand Wheel.....	4.40	5.15	7.35	8.80	8.80	7.35	8.80	8.80
†29	Load Sheave.....	7.35	8.80	13.25	14.70	18.00	13.25	14.70	14.70
30	Gear Cover.....	2.20	3.30	5.15	5.90	7.00	5.15	5.90	5.90
32	Galvanized Disc.....	.30	.45	.60	.75	.75	.60	.75	.75
34	Leather Disc.....	.95	1.10	1.45	1.45	1.45	1.45	1.45	1.45
35	Ratchet Disc.....	1.50	2.00	2.60	2.95	2.95	2.60	2.95	2.95
36	Suspension Plate, each.....	1.50	2.95	4.40	5.50	5.50	4.40	5.50	5.50
37	Hand Chain, per foot.....	.50	.50	.50	.50	.50	.50	.50	.50
	Complete Hand Chain.....	8.00	8.00	8.00	9.00	11.00	11.00	12.00	14.00
38	Load Chain, per foot.....	.80	.90	1.00	1.10	1.60	1.00	1.10	1.10
	Load Chain, without Hook.....	7.20	8.10	9.00	11.00	17.60	24.00	27.50	48.40
33	B. B. Lower Swivel Hook.....	3.65	5.50	6.60	8.80	12.00	.....	.....	.....
131	Lower Swivel Hook, old type.....	3.65	5.50	6.60	8.80	.....	.....	.....	.....
41	Top Hook.....	.....	.....	.....	.....	.....	8.80	13.25	17.65
42	Top Yoke.....	.....	.....	.....	.....	.....	20.60	30.90	36.75
43	Top Guard and Guides.....	.....	.....	.....	.....	.....	.....	.....	10.30
44	Top or Bottom Pin.....	.....	.....	.....	.....	.....	1.45	1.85	1.85
47	Top or Bottom Sheave.....	.....	.....	.....	.....	.....	5.90	6.60	6.60
51	Bottom Guard and Guides.....	.....	.....	.....	.....	.....	8.10	11.00	11.00
52	Bottom Side Plates and Cross Head.....	.....	.....	.....	.....	.....	7.35	10.30	14.00
53	Bottom Hook.....	.....	.....	.....	.....	.....	8.80	13.25	17.65
39	Ball Bearing for Lower Swivel Hook.....	.55	.80	1.00	1.00	1.20	.....	.....	.....
40	Ball Bearing for Driving Spindle.....	.70	.80	1.00	1.00	1.00	1.00	1.00	1.00

Use price in 1/2 ton column for 200 and 500 lb. Quick-Lift Hoists and 1 ton column for 700 and 1000 lbs.

†Specify if this part is for BB Type Hoist (letters BB appear on hand wheel).

For Net Prices See Supplement

WRIGHT QUICK-LIFT HOIST Ball-Bearing Type



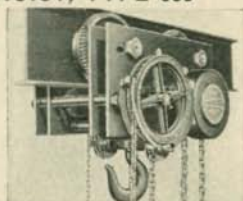
This hoist, which can be used to great advantage in countless different places, is constructed with the same high quality material and design and is essentially an adaptation of the High Speed Hoist shown on page 208. Gear adjustments enable it to raise loads of 200 to 1000 pounds much more quickly. The 200lb. hoists made by entirely removing the gears from the $\frac{1}{2}$ ton High Speed Hoist, making it an exceedingly fast hoist for light loads. The 500, 700, and 1000 pound Quick-Lifts are constructed by changing the gear ratios in the higher capacity types. The strength and exclusive features of the original hoist are retained.

Cap. Lbs.	List Price Regular Lift	Reg. Lift Feet	Minimum Distance Between Hooks	Price per Ft. Extra Lift	Pull to Raise Full Load	Chain Overhaul to Raise Load 1 Ft.	Net Weight Pounds
200	\$50.00	8	12"	\$1.80	73 lb.	3.1	47
500	70.00	8	12"	1.80	57 lb.	10	62
700	90.00	8	15 $\frac{1}{2}$ "	1.90	78 lb.	10	92
1000	90.00	8	15 $\frac{1}{2}$ "	1.90	78 lb.	15	92

WRIGHT LOW HEADROOM HOIST, TYPE 600

The Wright Low Headroom Trolley Hoist is designed for the special purpose of operating efficiently where the headroom is so limited that no other type of Wright Hoist and trolley is adaptable. It is well built to stand a great amount of wear. The Trolleys have steel side plates. Equipped with Timken Tapered Roller Bearings.

The hoisting mechanism is similar to that of the regular High Speed Hoist.



Cap. in Tons	List Price Plain	List Price Geared	Reg. Lift in Ft.	Minimum Distance Bottom of I Beam to Hook in In.	Net Weight in Pounds		Minimum Size of I Beam Inches
					Plain	Geared	
1 $\frac{1}{2}$	\$360.00	\$395.00	8	7"	575	625	8
2	360.00	395.00	9	7 $\frac{3}{4}$ "	591	635	8
3	365.00	400.00	10	8 $\frac{1}{2}$ "	591	661	8
4	455.00	500.00	10	10"	700	770	9
5	545.00	600.00	12	11"	745	825	10
6	545.00	600.00	12	11"	755	835	10
8	885.00	950.00	12	12"	1100	1175	12
10	1030.00	1100.00	12	13"	1175	1250	15

WRIGHT CLEVIS CONNECTED HOIST AND TROLLEY



In places where a saving of headroom is important, the top hook of the Wright High Speed Hoist may be omitted and a special clevis connection made to the Wright Timken Tapered Bearing Trolley.

On the smaller capacity hoists, the saving is just a few inches more than that secured by hooking the hoist top hook directly over the equalizing pin of the trolley, but on the sizes above two tons a very considerable saving is made.

NOTE: The Wright High Speed Hoist can also be clevis-connected to the Self-aligning Roller Bearing Trolley. The same list prices apply but they are subject to greater discounts.

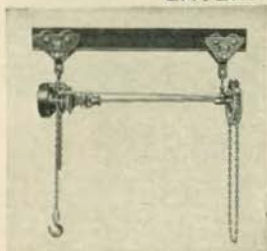
Cap. Tons	List Price		Price per Foot of Extra Lift		Standard I Beam Inches	Std. Lift Feet	Min. from Beam to Lower Hook Inches
	With Plain Trolley Timken Bearing	With Geared Trolley Timken Bearing	Plain	Geared			
$\frac{1}{2}$	103.00	1.80	5-8	8	13 $\frac{3}{4}$
1	129.00	.....	1.90	\$2.90	6-9	8	17 $\frac{1}{2}$
1 $\frac{1}{2}$	168.00	197.00	2.00	3.00	7-10	8	19 $\frac{3}{4}$
2	195.00	225.00	2.10	3.10	8-12	9	23 $\frac{3}{4}$
*3	240.00	275.00	2.60	3.60	9-15	10	26
4	303.00	351.00	3.20	4.20	10-18	10	32
*5	387.00	447.00	4.20	5.20	12-20	12	34 $\frac{1}{2}$
*6	461.00	532.00	4.20	5.20	12-20	12	34 $\frac{1}{2}$
8	567.00	685.00	5.40	6.40	15-24	12	42 $\frac{1}{2}$
10	693.00	825.00	6.50	7.50	15-24	12	45 $\frac{1}{2}$

Geared Trolleys are equipped with hand chain to give the same drop as that on the hoist.

Price per foot of lift includes all necessary hand and load chain on hoist and trolley. *3 ton hoist is constructed with single chain and 5 and 6 ton hoists with double chain to save headroom.

For Net Prices See Supplement

WRIGHT HIGH SPEED CHAIN HOISTS WITH EXTENDED HAND WHEEL



This extended hand wheel arrangement is very convenient in cases where the operator must stand at some distance from the lifting point, as in handling material into and out of furnaces, pickling vats, enameling tanks, etc. It is also desirable for handling large, bulky objects, where the size of the object prevents the operator from standing beneath the hoist.

The hoisting unit consists of the standard Wright High Speed Hoist, as described on the preceding page, with the hand wheel placed at whatever distance may be required, and connected to the hoist by a shaft and universal joint.

Can be furnished with or without trolleys. The trolley supporting the hoist is of the same capacity as the hoist. A 1/4-ton trolley is used to support the extended hand wheel.

General Specifications

Rated Capacity Tons	Standard Lift Feet	List Price			Maximum Extension Feet
		Hoist with 3-Foot Extension* without Trolleys	Extra Lift per Foot	Extra Extension per Foot	
1/2	8	\$103.35	\$1.80	\$0.90	10
1	8	125.85	1.90	1.10	10
1 1/2	8	169.20	2.00	1.20	10
2	9	191.70	2.10	1.30	10

*Length of Extension is measured from center of hand chain to center of load chain.

WRIGHT TWIN HOOK HIGH SPEED CHAIN HOISTS

Particularly adapted for lifting long lengths of lumber, pipe, steel and other material, truck bodies, etc. The lifting mechanisms of two Wright High Speed Chain Hoists are joined by connectors within the extended drum, and a single hand wheel operates the two mechanisms, permitting one man to raise the load evenly.

The two hooks always raise and lower simultaneously and uniformly, so that one end of the load cannot sag.



General Specifications

Rated Capacity Tons	Standard Lift Feet	List Prices						Extra Lift per Foot
		Span between Hooks—Center to Center						
		3 Feet	4 Feet	5 Feet	6 Feet	7 Feet	8 Feet	
1/2	8	\$165.00	\$165.00	\$168.00	\$171.00	\$174.00	\$177.00	\$2.60
1	8	220.00	220.00	223.00	226.00	229.00	232.00	2.80
1 1/2	8	286.00	286.00	289.00	292.00	295.00	298.00	3.00
2	9	330.00	330.00	333.00	336.00	339.00	342.00	3.20
3	10	440.00	450.00	460.00	470.00	480.00	490.00	5.00
4	10	500.00	510.00	520.00	530.00	540.00	550.00	5.40
5	12	600.00	610.00	620.00	630.00	640.00	650.00	7.60
6	12	700.00	710.00	720.00	730.00	740.00	750.00	7.60
8	12	820.00	830.00	840.00	850.00	860.00	870.00	9.80

All Hoists furnished with STANDARD LIFT unless otherwise specified.

WRIGHT ARMY TYPE HIGH SPEED TROLLEY HOIST

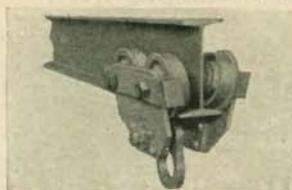
Recommended for use where head-room is limited. A close-coupled combination of hoist and trolley in one unit, made by building a Wright High Speed Chain Hoist into a Timken Roller Bearing Steel Plate Trolley. The head-room occupied by this arrangement is much less than that required by the ordinary hooked-together arrangement of hoist and trolley.

General Specifications

Rated Capacity Tons	List Price			Standard Lift Ft.	Standard 1-Beams Ins.	Min. Dist. between Hook & I-Beam
	With Plain Trolley	With Geared Trolley	Extra Lift Per Ft.			
1/2	\$117.00	.....	\$1.80	8	5	8 1/2"
1	117.00	.....	1.80	8	5	8 1/2"
1 1/2	149.00	\$183.00	1.90	8	6	10 1/2"
2	190.00	222.00	2.00	8	7	12 1/2"
2 1/2	221.00	254.00	2.10	9	8	14 1/2"
3	250.00	284.00	2.60	10	9	16 1/2"
4	339.00	383.00	3.20	10	10	22"
5	433.00	489.00	4.20	12	12	23 1/2"
6	535.00	590.00	4.20	12	12	23 1/2"



RYERSON STEEL PLATE TROLLEYS



Ryerson Trolleys are built with heavy steel side plates and unusually large wheels, the faces of which are crown machined. Plain trolleys, 2-ton and smaller, are provided with steel bumpers which protect the wheels and keep trolleys on the same runway from interfering with each other. These trolleys can be furnished with either plain or Hyatt roller bearings; the latter being recommended for continuous or severe service.

Capacity, Tons	Adjustable for Sizes I-Beams, Inches	Smallest Radius I-Beam Curve, Inches	Tread Diam. of Wheels	PLAIN TYPE			GEARED TYPE		
				Wt. Lbs.	List Price		Wt. Lbs.	List Price	
					Plain Bear'gs	Hyatt Bear'gs		Plain Bear'gs	Hyatt Bear'gs
1/2	4, 5, 6 & 7	18	3 1/4	25	\$ 9.00	\$ 14.00	.....	.....
1	4, 5, 6 & 7	18	3 1/4	25	10.00	16.00	.....	.....
1	5, 6, 7 & 8	21	4 1/4	42	16.00	22.00	80	\$ 28.00	
1 1/2	6, 7, 8 & 9	36	5 3/4	65	21.00	28.00	105	33.00	
2	6, 7, 8 & 9	36	5 3/4	70	23.00	30.00	110	38.00	
3	8, 9, 10 & 12	42	7 3/4	130	33.00	40.00	170	53.00	
4	10, 12 & 15	48	9 3/4	200	43.00	50.00	245	65.00	
5	12, 15 & 18	54	11	240	58.00	65.00	285	80.00	
6	15, 18 & 20	60	11	300	75.00	85.00	345	90.00	
8	18, 20 & 24	63	11 3/4	400	100.00	120.00	455	125.00	
10	20 & 24	66	12 3/4	525	115.00	135.00	580	145.00	

When ordering, be sure to specify either plain or geared type. Steel plate trolleys can be furnished on special order, to operate on larger I-Beams than given in above table, at an extra cost of 75 cents, net.

RYERSON SPECIAL BALL BEARING TROLLEY

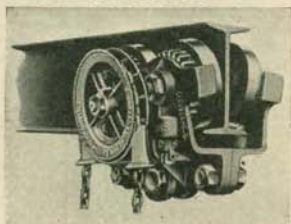
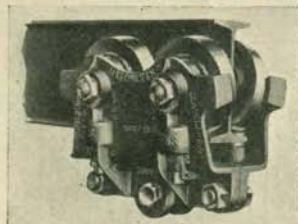


This special trolley is of all-steel construction and built in one ton size only. Is fitted with pressed steel wheels of the flange type for single I-Beam operation, and equipped with Ball Bearings throughout, thereby insuring superior service and satisfaction.

Tested to generous overload and readily adjustable to 4", 5", 6", and 7" Standard I-Beams. Net weight 21 lbs.

List Price, as shown in illustration.....\$12.75
List Price with guards and Zerk Oilers..... 15.00

"MATCHLESS" ADJUSTABLE TROLLEYS



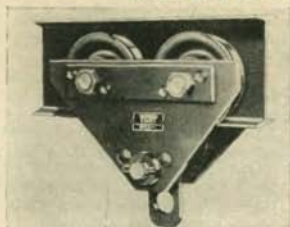
Matchless Trolleys are equipped with large, flangeless, chilled-face wheels, and are guided on the I-Beam by hardened steel vertical rollers. All sizes are equipped with Timken Tapered Roller Bearings. The hoist is hung on the central pin close to the I-Beam to save headroom. Bumpers protect the wheels from undue jar.

Capacity, Tons	Adjustable for Sizes I-Beam, Inches	Tread Diam. of Wheels	PLAIN TYPE		GEARED TYPE	
			List Price	Weight, Lbs.	List Price	Weight, Lbs.
1/2	5, 6, 7	4	\$ 32.00	32	.....	.....
1	6, 7, 8	4 3/4	40.00	52	\$ 70.00	73
1 1/2	6, 7, 8	4 3/4	52.00	58	76.00	78
2	7, 8, 9	5 3/4	56.00	82	80.00	118
3	8, 9, 10	6 1/2	66.00	114	94.00	142
4	9, 10, 12	7	74.00	156	104.00	183
5	10, 12, 15	8	86.00	211	130.00	247
6	10, 12, 15	8	110.00	240	160.00	259
8	12, 15, 18	9	140.00	373	190.00	435
10	15, 18, 20, 24	10	170.00	393	230.00	444
12	15, 18, 20, 24	10	220.00	550	260.00	600

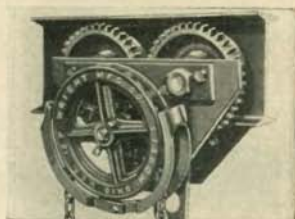
These can be furnished for larger beams without extra cost, unless for special sections. Sizes to 40 tons inclusive can be furnished.

For Net Prices See Supplement

WRIGHT TIMKEN TAPERED AND SELF-ALIGNING ROLLER BEARING TROLLEYS



Plain



Geared

The Wright Timken Tapered Roller Bearing Trolley is constructed with heavy steel side plates and chilled tread wheels which revolve on Timken bearings. There are two such bearings on each wheel and because of their design, they absorb all thrust and radial load and reduce the effort needed to operate the trolley along the I-Beam to less than one-half that required where plain bearings are used; it takes but eleven pounds to push a fully loaded one ton Wright Timken Trolley along the track.

This trolley, although of heavy rugged construction, is flexible enough to operate smoothly around a very small radius curve.

A heavy cold rolled pin connects the two halves of the trolley flexibly equalizing the load to take care of any irregularities of the track; it can be readily removed to allow the trolley to be placed on the supporting beam at any point. Its construction also permits adjustment of the trolley for different sizes of I-beam track.

The Wright Self-Aligning Roller Bearing Trolley is practically the same type as the above described trolley except that it does not have the Timken bearings. This trolley is designed for use where the work is not so exacting and where ease of operation is not so much a factor. While the effort to operate is double that required in the Timken Type still it is just as flexible and rugged and compares favorably with any other plain roller bearing trolley.

Specifications and list prices are the same for both trolleys but a greater discount is applied upon the Self-Aligning type.

General Specifications

Capacity in Tons	List Price Plain	List Price Geared	Adjustable for I-beams, Inches	Weight Pounds Plain	Weight Pounds Geared
1/4	\$25.00		4, 5, 6, 7	28	
1/2	28.00		5, 6, 7, 8	36	
1	32.00	\$66.00	6, 7, 8, 9	48	81
1 1/2	44.00	76.00	7, 8, 9, 10	86	122
2	53.00	86.00	8, 9, 10, 12	103	132
3	70.00	104.00	9, 10, 12, 15	150	180
4	96.00	140.00	10, 12, 15, 18	216	265
5	124.00	180.00	12, 15, 18, 20	270	368
6	145.00	205.00	12, 15, 18, 20	350	415
8	185.00	250.00	15, 18, 20, 24	400	470
10	240.00	310.00	15, 18, 20, 24	475	543
12	290.00	370.00	15, 18, 20, 24	550	640
16	400.00	490.00	on Application.	800	900
20	460.00	560.00		1000	1120

VOLZ POSITIVE PATENT PLATE LIFTING CLAMPS



Type A

These clamps are intended for lifting plates vertically, only one clamp being required. The heavier the load, the tighter it will grip and no adjustment is required for handling any thickness within the capacity.

Type A, the common style is made in four sizes and is ordinarily furnished. Type B is the same in principle, but is especially intended for handling plates in restricted spaces. It is of compact design, with all working parts enclosed.



Type B

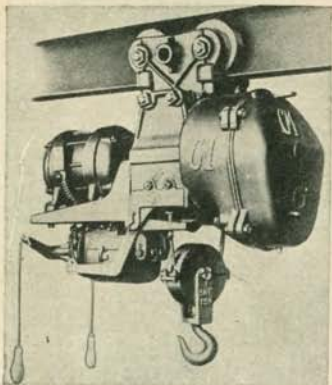
Size—Lifting Capacity	* 1/2 Ton	1 Ton	3 Tons	6 Tons	10 Tons
Thickness will hold . . . inches	3/8 to 3/4	1/2 to 3/4	1/2 to 1	1/2 to 1 1/2	1 1/2 to 2 1/2
Weight pounds	7	18	50	120	200

* 1/2 ton capacity is made only in Type A.

Larger sizes furnished on special order.

C-M ELECTRIC HOISTS

Due to the ever-increasing demand for equipment to reduce handling and production costs, the electric hoist has become a necessary factor in every branch of industry. Material handling at its best is difficult. It is therefore essential that such equipment be as simple and efficient as modern engineering practice will permit.



Standard Hoist Fitted to Trolley

The C-M Electric Hoists have created a new standard in electric hoist design. Their unusual simplicity and high efficiency due to high grade workmanship and material results in a class of equipment difficult to equal. Sturdy and compact, those familiar with this class of equipment can immediately recognize its special advantages.

The motor is a high torque standard enclosed crane type, mounted on a shelf, complete with controller specially built for hoist or crane service, and which is provided with a pendant rope drum starting switch for single speed. For variable speed, or other places where variable speed is required, the motor is of the slip ring type, with pendant rope self-centering variable speed controller. Push button, outrigger or other types of controls also furnished. All controllers are supplied with compensating fingers and renewable contacts, which are reversible, except where special controlling apparatus is desired.

Gears are of the spur type, cut and carefully heat treated. Two reductions are used while the pinion teeth are hobbled in the solid shaft. The pinions and drum gear are made from special heat treated alloy steel, while the motor gear is a steel casting. This entire mechanism is enclosed and runs in oil.

A Weston type load brake of ample proportions is provided and is run in oil. The safety limit switch is a steel trip-lever type, operated by contact with the hook block, and limits the upward travel of the hook. Various forms of upper and lower limit switches can be furnished at an extra charge.

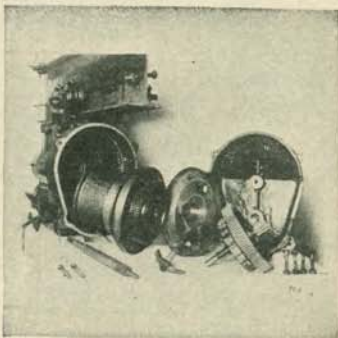
The drum is grooved and flanged and so mounted in the frame that under no conditions can the wire rope pass outside the flanges or jam. It is of proper size and diameter to insure a smooth, even travel of the hoisting cable. The hoisting cable is the best grade of plough steel rope that can be obtained, and is fastened to the drum through a threaded hole and held by a pipe plug.

All machinery or equipment regardless of its quality will at some time or other require attention and adjustment. These hoists due to their unusual simplicity are quickly and easily repaired or inspected. In most cases this can be accomplished by the maintenance man by merely removing the four main bolts on the gear case. The entire hoisting mechanism, drum, cable, gears and all can be pulled out in a horizontal line. There are no caps or keys to be pulled. It is equally simple to re-assemble the entire equipment.

The C-M Buddy Hoists are particularly useful for frequent lifting of small light loads. This hoist is built on one standard frame, and equipped with a standard one horsepower motor. The lighter sizes lift the loads at higher speeds. The controller, brake and upper limit switch is of the same general design as furnished with the larger hoists.

This type of hoist can be supplied with hook or yoke type of suspension, or equipped with built-in plain or geared trolley.

The trolleys furnished for all C-M Hoists are of the flangeless wheel type to permit operation on I-Beam curves of unusually small radius. They are furnished with chilled iron wheels equipped with Timken Roller Bearings, and are supplied in either the plain or geared types. For hoists of 3-ton capacity or larger we recommend the geared trolley.



Quickly Accessible

For Net Prices See Supplement

C-M ELECTRIC HOISTS (Continued)

Motor driven trolleys can be supplied when so requested. The motors are of the enclosed type being connected to the trolley by a flexible coupling. Each capacity tested to a generous overload, a factor of safety of at least five being employed.

Controllers are the standard enclosed drum type furnished with compensating fingers and renewable contacts except where special apparatus is required. Gears are steel cut excepting the motor pinion, which is made of formica.

Trolleys of this nature are adaptable where loads must be rapidly transported from one location to another, and where this service must be continuous.

