



**INSTRUCTION
MANUAL**

FOR THE

PRINTOMATIC

**HIGH SPEED AUTOMATIC
STOP CYLINDER
PRESS**



SOAG MACHINERY CO.

JUKON STREET, LAMBETH, LONDON, S.E.11

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SPECIFICATION

Maximum Paper Size	15" x 20 1/2" (38 x 52 cm.)
Maximum Paper Size with Push Lays	15" x 17" (38 x 43 cm.)
Inside Chago Measurement	15" x 20 1/2" (38 x 52 cm.)
Smallest Paper Size	4 1/2" x 5 1/2" (113 x 149 mm.)
Greatest Width of Paper when feeding two-up	9" (228 mm.)
Speed of the Machine	Up to 4,500 I.P.H.
Power Required	3-11 P.
Revolution of Fly-wheel to one impression	5 1/2
Nett Weight of Machine without Motor	1 ton 16 cwt. (1,823 kilos)
Weight Packed for Export	2 1/2 tons (2,290 kilos)
Space Required:—	
Length with motor on platform	6' 4" (192 cm.)
Width	4' 6" (137 cm.)
Height to Forme Table	2' 3" (69 cm.)

FEEDER ADJUSTMENT TABLE

<i>Adjustments</i>	<i>Tissue Paper</i>	<i>Medium Ordinary Paper</i>	<i>Card</i>
Feed table height with suckers at lowest point	Top sheet just clear of suckers	Top sheet just clear of suckers	Top sheet touching suckers
Feeder air blast	Weak	Medium	Strong
Sucker tilt	Acute	Medium	Slight
Suction	Weak	Medium	Strong

IMPORTANT
PRINTOMATICS FOR OVERSEAS CUSTOMERS ARE
SHIPPED DRY. FILL WITH OIL BEFORE ATTEMPTING
TO START MACHINE.

ERECTION OF MACHINE

The "Printomatic" is despatched completely assembled unless otherwise requested. After unpacking, carefully remove all grease and other anti-rust material. Special care should be taken to ensure that no lubricating holes are, or can be, blocked by anti-rust material.

When erecting the machine, it is not necessary to secure it to the ground if it is placed on a concrete or other solid base. If there is any doubt about the strength of the flooring, it is recommended that the machine be mounted on hardwood bearers approximately 2½" (6 cm.) in thickness (see Fig. A).

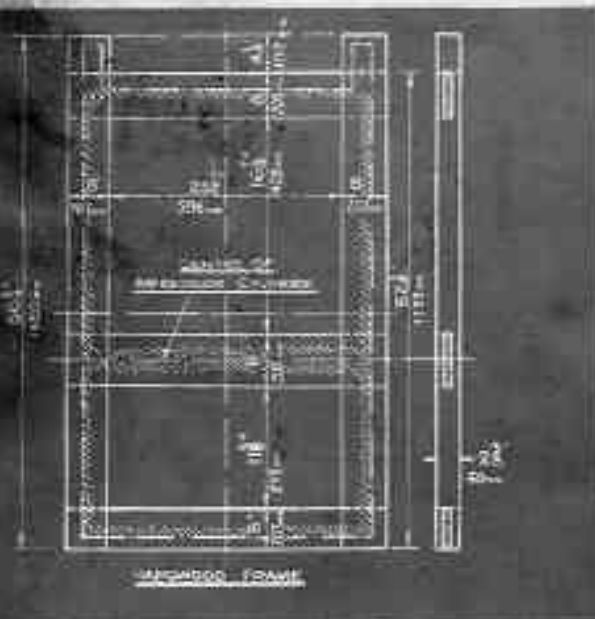


Fig. A

If the machine is to be erected on any floor other than a ground floor, it should preferably be placed so that it is located above at least two ceiling joists or beams.

Should these beams or joists be too widely spaced, the machine should be mounted on hardwood bearers as above, long enough to span at least two

joists or beams. It is advisable to place a thin metal sheet right under the machine, which can be turned upwards along its edges, and which should protrude about 4" all round the machine, to enable the floor to be kept clean. The machine must then be secured to prevent it sliding on the metal. A plan view of the base will be found on this page.

When erecting the "Printomatic," it must be levelled very accurately, in both directions, by means of a spirit level. To level up, use hardwood wedges 2' wide tapering from zero to $\frac{3}{4}$ " (1 cm.) over a length of 6" (15 cm.) or 8" (20 cm.), in pairs, so that they form a parallel strip.

In most cases, an erector from the factory will take care of the starting up of the machine and will also instruct the operator who is to take over from him. Should no instructor be available, the instructions in this book should be carefully followed by the operator. Before starting the machine up under power, it should be turned slowly by hand. This should always be done after any adjustment has been made, to ensure that the machine has been adjusted correctly, and that no damage will occur by using power too early.

LUBRICATION

Before crating machines for export all oil will be drained from sumps. Consequently, machines when received abroad must first be filled with oil in accordance with the following instructions.

Swivel lid (Ref. 1, Fig. C): Fill gear box (Ref. 1, Fig. B) through recess (Ref. 2, Fig. C) up to level (Ref. 2, Fig. B). It is important that the correct oil is used for this purpose. A list of recommended oils is on page 13. The rotary oil pump (Ref. 1, Fig. D) draws the oil by means of the suction pipe (Ref. 2, Fig. D) and feeds it through oil pressure pipe (Ref. 3, Fig. D) back into recess (Ref. 2, Fig. C). The oil runs from there to the chief lubricating points of the main drive inside the main gear box. The operation of the gears and other parts produces a mist of oil which lubricates the remaining parts in the gear box. The main crank bearing (Ref. 4, Fig. D) is also lubricated by this central system through oil pipe (Ref. 5, Fig. D). The oil from this bearing drains into the oil bath and lubricates the main cylinder fork cams, which are thus always supplied with fresh oil. The oil bath is provided with an over-flow through which the excess oil can return to the sump from which the pump always receives its fresh oil. For draining the gear box oil when a change of oil is needed, a drain plug is provided (Ref. 3, Fig. B). The crankshaft bearing nearest to the air pump is lubricated by a sight feed bottle (Ref. 7, Fig. E and Ref. 7, Fig. F) which should be so adjusted that two drops of oil are fed every minute. As this oil lubrication produces a slight drip of oil from each end of the