General Specifications

Lifting Capacity Lbs.	Hoisting Speed Ft. Per Min.	H. P. Motor-A. C. D. C. About Same	Standard Lift Ft.	Max. Lift Obtainable Ft.	*Headroom Type Inches	Approx. Net Wt.		List Prices Hook Type
						Hook or Yoke Type Style A.	Trolley Type Style B	
500 Buddy	40	1	40	50	25	325	....	\$450.00
500 Buddy	20	1	22	35	25	325	360	450.00
1000 Buddy	20	1	22	35	25	350	400	500.00
2000 Buddy	12	1	10	..	28	375	475	560.00
1000	50	2½	45	60	31	590	....	714.00
1000	25	1½	23	33	31	590	690	550.00
1500	18	1½	15	22	31	590	695	600.00
1500	25	2	23	33	31	600	700	654.00
2000	25	2½	23	33	31	600	700	680.00
2000	40	3½	40	60	37	1750	2060	1222.00
*2000	80	7	90	135	37	1900	....	1700.00
3000	18	2½	15	22	31	610	720	730.00
4000	12	2½	14	18	35	785	850	800.00
4000	25	5	29	43	39	1800	2425	1260.00
*4000	40	7	40	60	39	1800	2475	1700.00
5000	12	3	14	18	35	790	1142	890.00
5000	25	6	25	37	39	1800	2350	1260.00
*5000	40	8	40	60	39	1950	2675	1700.00
6000	13	3½	15	25	45	1750	2300	1222.00
6000	20	5	23	34	45	1800	2500	1260.00
8000	13	5	15	25	46	1900	2650	1260.00
*8000	20	7	23	34	46	1950	2650	1700.00
10000	13	6	15	25	48	1900	2650	1300.00
*10000	20	8	20	30	48	2000	2750	1740.00
*12000	14	10	12	21	51	2100	2900	1840.00

*Headroom is minimum distance from bottom of beam to lower hook when at its highest point.

*Variable speed hoists only.

Prices are for single speed control. For variable speed add \$200.00 to list. Prices for push-button or other special controls on application.

List price covers hook or lug type only. Plain or geared trolley types on application.

Prices given are for 220 or 440 volt, three-phase, 50 or 60 cycle alternating current, or 110 or 220 volt direct current. Prices are for single speed control except on hoists having motors having 7 H. P. or larger, which are furnished standard with variable speed control at prices shown on the table. Extra for variable speed control on other sizes as follows:

Up to 6 H. P. inclusive { \$200.00 extra list for alternating current.
 { \$100.00 extra list for direct current.

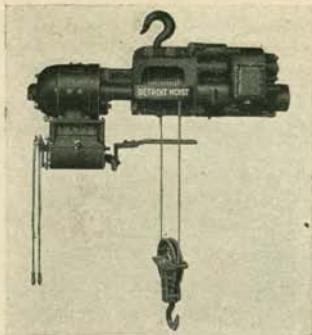
Prices covering other voltages or frequencies on application.

When specifying electric hoists always give voltage mentioning whether A. C. or D. C. If A. C. state cycle and phase.

*Prices and specifications on motor driven trolleys sent on request.

For Net Prices See Supplement.

DETROIT ELECTRIC HOISTS



Type H



Type M

Electric Hoists are indispensable items of labor saving equipment in the modern industrial plant. In machine shops, factories, foundries, in fact any place where it is required to lift loads from a few hundred pounds to 15 tons, these hoists will efficiently and economically meet the need.

The Detroit Type H. Hoists are of strong compact construction, yet unusually accessible and simple. Designed on sound engineering principles and built with high grade materials and workmanship, these hoists are particularly durable and reliable.

Spur gears cut from tough, hammered high carbon steel are used throughout, and all bearings are of hard phosphor bronze and are replaceable. A solid one-piece, heavily ribbed casting is used for the frame, except on Style D, where the frame is of two-piece construction, machined and bolted together with through bolts at the center.

The motor is a high torque type especially designed for intermittent hoist service. In the alternating current hoists a semi-enclosed squirrel cage motor is used with a pendant rope operated, drum type starting switch for single speed. For foundry service or other places where variable speed is necessary, a slip ring or multi speed motor is used with a pendant rope operated, self centering variable speed controller. In the direct current hoists the motor is a fully enclosed series wound, reversible crane type, with a variable speed drum type self-centering controller, operated by pendant ropes. All controllers have extra heavy contacts and copper segments which are removable and replaceable.

Motor bearings are lubricated by means of oil pockets and rings, while the gears and load brake run in a bath of oil, mounted in oil tight cases on the back of the frame.

The large hoisting drum has machined grooves to take the flexible steel hoisting cable and is mounted inside the frame on a large hollow steel shaft.

Two brakes are provided, the load brake being of a very simple mechanical type arranged in connection with the gearing, but mounted in a separate case and running in oil. It has a large braking area, is adjustable for wear, and will positively hold the load in any position. The motor brake is of a simple efficient type, which serves to bring the hoisting hook quickly to rest when the current is shut off. An automatic stop is provided in the upper limit switch which moves the controller to the off position when the hook reaches its upper limit of travel. When required, an up and down screw limit switch will be furnished at extra charge.

Plain or geared trolleys are furnished at extra charge, these being of steel side-plate construction rigidly attached to the hoist by a heavy stud bolt which replaces the upper hook of the hoist. The trolley wheels are machined treads and are fitted with ROLLER bearings. Current collectors furnished with trolleys are of the copper contact wheel type, mounted on adjustable swivel pole fixtures with contact pressure springs.

The Detroit Type M Hoists are particularly adaptable where there is frequent necessity for lifting small light loads. Just as the block and tackle was superseded by the chain hoist through the necessity of reducing handling costs, so will these small, easily controlled electric hoists produce even greater economy over the use of hand chain hoists for this purpose.

This type of hoist is built on one standard frame. The lighter capacities handle their loads at proportionally higher speeds, through different gear ratios and cable arrangements. They are furnished with hook or yoke suspension or with I-Beam trolley attached.

The motor is a one and one-half horse-power high torque intermittent rating crane type, fully enclosed. A. C. Motors are single speed, squirrel cage type, while D. C. Motors are series wound. The controller has reversible and replaceable contacts and is operated by means of pendant ropes.

For Net Prices See Supplement

DETROIT ELECTRIC HOISTS—(Continued)

Two brakes are provided, the load brake and an auxiliary brake which brings the load quickly to rest when the current is shut off. An upper limit switch automatically moves the controller to the "off" position when the hook reaches its upper limit of travel.

Trolleys which are furnished at an extra charge are of the malleable frame type and adjustable for 5" to 12" I-Beams. They have chilled tread wheels fitted with roller bearings and are provided with wheel type current collectors mounted on insulated adjustable spring supports.

Specifications—Type H Hoists

Size No.	Lifting Capacity Lbs.	Hoisting Speed-Feet		H. P. Motor		*Hgt. of Lift	** Head Room Hook Type Ins.	Approximate Wt. Hook or Yoke Type	Approx. Net Wt. Trolley Type	† List Prices Hook Type A. C.
		D. C.	A. C.	D. C.	A. C.					
1	1000	50	70	2½	3½	20	34	550	675	\$550.00
1A	2000	25	35	2½	3½	20	34	550	675	550.00
1½A	3000	24	24	3½	3½	10	40	600	725	575.00
2A	4000	12½	18	2½	3½	10	40	600	725	575.00
2½A	5000	13	13	3½	3½	10	40	600	725	600.00
2B	4000	25	25	5	5	12	45	1125	1325	775.00
3B	6000	17	17	5	5	12	45	1125	1325	800.00
4B	8000	12½	12½	5	5	12	50	1125	1325	825.00
5B	10000	10	10	5	5	12	50	1150	1350	825.00
6B	12000	8½	8½	5	5	12	50	1200	1400	875.00
3D	6000	36	34	11	10	12	55	1500	1800	1250.00
5D	10000	22	20	11	10	12	55	1500	1800	1300.00
7D	15000	14	14	11	10	12	57	1500	1850	1350.00
10D	20000	11	10	11	10	12	58	1500	1900	1350.00

*Can be fitted with special drum for any lift desired.

**Headroom is minimum distance between hooks when lower hook is at its highest point of travel.

†These prices are for A. C. Single Speed, 60 cycle. Hoists are furnished D. C. Single Speed, 110 or 220 volts, for same price. Variable speed always recommended, sizes 3-D to 10-D.

Extra for 3-Speed D. C., sizes 1 to 6-B, inclusive.....\$ 50.00

Extra for 8-Speed D. C., sizes 3-D to 10-D, inclusive..... 150.00

Extra for 8-Speed A. C., sizes 1 to 2-A, inclusive..... 135.00

Extra for 8-Speed A. C., sizes 2-B to 6-B, inclusive..... 160.00

Extra for 8-Speed A. C., sizes 3-D to 10-D, inclusive..... 185.00

Prices covering plain or geared trolley arrangements and extras for foundry controls on application.

General Specifications—M-Type Hoist

Size No.	Cap. Lbs.	Hoist Speed Ft. Per Min.	* Standard Lift In Ft.	H.P.	** App. Net Wgt.	** App. Shpg. Wgt.	List Prices			
							† Hook Type A.C. 60 Cycle	†† Hook Type D.C.	Trolley and Collectors	Extra Lift per Ft.
M2	500	70	11	1½	390	470	\$300	\$320	\$25.00	\$1.00
M3	1000	35	11	1½	390	470	325	345	35.00	1.00
M4	1500	24	11	1½	390	470	350	370	35.00	1.00
M5	2000	18	11	1½	390	470	350	370	*35.00	1.00
M6	1500	40	11	2½	425	500	400	420	35.00	1.00
M7	2000	30	11	2½	425	500	400	420	35.00	1.00

*Lift in grooves only. Hoists can be furnished up to 35 ft. Lift with cable overlapping.

**Add 35 lbs. for Trolley Type.

†For A. C. 60 Cycle, 2 or 3 phase 110, 220, or 440 volts.

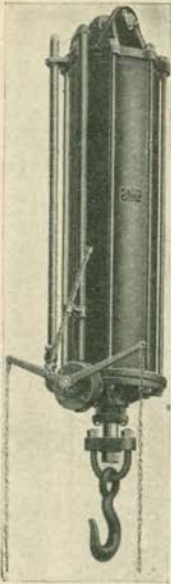
††For D. C. 110-220 volts.

Extra—A. C. 25 cycle, 2 or 3 phase 110, 220, 440 volts—\$15.00 list.

Extra—A. C. 60 cycle, single phase (1 H. P. used) 110-220 volts—\$15.00 list.

HANNA CYLINDER TYPE PNEUMATIC HOISTS

Pendant Styles



No. 5

Arrangement for hooking on the load.

All sizes and styles of these hoists have a check valve in the piping to prevent dropping the load should the air supply be suddenly interrupted.

The cylinder type of pneumatic hoist provides a simple, convenient and flexible method of lifting loads where a supply of compressed air is available. Hanna Hoists are clean, fool-proof, easy to handle and require little attention. They may be used successfully as hydraulic hoists on water pressure in which case oversize valves and piping are recommended.

All sizes are equipped with a patented Universal Valve of the disc type, which may be used as a two-way, three-way or four-way valve. The valve disc is seated on the under side of the valve cover, and both disc and cover may be removed without disturbing any pipe connections. The bronze valve is carefully lapped into the valve seat, which is of cast iron, and a passage in the valve stem provides for lubrication of the seat.

The cylinders of sizes up to and including 6" diameter are made of cold drawn seamless steel tubing. Larger sizes have cylinders made of cast iron, bored, lapped and polished. The piston construction is of a special patented type, in which the cup leather is seated against the cylinder wall independent of the air pressure, and maintained by means of square and round expansion rings held in place by a follower. The strain rods form a solid part of the cylinder assembly. They are not disturbed in removing the head.

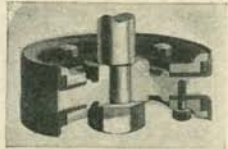
Piston rods are made of cold rolled steel specially selected for minimum variation in diameter to prevent leakage through the stuffing box. Construction is such that the piston rod may be removed while the hoist is suspended in the operating position, it being necessary to remove the cylinder head and break one standard pipe union. Only one gasket is opened in this operation.

Where the load is sustained by the head, the upper cylinder head is a steel casting. In other cases heads are of cast iron. Lower heads are provided with drain plugs.

The hook is a drop forging, attached to the piston rod by means of a loop and swivel, providing a safe, flexible arrangement for hooking on the load.

Style No. 1

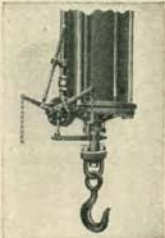
This style is a Single-acting Pendant, Straight Lift Hoist. Air is admitted beneath the piston, to raise the load, and exhausted to lower. There is no air pressure above the piston. Suitable for service where delicate control is not required. Will not sustain the load for any length of time at a point midway of the stroke.



Piston Construction

Style No. 5

A Balanced, Pendant, Straight Lift Hoist. Air pressure is introduced above the piston to lower the load, and exhausted for lifting, being balanced by full air pressure beneath the piston at all times. This style of hoist is provided with a device which automatically returns the valve to neutral position when the operator releases the control chains.



Style No. 6

Style No. 6

This is the Style No. 5 Hoist, with the addition of a load retaining device. By means of a friction collar on the piston rod, connected to the valve through a lever and link arrangement, sufficient air is automatically admitted or exhausted to compensate for any possible leakage or change in air pressure. With this device, the load may be held indefinitely at any desired point of the stroke, without appreciable variation. A valve return device is also provided, the same as on the Style No. 5 Hoist.

For specifications of the various sizes, see next page.

HANNA CYLINDER TYPE PNEUMATIC HOISTS

Bracketed Styles



Style No. 7

The bracketed styles of these hoists differ from the pendant styles shown on preceding page in that they are provided with supporting feet for attaching to crane posts, columns, walls, ceilings, etc. Except in Style No. 7, the end of the piston rod is threaded and may be equipped with a yoke carrying one or more sheaves, where a multiple or geared lift arrangement is desired. The valve ordinarily is attached to the hoist beside the cylinder as shown, but may be entirely detached from the hoist and placed in any location for convenience in operation.

An oversize piston rod is recommended when the hoist is to be used for pushing loads where there is a possibility of side strain on the piston rod, or in cases of hoists with unusually long stroke.

Unless otherwise specified, however, bracketed hoists will be furnished with standard piston rod and with valve located as shown in the illustration.

Style No. 7

This is a balanced, bracketed hoist, operating on the same principle as the Style No. 5 hoist on the preceding page. It is intended for use in a vertical position only, with the stuffing-box down, and should not be used otherwise unless equipped with an oversize piston rod. It is recommended for pulling—not for pushing. This is the only style of the standard bracketed hoist which is furnished with a loop and swivel on the lower end of the piston rod.



Style No. 3



Style No. 10

Style No. 3

A single-acting, bracketed hoist, which can be arranged either to push or pull the load, but not both. An outside force is required to return the piston, as the air operates it in one direction only. It may be used in either a horizontal or a vertical position, with stuffing-box up or down. Operation is on the same principle as the Style No. 1 hoist on the preceding page.

Style No. 4

This is a double-acting, bracketed hoist, arranged for variable air pressure alternating on both sides of the piston. It may be installed in either a horizontal or a vertical position, and will either push or pull the load. Similar in appearance to Style No. 3.

Style No. 10

This is a double-acting, double-ended, bracketed hoist, similar to a No. 4 style, with a continuous piston rod and a stuffing-box in both heads. Both ends may be used for pushing and for pulling, and the hoist may be mounted in either a vertical or a horizontal position. Variable air pressure is applied alternately to both sides of the piston.

General Specifications

Size Inside Diam. of Hoist Ins.	Capacity in Lbs. at		Cu. Ft. Free Air at 80 Lbs. Req'd. to Lift Full Load 1 Foot	Diam. of Standard Piston Rod inches	Length Constants, Inches (See Note)			Shipping Weight, Lbs.	
	80 Lbs. Air Pressure	100 Lbs. Air Pressure			A	B	C	Hoist with 4 Ft. Lift	*Each Extra Ft. of Lift Over 4 Ft.
3	420	550	.42	3/8	16 3/4	12	8 3/4	90	15
4	920	1,150	.542	3/8	17 1/2	12 1/4	8 1/2	125	20
5	1,430	1,790	.842	1	22 1/2	16 1/4	9 1/2	165	28
6	2,010	2,510	1.185	1 1/2	23 3/8	17	10 1/2	190	32
7	2,840	3,550	1.77	1 1/2	23 3/8	17 1/2	10 1/2	300	55
8	3,720	4,650	2.32	1 1/2	26	18 1/2	11 3/4	350	65
9	4,700	5,875	2.93	1 1/2	27 1/2	20 1/2	12 3/4	440	80
10	5,700	7,150	3.55	2	30 1/2	21 1/2	13 3/4	555	90
12	8,250	10,300	5.14	2	32 3/4	22	13 3/4	670	115
14	11,250	14,050	7.00	2	34 1/2	22 3/4	14	885	155
16	14,600	18,200	9.06	2 1/2	39 1/2	26 1/2	15 3/4	1,025	175
18	18,500	23,100	11.5	2 1/2	43 1/2	29 1/2	17 1/4	1,700	225
20	22,800	28,500	14.3	2 1/2	45 1/2	31 1/2	18 1/2	2,150	260

*Maximum lift allowable on 4', 5' and 6' hoists without splicing is 12 feet. On 7' hoists and larger, 10 feet. Greater lift can be provided by splicing cylinders, for which an extra charge is made.

On Pendant Hoists, Styles Nos. 1, 5 and 6, to secure the minimum distance between hook and suspension point when piston is clear up, add the constant A to the length of lift.

On Style No. 7 Bracketed Hoists, to secure the overall length when the piston is clear up, add the constant B to the length of stroke or lift.

On Bracketed Hoists, Styles Nos. 3 and 4, to secure the overall length when the piston is clear in, add the constant C to the length of stroke.

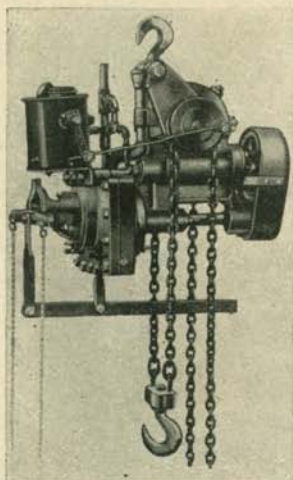
Hoists should not be used in temperatures high enough to burn the leather packing, nor low enough to cause it to freeze to the cylinder.

In ordering, state diameter, length of lift or stroke, and style of hoist required, together with air or water pressure available. On Bracketed Styles, also state if oversize piston rod is wanted, and whether for pushing or pulling the load.

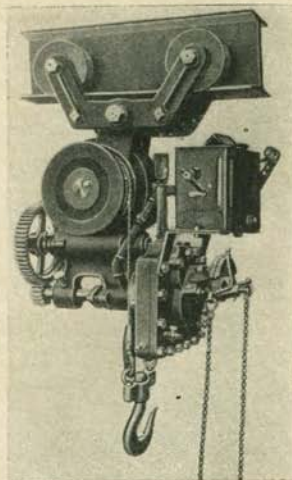
For Net Prices See Supplement

DAKE PNEUMATIC HOISTS

Chain and Wire Rope Types



Chain Hoist—Hook Type



Wire Rope Hoist—Trolley Type

These hoists will operate either on compressed air or steam. They are equipped with a standard reversing-type Dake square piston motor which is entirely self-contained, practically noiseless in operation and without vibration. This allows a very steady lift with careful and accurate control of the load, conditions which are highly essential for hoist duty. The throttle operating the motor is located on the front cover plate and is controlled by pendant hand chain. An automatic force-feed lubricator is provided, this operating only while the hoist is actually in motion.

The worm and worm wheel run in oil and are connected to the motor shaft by a cut spur gear and pinion. The worm made of high carbon steel, is provided with bronze bearings and has roller bearings at one end to take up the thrust. The worm wheel is of bronze. An automatic limit switch is provided with each hoist to close the throttle when the load reaches the highest point. The worm and worm wheel act as a positive brake, holding the full capacity load at any point, even though the air supply should be cut off. No mechanical braking arrangement is required.

These hoists are furnished in the standard hook type or with a built-in trolley, and all sizes are made with chain or with wire rope and drums as preferred.

We can also supply these hoists with built-in geared trolley or with built-in pneumatically operated trolley.

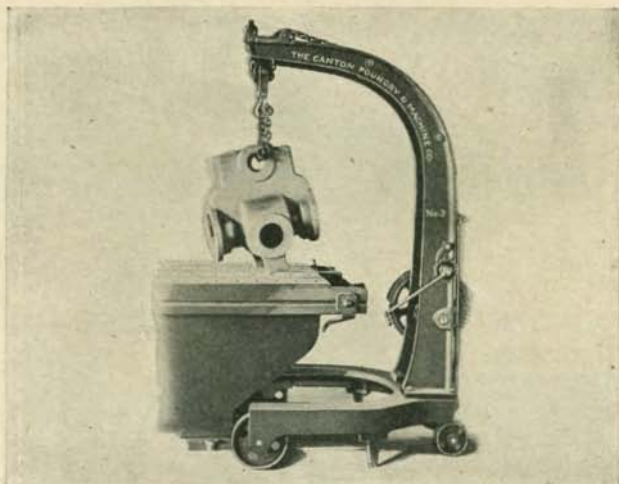
General Specifications

Size No.	Capacity Tons	Standard Lift	Lifting Speed, Ft. per Minute	Hook Type		Trolley Type	
				Min. Distance Between Hooks	Shipping Weight, Lbs.	Min. Distance Hook to Center of Wheels	Shipping Weight, Lbs.
0 CH	½	8'	24'	28¾"	210	30"	270
1 CH	1	10'	16'	30¾"	225	31½"	300
1½ CH	2	10'	14'	38¾"	410	41¾"	450
2 CH	3	10'	10'	40¾"	450	42¾"	585
3 CH	5	10'	7'	47"	685	47"	800
3½ CH	7	10'	8'	56"	1,100	54¾"	1,200
4 CH	10	10'	8'	68"	1,550	66"	1,650

We can also furnish various types of Electric Hoists. Specifications on request.

For Net Prices See Supplement

CANTON PORTABLE FLOOR CRANE AND HOIST



Size No. 3 with High Bed Placing Heavy Casting on Planer

The Portable Crane and Hoist is an indispensable tool for use in any plant for quick and economical handling of heavy and awkward jobs. With a Canton Crane one man can lift heavy work on and off machines and carry it about the shop much quicker and more easily than three or four men working by hand.

Where there is a complete overhead crane system the Canton acts as an auxiliary and moves loads where the big crane system cannot reach.

In shops without an overhead crane, the Canton acts as a crane, hoist and truck and performs the work of all with speed and safety.

The Hook, Block, Axle, Fork and Yoke are high quality drop forgings, having a high tensile strength. Hyatt Roller Bearings are used in the large rear wheels which carry the load. The base casting, projecting arms and gears are made of semi-steel. The chain is guaranteed hand-forged BBB. grade—the best that can be produced for this particular work.

Canton Cranes, when desired, can be furnished with Safety Friction Load Brakes which hold the load at any point and which complies with all State "Safety First" codes. If this load brake is desired, be sure to so specify and add \$50.00 to the list prices given below.

General Specifications

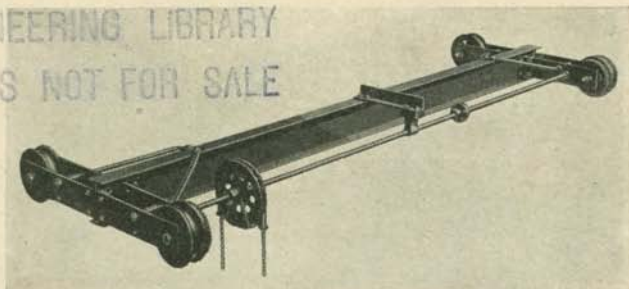
Size No.	Capacity, Tons	List Price	Lift	Height Overall	Overhang	Height of Bed	Width of Bed, Inside	Weight, Lbs.
†1	1	\$100.00	4' 6"	5' 8"	2' 3"	9"	1' 10"	600
*†2	1½	112.50	5' 4"	6' 6"	2' 6"	6¾" or 12"	2' 1"	740
*2S	1½	112.50	5' 4"	6' 6"	2' 6"	6¾" or 12"	3' 0"	740
*†3	2	125.00	6' 4"	7' 6"	2' 9"	6¾" or 12"	2' 4"	890
*3S	2	125.00	6' 4"	7' 6"	2' 9"	6¾" or 12"	3' 0"	890
3AS	2	125.00	6' 4"	7' 6"	2' 9"	8"	1' 11"	890
3GS	1½	125.00	6' 4"	7' 6"	3' 6"	6¾"	2' 4"	890
*†4	2½	150.00	7' 4"	8' 6"	3' 0"	6¾" or 12"	2' 8"	1150
4S	2½	160.00	7' 4"	8' 6"	3' 0"	12"	3' 6"	1150
4AS	2½	160.00	7' 4"	8' 6"	3' 0"	12"	4' 0"	1150
4BS	2½	150.00	7' 4"	8' 6"	3' 0"	12"	2' 4"	1150
*†5	3	175.00	8' 3"	9' 6"	3' 3"	6¾" or 12"	3' 0"	1300
†6	3	187.50	9' 3"	10' 6"	3' 6"	12"	3' 4"	1550
6S	2½	200.00	9' 3"	10' 6"	3' 6"	12"	5' 0"	1550
†7	3	225.00	10' 3"	11' 6"	3' 9"	12"	3' 8"	1800
†8	3	250.00	11' 3"	12' 6"	4' 0"	12"	4' 1½"	2000

*These sizes are best for average shop use. They can be furnished in either 6¾" or 12" height of bed. Unless otherwise specified, 12" height will be furnished.

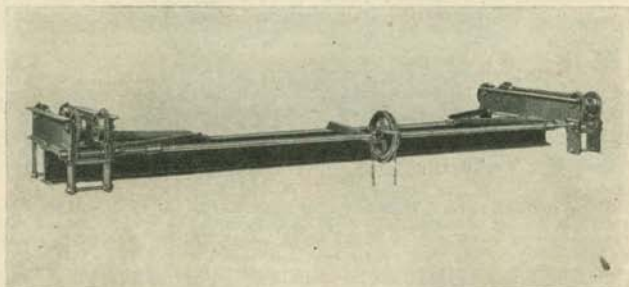
†These sizes are standard. Others are special.

For Net Prices See Supplement

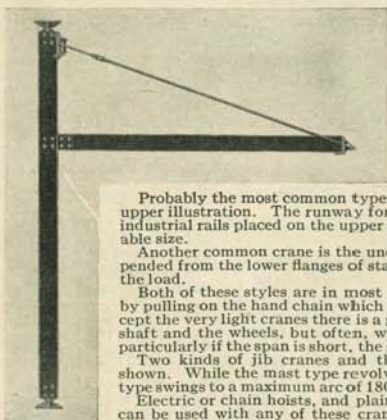
JOHN W. McMURRAY CRANES

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Traveling Single I Beam Type No. 2018



Traveling Single Beam Underhung Type B36

Mast Jib
Crane

the capacity, span, height of runway above floor, clearance dimensions; also mention whether hand or motor operation is preferred.

I-beams, switches and turntables for use in conjunction with monorail systems can also be furnished when required.

In case the hoisting and conveying equipment shown on these pages does not suit your requirements send inquiry with complete data for estimate and detailed proposition.

The illustrations on this page show a few of the many types and styles of cranes which can be supplied. Equipment of this sort is recognized as an important factor in speeding up production in many shops. The service of specialists in hoisting and conveying machinery is offered so that the best suited and most efficient units will be installed; all are invited to make use of this service.

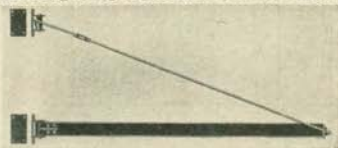
Probably the most common type of light crane is that shown in the upper illustration. The runway for this style usually consists of light industrial rails placed on the upper flange of standard I beams of suitable size.

Another common crane is the underhung type which is usually suspended from the lower flanges of standard I beams capable of carrying the load.

Both of these styles are in most cases, propelled along the runway by pulling on the hand chain which turns the driving shaft. On all except the very light cranes there is a gear reduction between the driving shaft and the wheels, but often, when the load is less than one ton, particularly if the span is short, the gear reduction is omitted.

Two kinds of jib cranes and the wall bracket and mast are also shown. While the mast type revolves in a full circle, the wall bracket type swings to a maximum arc of 180°.

Electric or chain hoists, and plain, geared, or motor driven trolleys can be used with any of these cranes; but since the efficiency of the cranes is often largely dependent upon the efficiency of the hoists careful thought should be given these units. Due to the wide field covered by this kind of hoisting and conveying machinery it is advisable to figure on each job independently. When sending inquiries include as much information as possible regarding requirements; be sure to give



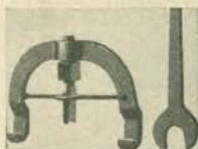
Bracket Jib Crane

RAIL BENDERS

Standard "Jim Crow" Rail Benders

The Standard "Jim Crow" Rail Benders have a bolted-on cross bar, and are furnished with a forged wrench. The yoke is forged from open hearth steel. The steel screw has square, machine-cut threads, three to the inch.

General Specifications



Size No.	Capacity—Size of Rails	Span of Hooks, Inches	Diam. of Screw, Inches	Weight Each, Lbs.	List Price Each
0	135	26	3	210	\$60.00
1	100	26	2 3/4	180	50.00
2	85	24	2 3/8	150	43.00
3	75	22	2 3/4	110	32.50
4	50	18	2	85	24.50
5	25	16	1 3/4	60	20.50
6	16	14	1 3/4	40	18.00

Samson Rail Benders

This type of rail bender is light in weight, yet powerful and compact. Can be operated by one man. Open hearth steel frame, with steel screw working in bronze nut, and provided with anti-friction washers and hardened steel thrust.

General Specifications

Size No.	Capacity—Size of Rails, Lbs.	Weight Each, Lbs.	List Price Each
0	150	190	\$60.00
1	110	140	50.00
2	80	110	40.00
3	60	65	30.00
4	45	35	20.00



Chicago and Smith Ratchet Rail Benders

These types, because of their compactness, are useful in mines. The yoke is forged from open hearth steel. The steel screw has square, machine-cut threads, three to the inch, with malleable cap to fit the rail.

The Smith Ratchet Bender is similar to the Chicago, but furnished with ratchet.



Chicago Type



Smith Ratchet Type

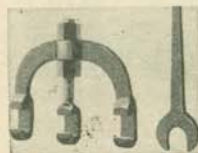
General Specifications

Size No.	Capacity—Size of Rails, Lbs.	Span of Hooks, Inches	Diam. of Screw, Inches	CHICAGO TYPE		SMITH RATCHET TYPE	
				Weight Each, Lbs.	List Price, Each	Weight Each, Lbs.	List Price, Each
0	135	28	3	200	\$60.00	...	...
1	100	28	2 3/4	170	50.00	200	\$50.00
2	85	28	2 3/8	145	43.00	160	45.00
3	75	24	2 3/8	110	32.50	120	33.00
4	50	20	2 3/8	85	24.50	90	25.00
5	25	16	2	65	20.50	70	21.00
6	16	14	1 3/4	40	18.00	50	18.00
7	10	14	1 3/8	30	17.00	40	18.00

Double Acting Benders

The Double Acting Rail Benders may be used for either bending or straightening operations. They are especially recommended for mine work, or for use in restricted space, where the bender can be applied only to one side of the rail.

The yoke is forged from open hearth steel. The screw is made of steel, with square, machine-cut threads, three to the inch.



Plain Type



Ratchet Type

The Plain Double Acting Bender is furnished with a forged, open-end wrench for operation. The Ratchet Type is similar in construction to the Plain Type, but is furnished with a ratchet wrench for operation, and is made only in the three smaller sizes.

General Specifications

Size No.	Capacity—Size of Rails, Lbs.	Span of Hooks, Inches	Diam. of Screw, Inches	PLAIN TYPE		RATCHET TYPE	
				Weight Each, Lbs.	List Price, Each	Weight Each, Lbs.	List Price, Each
1	100	26	2 3/4	200	\$50.00	...	...
2	85	24	2 1/2	160	45.00	...	...
3	75	22	2 3/8	125	33.00	...	...
4	50	18	2	90	25.00	100	\$35.00
5	25	16	1 3/4	70	21.00	80	30.00
6	16	14	1 3/4	50	18.00	60	25.00

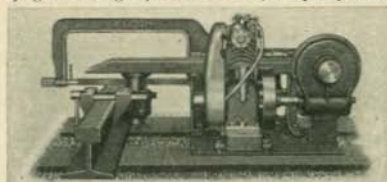
ALDON PORTABLE RAIL SAWS

These are convenient hand operated hack saws of excellent construction particularly adapted for sawing rails with-removing them from the track.

They will saw straight, or at an angle. The frame is clamped over the head of the rail without disturbing the track in any way. The clamping mechanism is provided with an instant release, allowing quick removal of the machine for passing trains. The feed is entirely by gravity. The foot rest at the bottom of the operating lever is provided with holes so that they may be attached to the floor, in cases where they are used in a stationary location in the shop.

Regular equipment includes one dozen standard blades.

Portable power saws of the same type can also be furnished. They can be driven by gasoline engine, electric motor, or by any make of air or electric drill of 1 1/4 in.



Gasoline Engine Driven



Hand Operated

capacity with either No. 3 or No. 4 Morse Taper Socket, with a spindle speed of 400 R. P. M. or less. These machines can be furnished with any desired speed reducing unit, or can be supplied complete with drill. Complete information sent on request.

General Specifications

Type	B	BB
Capacity	7" Rails—Any Section	10" Girder Rails
Length of Blade, inches	17	17
Length of Stroke, inches	8	8
Net Weight, lbs., hand operated	85	95

PAULUS TYPE TRACK DRILL

This is a substantial hand-operated track drill of the Paulus type, built with an automatic feed. The ratchet wheel may be turned by hand, quickly advancing the drill bit into contact with the rail ready for the drilling operation. The drill is held in place by means of two clutch arms, fitting over the head of the rail. The upright frame is strongly braced, and may be telescoped by pulling on the back brace handle, for convenience in carrying and to permit the passage of trains during the drilling operation.

The spindle has a set screw type of chuck for holding flat or twisted track bits having flattened round shanks.

Weight—60 Lbs.

List Price—\$20.00



ALDON CAR MOVERS



Aldon

it tends to push the car forward, rather than upward, thus minimizing the required effort in moving a car. The handle is of the best grade hard maple sand finished with varnished surface. All other parts are made of malleable iron, and are renewable.

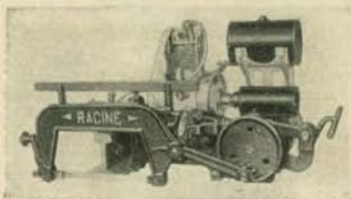
The Sheldon car mover is made with a malleable iron handle, with all wearing parts of heat treated tool steel except the shoe which is made of malleable iron. All parts of this mover are also reversible, renewable and interchangeable. It is finished with black asphaltum paint.



Sheldon

For Net Prices See Supplement

RACINE HIGH SPEED PORTABLE RAIL CUTTING MACHINE



Gasoline Engine Driven

The Racine Rail Cutter is designed for reconditioning old track on both steam and electric railroads. Worn joints and battered ends are cut off without removing the rail from the track. This method of reconditioning track not only removes the wear on the under side of the joint and rail but also when the gap is closed moves the joint to a new location over solid ballast. This method has many advantages over building up or welding battered rail ends.

Racine Rail Cutters can be furnished with a motor suitable for any kind of generating unit commonly used on the steam roads or with a motor for direct trolley connection and capacity for cutting the large Trilby rails used on electric roads.

This machine embodies all the qualities of the Racine line of cutting machines. An outstanding feature is its simplicity of operation. It functions without removing the rail from the bed. A pair of quick acting clamps readily adjusted to any size or width of rail permit the machine to hang on the rail without bolting, and to hold tightly in cutting position by the weight of the machine. When once adjusted for any rail, the clamps need no further adjustment, two men can easily lift the machine on and off the rail without turning a screw or nut. The cutting operation is automatic in that when started, no further attention is necessary until the cut is finished.

A 14" x 3/4" x .049 gauge, 10 tooth hack saw blade is used. It will cut rails up to 9" in height and 6" in width. In ordinary production a 90 to 100 pound rail can be cut clean and accurately in 10 to 15 minutes. The entire cutter is well constituted to serve its purpose steadily and to stand up under hard service. The base and saw guide are made of cast steel to insure the greatest strength with the least weight. It can be furnished for electric motor drive, pneumatic motor, or gasoline engine drive. The equipment includes motor (or engine); starting box; water tank for blade cooling; lifting handles; connection plug; and six blades.

Complete information will be gladly sent on request.



Motor Driven

General Specifications

Capacity—Regular.....	6 1/2 x 6 1/2"
Capacity.....	Special or Trilby rail 9" high by 6 1/2"
Length overall.....	36"
Height overall.....	18"
Stroke of blade.....	6"
Blades.....	10"—12"—14"
Motor.....	3/4 H. P., 1750 R.P.M.
Drive.....	direct through worm gear
Weight—net.....	250 lbs. to 325 lbs.
Weight for shipping.....	400 to 450 lbs.

FOR OTHER SMALL TOOLS AND LARGER METAL-WORKING MACHINERY

The Ryerson Line of small tools and equipment covers too great a field to be described fully in this limited space.

We have endeavored to give brief descriptions and essential specifications of only the leading tools in each line. If you desire any equipment which is not listed here we will be glad to receive your inquiry—which will have our prompt attention.

HAND AND POWER HACK SAW BLADES



All Hard or Flexible Hand Blades

Length Inches	Width Inches	Thickness Inches	Teeth Per Inch				List Price Gross
			16	18	24	32	
8	1 1/2	.025 or 23GA	16	18	24	32	\$ 8.00
9	1 1/2	.025 or 23GA	16	18	24	32	9.00
10	1 1/2	.025 or 23GA	16	18	24	32	10.00
11	1 1/2	.025 or 23GA	14	16	18	24	11.00
12	1 1/2	.025 or 23GA	14	16	18	24	12.00
12	1 1/2	.025 or 23GA	14	16	18	24	12.00
12	1 1/2	.025 or 23GA	14	16	18	24	12.00
12	1 1/2	.028 or 22GA	14	16	18	24	15.24

When ordering, specify whether all hard or flexible blades. Otherwise 18-tooth flexible blades will be sent. Flexible blades are hardened on the teeth only, the back is soft to prevent breakage.

Light and Heavy Power Blades

Length Inches	Width Inches	Thickness Inches	Teeth Per Inch				List Price Gross
			14	18	24	32	
10	3/4	.028 or 22GA	14	18			\$14.40
10	3/4	.032 or 21GA	14	18			18.24
10	3/4	.049 or 18GA		10	14		24.72
12	3/4	.028 or 22GA	14	18	24		16.80
12	3/4	.032 or 21GA	14	18	24		17.88
12	3/4	.032 or 21GA	14	18	24		21.36
12	3/4	.049 or 18GA		10	14		28.92
12	1	.049 or 18GA		10	14		37.92
14	3/4	.032 or 21GA	14	18	24		20.40
14	3/4	.032 or 21GA	14	18	24		24.36
14	3/4	.049 or 18GA		10	14		33.12
14	1	.049 or 18GA		10	14		43.56
14	1 1/4	.049 or 18GA		10	14		53.52
14	1	.065 or 16GA	7	10			50.88
16	1	.049 or 18GA		10	14		49.08
16	1	.065 or 16GA	7	10			56.88
17	1	.049 or 18GA		10	14		51.72
17	1	.065 or 16GA	7	10			59.52
17	1 1/2	.065 or 16GA	7	10			85.32
18	1	.049 or 18GA		10	14		54.36
18	1	.065 or 16GA	7	10			62.04
18	1 1/2	.065 or 16GA	7	10			90.24
20	1	.062 or 16GA	7	10			67.92
24	1	.049 or 18GA		10	14		70.32
24	1	.065 or 16GA	7	10			79.32
24	1 1/2	.065 or 16GA	7	10			119.04

Length of all blades measure from center to center of holes except 14" and 17" lengths, which measure 13 1/2" and 16 1/2" respectively.

Always specify length, width, thickness and number of teeth when ordering.

If not specified, 14-tooth blades will be furnished on length 14" and under; 10-tooth blades on longer lengths.

METAL CUTTING BAND SAWS



Width	Thickness Inches	List Price per Foot			Brazing
		Flexible	Bronze Cutting	Spring Temper Resharpen- able	
3/4"	.025 or 23 Ga.	\$0.07	\$0.07	\$0.13	\$0.25
3/8"	.025 or 23 Ga.	.08	.08	.14	.25
1/2"	.025 or 23 Ga.	.09	.09	.15	.25
5/8"	.032 or 21 Ga.	.11	.11	.16	.25
3/4"	.032 or 21 Ga.	.13	.13	.18	.25
1"	.035 or 20 Ga.	.16	.16	.22	.25

The flexible back blade, with hardened teeth only, requires no filing and will cut until worn dull, when it should be replaced. Furnished with 8, 10, 12, 14, 18, or 24 teeth to the inch.

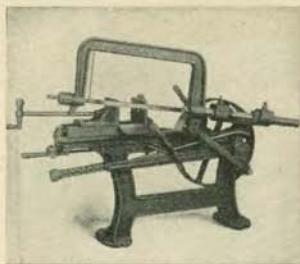
The bronze cutting blade is especially made for cutting brass and bronze—10, 12, or 14 teeth per inch.

The spring temper, bright finish, resharpenable blade, is tempered for cutting aluminum, white metals, fibres, yellow brass, and other special compositions. When dull, they can be resharpened in the same manner as wood band saws. They can be furnished with 4, 5, 6, 8, 10, and 12 teeth to the inch.

Specify size, shape and material to be cut.

For Net Prices See Supplement

MARVEL POWER HACK SAWS



Size No. 2—Belt Driven

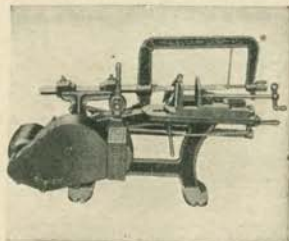
lever is connected with an automatic stop device, and is conveniently located at the front of the machine.

Size No. 1 has a quick-acting, solid vise for straight cutting only. Size No. 2 has a quick-acting vise which may be swiveled both ways to 45 degrees, or may be removed leaving a T-slotted bed for holding irregular shapes.

The stroke on the No. 2 saw is adjustable from 4" to 6 $\frac{3}{4}$ ", with a normal capacity 6"x6" material using the full stroke, or a maximum capacity of 8"x8" material on the shortest stroke.

The direct motor driven arrangement is fully portable, making them especially convenient in cases where it is desired to take care of miscellaneous cutting in various parts of the plant. One of these motor driven units will often save considerable time and expense by eliminating the transfer of material through the shop to the regular sawing equipment.

The No. 1 machine is supplied only with a 110 volt motor, either for direct current or for single phase alternating current, with belt connection to the drive pulley of the saw through an idler. An enclosed switch is operated by the starting lever of the machine, and the automatic stop is arranged to open the switch and stop the motor. The entire outfit is self-contained, being mounted on wheels for portable use, and is furnished with extension cord and plug for attaching to the lighting circuit.

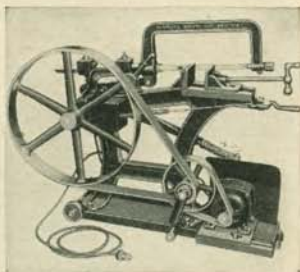


Size No. 2—Motor Driven

The No. 1 and No. 2 Marvel Hack Saws are dry-cutting machines, not being provided with pump or tank for cutting compound. They are excellent for use in the small shop, or in places where an inexpensive saw is required for occasional service.

Substantially constructed, with an open type, ribbed frame. Light in weight and occupies minimum floor space. The design is extremely simple, embodying but few moving parts. Cutting is done on the draw stroke, pressure on the blade being released on the forward stroke. The saw frame is raised, lowered, or held at any desired angle by the feed lever, allowing the operator free use of both hands for placing or removing the work.

Adjustable V-bearings are provided for the saw frame slide. The drive shaft runs in a long bronze bearing. The Starting



Size No. 1—Motor Driven

The No. 2 machine can be supplied for 110 or 220 volt direct current, or alternating current of any standard phase and frequency. Drive is by means of silent chain and intermediate cut gears, completely enclosed and provided with oil pocket. An enclosed, fused switch is operated by the starting lever of the machine, and the automatic stop is arranged to open the switch and stop the motor. Wiring between switch and motor is in conduit. This is a self-contained unit which is readily moved to a new location at any time, although not mounted on wheels.

General Specifications

Size	No. 1	No. 2
Capacity, Ins.	4x4	6x6 or 8x8
Size of Blades, Ins.	12x $\frac{5}{8}$	12 to 17x $\frac{3}{4}$
Length of Stroke, Ins.	5	4 to 6 $\frac{3}{4}$
Size of Pulley, Ins.	18x2 $\frac{1}{4}$	20x2 $\frac{3}{4}$
Speed—Belt Driven	60 to 90	50 to 70
Motor Driven, strokes per minute	80	65
Net Weight—Belt Driven	110	265
Motor Driven	220	350

In ordering Motor Driven Saws, give full specifications of electric current available.

For Net Prices See Supplement

MARVEL POWER HACK SAWS

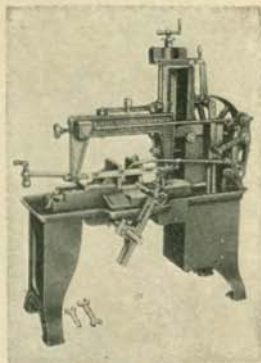
Size No. 4.

The No. 4 Marvel Power Hack Saw is a high grade, well constructed machine of the high speed type, recommended for use where speed and accuracy are essential. Cutting is done on the draw stroke, the blade being lifted free of the cut on the forward stroke. The pressure on the blade is easily regulated by a convenient hand nut, which also serves to engage or disengage the feed mechanism.

One of the features of this machine is that the saw frame, and consequently the blade, always moves in a horizontal position. The feed is of the vertical type, so that there is not a varying angle between the blade and the work during the cut. The crank lever provides a smooth, even cutting stroke and a quick return stroke for the blade. The entire length of the blade may be used up by means of a simple device which permits shifting the saw frame in relation to the work while the machine is running. The saw blade holders allow the blade to be tilted to the right or left and indicating marks are provided to show when the blade is set square.

The stroke is adjustable from 4 inches to 6½ inches, by means of a shifting bolt in the crank. The machine stops automatically when the cut is completed, and the device controlling this action may be set to stop the machine at any desired depth of cut.

Regular equipment includes a swivel vise, plunger pump with ball valves, and tank for the cutting compound. The pump and tank are located in the cabinet leg of the machine.



Size No. 4.

Size No. 5.

The No. 5 Marvel Saw is similar to the No. 4 machine, but is equipped with an Automatic Stock Feeding Device. This arrangement is of particular value in shops where large quantities of duplicate pieces are to be cut on a production basis. Duplicate work can be handled at a considerable saving in time and labor over ordinary methods of cutting.

The Stock Feeding Device is entirely automatic in action, so that the machine requires no attention from the operator until it is necessary to put another bar of stock in place. After each cut, the saw frame raises automatically, the chuck opens, the bar of stock is fed forward to the gauge, the chuck closes and the saw frame lowers to the work, starting a new cut, all in a space of about ten seconds.

The machine has all of the features of the No. 4 Saw and can be used as a regular hack saw for ordinary cutting when desired. The maximum sawing capacity is the same as for the No. 4 machine. Will automatically feed the bar from ½ inch to 2 feet.

Inquiries relative to this machine should state size of bars to be cut and length of duplicate pieces required.

Two bars of 1½" round cold rolled steel are required for the vise carriage. These bars are not regularly included with the machine because of inconvenience in shipping and added freight charges, but can be furnished at an extra charge, when desired.

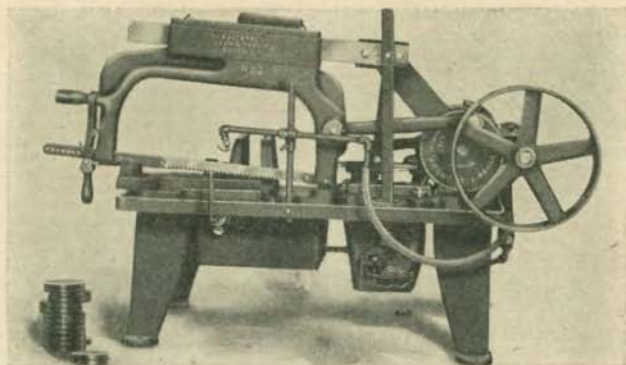
General Specifications—Sizes No. 4 and No. 5.

Maximum Cutting Capacity Inches	Size of Blades Inches	Length of Stroke Inches	Size of Pulley Inches	Speed R. P. M.	Net Weight Lbs.	
					No. 4	No. 5
6x6	14x1	4 to 6½	17x3¼	130 to 145	475	600

Both the No. 4 and the No. 5 Saws can be supplied in direct motor driven arrangements, with or without motor. Inquiries should give full specifications of electric current available.

For Net Prices See Supplement

ECONOMY POWER HACK SAWS



No. 4—High Speed Type—Belt Driven

Economy Power Hack Saws are built by a manufacturer with nearly twenty years of experience in making this class of equipment. The very best of materials are used and this, combined with proper design and skilled workmanship, results in a product that we can recommend to any one desiring an accurate power hack saw at a moderate price.