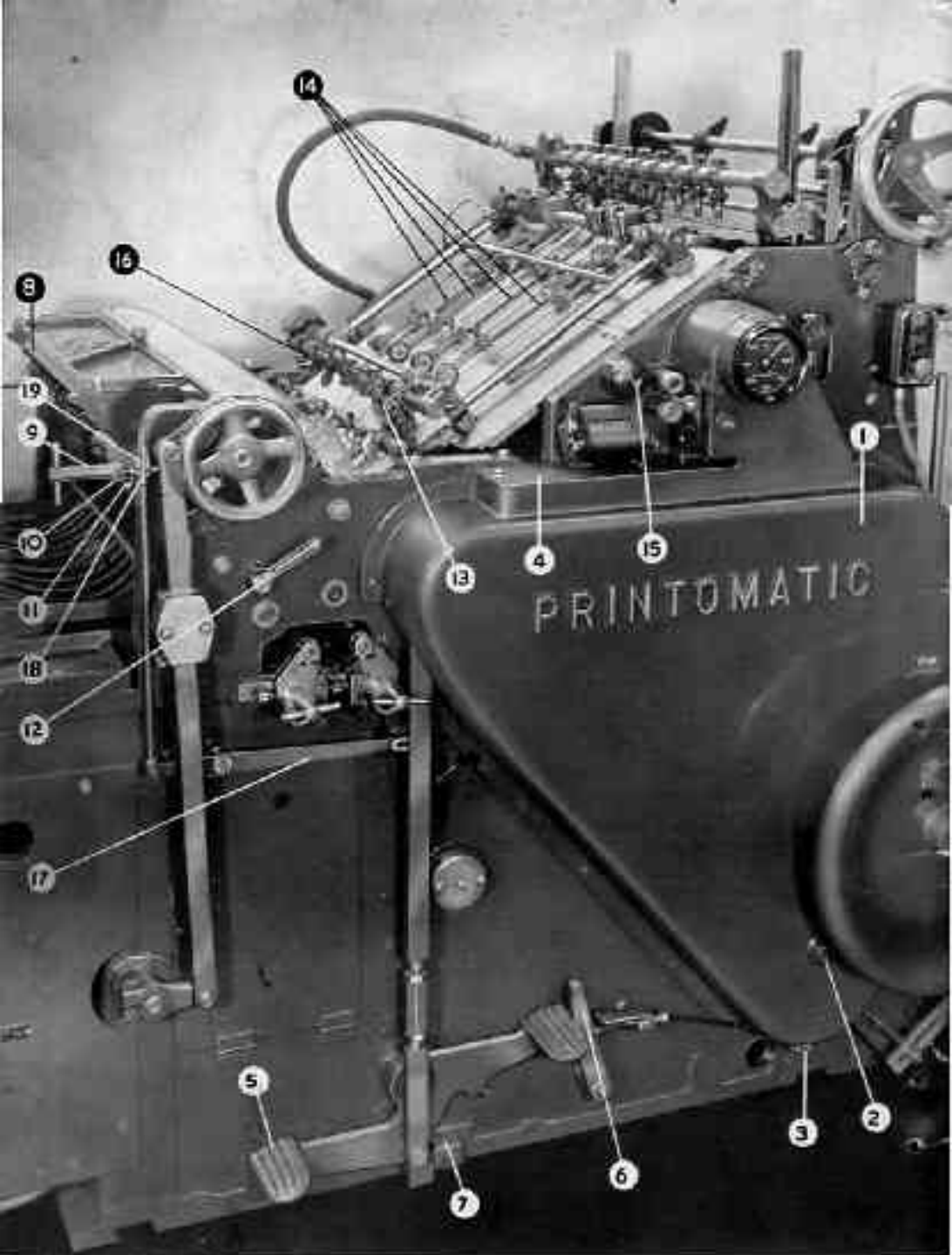


Fig. 1

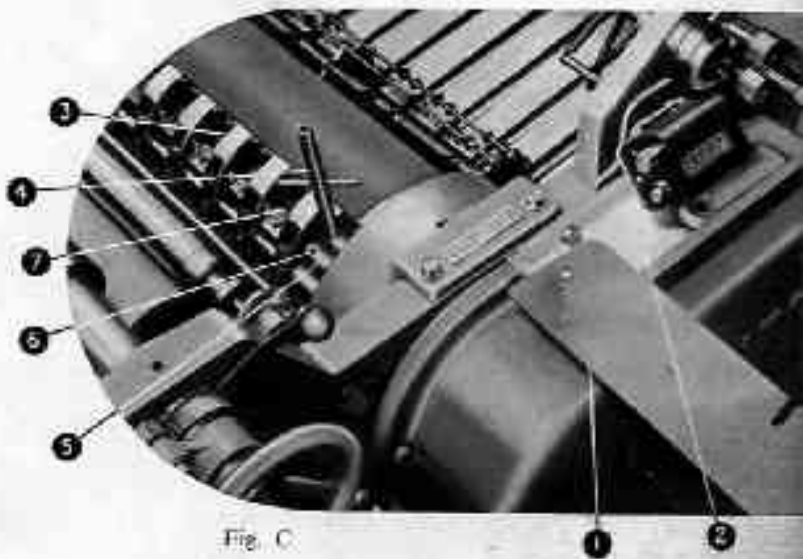


Fig. C

bearing, an oil drip tray, which requires emptying occasionally, is provided. To insert the tray, remove the metal inspection cover on the offside of the machine, and place the tray inside the base of the machine, to the rear of the machine. The tray should be positioned off-centre, so that it catches drips of oil from the pump bearing, and also from the oil hole in the lowest portion of the bed casting, between the bearings, in the centre of the machine.

The two glass drip feed lubricators are packed with the spares, for safety. They must, of course, be fitted before the machine is used.

The small gear boxes (Ref. 1, Fig. E) on the side of the inking unit must also be filled with oil up to the control plug (Ref. 2, Fig. E). The gear box is filled by removing this plug, and is emptied through drain plug (Ref. 3, Fig. E). Check the oil level every two weeks by undoing plug (Ref. 2, Fig. E). During the first twelve weeks, the oil should be drained from the main gear box at intervals of three weeks, and the gear box flushed with a cleaning oil before refilling with fresh oil. Allow the machine to run for several minutes with this motor cleaning oil so as to make sure the oil pump is also thoroughly cleaned. Each time the machine is re-started, make sure that the oil pump is working properly by opening lid (Ref. 4, Fig. B).

For the lubrication of the runner tracks (Ref. 1, Fig. 1^f) use just enough oil to cover the tracks. Lubricating holes are drilled to ensure that the guide gibs of the carriage will always receive sufficient oil. The oil in the runner tracks should be changed approximately every 500 working hours, or when the tracks become exces-

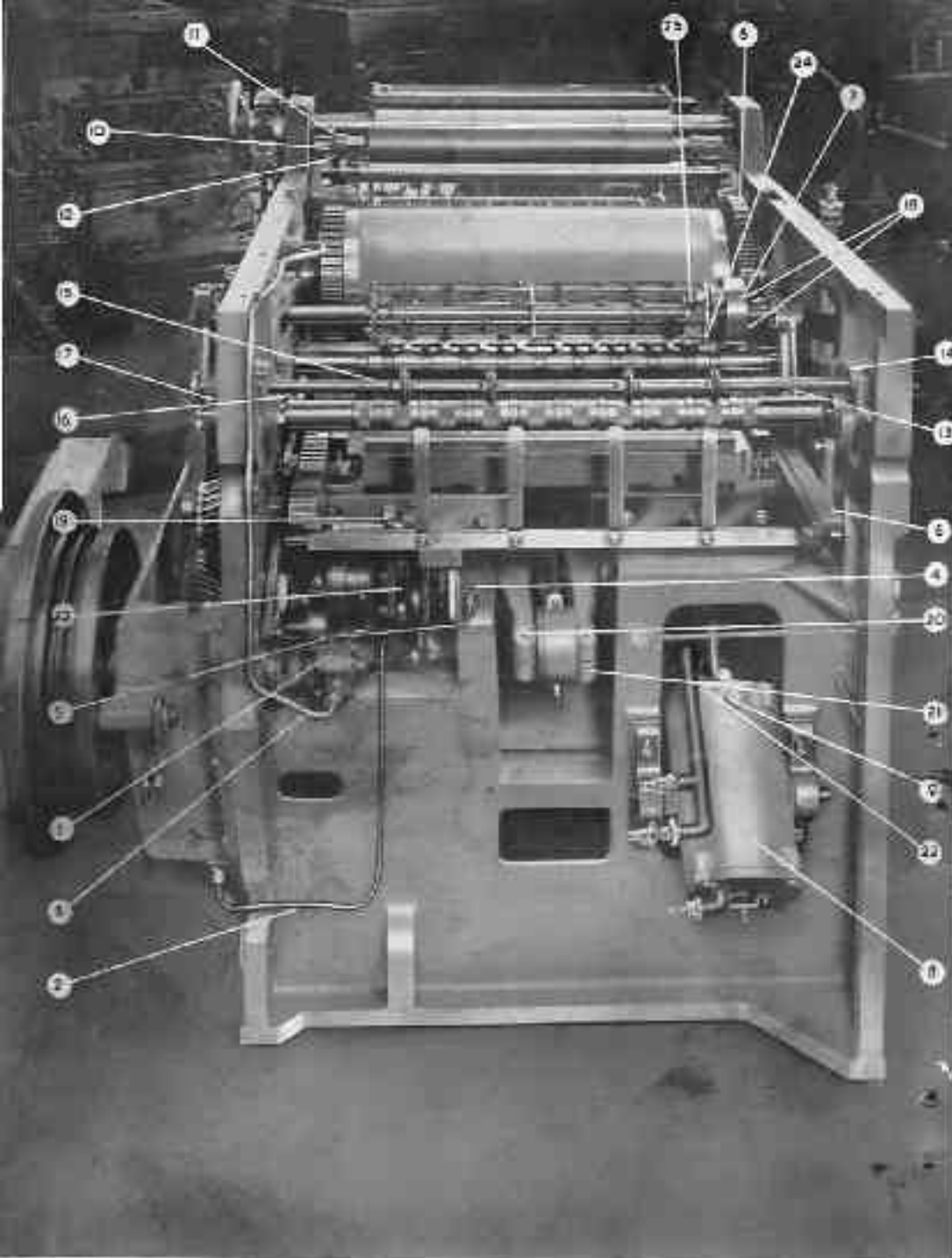


FIG. D

sively dirty. An oil syringe should preferably be used for this purpose. The syringe is also useful for sucking away the oil in the oil bath lubricating the cylinder fork cams.

All gears and racks should be lubricated with a special gear grease which must be free from acid. This applies also to the rack and gear operating the cylinder grippers (Ref. 6, Fig. D) as well as to the gear segments operating the gripper of the delivery cylinder (Ref. 24, Fig. D). The main carriage racks (Ref. 1, Fig. G) and mating gear (Ref. 6, Fig. F) must be lubricated with grease every other day. Refer to Lubricating Plan (Fig. H) for the location of all other lubricating points.

The points which lubricate permanently running parts should be oiled once or twice daily, and those of mechanisms operated by hand only should be oiled once weekly. The lubricating points served by the pressure lubricating gun should be lubricated twice weekly. The air pump cylinder (Ref. 8, Fig. D) is lubricated by the lubricator (Ref. 9, Fig. D). This should be done when the piston is at top dead centre. By this means, the air is kept fairly free of grease. If this is not carried out trouble may arise through grease entering the air pipes, and grease particles may soil the sheets on the feeder. Should this happen it will be necessary to clean the pump as follows: Take out the four screws (Ref. 1, Fig. J) at the bottom of the pump, and remove the pump end plate. The piston should be pulled right forward so that the cylinder bore is completely accessible and can be thoroughly cleaned with a non-fluffy rag. Make sure that no particles of rag remain in the pump. After cleaning the end plate of the pump (Ref. 2, Fig. J) re-assemble by tightening screws (Ref. 1, Fig. J) firmly.