The No. 2 machine 1921 model on the first line of specification table below is furnished in the dry cutting type only. Nos. 3, 40, and 40-B are furnished in the high speed and two speed types. Nos. 4, 5 and 6 saws are furnished in low speed, high speed, and two speed types. All high speed and two speed saws are equipped with liquid outfit for cooling the blade, which includes pump, hose, adjustable nozzle and reservoir for holding liquid.

An important feature on the Economy Saws is the Oil Compression Lift, which raises the blade from the work on the idle or return stroke. This feature is responsible for the long life of blades on this machine as it is positive in action and absolutely prevents the frame from falling. The Oil Lift is extremely simple and requires no maintenance attention.

The frames of all Economy Saws are provided with gibs for wear adjustment and all gears are cut from the solid. Each machine has an automatic stop. Sizes 2, 3 and 4 are equipped with the plain screw vise; all other sizes with the quick acting type vise.

Nos. 5 and 6 are real utility tools, as they cut not only small bars, etc., but also the larger structural shapes. The No. 5 will handle a 15" section and No. 6 up to 18" I beams. Series 40 and 40-B are for production manufacturing, the latter type on account of its box base being unusually substantial and rigid.

General Specifications

Size No.	Capacity Inches	Type	Weight	Pulley Speed	Blade Length
2	6x 6	1921 Model Dry	240	60	10-12-14
3	6x 6	High Speed	355	210	10-12-14
3	6x 6	Two Speed	355	155	10-12-14
4	8x 8	Low Speed	345	155	12-17
4	8x 8	High Speed	385	210	12-17
4	8x 8	Two Speed	405	155	12-17
5	8x15	Low Speed	380	155	12-24
5	8x15	High Speed	420	210	12-24
5	8x15	Two Speed	440	155	12-24
6	8x18	Low Speed	400	155	12-26
6	8x18	High Speed	435	210	12-26
6	8x18	Two Speed	455	155	12-26
40	8x 8	High Speed	400	210	12-17
40	8x 8	Two Speed	415	155	12-17
40-B	8x 8	High Speed	550	210	12-17
40-B	8x 8	Two Speed	600	155	12-17

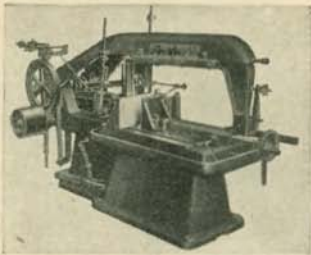
Regular equipment includes arrangement for belt drive with 2½ x 12" pulley. Direct motor drive can be furnished at an extra charge if preferred.

On the No. 2 size a ½ H.P., 1725 R. P. M. or 1450 R. P. M. motor is used, by means of worm and worm gear, while on larger sizes the drive is through a spur gear with fiber pinion mounted on the motor shaft. With this latter arrangement the following motor speeds are recommended, a ½ H.P. motor being used in all cases.

For Low Speed Machines—1100-1200 R. P. M.
 For Two Speed Machines—1100-1200 R. P. M.
 For High Speed Machines—1700-1800 R. P. M.
 For 25 Cycle Motors 1400-1500 R. P. M.

For Net Prices See Supplement

PEERLESS HIGH SPEED METAL SAWS



13"x16" Saw
Belt Drive Arrangement

These saws are intended for rapid, accurate cutting and are built to insure maximum production, economy, accuracy and reliability.

Pressure on the blade can be varied from nothing to 175 pounds, by means of a convenient hand lever. Once set, the pressure remains constant, no matter at what angle the blade may be cutting. There are no weights on the saw frame to be shifted to secure the desired pressure, or to cause blade breakage by vibration. The feeding mechanism is so designed that as the blade becomes dull or hard spots are encountered in the work, the pressure on the blade remains the same but the feed automatically becomes less to compensate for the changed conditions.

In starting the machine, or on encountering a hole in the work the saw frame cannot drop to the work and break the blade as in the ordinary hack saw. The feeding mechanism will rapidly carry the blade down at the rate of $\frac{1}{8}$ " per stroke until the blade comes into contact with the work, when the regular feed is automatically engaged.

Balance springs automatically lift the blade on each forward stroke. When the cut is completed, the machine stops automatically and the balance springs lift the blade clear of the work. An adjustable height gauge controls the height to which the frame and blade raise after the cut, and it should be set so that the blade just clears the work.

An adjustable depth gauge is also provided, by means of which the work can be cut part way through to a predetermined depth. The machine is automatically stopped and the frame raised when the desired depth is reached.

The saw frame is extremely rigid in design and is nicely balanced. The extra large V-type ways are hand scraped to an accurate fit, and are provided with ample lubrication and adjustment for wear. The blade lies along the center line of the connecting rod and saw guide, eliminating side thrust and insuring accuracy.

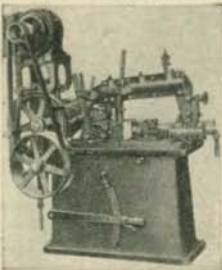
The blade holders are of a clamp type, holding the blade rigidly to prevent tilting and thus preventing breakage of blades and crooked cuts from this cause. An improved type of saw tightener provides a straight pull on the blade in tightening.

A quick-acting adjustable vise is provided, and the bed has two T-slots to permit clamping of odd shaped work or sawing at an angle.

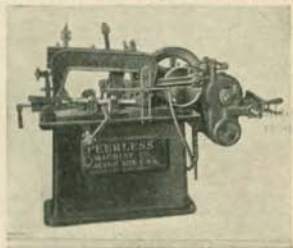
The full cabinet base forms a rigid, substantial foundation for the machine. The pump for the cutting compound is a gear type, made entirely of bronze to avoid corrosion, and is located with the reservoir in the cabinet base where it is readily accessible, yet protected from damage.

All sizes of these saws can be supplied with a six speed Quick-Change Gear Box at an extra charge. This arrangement is recommended where materials of varying hardness are to be cut, as it provides a range of from 50 to 150 strokes per minute, thus affording the correct speed for every class of work to be handled.

All sizes, either in the regular arrangement or with the quick-change gear box, can be furnished arranged for direct motor drive, either with or without motor. An 1800 R. P. M. motor is used, being mounted on a bracket above the machine at the rear, and connected to tight and loose pulleys by a short belt, with 4 to 1 reducing gears in the machine itself.



6"x6" Saw—Motor Driven



6"x6" Saw—With 6-Speed
Quick-Change Gear Box

General Specifications

SIZE—Nominal Cutting Capacity		6"x6"	9"x9"	13"x16"
Actual Cutting Capacity.....	Inches	6 $\frac{3}{8}$ x6 $\frac{3}{8}$	9 $\frac{1}{2}$ x9 $\frac{1}{2}$	13 $\frac{1}{2}$ x16 $\frac{1}{2}$
Length of Blades.....	Inches	10 to 14	10 to 17	12 to 24
Length of Stroke.....	Inches	6	6	6
Size of Motor Required.....	H. P.	1	1 $\frac{1}{2}$	2
Speed of Motor Recommended.....	R. P. M.	1800	1800	1800
Height—Floor to Vise.....	Inches	22	21	21
Floor Space Occupied.....	Inches	22x44	26x66	30x92
Net Weight—Belt Driven.....	Pounds	600	1000	1600

For Net Prices See Supplement

PEERLESS UNIVERSAL HIGH SPEED METAL SAWS



6" Universal Saw

The Universal High Speed Saw is a new departure in the sawing of metals. It is the result of many years of metal cutting machinery experience and research.

It can be used in four general ways,— in the shop that makes a specialty of general work, in the production shop, and in the tool and die room. It is equally suitable on tubing, small rounds, large bars, and structural shapes. In the tool and die room the machine is invaluable with the Angle Plate and Cross Feed Fixture, furnished extra for that purpose. Tool and fixture parts such as locating jaws, straps, clamps, etc., can be blocked out very quickly and leave only the finishing to be done in the shaper or milling machine by the tool-maker. The Cross Feed Fixture is used for cutting out corners, slot openings, etc., in dies. It is necessary to clamp the work on the table of the fixture and move table and all, by use of the micronmeter screw.

Due to its unusual construction the saw is capable of doing a wide range of work. Its four sided saw frame enables the blade to be placed under proper tension without distortion of bearings. The bearings are ample and far apart to decrease variations; vibration and chatter are eliminated. Uniform feed pressure is provided through the entire cut, while the blade works in a parallel position coming down upon the work as a cutting tool rather than as a scraping tool. The lifts of the blade on the non-cutting stroke is positive and uniform. Proper speeds and feeds are provided for cutting all classes of material. The vise is of the milling machine type; pressure from the movable jaw does not raise the work from the table, and the work table is arranged to accommodate various fixtures for special work.

The blade expense is reduced to a minimum because it is vibrationless, parallel to the work, and fully tensioned, and therefore is not easily broken or worn out.

Three special attachments, an angle fixture, a Cross-Feed Fixture and an Off-set Open Side Saw Frame are made for the 6" Universal but are not included in the regular equipment.

The accompanying illustration shows the 6"x6" Saw in Operation, blocking out work using the Angle Fixture.



Angle Fixture on Blocking Out Job

General Specifications

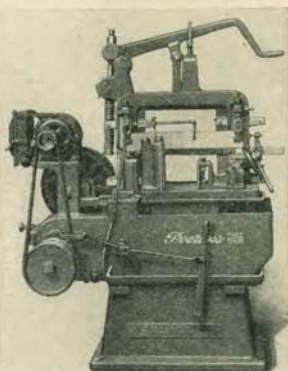
Nominal Cap.	6"x6"	Hgt. of Floor to Vise....	23"
Actual Cap.	6 3/4"x6 3/8"	Floor Space.....	24"x43"
Capacity at 45°	2 1/2"	Net Wgt. without motor.	800 lbs.
Blade length.....	10" to 14"	Additional for Motor....	100 lbs.
Stroke (3 speeds, 125,85,50)	5 1/2"	Power required.....	1 H. P.
Pulley.....	2"x10"	Designed for Motor.....	1700-1800 R.P.M.
Pulley Speed.....	600		

Heavier Types

The illustration shows the heavier type Universal High Speed Saws. The construction is somewhat different from that of the saw shown above, but its features are, in the main, similar to it. This machine can be furnished in capacities 9"x9" and 13"x13".

General Specifications

Capacity, Square Cuts	9"x9"	13"x13"
Capacity at 45°, inches..	6	9 1/2
Blade length, inches.	14-17	14-21
Stroke (3 speeds, 125-85-50).....	6	6
Pulley tight and loose, inches.....	2 1/2 x 10	3 x 10
Driving pulley speed.....	590	590
Hgt. floor to vise, inches	33	42
Floor space, inches.....	26x52	30x75
Wt. without motor, lbs..	1400	2200
Shipping wt. with motor, lbs.....	1500	2400
Power required, H. P.	1 1/2	2
Designed for motor, R. P. M.	1700	1800



9" x 9" Universal

For Net Prices See Supplement

RACINE HIGH SPEED METAL CUTTING MACHINES

The manufacturers of the "Racine" machine were the first to perfect and develop the High Speed Type of metal saws. The patents cover a simplified means of lifting the saw blade on the non-cutting stroke. This lift is positive, regardless of pressure, and insures long blade life and great accuracy.

The gravity feed principle is fool-proof and positive. There is no varying pressure; adjustable weights determine proper feed for every size or kind of material. The solid cabinet base insures rigidity and there are no working parts below table. There are ample bearing surfaces for long wear and accuracy. All parts are machined in accurate fixtures and interchangeable. Adjustments are provided for take up for wear at all necessary points. These machines were all built for long life and dependable service, requiring a minimum of adjustment or repair expense.

Racine Junior 4"x4" capacity is designed to meet the demand for a high-grade dependable saw of moderate capacity, but inexpensive in price. It cuts dry and at a lower speed than the six inch machines, but faster than other machines of its size.

This is an ideal auxiliary saw for maintenance work, or to help out the high speed production saws. In the motor driven type with worm reduction, it becomes a self-contained, portable unit which can be moved about wherever electric current is available.

The High Speed machines are manufactured in sizes 6"x6", 8"x8", 12"x12" and 12"x15". A swivel vise is furnished with the Nos. 2, 10, 7 and 9 series. Three speed transmissions may be specified for cutting tool steel or other hard materials requiring low-cutting speed.

All types of these machines may be equipped with motor drive. On the high speed machines the use of silent chain drive direct from the motor to drive shaft without intermediate gearing gives utmost freedom from friction or vibration. This link-belt chain is fully guarded.

A positive circulating pump for cooling applies a cutting compound on the blade as desired. The clutch is of the standard expanding type, easily adjusted and very sensitive, which eliminates the necessity of tight and loose pulleys.

All high speed machines are equipped with automatic knockout which throws out the clutch and stops the machine when the cut is made. Length gauges included in standard equipment, are for convenience in cutting multiple pieces of same length.

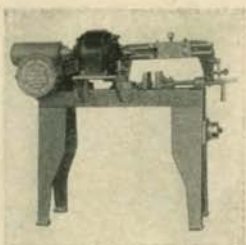
The blade holders are made from 1x1 1/2" flat bar fitted into a milled slot which holds the blade square with the work. The blade tightener enables the operator to give the blade sufficient tension without the use of a wrench. The old blade may be removed and a new one inserted in less than ten seconds. Lifting dogs and ratchet bar of the lifting device are made from hardened alloy steel.

These machines are tested individually in the factory and worked in thoroughly to insure free and proper action before being shipped. They are each guaranteed to be free from defects in material and workmanship and to perform efficiently the work for which they are intended.

General Specifications

Belt Driven.....	No. 0	No. 1	No. 2	No. 10	No. 7	No. 9
Motor Driven with Motor.....	No. 01	No. 3	N. 2 B	No. 10B	No. 7B	No. 9B
3 Speed Trans. Belt Driven.....	.....	No. 4	No. 2A	No. 10A	No. 7A	No. 9 A
3 Speed Trans. Motor Driven.....	.....	No. 5	No. 2C	No. 10C	No. 7C	No. 9C
Capacity, Inches.....	4x4	6x6	6x6	8x8	12x12	12x15
Floor Space, Inches.....	44x12	21x40	24x44	30x47	24x57	24x57
Pulley Speed, R. P. M.....	80-100	130	130	130	120	120
Stroke, Inches.....	6	6	6	6	6	6
Blades, Inches.....	10-12	10-14	10-14	12-17	17-21	17-24
Motor Speed, R. P. M.....	1750	1200	1200	1200	1200	1200
Motor, H. P.....	1/4	1/2	1/2	1/2	1	1
Shipping Weight, Lbs.....	280	600-800	600-800	800-1100	1050-1350	1060-1360

For Net Prices See Supplement



No. 01 Motor Drive



No. 1 Belt Drive



No. 10-B

RACINE SHEAR-CUT PRODUCTION SAW

This new high speed metal cutting production saw is an outstanding improvement in metal cutting machinery and is the product of years of constant experimentation in this field. It embodies a greatly advanced automatic cutting principle.

In this machine the saw is progressively drawn or fed into the metal at a certain speed accurately pre-determined for each size of stock by a remarkably simple automatic screw feed mechanism. The adjustment for various feeds is easily and instantly made. The saw is brought down positively; the cutting load is uniformly distributed throughout the cutting action, and no tooth takes more than its pre-determined depth of cut. In the older methods a heavy pressure is applied to the blade, causing the first teeth to dig into the metal and load up with chips. The blade then rides over the work until the loaded teeth have deposited their cuttings. The continued heavy pressure causes the blade to bow upward, cut crooked, become dull and break. By this method, however, of graduated feeding during the entire cutting stroke, undue blade pressure is eliminated; the metal is removed as fast as the saw is fed down—greatly reducing the blade expense.

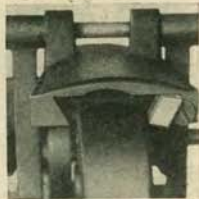


High Speed Saw

The clutch is thrown out automatically and the feeding device is released after the cut is finished, by means of an automatic knockout. This knockout releases the feeding screw, which allows the balanced saw guide to be reset in any desired position. This saw guide is so balanced that it holds itself at any desired height, giving operator free use of both hands in resetting and gauging stock for the next cut. The saw is again started simply by throwing in the clutch and feeds itself automatically into the work. The blade has a positive lift from the work on the non-cutting stroke.

The yoke is of special design to withstand distortion in tightening the blade. The frame is securely guided in sliding ways (see illustration) by extra long bearing surfaces, and with accurately ground gib with one adjusting screw, consistent with the best machine tool practice. The bearing surfaces are spaced widely and the upward pressure automatically centers the saw blade at right angles to the stock.

This machine is furnished with three speed transmission where it is necessary to cut a variety of metals, such as cast iron, tool steel, alloys, and other stock of various degrees of hardness.



Frame Guide

General Specifications

Capacity.....	6"x6"
Capacity (Actual).....	6 $\frac{3}{8}$ "x6 $\frac{3}{8}$ "
Blades.....	10"-12"-14"
Pulley.....	4"x16"
Pulley, R. P. M.....	135
Floor Space.....	30"x50"
Stroke, 6"	

Weight	No. 20 Belt drive, Single Speed, 700 lbs.
	No. 20A Belt drive, 3 Speed trans., 860 lbs.
	No. 20BX Motor Drive, Single Speed, 850 lbs.
	No. 20CX Motor Drive, 3 Speed trans., 900 lbs.

RACINE ABRASIVE METAL CUTTER



Abrasive Cutter

Abrasive metal cutters are coming into general use in all well equipped machine shops and tool rooms for cutting high speed and hardened steels as well as for cutting brass, copper, aluminum flexible tubing, carbon, metal covered wood rods and many other materials.

This machine will cut square or at any angle without burning and loses only $\frac{3}{16}$ ", the width of the abrasive wheel through $2\frac{1}{4}$ " material either round or square. It is very simple and efficient. It is fitted with the highest grade ball bearings, requiring little attention, assuring light running and absolutely preventing end play.

The arbor is ground from high grade steel, and carries a 12" diameter by $\frac{3}{16}$ " abrasive wheel, which is guarded by an iron hood. The work table is 9" long and swivelled to allow cutting various angles. A work clamp holds irregular pieces; adjustable stop gauge for duplicate cuts is included in stand and equipment.

The countershaft is fitted with ball bearings and is very rigid. Driving pulley is 14" diameter for 3" belt and is well balanced; loose pulley is 6" in diameter for $3\frac{1}{4}$ " belt; speed of countershaft 860 R. P. M.

The machine may be equipped with motor drive, in which case the countershaft is not included. Shipping weight with with countershaft 375 lbs.

RACINE DUPLEX BAND SAW

This band saw is a most valuable machine in the tool room, in experimental work, and for patternmakers, as well as for the general machine shop.

It is furnished with one or two speeds making possible the cutting of practically any material. The machine having only the single speed is intended for cutting such materials as wood, fibre, bakelite, brass, aluminum and hard rubber.

The two speed type will cut any of the above materials in high gear, but in low gear it is capable of cutting light steel bars or shapes, tool steel, formed steel, and other hard material. The two speed transmission is constructed so as to permit the use of additional gears which can be placed quickly in position to give additional cutting speeds for various sizes and kinds of stock. The saw thus becomes suitable as a general purpose machine as well as a fast production tool.

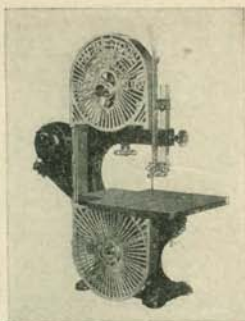
A swivel guide and swivel table can be furnished with the Racine Duplex Band Saw Machine. This arrangement provides means for directing the blade to any desired angle, and permits cutting of long pipe, bar stock, boards etc., without interference with the frame of the machine.

Very minute adjustment of the swivel guide is also possible, and perfect alignment of the blade is secured which will

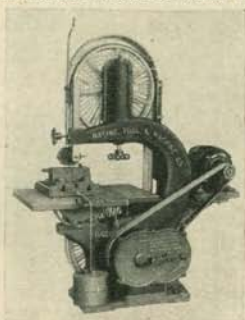
compensate for inaccuracies in the blade itself, faulty set of teeth, poor brazing, or other defects which may cause the blade to cut out of line or "crawl." The tendency to crawl is objectionable especially where multiple pieces or strips are to be cut parallel. The blade can be directed by this device with ease and certainty.

The cast aluminum wheels are accurately machined, balanced, and enclosed in polished cast aluminum guards which swing outward to facilitate changing blades. Ball bearings are used throughout. Housings which carry the wheel bearings are packed with grease and protect the bearings from dust. The saw guides are the heavy type with adjustments for width and gauge of blades. The blade being under spring tension, runs without vibration at all speeds. The motor is $\frac{1}{2}$ H. P. alternating or direct current and runs at 1750 R. P. M.

The swivel guides are fitted with thumb screw adjustments throughout and the thrust roller and small guide rollers are hardened and ground and contain ball-bearings. All parts are accurately machined and are interchangeable.



Front View Nos. 12 and 13



Rear View No. 14

General Specifications

Capacity—under guide without vise	5'
with vise	3'
frame to blade	14'
Height, overall	39"
Floor Space	34"x21"
Length of Blades	7'x8"
Saw guide adjustable for blades— $\frac{1}{8}$ " to $\frac{3}{8}$ " wide, any gauge.	
Pulley	on motor, 3" on machine 7"
Weight	Single speed 350 lbs., two speed 400 lbs

Pedestal height (Pedestal takes an extra charge) 22".

This machine is designated by different numbers according to the equipment furnished as indicated in the table below:

No. 12 Single Speed Motor Driven with standard motor.

No. 13 with 2-Speed transmissions and standard motor.

No. 14 with 2-Speed transmission, standard motor and and gravity, feed vise.

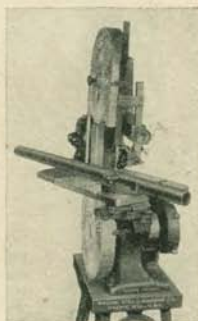
No. 12-A Same as No. 12 with Swivel Table and Swivel Guides.

No. 13A Same as No. 13 with Swivel Table and Swivel Guides.

No. 14-A Same as No. 14 with Swivel Table and Swivel Guides.

The following attachments can be furnished when specified at extra cost: sliding cross-cut fixture; gravity feed vise; ripping fence; swivel table and swivel guides as described above; extra gears for various speeds; and pedestal.

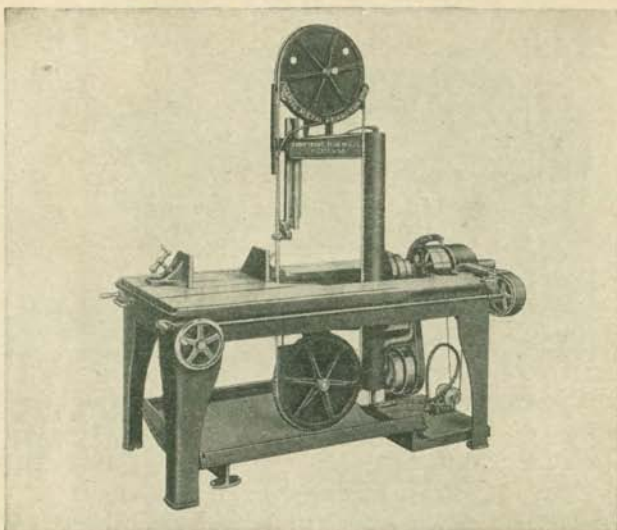
Information regarding adaptability to specific requirement will be gladly furnished on request.



No. 13-A

For Net Prices See Supplement

MARVEL METAL BAND SAW



Upright Position for Ordinary Cutting

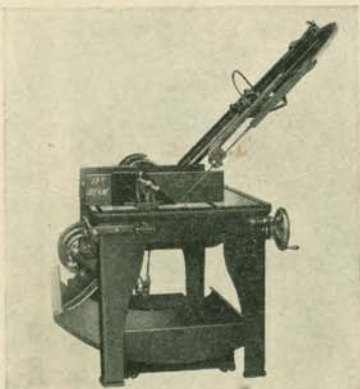
This machine is especially designed to meet the requirements of the ornamental and structural iron shop. It will cut off square, will mitre, notch, and cope any metal section, from the smallest pressed steel or cast iron moulding to the largest structural shape.

It is so universal in its applications that no metal cutting problem can possibly arise that this machine will not handle satisfactorily, with maximum speed and a very fine degree of accuracy. It will cut pipe, cast iron and tubing, just as easily as solid bars, without necessitating any change in the set-up.