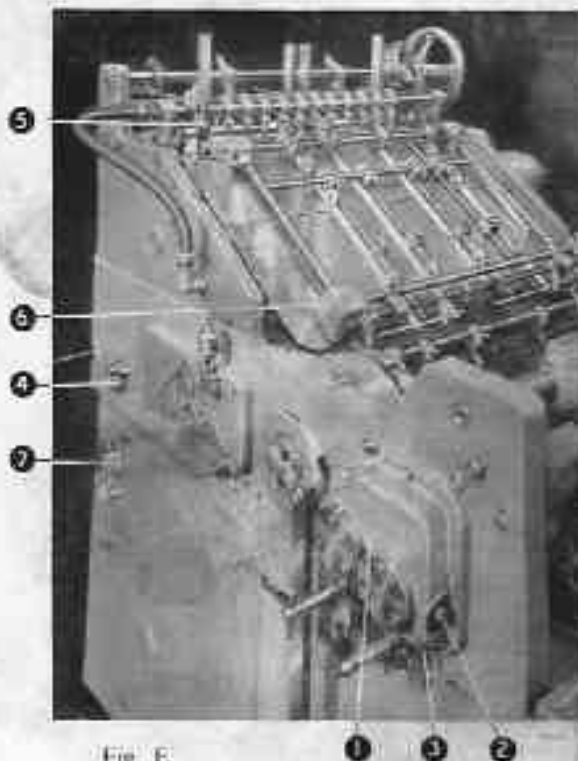


Fig. E

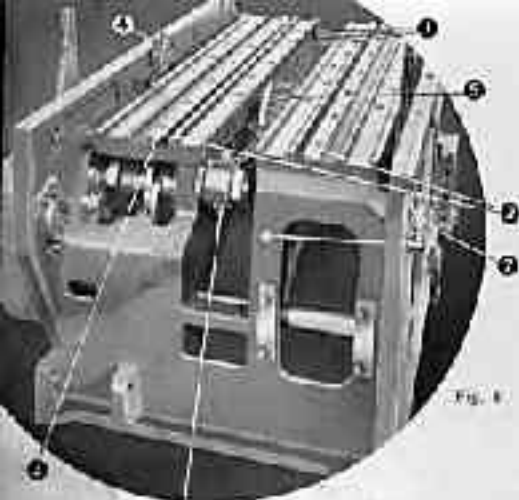


FIG. 6

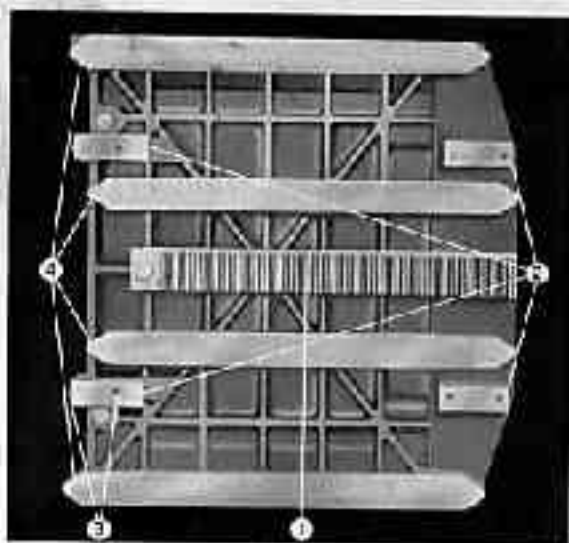


FIG. 7

In order to clean the upper part of the pump, remove guard (Ref. 3, Fig. J) then remove screws (Ref. 4, Fig. J) and take off cylinder end (Ref. 5, Fig. J). The piston should be pushed backwards, and the exposed part of the cylinder face should be cleaned. After cleaning cylinder end plate (Ref. 5, Fig. J) re-fit and tighten screws thoroughly.

In order to avoid confusing the suction and blast pipes, the

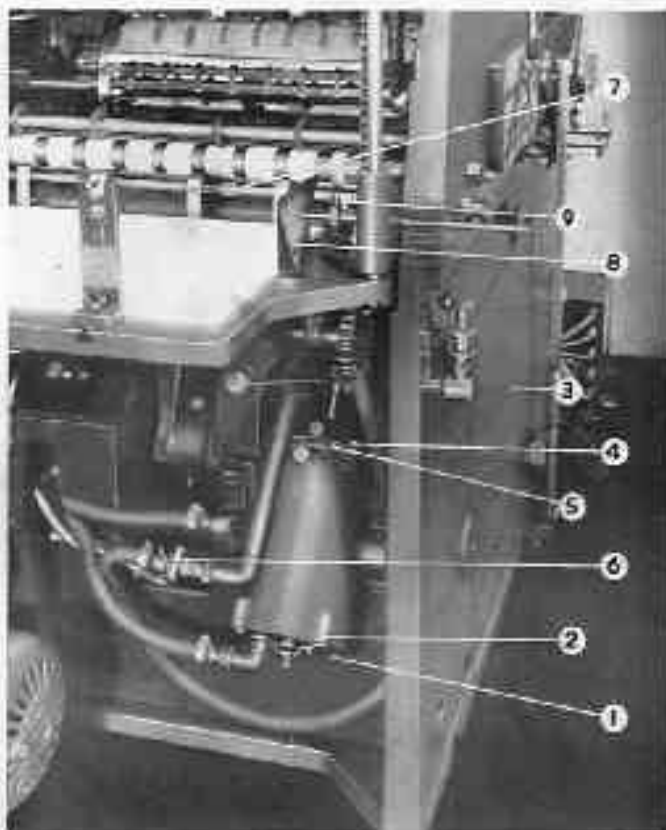


Fig. J.

latter should be left connected to the pump covers (Refs. 2, and 5, Fig. J). The guard (Ref. 3, Fig. J) must, of course, be replaced. The assembly must then be lubricated again.

The paper feed rollers on the feed table must be slightly lubricated, at frequent intervals, with a very thin high-grade oil. Regular lubrication in the same sequence is strongly recommended, so that no lubricating holes are overlooked. Adherence to recommended lubricants on pages 12 and 13 is advised.

LUBRICATING PLAN

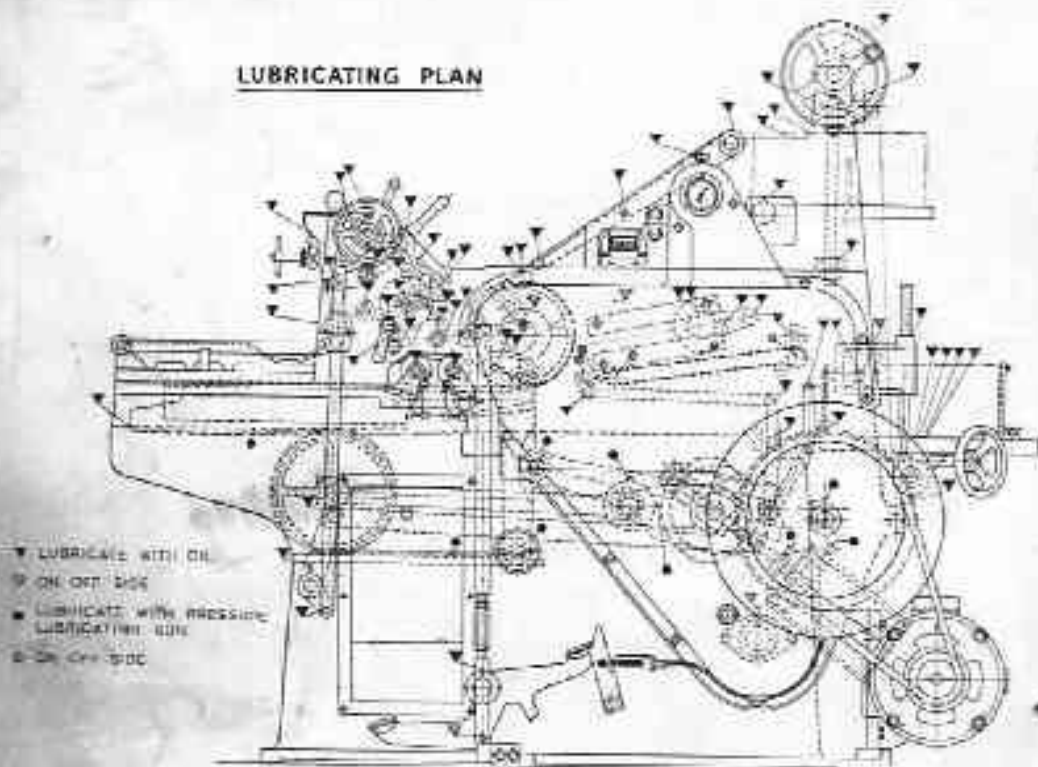


Fig. 31

RECOMMENDED LUBRICANTS

<i>Parts Description</i>	<i>Method of Application</i>	<i>Lubricant Recommended</i>		
		<i>Shell Co.</i>	<i>Vacuum Oil Co.</i>	<i>Wakefield Oil Co.</i>
Main Gear Drive	Rotary Pump	Shell Vitrea Oil 41	Gargoyle D.T.E. Oil Heavy Medium	Wakefield Perfecto Alpha 217

Part Description	Method of Application	Lubricant Recommended		
		Shell	Castrol	Wickfield
Feeder drive Roller Shaft, Fork Lever Tachometer Drive, Feeder tape Slow Down Motion, Delivery tape roller Impression Cylinder Washer, Delivery Grippers, Main drive Connecting Rod, Feeder Camshaft centre Bearing	Tecalan nipples	Shell Vitrea O179	Gargyle Vactra Oil BB	Wickfield Alpha 717
Delivery Cylinder Slide, Air Pump Crankshaft	Drip Oil Bottle (4 drops per minute)	Shell Vitrea Oil 41	Gargyle DTF Oil Heavy Medium	Wickfield Alpha 217
Air Pump	Grease cups	Shell Nardia Grease 3	Gargyle Grease BRB No. 3	Wickfield Behmatol
Forming Roller Traces	Hand oiling	Shell Vitrea Oil 41	Gargyle DTF Oil Heavy Medium	Wickfield Alpha 217
Feeder Sheet Conveyor Rollers	Hand oiling	Shell Telios Oil 15	Gargyle Vactra Oil D	Wickfield Magna 35
Exposed Racks	Hand application	Shell Carium Compound A	Gargyle Vivodine Lubricant No. 4	Wickfield Carubense G
Chilling Steel Taper Drive	Grease nipples	Shell Sphera Grease Oil	Mobilgrease No. 2	Castrolase GL

ELECTRICAL EQUIPMENT

Before setting to work check:—

Motor.

Make certain that it is correctly connected for the voltage on which it is to work. For operation on three-phase supply there are six terminals and connections for high or low voltage as shown in diagram (Fig. K). With D.C. supply, connections are as shown in diagram (Fig. L).

See that brushes are making good contact with sliprings and that motor turns easily in the bearings.

Direction of Rotation.

This can be reversed by changing any two A, B or C lines.

Controller.

See that contactors operate freely.

If any undue stiffness, clean hinge pin, but do not reduce its diameter or increase size of holes as this may make contactor noisy in operation.

Check that overload dash pots have each been filled with six drops of good machine oil.

Where dual voltage has been specified, additional coils and overloads are provided. Make certain that correct coils and overloads are fitted.

Controller is always fitted with high voltage coils and overloads. Low voltage coils and overloads are supplied separately.

General.

If any part of the equipment has been subjected to dampness it should be thoroughly dried out and allowed to stand in a warm dry room for a few days. Insulation tests to earth should be made and the motor stator tested between phases as well as to earth. An insulation resistance of not less than 5 megohms should be obtained before full pressure is applied.

Operation.

Close main switch in contactor.

Regulator in slow speed position.

"Inch."

Press will run at slow speed only whilst this button is depressed.

"Run."

Press continues to run at slow speed after pressure on button is released.

Speed-up by means of regulator handle.

"Stop."

Causes control circuit relay and main contactor to fall out.

Speed Regulation.

Machines are supplied for fully electric speed control. The various running speeds can be obtained by moving the control lever fitted to the rheostat to the desired position. Local regulations laid down by electricity undertakings normally require that the motor should start at its lowest speed to obviate peak loads. The speed control lever should therefore always be moved back to the lowest position before starting the machine. It is, however, possible to remove the automatic cut-out and enable the machine to be started up at any speed at which it may be set. Both control equipment and motor are designed to carry these loads without harm. It is advisable to consult an electrician when making this slight change.

Maintenance.

Motor and controller should be kept clean from dirt and oil and should be cleaned at least once a month. Brushholders, brushes and sliprings should be examined and any dust removed with a clean cloth.

If brushholders are removed or replaced, spring pressure should be set at 2 lbs. per square inch of brush surface.

Contacts in controller should be kept clean and when it becomes necessary to face up contactor contacts due to pitting and burning, make certain that each pair of fixed and moving contacts make good contact.

Motor bearings are greased before leaving the workshop, and will run for at least 3,000 hours before requiring attention.

To renew grease, pulley and bearing cap should be removed, bearing washed out with petrol and bearing then half-filled with new grease.

To re-grease the slipring end, loosen slipring cover and withdraw rotor as much as windings and fan will permit. Sufficient space is then available to wash out bearings and put in new grease.

FORME CARRIAGE

The forme should be placed on the carriage with the head, or grip edge, towards the forme bar (Ref. 1, Fig. M) taking care that the type master or blocks do not extend beyond the pitch line marked on the table approximately 1" (25 mm.) from the bar, otherwise the grippers will damage the forme. The forme should be locked in position by the swivelling dogs (Ref. 2, Fig. M) and screws (Ref. 3, Fig. M). Make sure that the forme is absolutely secure. The bearers on the forme carriage are supplied with each machine according to the type height for which the machine was ordered, and should not be changed.

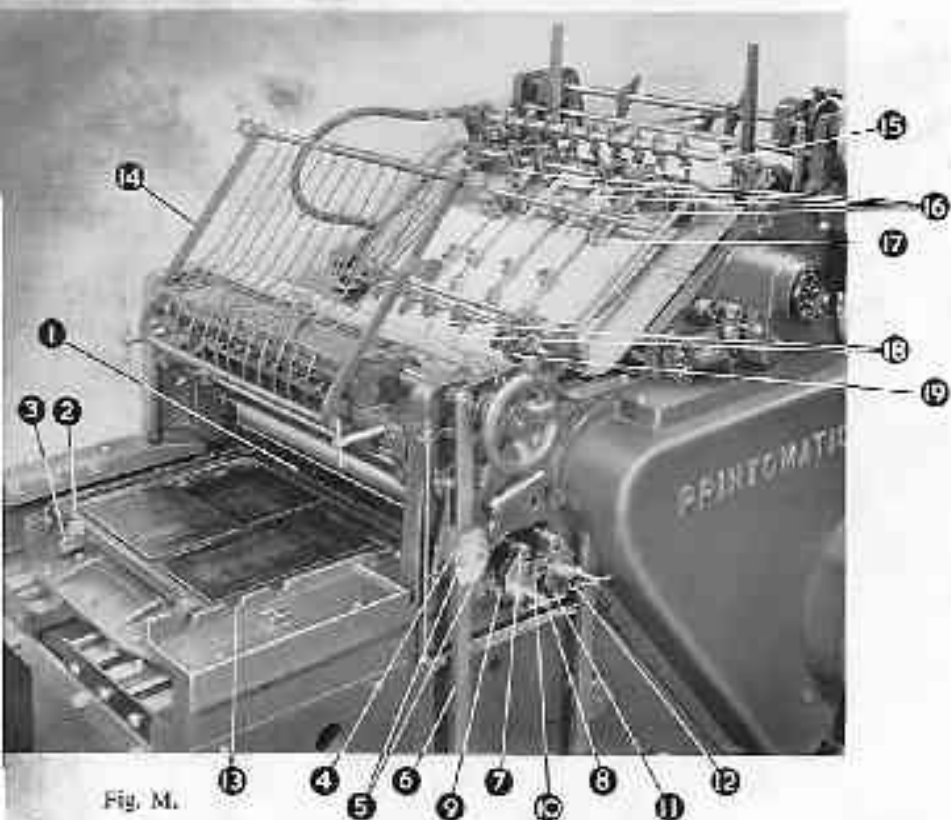


Fig. M.

Referring to the illustration of the under-side of the forme carriage (Fig. G) note that the carriage is guided laterally by the gibs (Ref. 2, Fig. G) and is prevented from lifting by strips (Ref. 2, Fig. F) which engage lugs on the gibs. The gibs nearest the operating side are adjustable, and the ones on the opposite side are pinned. Should it be necessary for any reason to tighten these gibs, this can be done after loosening screws (Ref. 3, Fig. G) which are accessible from the top of the carriage. The guide tracks of the bed and the forme carriage (Ref. 4, Fig. G) must always be kept clean from foreign matter, otherwise the carriage may jam, since it is held down snugly by the guide strips mentioned above. This also applies to the racks. Should the carriage become jammed, it can be freed by loosening screws (Ref. 3, Fig. F) which serve for holding down guide strips (Ref. 2, Fig. F). The machine should then be turned by hand until any foreign matter is removed.

If a small chase is used, or solid blocks which do not require locking in a chase, these can be locked up by means of a locking-up bar which is supplied with every machine, and which fits into slots cut into the bearers. It will be seen that one end of this bar is fitted with a pivoted latch. Raise the latch and insert that end of the bar as far as it will go into the bearer slot. Now lower the bar on to the carriage, and push the other end of the bar into the opposite bearer slot, allowing the latch to fall level with the bar. This will then lock the bar in position.

The tapered ends of the bar are off-set from the centre, allowing two positions of the bar for each bearer slot by merely turning the bar end for end. The latch would then be in the way for locking-up the chase, and for this reason it is arranged in such a manner that the hinge pin on which it pivots can be unscrewed and replaced in the hole provided on the other side of the locking-up bar.

IMPRESSION CHECK AND INK CHECK

The cylinder is lowered on to impression by pressure on a pedal (Ref. 5, Fig. B) and the pedal held in the lowered position by a spring-loaded catch (Ref. 6, Fig. B). This catch is withdrawn automatically whenever the machine is stopped, either by the operator or the cut-out, to avoid printing on the cylinder when no sheet is fed into the machine. To lift the cylinder off impression

without stopping the machine, disengage the spring-loaded catch by tapping it to the right with the foot. The cylinder will then be lifted by the spring on the pedal.

The cylinder should only be lowered after the grippers have closed on the sheet, as the front lays, being fitted in the cylinder, will move slightly when the cylinder is lowered, and this will put the sheet out of register if it is not held by the grippers.

When using type-high numbering boxes, the loose stop block (Ref. 7, Fig. B) against which the impression pedal rests in the off position, should be lifted out, allowing the cylinder to lift high enough to clear the numbering box plunger. **Replace this stop block immediately you return to normal printing.**

Connected to the impression check bar is the ink check device. If, whilst the machine is running, no paper is being fed through the machine, i.e., no printing is taking place, the vibrator roller (Ref. 5, Fig. O) of the tacking unit would normally continue to feed ink from the duct and over-charge the tacking unit, resulting in far too much ink being applied to the first sheets when normal printing is resumed. To overcome this, an ink check has been added which stops the feeding of ink automatically when the impression check comes into operation. Levers 17 and 18 (Fig. B) cause the disengagement of the ink feed pawl, by moving a cam behind the ink feed ratchet.