Versatility, great range, ease of operation, perfect control, speed and economy are features that make this machine a necessity in modern ornamental, structural, stair, wire and iron shops.

The saw blade is guided with a one-quarter twist between the ball bearing band wheels and the ball bearing guide rollers to bring the teeth straight forward so that any length bar can be mitred or cut in two without interfering with the upright column. This is an exclusive feature that can be found in no other metal band saw.

The upright that carries the band wheels is mounted in a traveling carriage that runs forward and back the long way of the table on four ball bearings that travel in planed ways underneath the table. The feeding mechanism moves this ball bearing carriage and so feeds the blade straight forward into the work. The work, therefore, does not move, being clamped to the rigid table by means of the vise jaws; and the blade moves or feeds through the work.



Tilted Position for Cutting on an Angle.

When cutting angles, mitring, etc., conveniently located degree graduations on the machine give the proper setting for any angle desired, thus eliminating the necessity of laying out the angles on the work.

Write for complete illustrated circular.

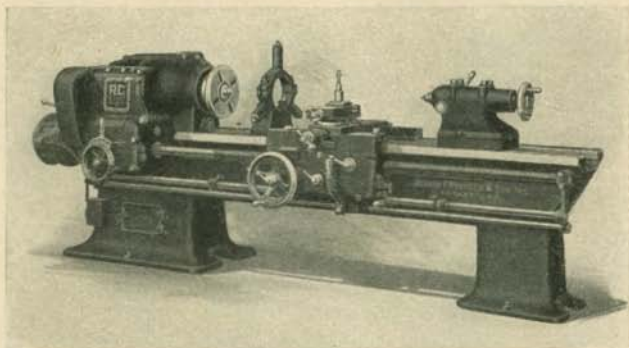
General Specifications

Capacity of throat: depth 18", height 20"; at 45 degree angle, depth 18", height 14". Feed or travel, 18". Diameter of band wheels, 18". Floor space 36" x 6½'. Height over all 7'. Shipping weight, belt driven, 1800 lbs.; motor driven, 2000 lbs.

When inquiring for price motor driven, give full specifications of electric current available.

For Net Prices See Supplement

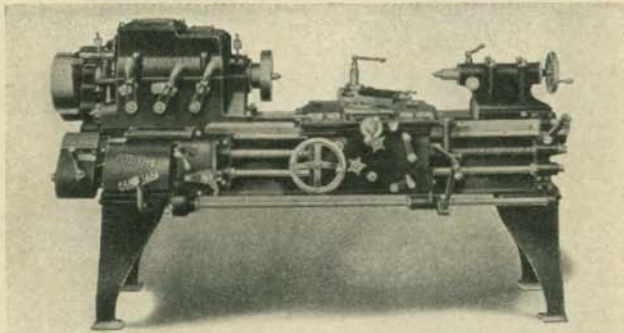
RYERSON-CONRADSON ENGINE LATHES



High power accurate tools with a number of radical improvements over the usual lathe design. The head and bed are a single casting; centralized control speeds operations and herringbone gear drive to the spindle eliminates all backlash and chatter.

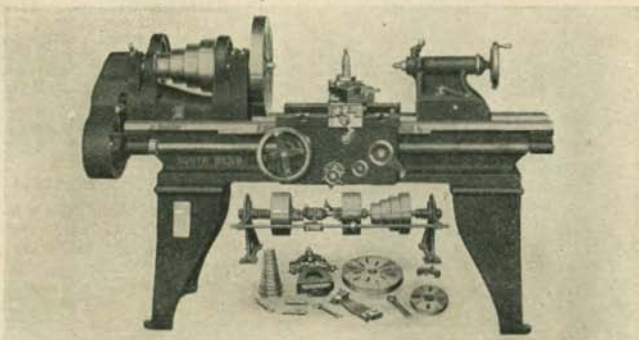
Made in four sizes, 17, 21, 25, and 30 inch swing. Write for Bulletin P-1301.

LEHMAN GEARED HEAD LATHES



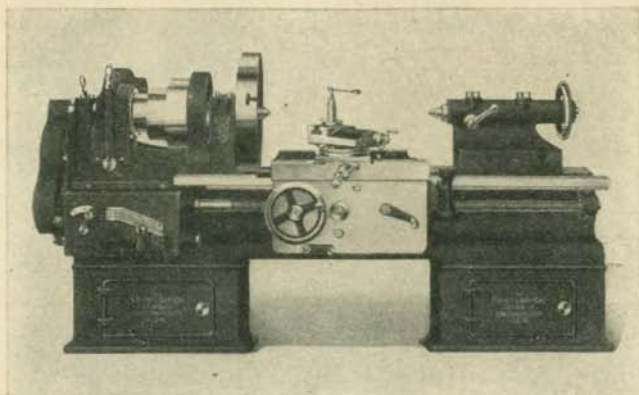
A standard geared head engine lathe, with several exclusive features such as the patented Friction Clutch. Carried in a complete range of sizes. Bulletin P-590 describes them. Write for a copy.

SOUTH BEND ENGINE LATHE



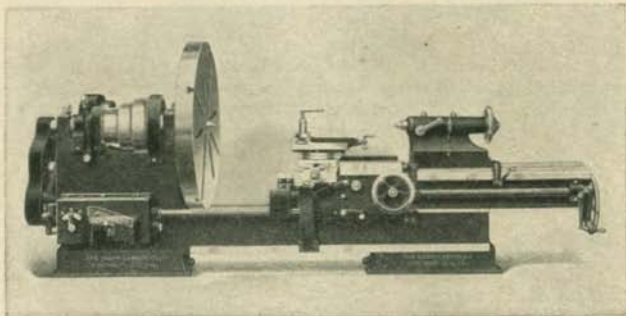
A lighter lathe with four step cone drive, single back geared. Offset type tail stock with set-over screw for taper turning. The carriage has power cross and longitudinal feeds. Write for Bulletin P-100.

RAHN-LARMON ENGINE LATHES



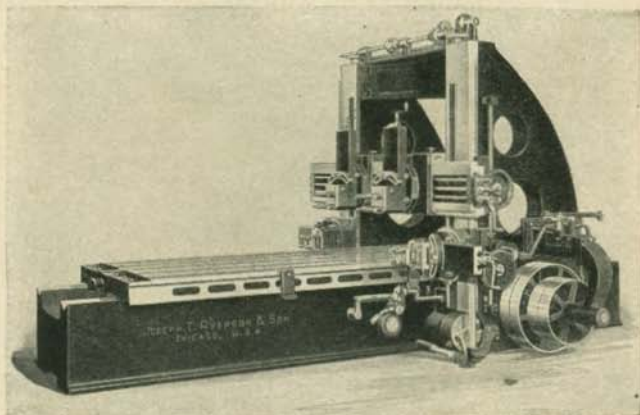
High grade moderately priced tools suitable for tool room. Arranged for various drives. - Described fully in Bulletin P-102.

RAHN-LARMON GAP LATHES



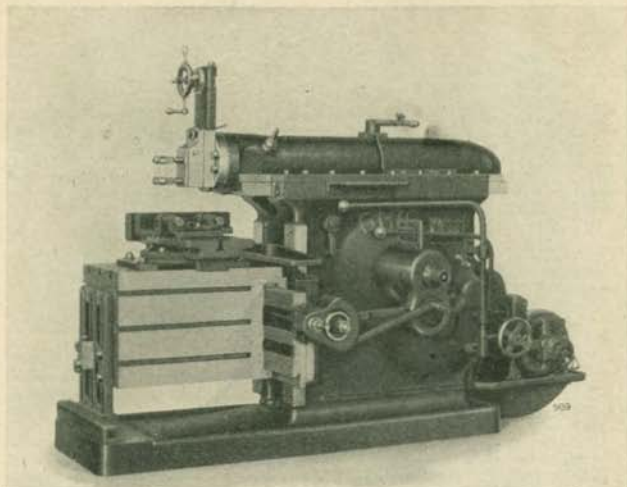
Particularly suitable wherever an infinite variety of work is to be handled. Built in six sizes ranging from a 16-inch to a maximum swing of 48 inches. Described in Bulletin P-102.

RYERSON-ROCKFORD PLANERS



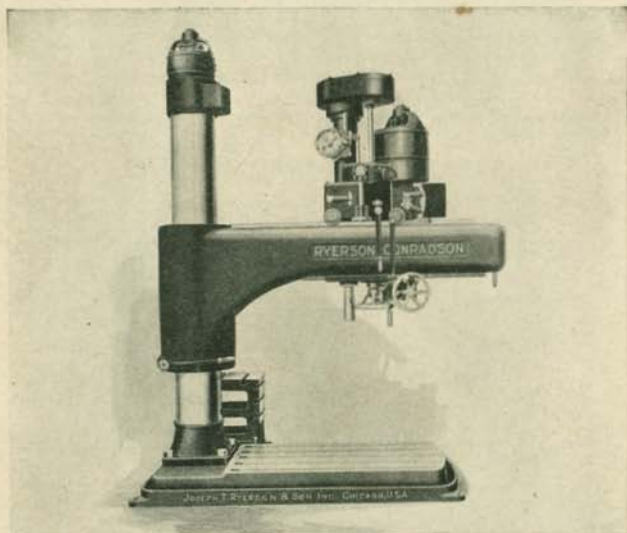
A complete balanced line of standard and heavy type planers, as well as the corresponding sizes of widened planers. Descriptive Bulletin P-2201 sent on request.

OHIO SHAPERS



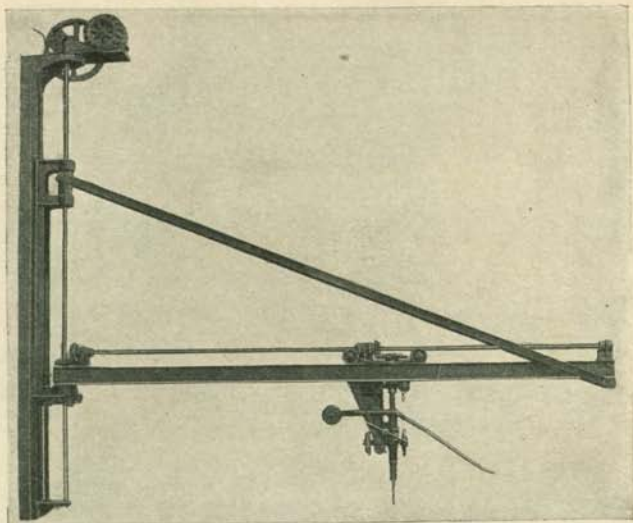
We are prepared to furnish either belt or motor driven types of Ohio Shapers in a complete range of sizes. Centralized control, Forced feed lubrication, power and accuracy, and the high number of cutting strokes per minute are a few of the reasons for their wide use. We will be glad to send complete information on any of the various sizes. Tell us your requirements and ask for Bulletin P-48.

RYERSON HEAVY DUTY PLAIN RADIAL DRILL



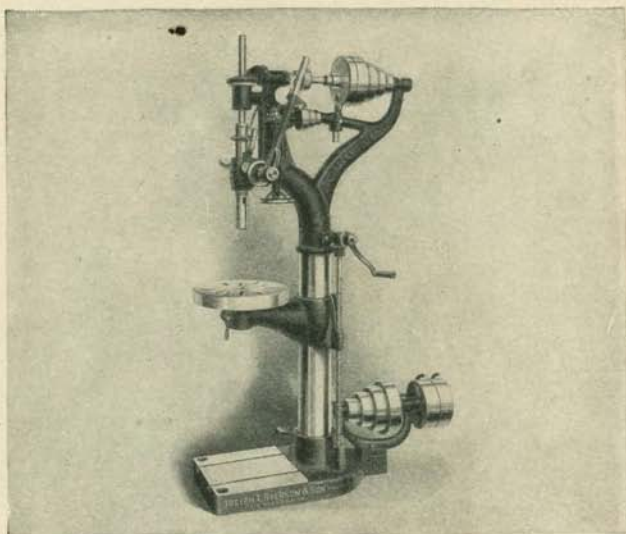
Drilling, Boring, Tapping and Reaming Operations can be performed with equal efficiency. The high power twin motor drive reduces the number of shafts and gears, saves power and eliminates all bevel gears and their attendant troubles. The spindle is on the center line of the arm so that there is no torsional strain under the heaviest drilling pressures. Entire control located in the head convenient to operator. Bulletin P-4001 tells the story. Write for a copy.

RYERSON WALL RADIAL DRILL



For mounting on a post, column or wall and recommended particularly for drilling, reaming and countersinking holes in plates, angles, girders, castings, etc. Made in six standard sizes with arms varying from 6 to 16 ft. in length and can be furnished to special order with other lengths of arm. Two styles are furnished, one having hand wheel and lever feeds, while the other has power feed in addition to the hand feeds. Bulletin P-4011 gives complete description and specifications.

ROCKWELL 20-INCH DRILL



A small drill of the stationary type especially valuable in small machine shops and garages, and also on small part production work. Provided with both ratchet type hand feed and power feed of the three cone belt driven type. Twenty-four feeds, three for each driving speed, may be secured.

This drill can also be arranged for direct motor drive. Complete description and specifications gladly sent at your request. Ask for Bulletin P-4021.

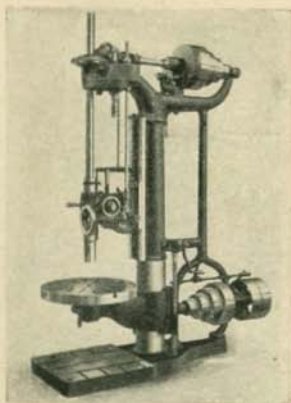
ROCKFORD MECHANICS' DRILL

A sliding head drill well adapted to both jobbing and manufacturing operations. The drive is through four step cone pulley and back gear to crown gear and pinion. Spindle sleeve is graduated as a depth gauge. Automatic adjustable trip disengages the feed at any desired position. These drills can also be furnished in gangs with any number of spindles.

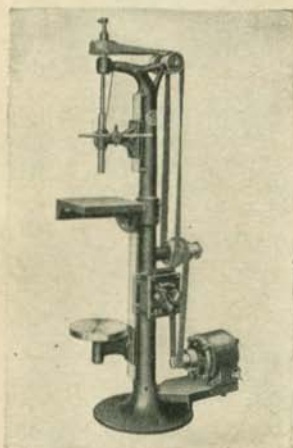
Six positive feeds can readily be obtained by means of the direct reading feed changing device which indicates the feed in thousandths of an inch per revolution of the spindle.

If desired, we will furnish these drills in gangs with any number of spindles, the individual columns being mounted on a single base plate, properly proportioned and provided with "T" slots.

Write for Bulletin P-4019 which gives complete description and specifications.



U. S. STANDARD 14-INCH SENSITIVE DRILL



A simple, strong and rigid machine for drilling $\frac{1}{2}$ -inch holes or smaller, quickly and accurately. Spindle has ball thrust bearing and is counterbalanced by a weight inside the column.

Two tables are furnished with the drill. A square table which can be swung around the column and also tilted to any angle desired. A bolt is provided for clamping it to any required position. The apron on the side is a convenient and useful feature. The round table rests in a bracket and is vertically adjustable on the column. It can be clamped in any vertical position by locking handle. This table can be removed and the cup center or crotch center used in its place.

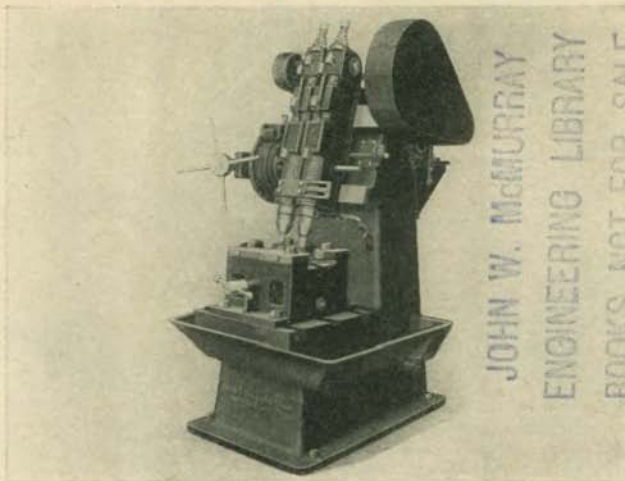
Can be furnished equipped for motor drive as illustrated. Bulletin P-401 gives complete specifications. Write for a copy.

"LITTLE GENERAL" SENSITIVE DRILL

A drill meeting every requirement in general shop and tool room service. Both table and head have an unusually large vertical adjustment. All belts and gears have been eliminated. Drive is through a patented "V Disc" transmission giving a range of spindle speeds from 125 to 5250 R. P. M. Other advantages of this new principle drill are—the long reach from drill to column; the small number of levers and working parts; the accurate depth gauge graduated in both inches and millimeters; and the quick and convenient provisions for shifting and adjusting which reduce to a minimum the waste of time which is unavoidable in the use of many other drills. Write for Bulletin P-4023.



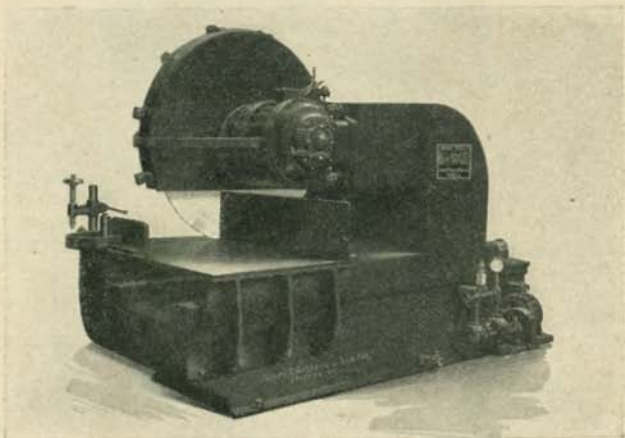
RYERSON IMPROVED RAIL RECLAMATION EQUIPMENT



Ryerson Inclined Rail Drill

The value of rail reclamation work depends largely upon the system of sawing and drilling the old rails. Various methods have been tried but most railroads are now using Ryerson Rail Reclaiming Equipment with good success.

The Ryerson Inclined Rail Drill is designed so that the rail passes through the reclamation plant without having to turn it from its natural skidded position. The operation of the drill is extremely simple. While controlled by hand, it has practically every advantage of automatic equipment. All working parts are securely covered and protected from dirt to assure successful operation when used outdoors and under the most adverse conditions.

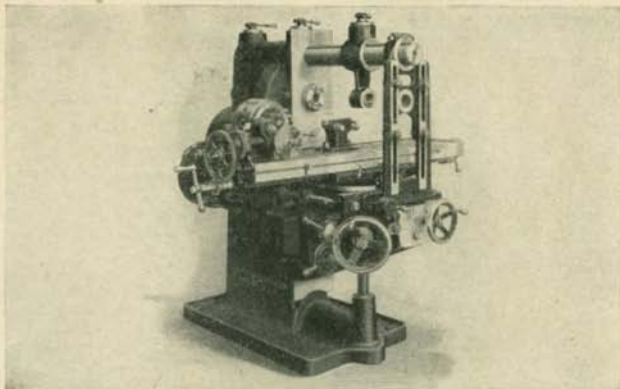


Ryerson High Speed Friction Saw No. 3½

The saw illustrated is especially adapted to this work. A special heavy motor built into a steel frame gives it an abundance of power for continuous cutting of the largest rail rolled.

Bulletin P-21,001 describes this equipment. Our engineers are always glad to make recommendations. Write for complete information.

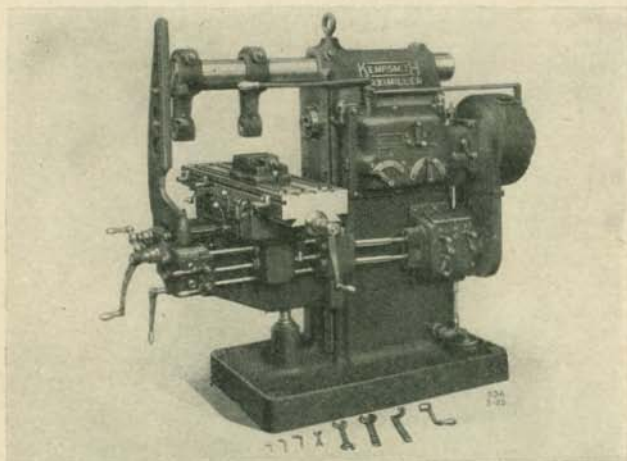
RYERSON-CONRADSON MILLING MACHINE



A heavy duty milling machine designed for the strenuous service of the modern shop. Herringbone gear drive for smooth heavy cuts; one lever control for forward and reverse rapid traverse and feed of table, saddle and knee; ball bearings on all high speed shafts; twelve spindle speeds ranging from 16 to 358 R.P.M. and an over arm of special design preventing rotation due to heavy cuts. The feed mechanism is mounted in the knee. Table has power rapid traverse.

Bulletin P-5023 giving specifications and complete description will be sent at your request.

KEMPSMITH MAXIMILLER



One of the leading lines of millers, complete as to range of sizes, drives, attachments, etc., for handling every milling job. The No. 4 Maximiller illustrated is typical of the complete line. Sturdy unit construction, column and base integral; centralized control; lubrication centralized for all units; one piece adjustable gib, power quick traverse in all directions, etc.

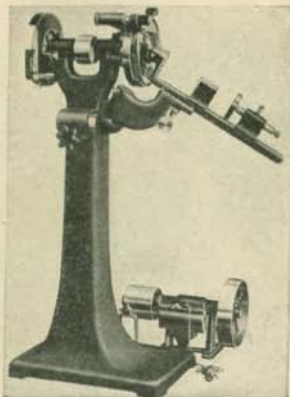
The cut shows belt drive with pulley guard. The motor drive has the motor mounted in the base.

Write for a complete catalog giving descriptions of these machines and their attachments. Ask for catalog P-9.

GRINDING MACHINES



**La Salle Plain and Surface
Grinder**

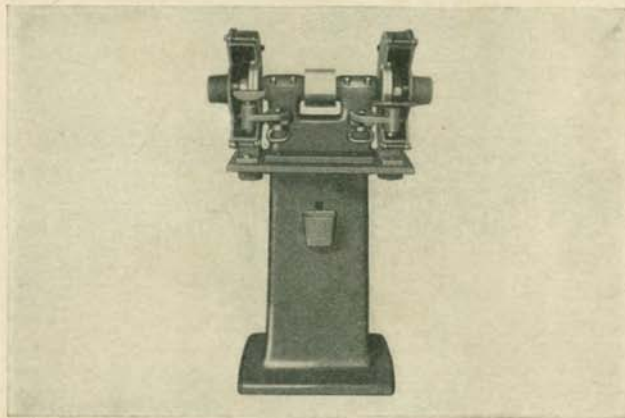


Grand Rapids Drill Grinders

These grinders are intended for general shop and tool room use. Each type has features which make it particularly valuable for its specific work. In addition to other types of surface grinders we can also supply other types of grinders including Dry Grinders, Disc Grinders, Universal Grinders, etc. Surface grinders can be furnished either plain or full automatic. The equipment includes wheel, wheel guards and countershaft. The drill grinders are made both belt drive and direct motor drive in several sizes.

Tell us your grinding problem and we will send description of machines suitable for the work.

IMPERIAL WICK OILING GRINDER

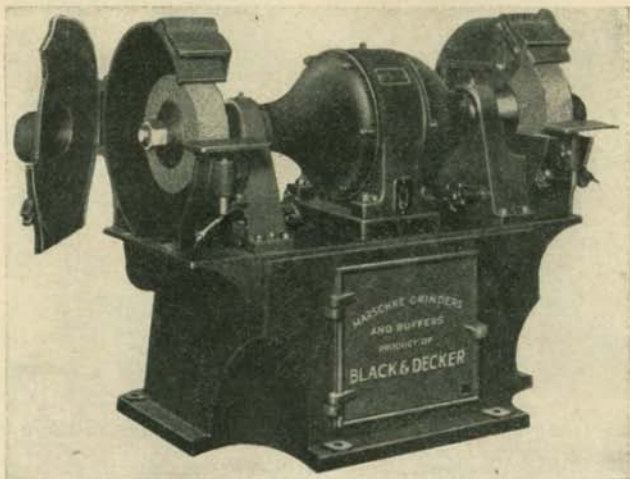


An exceptionally well made grinder for general use in the tool room, repair shop, blacksmith shop, factory, etc.

Bearings are unusually long and heavy, well babbitted and fitted with wick oiling arrangement as insurance against faulty lubrication. Tool rests are quickly adjustable or can be easily removed when not in use.