A thumb-operated triangular trigger (Ref. 19, Fig. B) renders the ink check inoperative, when swung aside by placing a finger on its knurled top. This is required for inking up before printing commences, or on other occasions, and gives the operator the opportunity of running the machine with or without ink check. When impression is put on again, the trigger will automatically swing back into operation.

IMPRESSION CYLINDER

The cylinder is set according to the type height ordered, and its adjustment should not be changed. The cylinder packing of (0.058") 1.5 mm. thickness should be applied with the cylinder grippers opened as much as possible. The packing is fixed with the aid of clamping bar (Ref. 3, Fig. C) which can be opened by undoing the square headed screw by means of the box-spanner (Ref. 4, Fig. C). Before opening, however, it is necessary to lift the front

lay bar (Ref. 5, Fig. C) using a tommy bar, which can be pushed into the hole (Ref. 6, Fig. C) on the operating side of the spindle carrying the front lays. If a linen sheet is fitted to the cylinder, a hem of about $\frac{1}{4}$ " (6 mm.) should be sewn along the edge, and into this the $\frac{1}{8}$ " (3.2 mm.) wire rod (Ref. 8, Fig. N) should be threaded. The wire rod should then be hooked behind the three pins (Ref. 7, Fig. N) and the linen drawn tight around the cylinder by winding on the first reel rod (Ref. 10, Fig. N) and tightening with the tommy bar supplied. The hem of the linen should be cut away from the pins to facilitate fixing.

Rubber sheeting, as supplied by Manufacturers' Supply Services, Berrymede Road, London, W.4, has been found a very effective cylinder packing. The final sheet of the packing should be wound on the second reel rod (Ref. 9, Fig. N). To release the reel rods depress the pawls after easing the weight from them with the tommy bar.

The cylinder surface must be oiled before fitting the packing to prevent rust.

If two sheets are to be printed side by side, it is necessary to use four front lays (Ref. 1, Fig. O and Ref. 7, Fig. C) two to each sheet. The grip can be adjusted by moving the front lays. These can be individually adjusted by turning a screwdriver or a coin in the slots.

The cylinder grippers of the "Printomatic" are individually sprung. The springs are adjusted correctly at the works and should not be altered. The spindle on which the cylinder grippers are mounted (Ref. 11, Fig. N) should always turn freely and it is important to keep its bearing in the cylinder well lubricated. It is also important to lubricate, from time to time, the operating spring pin at the point where it passes through the end of the gripper spring channel. If any one of the cylinder grippers (Ref. 2, Fig. O) will not close properly, this is probably due to the leaf spring having been bent, in which case they must be taken out by loosening screw 3, (Fig. O), and straightened. The short leaves (Ref. 12, Fig. N) should be straightened a little more than the longer ones (Ref. 13, Fig. N). If they cannot be straightened, they should be replaced. When the grippers are correctly set they should open a distance of $\frac{9}{16}$ " (14.3 mm.) from the tympan bar. The grippers can be reset by means of the adjusting grab screw, but it must be remembered that the cylinder grippers continue to tighten after they have been closed.

until the cylinder begins to rotate. All grippers must make contact simultaneously. Secure the grub screws tightly by means of the lock nuts and check that this has not altered the setting.

Particular care should be taken to keep carriage bearers and cylinder bearers spotlessly clean, since the impression results depend very largely upon this. If half-tone blocks do not print clearly, it should be checked that the cylinder bearers are still hard on the forme carriage bearers. This can easily be checked by putting a little printer's ink on the carriage bearers in line with a printing block and then turning the machine by hand or power (with impression "on") until the bearer has passed below the cylinder when the ink should be completely pressed out. If it is not, a printer's engineer should be called to adjust the impression. This condition is most likely to occur when a new machine has been run for a few months.

INKING UNIT

The ink duct body (Ref. 8, Fig. B) is hinged and can be swung away from the roller after undoing screws (Ref. 9, Fig. B), thus enabling the duct and duct roller to be thoroughly cleaned. The stop screws (Ref. 10, Fig. B) ensure correct positioning of the flexible ink knife in relation to the duct roller. The adjustment of ink supply across the width of the roller is carried out in the usual manner by means of individual duct knife adjusting screws. The amount of ink transmitted to the inking unit is adjustable by a lever (Ref. 4, Fig. O), since this adjusts the amount of rotation of the duct roller whilst the vibrator is in contact with it. The vibrator (Ref. 5, Fig. O) which transfers the ink to the small steel reciprocator (Ref. 6, Fig. O) is operated by the slide coupling (Ref. 4, Fig. M). If the vibrator does not make proper contact with the steel roller, tighten nuts (Ref. 5, Fig. M) slightly, to increase the friction of the coupling, at the same time holding the head of the bolt with a second spanner so that it cannot move. The nuts must not on any account be tightened so hard that the coupling cannot continue to slide on the bar (Ref. 6, Fig. M), after the vibrator has made contact with the steel distributor, or duct roller. The nuts must be securely locked by lock-nuts provided. The coupling should not be lubricated with oil but only with paraffin.

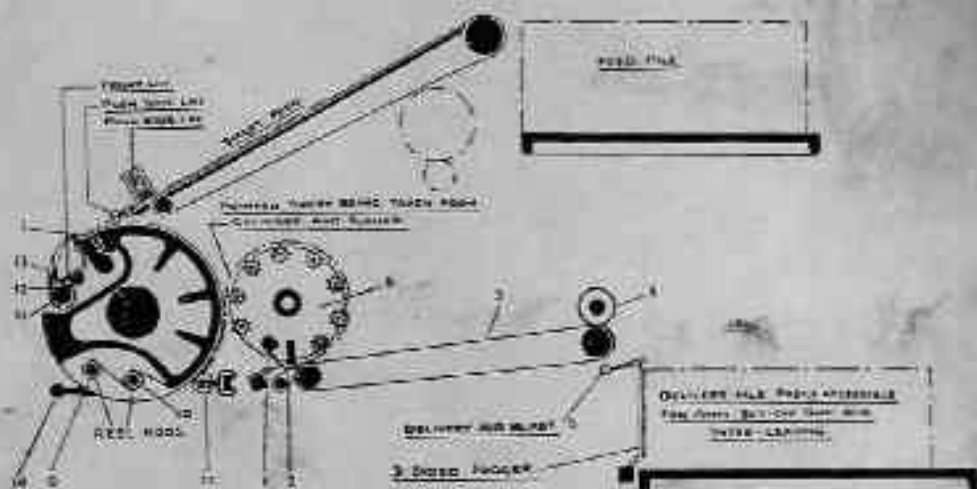
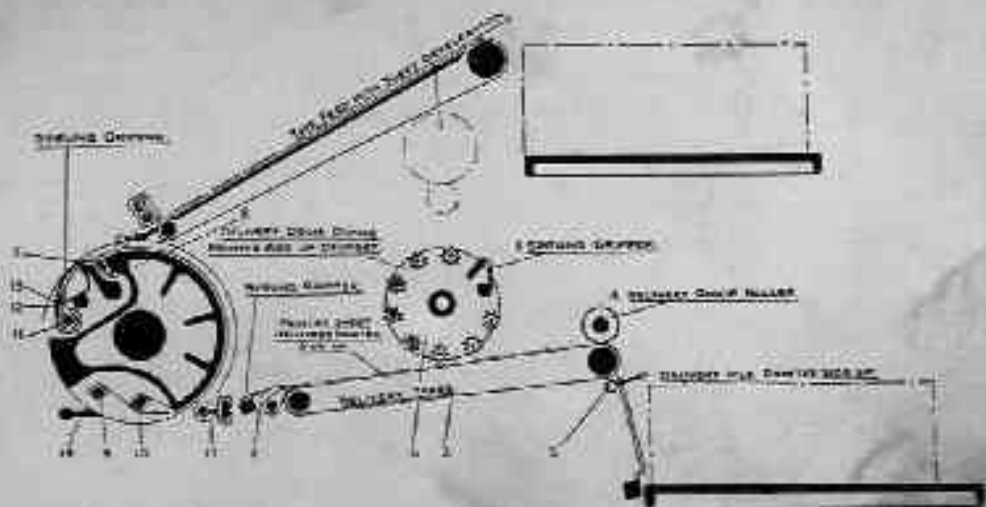