Made in seven sizes, both bench and pedestal types. Write for specifications and complete information. Ask for Bulletin P-777.

BLACK AND DECKER HEAVY DUTY GRINDERS



A complete line of electric grinders for heavy production work. Wheel guards are adjustable and universal types are furnished in order to adequately meet every grinding condition. These grinders can be furnished in sizes ranging from 1 H. P., 10 inch wheels to 15 H. P., 24 inch wheels. Write for Catalog P-40 which gives complete information.

MAYER UPRIGHT POWER HAMMER



Valuable in plants where light forging must be handled and in the modern blacksmith shop. The connecting arms between the ram and crank pin are separated by a heavy steel spring which effectively cushions the blow. Made in five sizes; the three smaller sizes having the anvil cast in one piece with the frame. The larger ones have a separate anvil block which is bolted to the main frame.

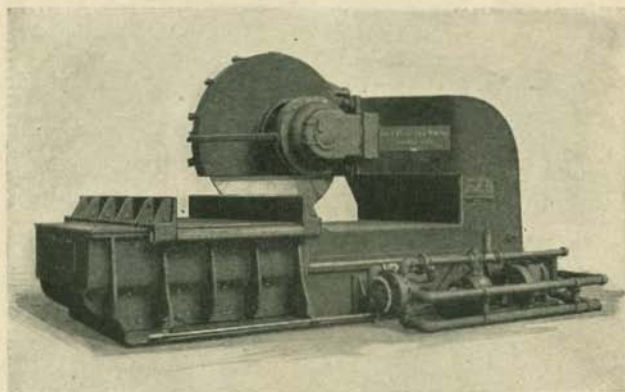
Described fully in Bulletin P-8026. Write for a copy.

RYERSON HIGH SPEED FRICTION SAWS



The No. 0 Hand Feed Saw

The Ryerson High Speed Friction Saw is not only the fastest but also the cheapest method of cutting steel. Sections of any shape or size are cut in rapid succession without clamping of the material or making any adjustments. They are made in eight sizes to meet practically every cutting requirement.



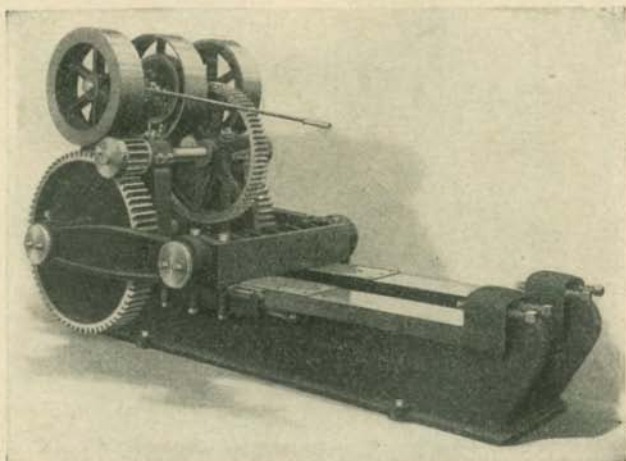
The No. 5—Largest of Ryerson High Speed Friction Saws

The No. 0 Saw illustrated was especially designed for manufacturers cutting the smaller structurals, beams, angles, and channels, tubing, etc. It can be equipped with a special blade so that light moulding, small diameter pipe, etc., can be cut without any burr. The No. 5, largest of the Ryerson High Speed Friction Saws will handle the largest standard structural sections rolled, 40"–170 lbs. I-Beams are cut in 90 seconds. Intermediate sizes of saws cut steel of all shapes and sizes within their capacity in correspondingly fast time.

Ryerson High Speed Friction Saws are now in use in the principal steel mills, structural shops, car shops and steel warehouses throughout the country.

We will be glad to send a catalog giving complete information on Ryerson High Speed Friction Saws, and to use our years of experience in this field to help solve any of your cutting problems. Write for catalog P-9001.

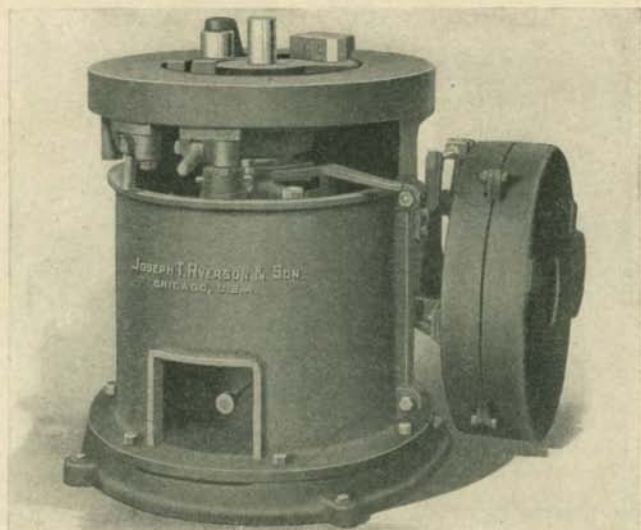
RYERSON-KLING BULLDOZERS



A heavily constructed machine for a large variety of bending, pressing, forming, punching, and shearing operations. The bed is a semi-steel casting with extra large bearings for the bull gear shaft. Both sides are double-gearred and fitted with friction clutch drive which will slip before breakage can occur in case of overload.

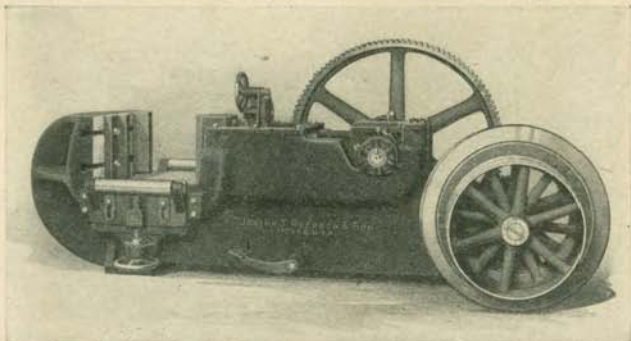
These machines furnished for either belt drive or direct geared motor drive. Described completely in bulletin P-10,101, which will be mailed at your request.

RYERSON-KLING BAR BENDERS



Especially designed for bending reinforcing bars but will handle ordinary round and flat bars with equal efficiency. Two stops adjustable to various degrees are provided. These operate so as to automatically disengage the driving mechanism at the desired angle of bend up to 180 degrees. A single foot lever controls the operation of the machine. Arranged for direct motor drive. Bulletin P-10,102 tells the complete story. Write for a copy.

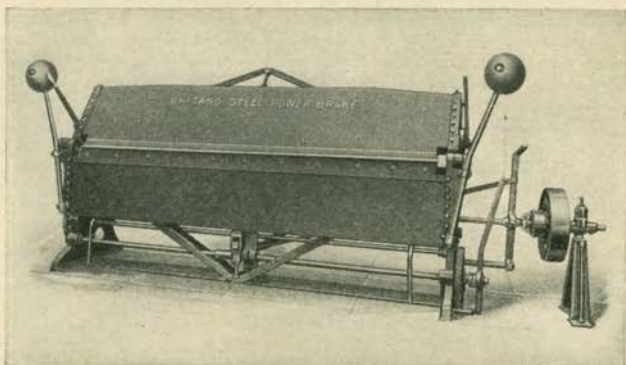
RYERSON-KLING HORIZONTAL BEAM BENDER



These machines are designed for bending, and straightening I-Beams, channels and other structural shapes.

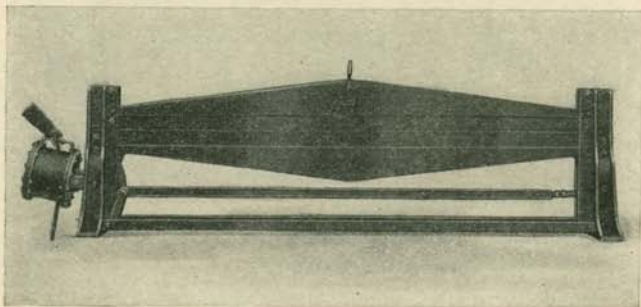
Furnished for either belt drive with tight and loose pulleys as shown or arranged for geared motor drive. Write for bulletin P-10,202 which gives complete specifications.

CHICAGO POWER BENDING BRAKE



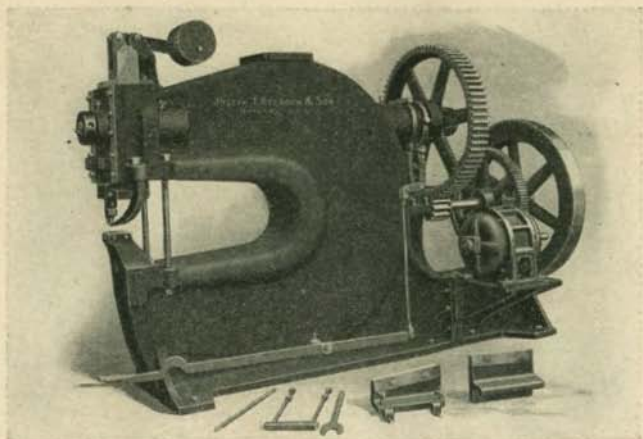
An all steel bending brake for cold bending heavy plates without fracturing the material. No dies are required for different angles or sharp or rounding corners. Narrow reverse bends can be formed. Bulletin P-802 describes them fully.

RYERSON PNEUMATIC FLANGING CLAMPS



Rapid operating pneumatic flanging clamps made in six different sizes, all with capacity to securely clamp plates up to three-fourths inch in thickness for the full length. Write for bulletin P-14,501.

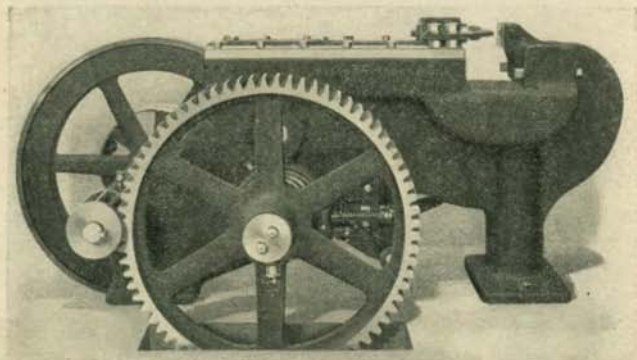
RYERSON-KLING SINGLE END PUNCHES



Single end geared punches of the standard vertical type built with a cored frame with the metal so distributed as to secure the greatest strength and rigidity. Jaw is heavily ribbed and in the larger sizes provided with tie bars for additional stiffness in shearing bars and angles. The eccentric shaft is forged in one piece of open hearth steel and has bronze bushed bearings. The clutch has adjustable automatic stop, jaws being faced with renewable tool steel blocks. The slide is counterbalanced and fitted with a bronze gib for taking up wear and has spring link between slide and counterweight lever. Furnished with cast steel architectural punching jaw as shown for structural work or with a plain flat jaw suitable for boiler and plate work. Can be arranged for tight and loose pulleys for belt drive or direct geared motor drive.

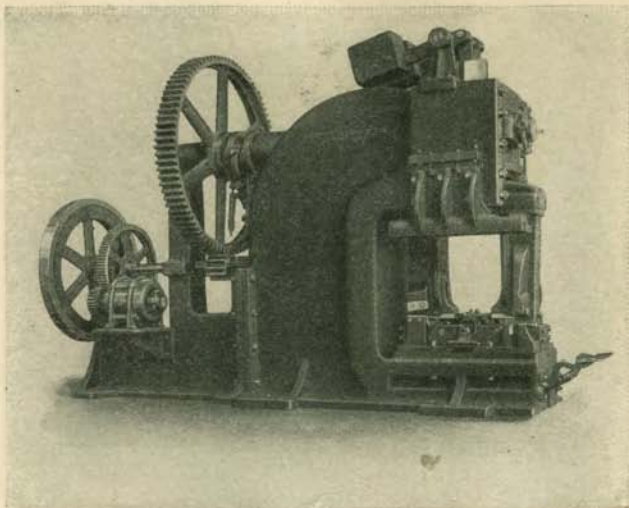
Write for complete information, ask for Bulletin P-11,060.

RYERSON-KLING HORIZONTAL PUNCHES



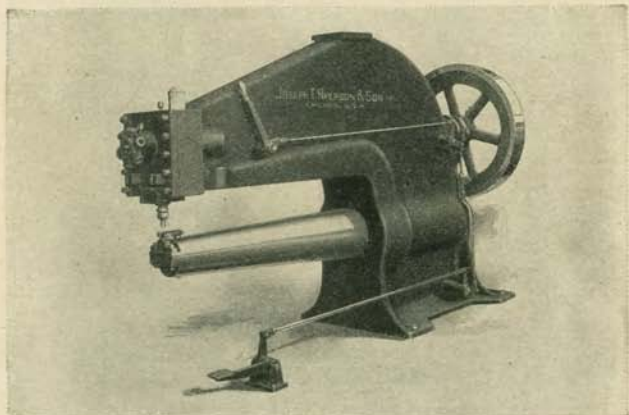
For punching the flange of structurals, bent angles, for plate and structurals requiring punching after fabrication, this type of machine is often more readily adaptable than the vertical punch. Made in two sizes, 7" throat, capacity $\frac{3}{4}$ " hole through $\frac{3}{4}$ " mild steel, and 13" throat, capacity 1 $\frac{1}{4}$ " hole through 1" mild steel, both furnished with clutch having adjustable automatic stop. Clutch jaws are faced with renewable steel blocks. Arranged for either belt drive or geared motor drive. Write for Bulletin P-11,061 which gives complete description and specifications.

RYERSON-KLING COPING MACHINE



This single end geared type coping machine built with semi-steel cored frame handles all regular punching operations, coping, notching, blanking, shearing, and group punching.

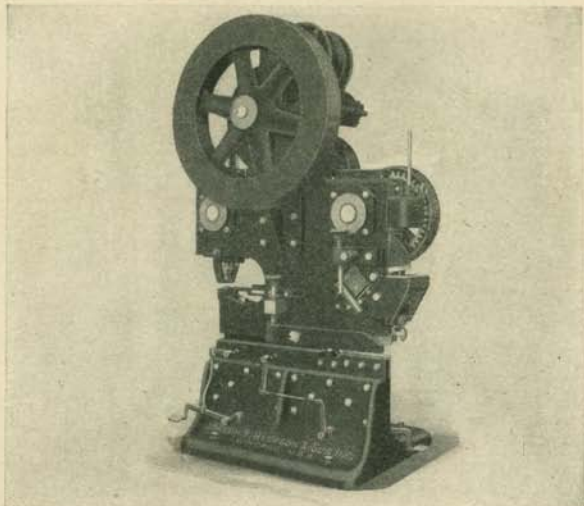
Especially adapted for car, shipbuilding and fabricating shops. The clutch is provided with adjustable automatic stop; clutch jaws are faced with renewable steel blocks; eccentric shaft forged in one piece; and the slide, counterbalanced with spring lever and counterweight, is fitted with bronze gib for taking up wear. Bulletin P-11,979 giving complete description, gladly sent at your request.

RYERSON-KLING STAKE RIVETER AND PUNCH
Flywheel Type

Standard flywheel type riveter built with a semi-steel cored frame. The clutch is provided with an adjustable automatic stop and clutch jaws are faced with renewable steel blocks. Eccentric shaft and stake are forged from .30 to .45 carbon steel. Regularly equipped for belt drive but can be furnished arranged for motor drive if desired. The standard machine is furnished with interchangeable punching and riveting attachments. Double gag attachment can be furnished on order.

Complete description and specifications on the different sizes are given in Bulletin P-11,075. Write for a copy.

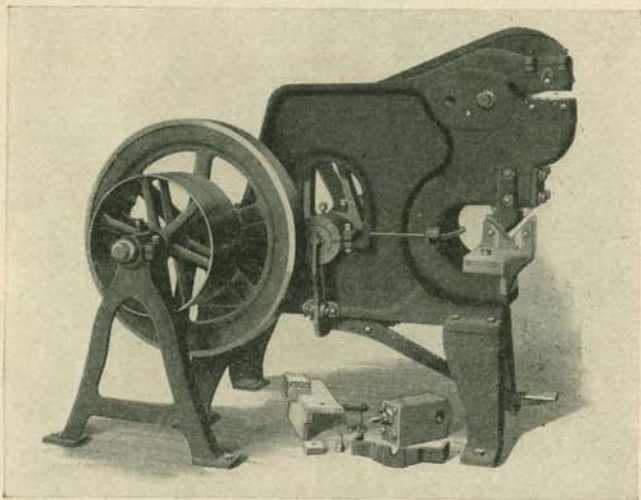
RYERSON STEEL-FRAME QUADRUPLE PUNCH AND SHEAR



The machine illustrated is typical of our complete line of combination machines. It handles the four operations, punching, shearing of plates, round and square bars, cutting of angles and tees, as well as coping and notching without interchanging any attachments.

Solid cast steel off-set body reinforced by two steel plates permits splitting plates of any length or width. Write for catalog giving complete information on various combination machines.

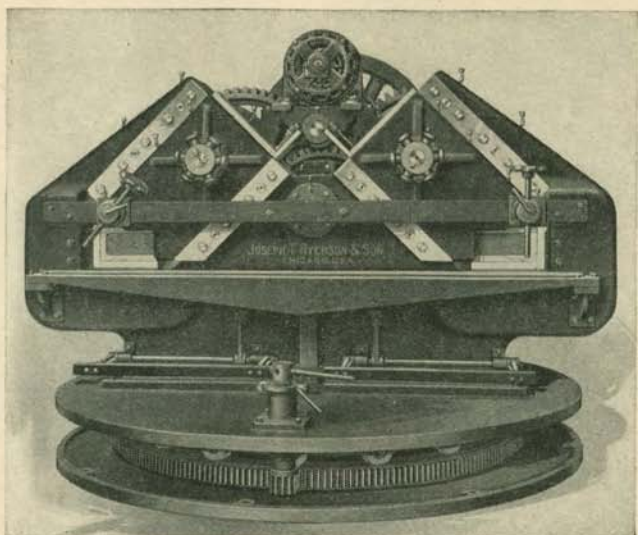
BELOIT COMBINED POWER, PUNCH AND SHEAR



Particularly valuable in shops requiring a machine for miscellaneous punching and shearing yet not having a sufficient amount of work to warrant installing one of the heavier types of boilermakers' or structural punches. The frame is a one-piece casting; blades are extra heavy and made of best tool steel. Angle shearing attachment can be provided.

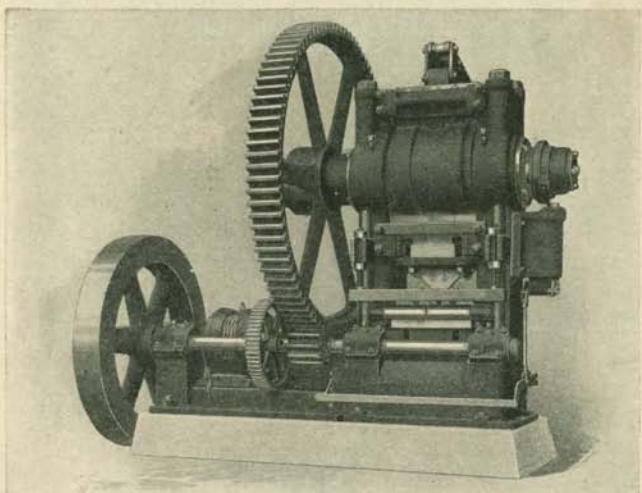
Made in six sizes, arranged for either belt or direct geared motor drive. Write for Bulletin P-111, which gives complete information.

RYERSON-KLING DOUBLE ANGLE SHEAR



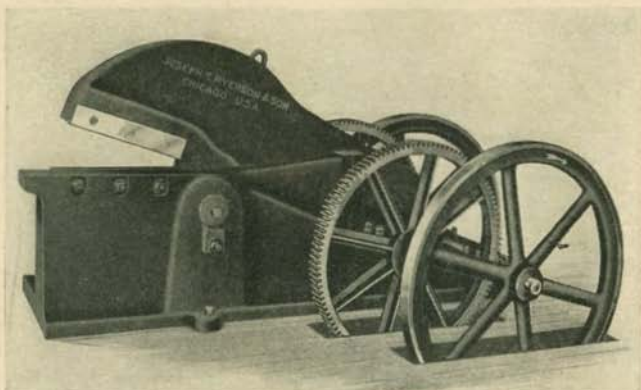
The Ryerson-Kling Double Angle Shears are of the double eccentric shaft type, each slide being driven by its own shaft and equipped with clutch and automatic stop operating independently of the other slide. These machines will shear angles, either square or on bevel up to 45 degrees. They are furnished plain or mounted on turntable, as desired. The latter arrangement is preferable where any great amount of bevel shearing is to be done, as it eliminates the necessity of swinging the material to be cut. Bulletin P-12,011 gives complete information. Write for a copy.

RYERSON-KLING BAR SHEAR



A Guillotine Type Bar Shear of exceptionally rigid construction. The slide and bolster are arranged to receive various attachments, all of which are interchangeable. Built in six sizes all of which can be furnished arranged for either belt or direct geared motor drive. Write for a copy of Bulletin P-12,211 which gives complete descriptions and specifications.

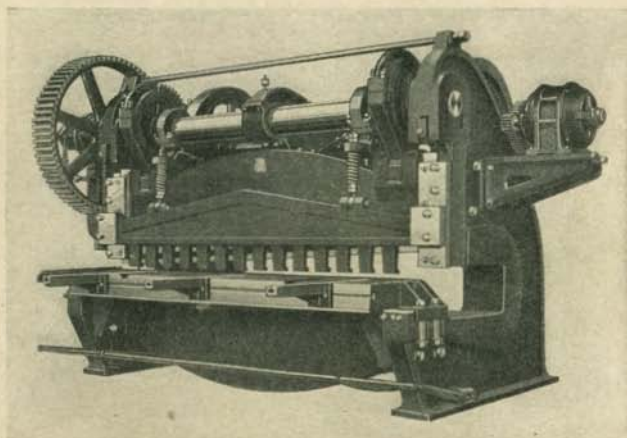
RYERSON ALL STEEL ALLIGATOR SHEARS



One piece steel frame construction gives these shears unusually great strength and rigidity. We are prepared to furnish them in a complete range of sizes, stationary or portable types, arranged for either belt or motor drive. All machines are equipped with bronze plates and wedge for taking up side play and to keep the blades properly lined up. All blades have four cutting edges.

Write for complete specifications and information. Ask for Bulletin P-12,018.

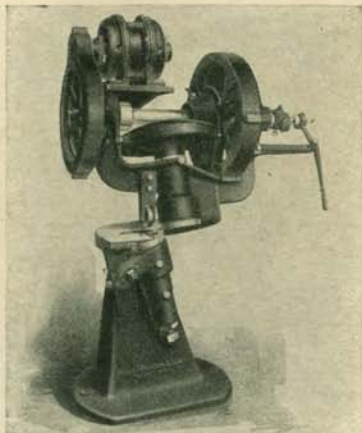
BERTSCH GATE SHEARS



These gate shears are made in a full range of sizes in lengths from 3 feet to 16 feet, with capacities ranging from No. 14 gauge sheets to $1\frac{1}{2}$ " plate. The housings may have either shallow gap or deep throat for trimming or splitting plates. They are equipped with a self-adjusting center bearing, automatic hold down, and positive automatic clutch. Principal castings throughout are semi-steel. Bulletin P-501 tells the complete story. Write for a copy.