Fig. N

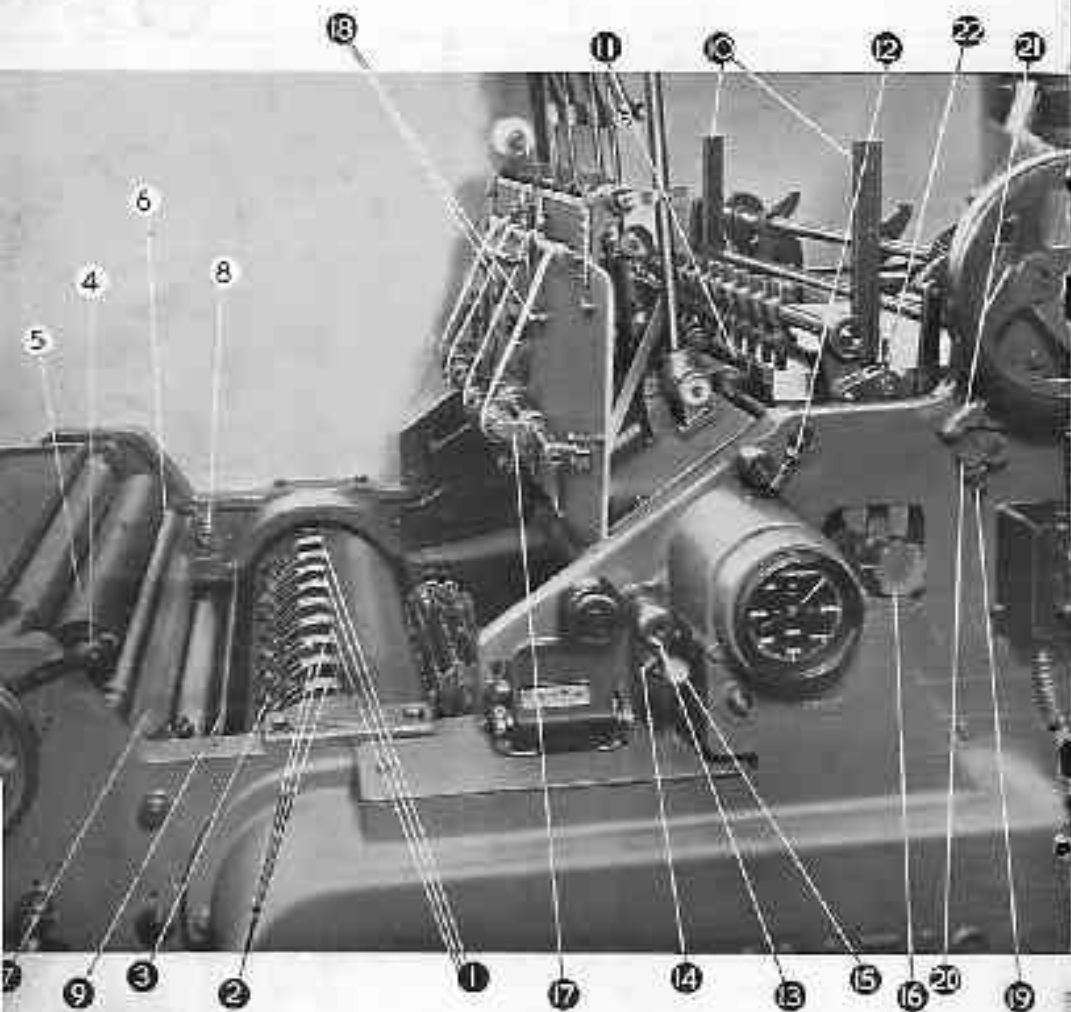


Fig. O

To remove vibrator, simply slacken the wing nut (Ref. 10, Fig. D) so that the roller lock (Ref. 11, Fig. D) opens. If the vibrator does not make contact evenly along the duct roller, the roller arm on the operating side (Ref. 12, Fig. D) can be moved slightly after undoing the screw securing it to the shaft.

The form rollers are carried in sockets (Ref. 7, Fig. M) which are adjustable vertically and horizontally. After undoing screw 8, (Fig. M) the socket can be moved horizontally and can then be set in the desired position by means of screws 9, (Fig. M). After

undoing wing nuts 10 (Fig. M), the roller can be adjusted vertically by its wing nut (Ref. 11, Fig. M). The roller is pressed upwards by a spring and held downwards by the wing nut. Tighten all screws after correct adjustment of the bearing. To remove inking rollers from contact with steel reciprocating rollers, undo screw (Ref. 8, Fig. M) and move roller bearings on the control side of the machine.

If the inkers are to be removed from the machine, turn the machine until the forme carriage is at the delivery end, then loosen screws (Ref. 8, Fig. M) and lift collars (Ref. 12, Fig. M) on to the shaft of these screws. The whole bearings can then be removed from the journals of the inking rollers so that the latter can be pulled out of the bearings on the opposite side. It is possible to put the inkers into the shaped rack guards (Ref. 13, Fig. M) which are so arranged that guard 14 (Fig. M) can be closed, even when the rollers are lying in these racks. All other rollers can be moved away from each other by a central lever (Ref. 12, Fig. B).

When putting inking rollers in contact again ensure that the roller for the lateral movement of the top steel reciprocator drops into the gap provided for this movement. Never clean the rollers whilst the machine is running.

The correct position of the large rubber inking roller (Ref. 7, Fig. O) in relation to the lower steel reciprocating rollers (Ref. 1, Fig. P) is adjusted at the factory, and should not normally be interfered with. If, however, the inking does not remain uniform over the whole width of the rollers it is possible to adjust the position of the rubber cylinder by means of eccentric bushes. These bushes are held by clamp screws in levers acting as carriers for the roller. Always loosen one of the levers on its shaft when adjusting the bushes. When adjusting the rubber roller in relation to the two steel reciprocators, check with strips of paper placed between the rollers that the rubber roller has even contact with both steel rollers across the machine. If the top steel reciprocator (Ref. 6, Fig. O) does not lie parallel with the vibrator roller after the latter has been set parallel with the duct roller, the correct position can be secured by moving the eccentric pin (Ref. 8, Fig. O). To do this, loosen the securing nut and move the eccentric pin by means of a small cammy bar, which should fit into the hole drilled into the head of the pin.

An extra reciprocating steel roller can be supplied to order which fits between and below the two forme rollers. This is not normally required even for the printing of heavy formes and



Fig. P

should only be used on quite exceptionally heavy "solids." It is not safe to run the machine at more than 3,000 i.p.h. with this roller in position, and furthermore, the use of the roller complicates adjustments and washing up. The roller, complete with its driving members and guards can be easily put on or removed.

FLYWHEEL BRAKE

A strong electro-magnetic brake of the internal flywheel type will brake the machine when the "Stop" button is pressed or if the automatic cut-out comes into operation. This brake remains on during the whole of the time that the machine is not running.

Should it be found necessary to turn the machine by hand, the brake should first be released by lifting the handle with the red knob which protrudes through the guard covering the brake solenoid, between the flywheel and the delivery board. This handle will remain in the raised position until the machine is again run under power, when it will reset itself for automatic operation. It is not usually necessary to turn the machine by hand, however, because an "inch" push button is provided. If it should be necessary after a time to re-adjust the tension of the brake, owing to wear on the lining, the guard covering the solenoid should be removed by taking out the two hexagon screws on the top and lifting the guard clear. This will expose the spring which actually applies the brake and it will be noticed that at the lower end of the spring is a screwed sleeve and lock nut. To give more tension, slacken the lock nut and screw the sleeve upwards, compressing the spring, afterwards refastening the lock nut. If the brake is adjusted too tightly the solenoid will make

a humming noise. The brake releases immediately if the "inch" or "run" button is pushed whilst it is on. After re-adjusting the brake, make sure that it does not touch the flywheel rim when it is released. Keep the brake free from grease and oil.

CYLINDER BRUSH & GUIDES FOR IMPRESSION CYLINDER

Brush (Ref. 14, Fig. N and Ref. 2, Fig. P) smooths the sheet on to the impression cylinder and prevents air being trapped between cylinder and sheet. Adjustment is made with lever (Ref. 1, Fig. Q) which can be moved after undoing its wing nut. The distance of the brush from the cylinder is adjusted according to the thickness of the stock.

If it should be necessary to remove the brush for cleaning or for any other reason, the ink guard (Ref. 9, Fig. O) should first be taken out by removing the screw at the operating side, and drawing the guard upwards and towards the operating side. Next slacken back the nut (Ref. 2, Fig. Q) about $\frac{1}{4}$ " (20 mm.) and draw out the lever (Ref. 1, Fig. Q) which is attached to the brush operating pin (Ref. 3, Fig. Q). This end of the brush will then fall down and should be drawn towards the off-side of the machine, to release the other end. When replacing the brush, make sure that the flats on the end of the operating pin (Ref. 3, Fig. Q) fit into the slot cut into the brush hoop (Ref. 3, Fig. P). When refitting the ink guard, make sure that the clips at its lower corners straddle the brush correctly, otherwise they will foul the inking rollers. The inking rollers must, of course, be removed prior to removing the brush. Never attempt to adjust the brush whilst the machine is running, as the brush holders might become caught in one of the racks. After adjustment of the brush always turn the machine by hand to ensure that the brush holders are clear.

Guide rollers (Ref. 4, Fig. P and Ref. 17, Fig. N) are provided below the impression cylinder to keep the freshly printed sheet away from the forme, to avoid smudge and to ensure correct progress



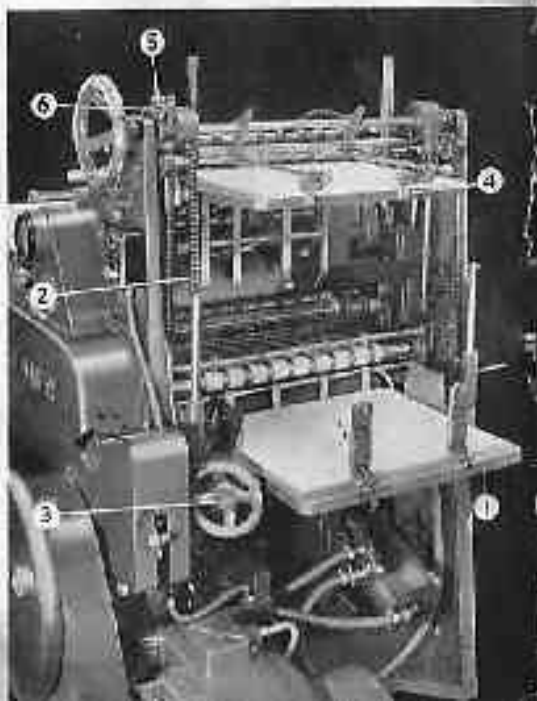
Fig. O

of the sheet at the point of take over from the impression cylinder to the delivery cylinder. These rollers run on ball bearings and are correctly adjusted at the factory. They can be moved laterally on the rod so that, if necessary, they can be moved into white spaces, provided they are not placed into position where they can foul cylinder grippers or front lays.