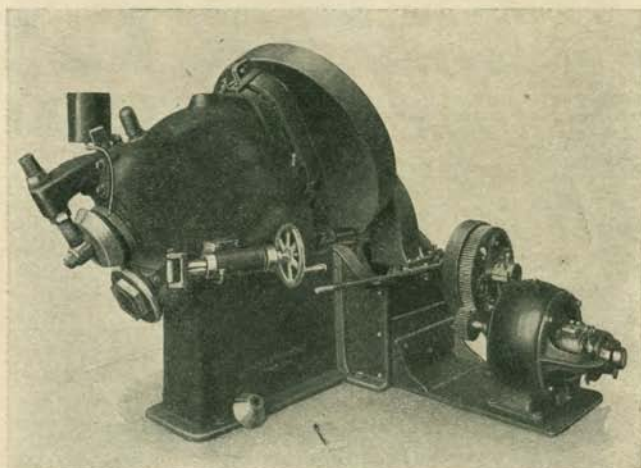
JOHN W. McMURRAY
ENGINEERING LIBRARY
BOOKS NOT FOR SALE

RYERSON SERPENTINE SHEARS



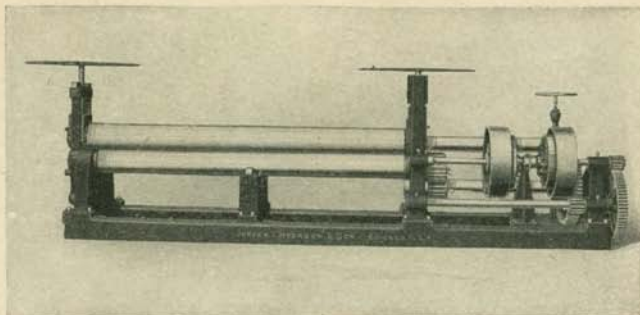
Irregular and curved cutting of sheet metal and light plate is handled with all the smoothness of the usual type rotary shear making a straight cut. A pattern marked on the material can be followed without straining or pushing, the operator merely guiding the sheet as the knurled blade pulls it through. No distortion, no waste of material or crimping of the edge of the material. Built in six sizes, hand and power driven, meeting the requirements on all types of work. Write for Bulletin P-13,251 which gives complete information.

RYERSON-LENNOX ROTARY BEVEL SHEAR



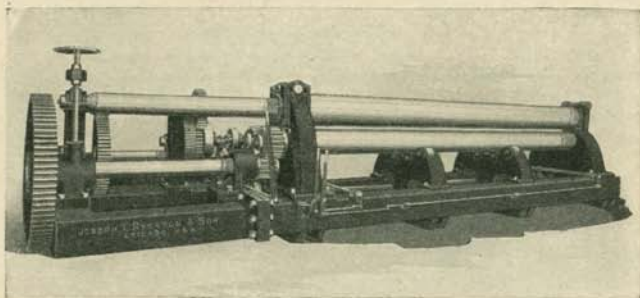
Ryerson-Lennox Rotary Bevel Shear designed to handle edge beveling of in-and-out curved segments, angles, flanged boiler heads, manhole saddles, dome sheets and straight work, and in fact all of the irregular curved beveling required in boiler and tank construction, railroad and shipbuilding work. It is an essential item in the equipment of the boiler and tank shop, and when fitted with our hold-down attachment, will handle many classes of bevel shearing that have heretofore been considered impossible. The hold-down attachment is provided with a conical shaped roller, insuring the same degree of bevel for the entire length of the cut. Bulletin P-13,151 tells the complete story. Write for a copy.

RYERSON-KLING PLATE BENDING ROLLS



Hand Adjustment

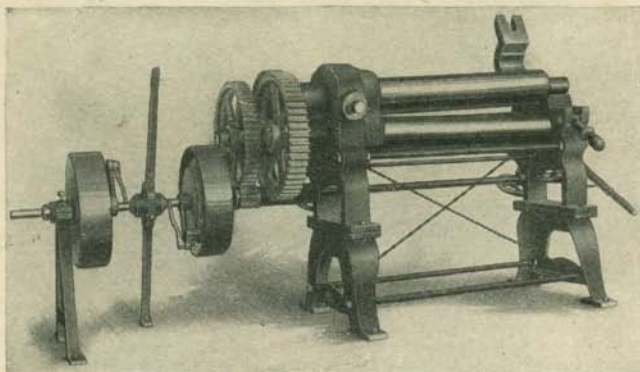
Ryerson-Kling Pyramid type, Horizontal plate bending rolls are made in a wide range of capacities and sizes suitable for all classes of work from light tank and boiler shop work to the heaviest car and shipbuilding work. Smaller sizes have hand ad-



Power Adjustment

justment only and the larger sizes power adjustment only. A few intermediate sizes can be furnished with either hand or power adjustment. They can be arranged for either belt or direct geared motor drive. Write for Bulletin P-14,131.

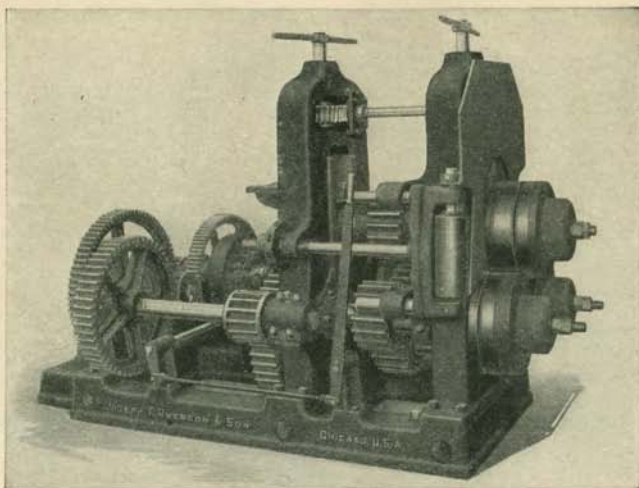
BELOIT POWER BENDING ROLL



Initial Type

The Beloit Initial Type Bending Rolls are especially adapted for sheet metal work and the lighter classes of boiler shop work where a light quick-acting roll is required. Quickly adjusted by means of hand wheels on the lower roll. Made with capacities for $\frac{1}{8}$ ' to $\frac{3}{8}$ ' mild steel plate. Write for a copy of bulletin P-142.

RYERSON-KLING ANGLE BENDING ROLLS



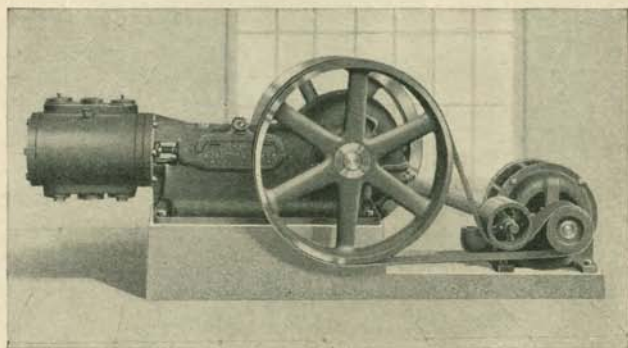
Heavily constructed rolls which will handle in addition to angles, sections such as tees, zees, and flat bars with extra roll equipment. We are prepared to furnish special rolls for bending pipe, beams, channels, round bars, etc.

The rolls are arranged in pyramid form, all being driven. Each roll has adjustable slot, faced with renewable steel collar. Heavy guide rolls have adjustment, and are used to prevent twisting of the material.

Ryerson-Kling Angle Bending rolls are built in three sizes and can be furnished arranged for either belt or motor drive. Bulletin P-14,137 gives complete descriptions and specifications. Write for a copy.

We can also furnish other types of Bending Rolls from the lightest hand operated rolls for tinner's and sheet metal workers, to the largest sizes built for tank car and shipbuilding work.

GARDNER HORIZONTAL AIR COMPRESSORS

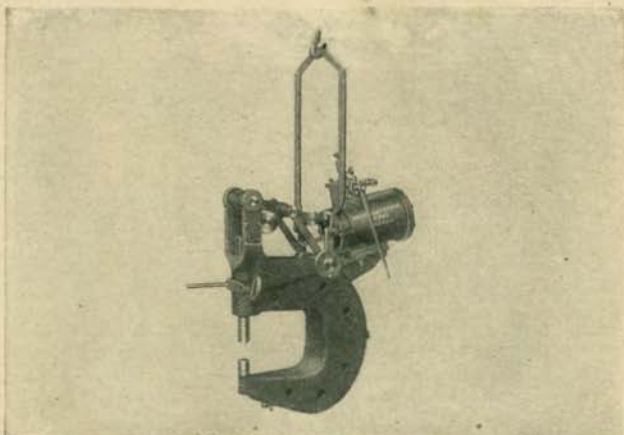


These compressors are the product of long experience in design and construction of air compressors. They are built in a wide range of sizes and can be furnished in either belt drive, steam actuated or with short belt motor drive as shown in the cut. Also in duplex belt, motor or steam driven in simple or compound types. Extremely heavy construction and counterbalancing of moving parts insures a smooth and easy running machine.

Single Staged Enclosed Type Belt Driven Compressors can be furnished in various sizes ranging from 6 inch cylinders with 6 inch stroke to 20 inch cylinders with 12 inch stroke with maximum pressures of 25 lbs. to 125 lbs. Write for Bulletin P-225 which gives complete information regarding air compressors.

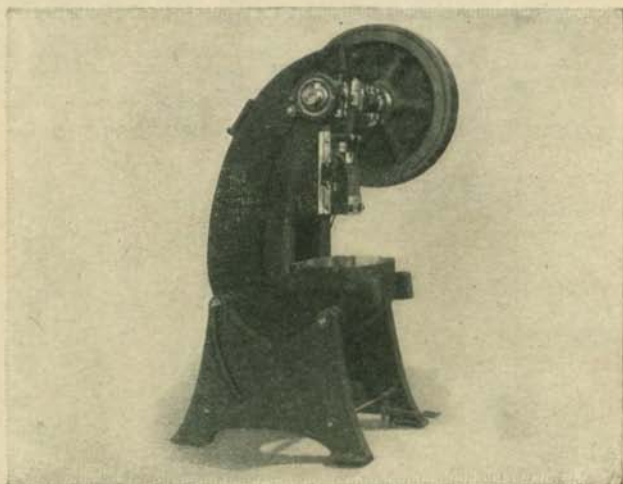
We also are in a position to meet your needs in other types of air compressors. Our staff of engineers is always at your service to aid in the selection of the proper equipment.

HANNA PNEUMATIC RIVETERS



Hanna riveters combine in simple form, toggles, levers and guide links to secure an ideal riveting action of the dies, giving them a distinct advantage over the ordinary toggle riveter. They are made in a variety of types and sizes ranging from 4 inch to 21 foot reach and with capacities from 10 tons to 150 tons inclusive. There is a machine to meet every condition. Bulletin P-221 gives complete information and specifications on the various machines. Write for a copy.

McDONALD OPEN BACK INCLINABLE PRESSES



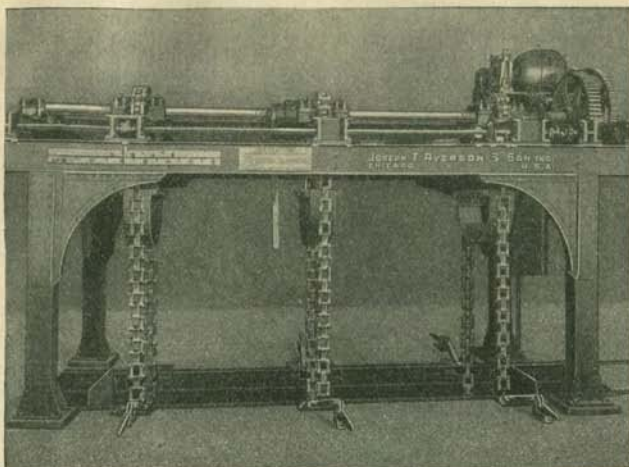
Open back inclinable presses adapted to an endless variety of pressing operations. Ruggedly constructed to withstand the hardest usage. The crankshaft is forged of alloy steel in one piece and heat treated. The fly wheel is extra heavy with a web cast between the spokes. Made in nine standard sizes which are described in Bulletin P-237. Write for a copy.

IMMEDIATE STEEL

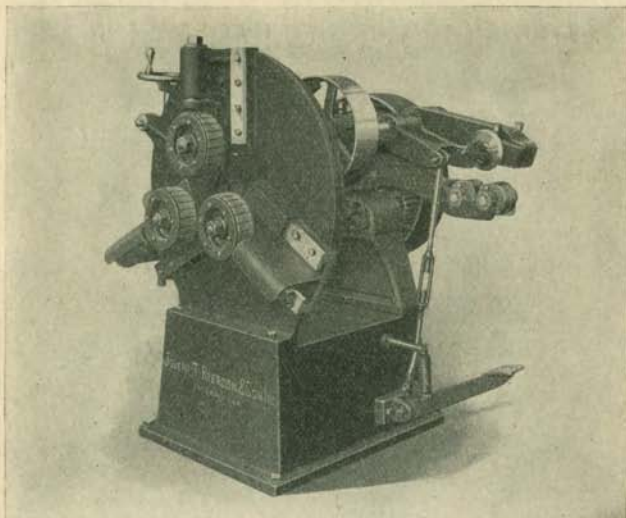
Bars, Shapes, Plates, Sheets, Bolts and Nuts, Rivets, and a hundred and one other steel products are carried in stock for immediate shipment from the nearest Ryerson plant.

RYERSON FLUE CLEANING MACHINES

Overhead Type

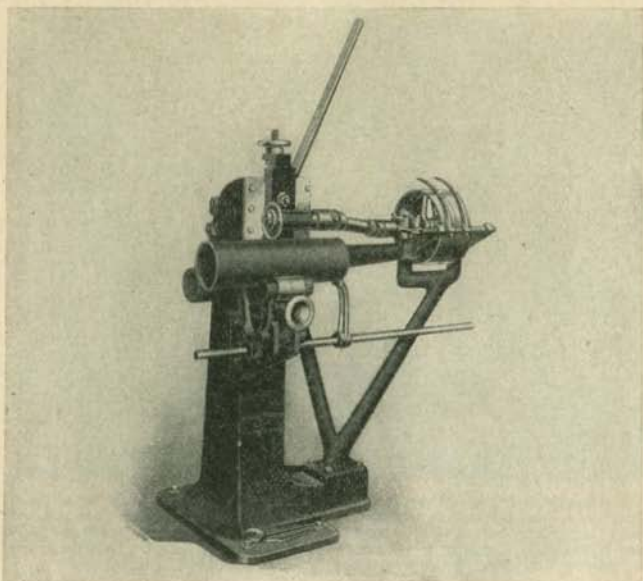


The large capacity of this type of machine permits cleaning a whole set of tubes from the largest locomotive without separating. Handling expenses are reduced due to the cleaner raising and lowering the tubes by its own power. Only one operator is required. Capacity 350 two-inch tubes, 8' to 24' in length. Described fully in Bulletin P-19,409. Write for a copy.

RYERSON IMPROVED UNIVERSAL
FLUE CLEANING MACHINE

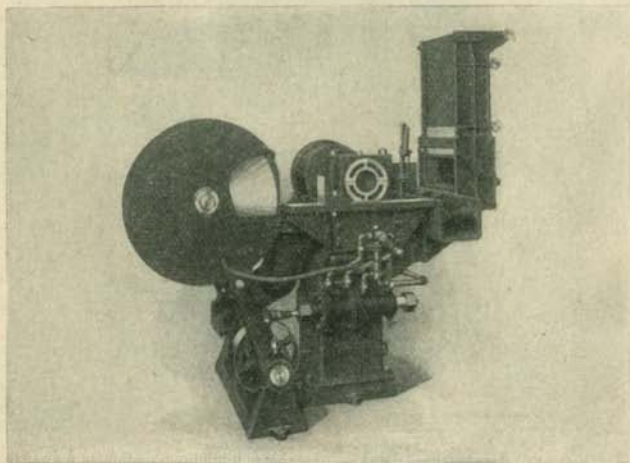
The Ryerson Universal Flue-Cleaning Machine is intended particularly for use in shops where the amount of work does not warrant the purchase of the more expensive flue-rattling machines. It is designed to clean flues one at a time, and is the only single flue-cleaning machine on the market which will clean both standard and super-heater sizes. Bulletin P-19,415 giving complete description and specifications will be gladly sent at your request.

**RYERSON ADJUSTABLE
TUBE AND PIPE CUTTING MACHINE**



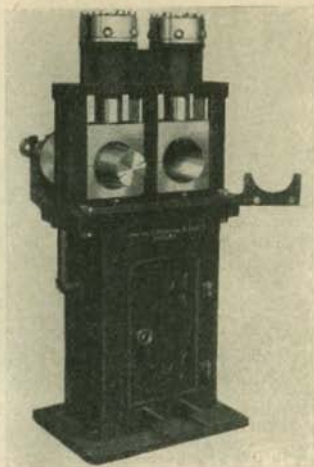
The drive arrangement of this tube and pipe cutter permits rapid cutting of tubes or pipe of any length. It is quickly adjustable for tubes any size from $\frac{1}{2}$ inch up to 6 inch. Furnished either belt driven as illustrated or arranged for direct motor drive. Bulletin Page 19.420 tells the complete story. We will be glad to send you a copy.

**RYERSON COMBINATION HOT SAW AND
TUBE EXPANDER**



This machine handles three operations—cutting the rag end of the tube, expanding same, and inserting of the safe end—all in less than ten seconds. Made in two sizes for standard and superheater tubes. Write for complete information and specifications. Ask for Bulletin P-19.422.

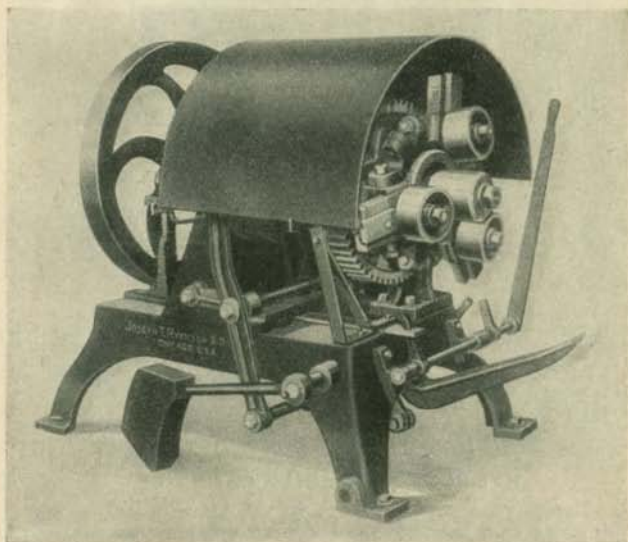
PNEUMATIC FLUE WELDING MACHINES



In addition to the welding of flues this machine will also handle swedging and scarfing, the dies for such work being interchangeable. While designed particularly for railroad work, it is also a valuable tool for commercial shops having a similar class of work to handle. Two sizes are manufactured, one for standard size flues and the other for superheater.

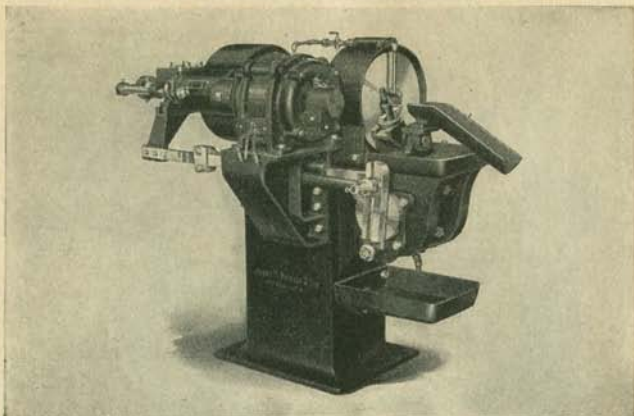
Write for Bulletin P-19,429 which gives complete information.

RYERSON FLUE WELDER



This machine will handle both the larger superheater tubes and the standard tubes. A simple adjustment quickly adapts the machine to any gauge or size of tube. Positive adjustment controls the stroke of the rolls and makes it impossible to roll the tube top too thin or leave a ridge on the inside. Bulletin P-19,427 tells the complete story.

AUTOMATIC SAFE END CUTTING MACHINE



This machine will automatically and accurately cut to length, scarf and finish completely, safe ends for tube welding in any length from $2\frac{3}{4}$ inches to 12 inches and for the various diameters. It handles tubes ranging from $1\frac{1}{2}$ inches up to 3 inches in size. In many shops it has proven to be a great economy over the old slower methods of making safe ends. The tube is held in a pneumatic automatic chuck. The feeding of the tube and the cut-off slide are actuated by cams. May be furnished either belt drive or direct water drive. Bulletin P-19424 tells the story. Write for a copy.

RYERSON FLUE WELDING FURNACE



Three or four standard size flues or one superheater flue may be heated at one time in the above furnace, thus permitting continuous operation and the serving of flue welding machine to its full capacity. Furnished lined for either standard or super-heater tubes. The lining has the same flue opening at the rear as at the front of the furnace, thus facilitating charging from either side.

May be equipped for either oil or gas. We recommend shipping knocked down, but can ship bricked up and crated at a small charge.

RYERSON MACHINERY-SERVICE

Long years of experience in the metal-working industries have helped build a very efficient machinery organization.

Ryerson engineers are always at your service to help solve any equipment problems. There is a Ryerson Machinery office near you. Call on them for service.

H. P. M. HYDRAULIC PUMPS

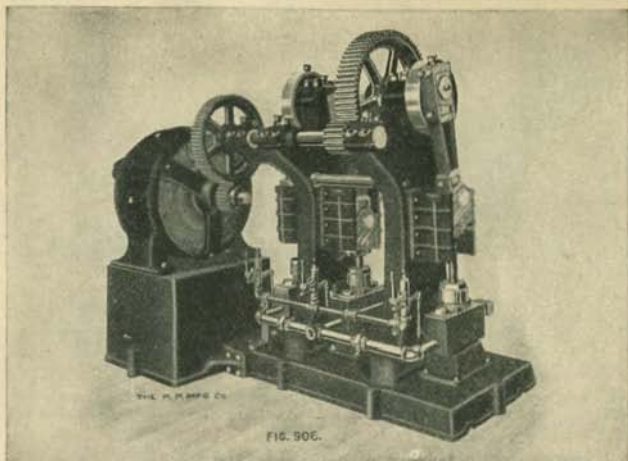
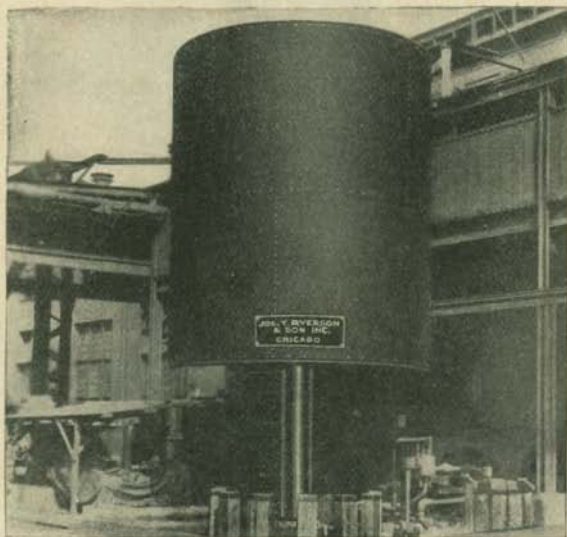


FIG. 306.

We are able to meet your needs on any hydraulic pumping equipment. The machine illustrated is but typical of a complete line of vertical and horizontal; single unit, duplex and triplex; belt, motor and steam driven pumps. Write for complete information. Ask for Bulletin P-225.

HYDRAULIC ACCUMULATORS

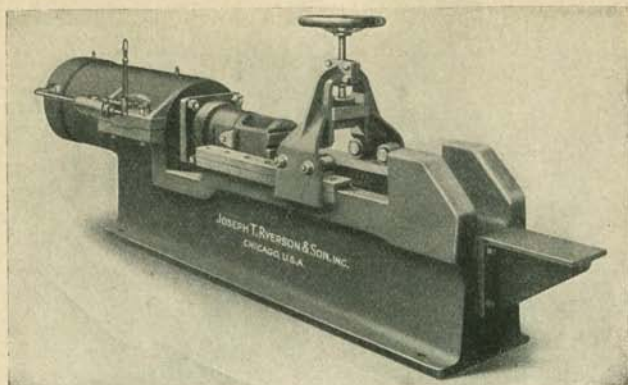


We can furnish hydraulic accumulators of both the moving cylinder and the moving ram type.

The moving cylinder type, fitted with a steel ballast tank, illustrated above, is the most popular. Cast iron weights can be furnished in place of the ballast tank when specified.

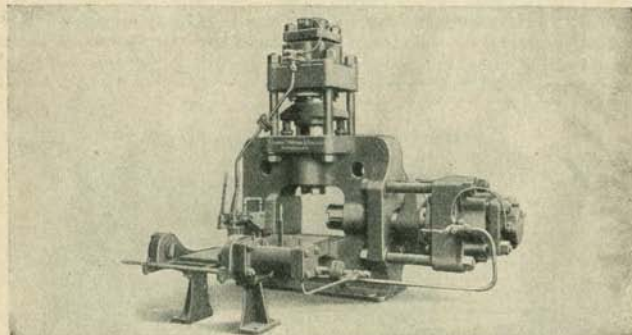
The accumulators are provided with long guides to insure perfect alignment and a safety port which opens when the tank reaches a certain height to prevent all danger of over pumping. Bulletin P-223 gives complete information on this equipment.

RYERSON HYDRAULIC SPRING STRIPPING MACHINE



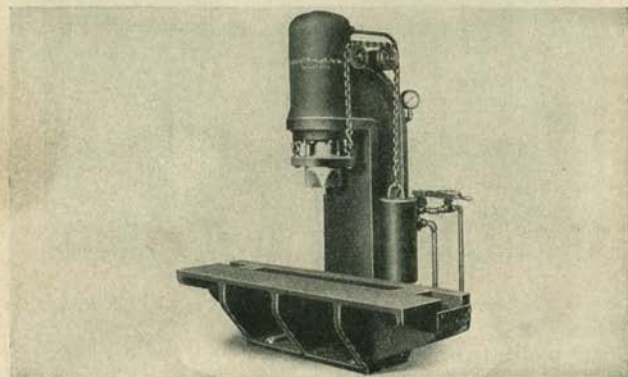
This machine will strip off the bands cold with a considerable saving in time compared with other methods, particularly that of cutting off by hand. Write for Bulletin P-20,204.

RYERSON HYDRAULIC SPRING BANDING PRESS

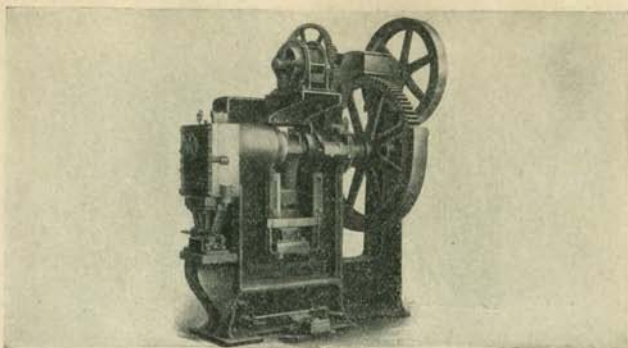


Triple pressure banding press illustrated. We are also in a position to furnish the single-pressure type or special machines for special requirements.

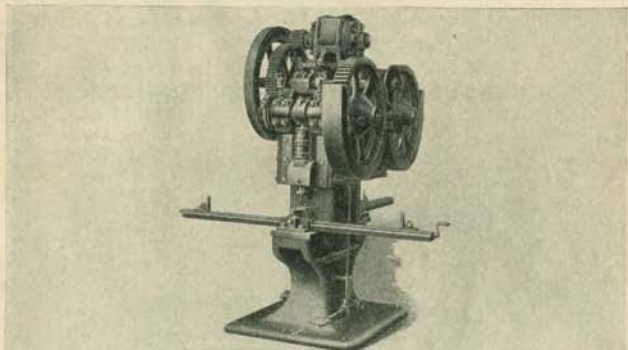
RYERSON HYDRAULIC SPRING TESTING MACHINE



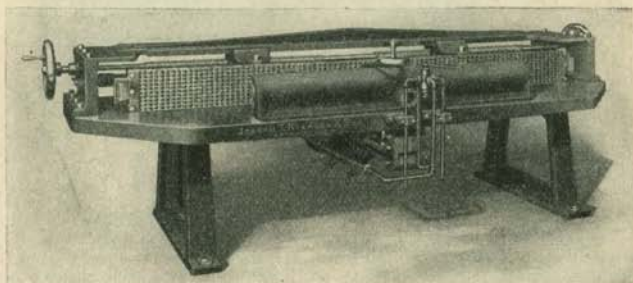
We are prepared to furnish spring-testing machines to exert any tonnage desired and for operation on any line pressure. Write for Bulletin P-20,221.

RYERSON COMBINED SHEAR AND HOT PUNCH

This machine handles the cold shearing of the spring stock to length and hot punching of slots for inside hangers, as well as notching for outside hangers. Write for Bulletin P-20,211.

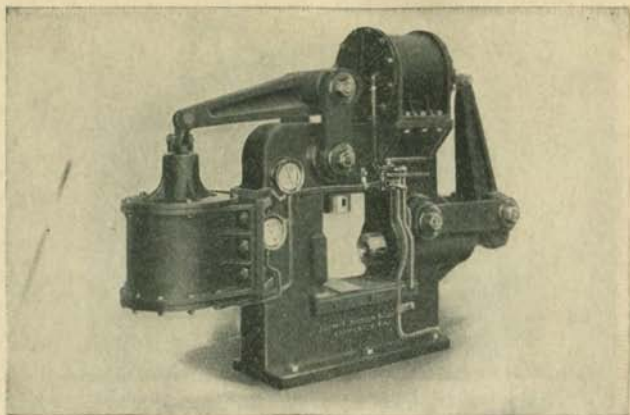
COMBINED NIBBING AND TRIMMING MACHINE

This double-end machine is designed for nibbing the hot spring leaves on the one end and trimming the ends of the tapered leaves on the other. Write for Bulletin P-20,213.

RYERSON UNIVERSAL ELLIPTIC SPRING FORMER

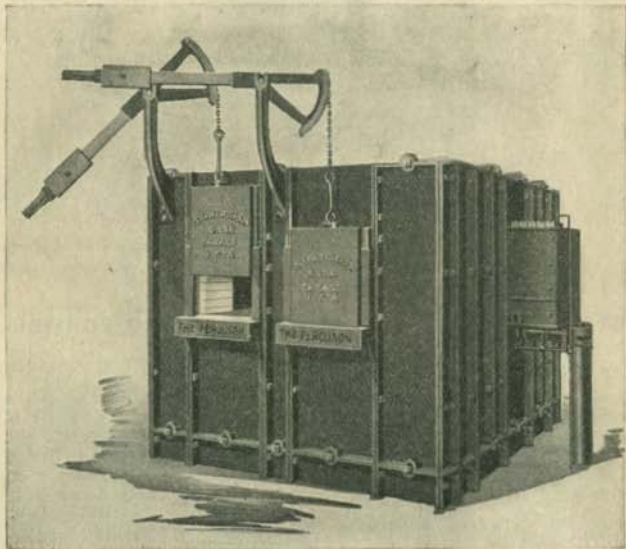
This machine is quickly adjustable for forming any size and curvature of flat spring leaves used in ordinary practice. New leaves are correctly formed and the desired camber produced in a single operation. Write for Bulletin P-20,215 which gives complete descriptions and specifications.

RYERSON PNEUMATIC SPRING BANDING PRESS



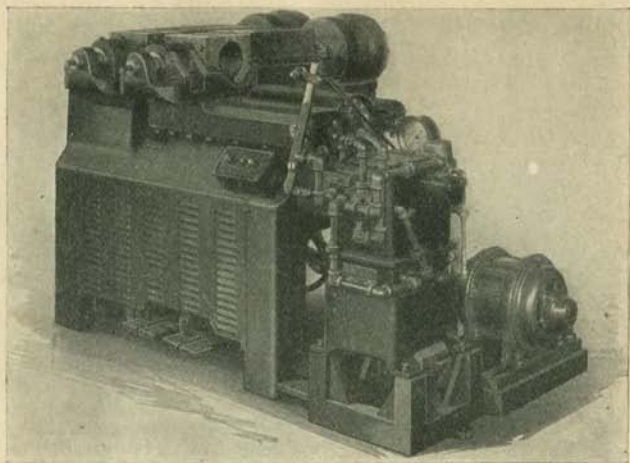
The Pneumatic Spring Banding Press is especially designed for railroad and commercial spring manufacturing and repair shops, which are not equipped with hydraulic power. By means of both horizontal and vertical rams, a positive and known pressure is exerted on the spring band, which insures uniform and rapid work and has many other advantages, as compared with hand banding. Write for Bulletin P-20000.

FERGUSON SPRING SHOP FURNACE



The Ferguson Furnace is built in various sizes for one, two, or more fitters. The single-fitter has a width of four feet four inches, the two-fitter, nine feet two inches, and the four-fitter, practically a double furnace with a center wall, representing two of the two-fitter furnaces. The standard depths are five feet two inches and six feet, although they can be built to accommodate any special work. This furnace is of the over-fired type. We are prepared to figure on under-fired furnaces if preferred. Write for Bulletin P-20010.

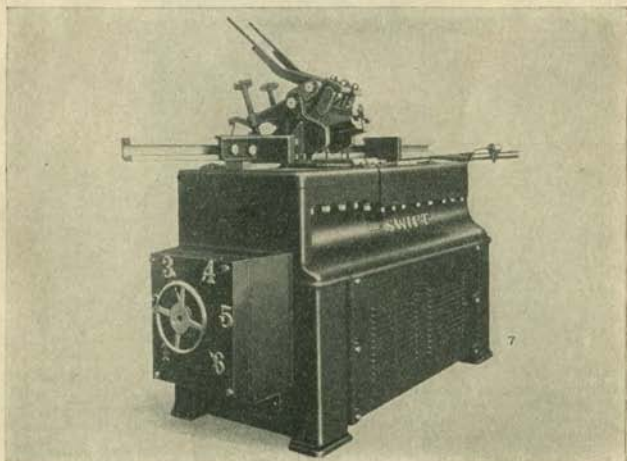
RYERSON-SWIFT ELECTRIC FLUE WELDER



The No. 35 illustrated will handle all tubes up to and including the six-inch super-heater flues. Welds are made in a few seconds by the flash process which eliminates much of the preparatory work on the tubes.

These welders can be furnished with oil gear hydraulic or hand toggle press-up arrangement. Bulletin P-19,447 tells the complete story. Write for a copy.

RYERSON-SWIFT ELECTRIC BUTT WELDERS



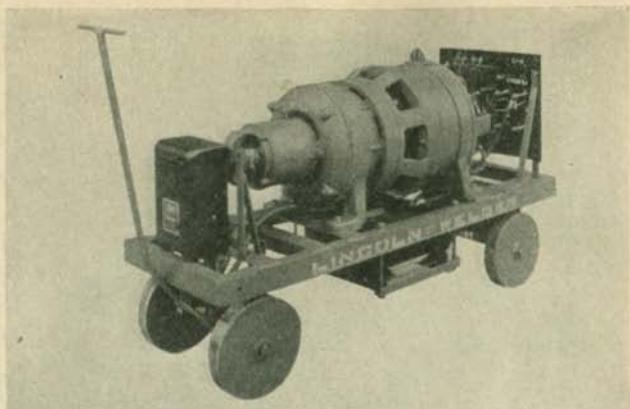
The Ryerson-Swift Electric Butt Welder will handle all types of commercial butt welding. Dies are furnished to suit each particular job.

These welders have a power factor of 83 per cent. The extra large transformer is capable of taking a heavy overload. Manufactured in thirteen sizes ranging from 2 K. V. A. to 900 K. V. A.

The smaller sizes are built with hand clamps and hand press-up; larger sizes are arranged for toggle air clamps and hydraulic press.

Bulletin P-15,401 gives complete specifications and descriptions. Write for a copy.

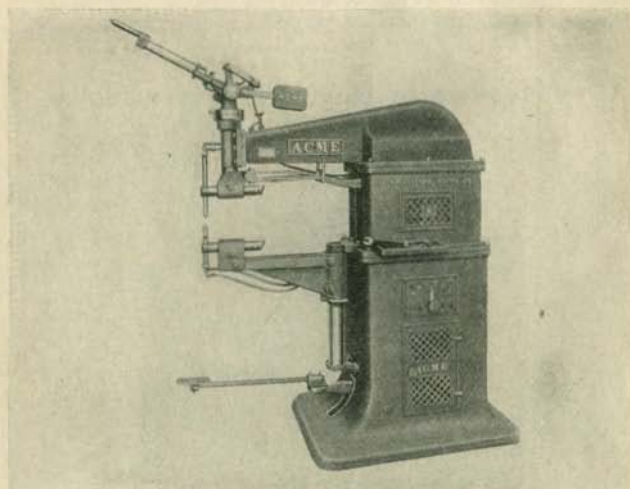
LINCOLN "STABLE-ARC" WELDERS



Perfectly compensated timing elements which provide the steady uninterrupted "stable" arc makes these welders easy to operate and greatly increases production.

We are prepared to furnish "Stable-Arc" Welders in portable or stationary types either electric, gasoline motor, or belt driven. Also, automatic sets for any production work. Write for Bulletin P-15,101 which gives complete information.

ACME SPOT WELDERS

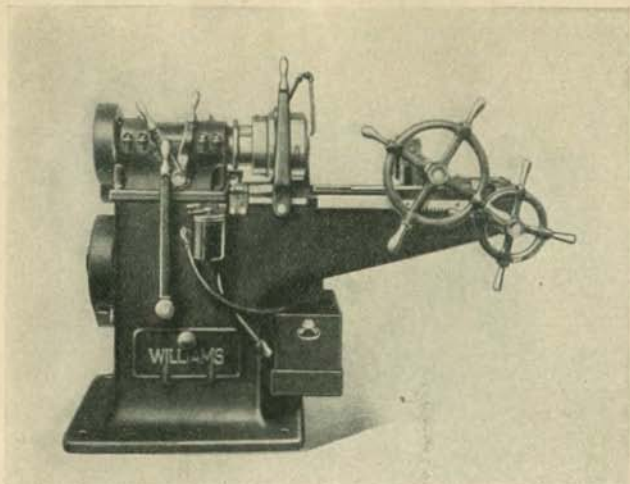


Spot Welds are being widely used in place of riveting. These machines can be furnished in various sizes, and provided with facilities for attaching jigs, templates and special horns, so as to meet any requirement. The patented swivel lower horn and swivel head are two features which greatly increase production. Write for further information. Ask for Bulletin P-230.

RYERSON MACHINERY-SERVICE

Ryerson engineers are always at your service to help solve any equipment problems. There is a Ryerson Machinery office near you. Call on them for service.

WILLIAMS RAPIDUCTION BOLT THREADING MACHINE

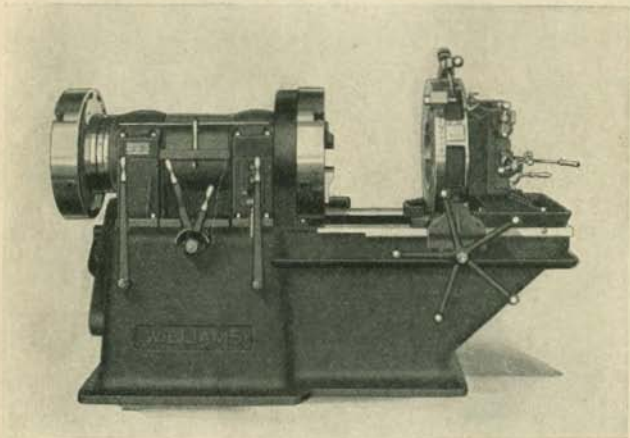


An all geared bolt threader designed for high production work. Dies are held in position by a lock nut placed in front of the holder so that it is not necessary to change the adjustment of the die head or holder when removing dies.

We also have other lines of bolt threading equipment, single, double or triple head and long bed machines with power feed for staybolt threading.

Furnished arranged for either belt or motor drive. Described fully in Bulletin P-571. Write for a copy.

WILLIAMS RAPIDUCTION PIPE THREADING MACHINE

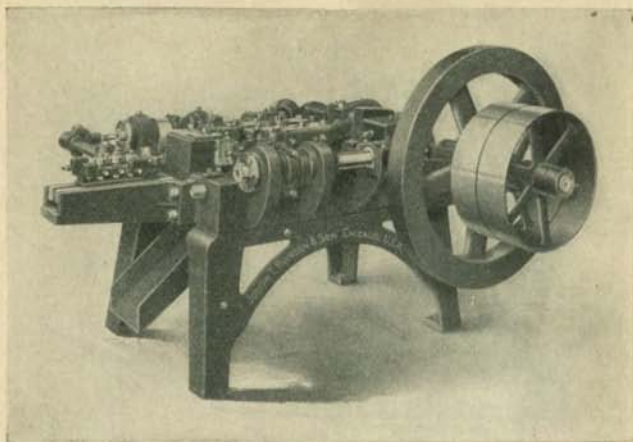


The Williams Rapiduction pipe threader is built in five sizes to cover the complete range of threading from 2½ inches to 12 inches. All dies are interchangeable and can be replaced separately at low cost.

In addition to the above we have a complete line of standard and portable types of pipe threading machines.

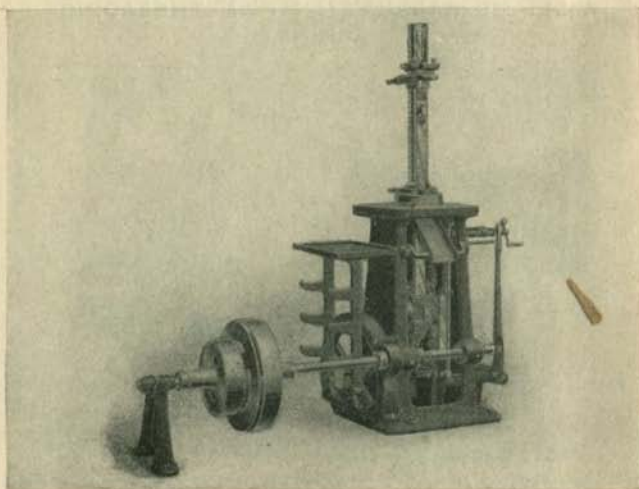
Arranged for either belt or direct motor drive. Write for complete description of the various machines. Ask for Bulletin P-234.

RYERSON-GLADER IMPROVED WIRE NAIL MACHINE



A steel frame wire nail machine built in eight sizes for making all types of nails, brads, etc. Designed with particular attention to speed, strength and accessibility. The crank shaft is of alloy steel, heat treated, counterbalanced, and has three bearings. All adjustments are within reach of the operator and the most important ones can be made while the machine is in operation. Ryerson-Glader Nail machines have speeds ranging from 175 to 500 nails per minute, depending upon the size of the nails being made. Write for complete information. Ask for Bulletin P-22,015.

GIANT KEY-SEATER



The Giant Keyseaters are of an improved type, differing radically in design and construction from other machines intended for this class of work. A grooved post holds the work and forms a guide for the tool, assuring perfectly true, straight keyways, whether the hole is straight or tapered, or whether the hub is faced true or left rough.

These machines can be furnished to cut key-seats in holes from one-half inch diameter up to the largest size needed. Either belt or motor drive arrangement can be supplied. Write for Bulletin P-235 which gives complete information.

SPECIAL STEELS

Many special steels have recently been developed which are particularly well suited for various types of work. In fact, so many new products have been developed that it is not always easy to determine what is the best material for your purpose.

To assist our customers along this line we maintain a well organized Special Steel Department. If you would like to strengthen or improve your products, or are having trouble with breakage or wish suggestions on any alloy or tool steel problem, we will be glad to serve you.

Ryolite Tool Steels

Ryolite is the trade name for all Ryerson brands of tool steel. We maintain a large and complete stock, including the following:

Special High Speed Steel	XXX Carbon Tool Steel
High Speed Steel	XX Carbon Tool Steel
High Speed Tool Holder	X Carbon Tool Steel
Bits	Carbon Steel Drill
Four Point Chisel Steel	Rod
Tool Steel Sheets	Die Steel

Stock sizes are shown in the Journal and Stock List. For complete information write for Catalog.

Ascology

A chromium iron alloy which is immune to rust, stain, high temperatures, and the corrosive action of most chemicals.

It has twice the strength of steel, yet is readily machined or forged and drawn.

Manufacturers are having remarkable success with this material. If you are interested we will be glad to send samples for testing.

Ascology bars, sheets and plates are carried in stock. See the Ryerson Journal and Stock List for more complete information and sizes.

Hot Rolled and Cold Drawn Alloys

Nickel steels of various analyses and other special alloys meeting practically all requirements, are carried in stock at the various Ryerson Plants. The Ryerson Journal and Stock List gives information and complete lists of the many sizes carried in stock for immediate shipment.

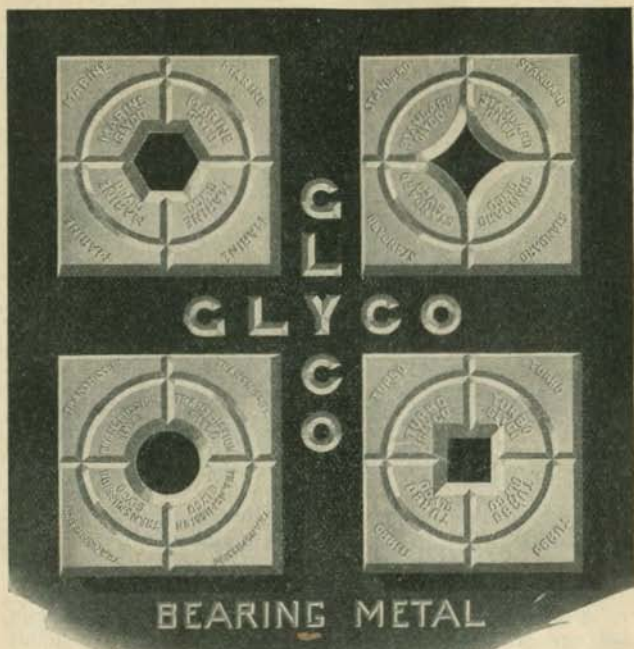
Ryco Steel

Ryco Steel is a new alloy steel, heat treated and machine straightened, possessing twice the strength of mild steel but as easy to machine as cold rolled shafting. It is suitable for axles, shafts, spindles, pins, machine tool parts, etc.

Manufacturers are securing splendid results and saving money through the use of this new alloy, which combines the good qualities of the low priced common steels and also the high priced alloy steels, with none of the disadvantages of either of these grades.

Write for complete information.

GLYCO BEARING METAL



Glyco Bearing Metal is made of virgin materials only, properly alloyed so that there is no segregation. Glyco has a lead base, thus giving it a much lower coefficient of friction than tin base babbits, at the same time, owing to its method of manufacture, Glyco offers greater resistance to compressive loads. Turbo and Marine grades are both recommended for use in place of genuine (tin base) babbits. Specific applications as indicated below.

Each grade of Glyco is carried in stock at all of our warehouses, ready for immediate shipment. Glyco is packed in 10, 25, 50, 100 and 250 lb. boxes.

Turbo "Glyco"

This is our highest grade and has proved remarkably successful under varied and severe conditions of service. It is particularly suited for bearings subject to shock or excessive vibration such as in gas and oil engines, rock crushers, armature bearings, street railway motors, etc.

Marine "Glyco"

This is one of our two highest grades and is intended for use where the service is severe. An excellent bearing metal for electric motors, generators, compressors, stationary steam and gas engines, etc.

Standard "Glyco"

A splendid grade for an infinite variety of ordinary conditions of service. Used in large quantities for general repair purposes.

Transmission "Glyco"

This grade we recommend for use where the stresses are unimportant and the requirements are not such as to warrant the use of a high grade metal, as in all light machinery and shafting where a low priced babbit is required.

For Net Prices See Supplement

THE RYERSON JOURNAL AND STOCK LIST



In addition to the tools and equipment shown in this booklet, we carry in stock, for immediate shipment, bars, shapes, structurals, plates, sheets, tubes and "a thousand and one" other steel products. The Ryerson Journal and Stock List, published bi-monthly, contains the stock sizes, weights, extras and average stock carried on hand—it is the "key" to immediate steel. It also contains 32 pages of trade news, business conditions and articles of general interest.

If you are not already getting it, we shall be pleased to place your name on our mailing list to receive it regularly.

Other Ryerson Publications

We also publish other booklets of information along various lines. Any of these will be sent free upon your request.

Machinery Catalog

Special Products Catalog

General Data

Structural Tables

Steel Products for Contractor and Builder

Handbook on Alloy Steel

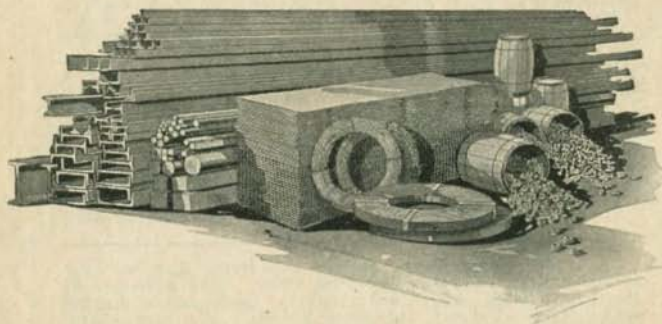
Handbook on Tool Steel

Treads for Every Purpose

Glyco Babbitt Metal,

Lewis Refined Iron

Also literature on various special subjects and products.



**Ryerson Steel-Service Stands for the Immediate Shipment
of Everything in Iron and Steel**

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