SHEET DELIVERY

The "Printomatic" is equipped with a printed-side-up delivery, the operation of which can be seen from Fig. N. The sheet is fed to the stationary impression cylinder and is removed from this cylinder during its movement by means of grippers (Ref. 1, Fig. N) fitted to the delivery drum (Ref. 6, Fig. N). The sheet is then transferred to stationary grippers (Ref. 2, Fig. N). During the period when the impression cylinder is stationary, the delivery cylinder rolls the sheet on to the delivery tapes. When the sheet is lying in its full length on the tapes (Ref. 3, Fig. N) the stationary grippers open and the tapes deliver the sheet on to the delivery table, where it is deposited, supported by blast air, printed side up. With light substances, such as airmail, it is advisable to use delivery rollers (Ref. 4, Fig. N) which are fitted to spindle (Ref. 13, Fig. D) and which can easily be placed in bearings (Ref. 14, Fig. D) located above the conveyor roller. The rollers can be moved sideways without the use of tools and are kept in position by means of springs (Ref. 15, Fig. D). If these rollers are not used, the spindle need not be removed from the machine, but can be carried in the rests next to their bearings, so that the sheet can travel freely below the rollers.

The blast pipe (Ref. 5, Fig. N) emits air which floats the sheet on to the pile and helps to prevent offset. The intensity of the air blast must be adjusted according to the weight of the paper used. Adjustment can be made by



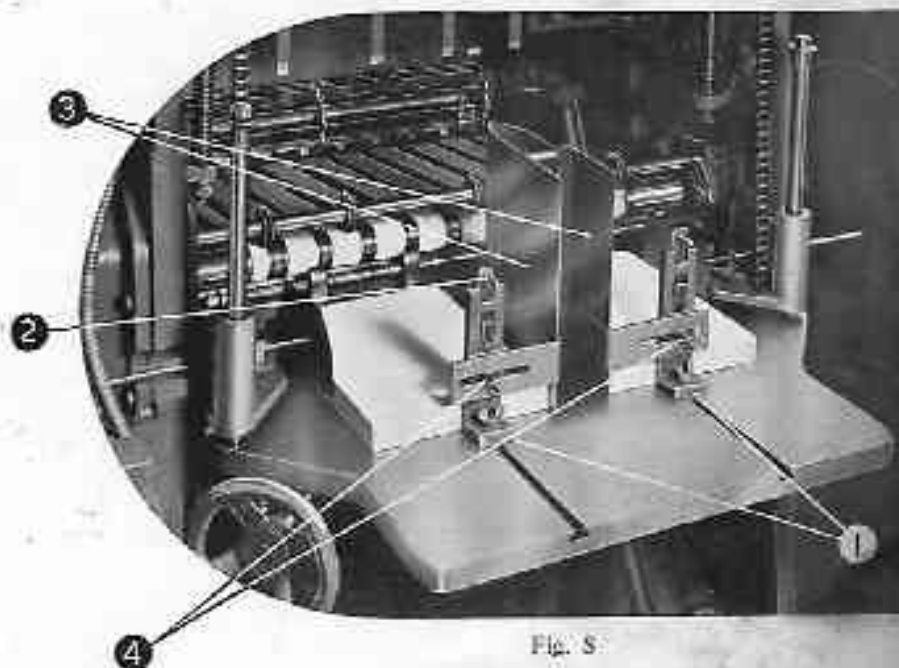


Fig. 5

means of tap (Ref. 6, Fig. J). Adjustable sleeves (Ref. 7, Fig. J) are also provided on the blast pipe to cut off certain blow-holes to suit different widths of paper run, and different substances.

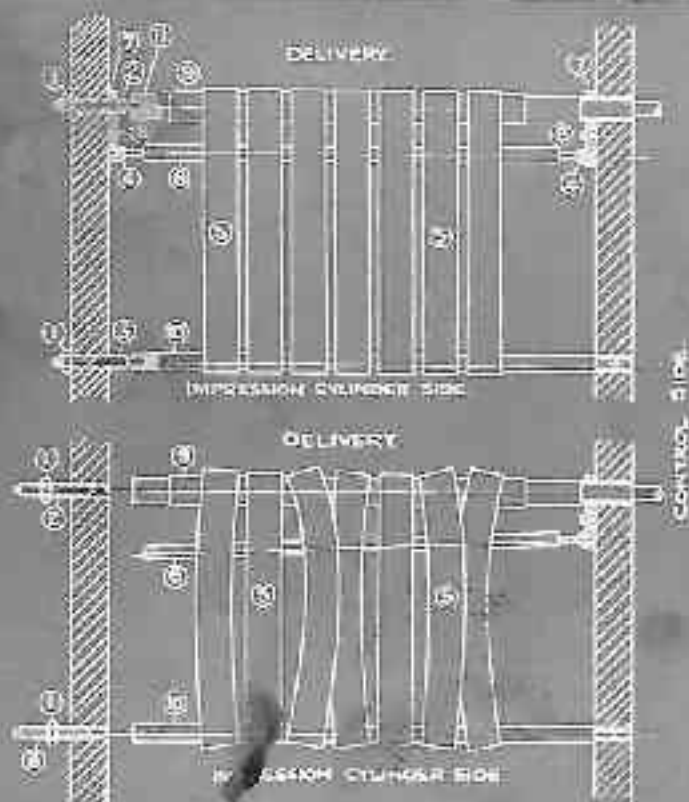
Also mounted on the blast pipe are moveable bridge pieces which lead the sheet over the jogger fingers. These can be moved by sliding along the blast bar, but should not be placed in line with the tapes.

The delivery table (Ref. 1, Fig. R) is connected to the feeder table by means of chains (Ref. 2, Fig. R) so that the delivery table will always drop the same amount as the feeder table is lifted. The depth of fall from delivery tapes to delivery table is adjustable by means of hand-wheel (Ref. 3, Fig. R), and should be increased or decreased according to the weight of the paper. A three-sided jogger is provided, and the side joggers (Ref. 8, Fig. J) must be adjusted to the width of the sheet being run, by means of thumb screw (Ref. 9, Fig. J). The sheet stops (Ref. 1, Fig. S) which are fitted in tee-slots in the delivery table, can be telescoped upwards by raising slide (Ref. 2, Fig. S) as the delivery pile grows. If two small sheets are printed side by side, side plates (Ref. 3, Fig. S) should be fitted to sheetstops (Ref. 1, Fig. S). The side plates are provided with slots through which pass thumb screws (Ref. 4, Fig. S) enabling side plates to be adjusted according to size of paper being run.

TO REPLACE TAPES

When replacing the delivery tapes, work according to Fig. T. In order to slacken tapes, drop tension roller (Ref. 6, Fig. T) which is supported in levers (Ref. 7, Fig. T), by undoing screws (Ref. 8, Fig. T). Then loosen the lock nuts (Ref. 1, Fig. T) and unscrew studs (Refs. 2 and 3, Fig. T). This will release one end each of the front and back tape rollers (Refs. 9 and 10, Fig. T). The old tapes can now be removed and new tapes threaded. Now replace studs (Refs. 2 and 3, Fig. T) taking careful note of the following points:

Stud 3, which is situated nearest to the impression cylinder, also serves for the lateral guidance of the tape roller (Ref. 10, Fig. T). It is necessary, therefore, that the stud be screwed into the machine



sufficiently to bottom on the base of the hole in the tape roller. Having bottomed it, it is necessary to undo it again $\frac{1}{2}$ turn so that there is just enough end-play to enable the roller to run freely. Stud 2, (Fig. T) of the front tape roller (Ref. 9, Fig. T) should be screwed sufficiently into the roller until the shoulder of the barrel-shaped bearing (Ref. 11, Fig. T) protrudes approximately $\frac{1}{16}$ " (1.5 mm.). The studs (Refs. 2 and 3, Fig. T) must then be secured by means of the lock nuts (Ref. 1, Fig. T). All tapes can then be tightened simultaneously by raising the tension roller (Ref. 6, Fig. T) and locking it in position by means of the bolts passing through the radial slots in the outer ends of the roller arms (Ref. 7, Fig. T). It is essential that all tapes are exactly the same length. To join tapes together they should be sewn and/or cemented, but there must be no thickening at the joint since this would interfere with the smooth running of the sheet. Pliable Duplex tape should be used for the feeder and $1\frac{1}{4}$ " (45 mm.) should be peeled off one ply only on either end of the tape as indicated by Fig. U. Remove the web (cross threads) leaving only the long threads in the manner shown in Fig. V, slightly taper the long threads as shown and proceed to cement the two surfaces together. An almost invisible joint is produced by this method.

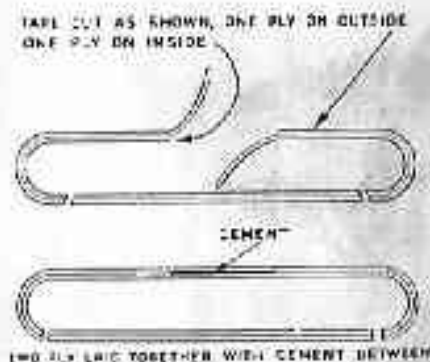


Fig. U

Best tape cement should be used for joining, and the tapes left overnight to dry. The total endless length of delivery tapes should be $32\frac{1}{2}$ " (819 mm.) and the thickness preferably 0.04 " (1 mm.). Tape

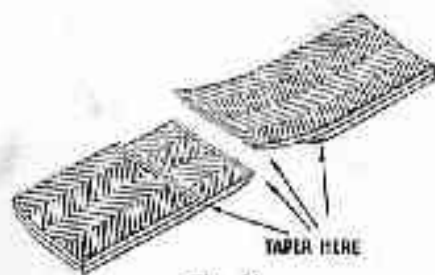


Fig. V

width should be $1\frac{1}{2}$ " (38 mm.) for the eight inner tapes and $\frac{7}{8}$ " (22 mm.) for the two outer tapes. Allowing for overlap of $1\frac{3}{8}$ " (45 mm.) the tapes should be cut off the reel to a length of 34 " (864 mm.).

GRIPPER TAKE OVER

The sheet take-over by grippers is designed and adjusted so that no difficulties should arise in normal printing. The use of individually sprung grippers throughout secures perfect register. If, through the use of bad paper or board, a jam should occur, and grippers should become displaced, the following notes will prove useful.

Failure of the take-over between impression cylinder and delivery drum may be caused by the stretching of the chain driving the delivery drum, or by the fact that cam (Ref. 7, Fig. D) operating delivery drum grippers (Ref. 1, Fig. N) has moved. The chain can be tightened by undoing nut (Ref. 16, Fig. D) located on bolt (Ref. 17, Fig. D) and then by slightly moving bolt (Ref. 17, Fig. D) by means of the nut in the direction of the delivery table. Re-tighten nut in the new position. To return cam (Ref. 7, Fig. D) undo screws (Ref. 8, Fig. D) to loosen this cam. By turning the cam slightly forward or backward the timing of the grippers (Ref. 1, Fig. N) can be advanced or retarded. When making this adjustment note that grippers (Ref. 2, Fig. O) of the impression cylinder, as well as the grippers of the delivery drum, should hold the sheet simultaneously for about $\frac{1}{8}$ " (2 mm.) of its path. On no account must the grippers of the impression cylinder open before the grippers of the delivery drum have taken over firmly. The vertical distance from the tympan clamping face of the impression cylinder to the machined top face of the forme carriage should be 4.625" (117.5 mm.) when impression cylinder grippers commence to open and when the cylinder is on impression.

Adjustment is effected by horizontal movement of the gripper gear rack (Ref. 6, Fig. D) which is secured to the forme carriage by two hexagonal headed bolts. The bolts are accessible after removal of the off-side tray on which the forme guard (Ref. 14, Fig. M) rests when in the operative position. A box key is provided for turning these bolts.

The rack is moved by loosening the clamping bolts and turning the horizontal jacking screws at each end of the rack. On no account must the vertical jacking screws (also to be found at each end of the rack) be moved, as these are set at the factory to give the correct meshing between rack and gear.

Movement of the rack towards the feed and delivery end of the machine will retard the opening of the grippers—i.e., increase the distance between gripper-tips and forme carriage at the commencement of opening. Movement in the opposite direction has the opposite effect.

When re-tightening the rack bolts, see that the rack is not lifted and that the vertical jacking screws remain in contact with the main casting. Also, see that the horizontal jacking screws are screwed up tight to the main casting and lock-nuts securely fastened.

Similarly, the stationary grippers (Ref. 2, Fig. N) must have taken over the sheet before the grippers of the delivery drum open.

Adjustment of the timing of the stationary grippers is made by altering the position of the cam (Ref. 23, Fig. D) which operates them. This is secured to the shaft by a set screw through the boss, and the jogger cam is fixed to the gripper cam by two bolts passing through slots, making the jogger cam independently adjustable. The gripper cam is set at the works to give the correct amount of grip, but it may be found necessary to advance it in order to reduce the grip to avoid smudging when working a job with a very short margin. This adjustment should only be made in extreme cases.

The amount of squeeze on the stationary grippers can be varied by adjustment of the cam lever (Ref. 19, Fig. D) which is held to its shaft by a clamping screw. When correctly set, the grippers will close only partially after releasing the sheet, and when closed have just sufficient squeeze to hold the thinnest sheet.

Similarly, the delivery cylinder grippers should have only just enough squeeze to hold the thinnest sheet. This is adjusted by turning the eccentric pin which forms the fulcrum of the larger gear segment (Ref. 24, Fig. D) operating the grippers by the side of the gripper cam, after slackening the nut (Ref. 25, Fig. D) which locks the pin. Re-tighten the nut securely after adjustment.

If the grippers on the delivery drum or the stationary grippers should become bent after the machine has jammed, they can easily be replaced by removing the pins (Ref. 5, Fig. P), and the grippers can then be removed. Take care that the small split pins and washers underneath pins (Ref. 5, Fig. P) are not thrown out by the small springs. The split pins must again be opened for safety after re-assembling. Correction of the impression cylinder grippers has already been dealt with earlier, see pages 21 and 32.

CYLINDER FORK & FORME CARRIAGE MOVEMENT

Fork (Ref. 4, Fig. F) serves to arrest the impression cylinder, to hold the cylinder during the stop period, enabling the sheet to be fed to register, and to start the cylinder movement for the printing cycle. The forme carriage is driven by the main crank (Ref. 20, Fig. D) supported by a counter-crank (Ref. 21, Fig. D). The rotary movement of the cranks is converted into a reciprocating movement by means of the connecting rod (Ref. 5, Fig. F) and is transmitted to the carriage by means of carriage wheel (Ref. 5, Fig. F). The fork and driving mechanism must function accurately in unison. If they do not, the machine will move erratically and noisily and will wear much more quickly than it should. Trouble in this respect will only be caused either by ordinary wear after a long period, or through an accident of some kind. Re-adjustment must be made by an expert printers' engineer.

AUTOMATIC FEEDER

This unit is built into the machine, and it is essential to keep it absolutely clean, to lubricate it daily, and not to alter its timing, which is carried out in the factory. For lubrication use only oils and greases which are free from acid and which will not gum. The most important point is that of the sheet guide rollers which must be lubricated only by a clean oil of low viscosity which must not gum. See recommendation on page 13. If the feeder has been out of use for any length of time or if the rollers become sluggish, they must be cleaned with paraffin and oiled afterwards. The rollers themselves must be kept free from oil and grease. Perfect register will depend on the attention given to these rollers.

STACKING OF PAPER

Fix the position of the side lay (Ref. 12, Fig. B) and the lateral position of the pile roughly by means of a control sheet. Fix side stack bars (Ref. 10, Fig. O) to suit this position. Before placing the

paper on the machine it should be fanned and knocked up squarely. The back gauges (Ref. 4, Fig. B) must not jar the pile, but must just guide it. The small weights in the paper holders should have play up and down in their bearings.

AIR BLAST

This serves to loosen the top sheets, and it should blow between the sucked-off top sheet and the rest of the pile. Correct adjustment of the air blast is important. The blow-pipe (Ref. 11, Fig. O) should be sufficiently high so that only the top sheets of the pile are affected by the blast. The position of the pipe is adjustable by means of a small set screw (Ref. 12, Fig. O). This set screw is supported on the guard over the feeder drive. When running thin papers some blow holes can be put out of action by means of slides which are arranged on the blow-pipe. The strength of the air blast is adjustable by means of the top valve (Ref. 13, Fig. O), on the control side next to the sheet counter. Clockwise rotation gives stronger air blast, anti-clockwise rotation gives weaker air blast. If the valve is accidentally unscrewed, the ball should be put in before the spring when replacing, so that when replaced the ball is not visible in the valve aperture.

SUCTION

This is adjustable by the lower ball valve (Ref. 14, Fig. O). Clockwise rotation gives stronger suction. Adjust suction sufficiently only to hold the sheet firmly. If the top of this valve should be unscrewed accidentally note that it should be replaced in the opposite order to the air blast valve, so that the ball protrudes slightly from the valve aperture. Suction and air blast can be cut off simultaneously by pushing rod (Ref. 15, Fig. O) located between the two valves.

The set screw of the release valve (Ref. 5, Fig. E) located on the suction bar must be adjusted so that the valve commences to open just before the draw rollers (Ref. 15, Fig. M) take over the sheet from the suckers.

To adjust the sucker tilt use the small hand-wheel (Ref. 16, Fig. O) which is on the control side, and is suitably marked. After undoing this hand-wheel adjust by sliding it along the slotted lever,

right to increase, left to decrease fill, and lighter hand-wheel after adjustment. Little or no tilt is required for boards or heavy stock, and, in general, the lighter the paper the more tilt required.

FEEDER ADJUSTMENTS

To avoid too much resetting when changing from large to small sheets, and also in order to be able to feed two sheets side by side, four draw rollers (Ref. 15, Fig. M) are provided. These run on the feeder tapes (Ref. 16, Fig. M) or tape roller and care should be taken to see that they are not positioned so that they might foul the suckers on their forward stroke. Two rollers only should be used to control the sheet, the other two being set a little higher so that they do not come into contact with the sheet until the first two have taken control, or they need not touch the sheet at all.

The two which are used should both be set at exactly the same height so as to lead the sheet in squarely. The distance between the operating draw rollers and the tapes when the rollers are in their raised position should be approximately $\frac{1}{8}$ " (12.5 mm.).

The thumb screw controls the setting of the roller height. Keep the lock nuts tightened.

Sheet guide rollers (Ref. 17, Fig. M) should be positioned in pairs on the tapes so that before the tail end of the sheet leaves one set of rollers the front edge is under control of another set of rollers, and the final pair should be set so as just to clear the tail end of the sheet when it reaches the front lays. For the final pair use the ball races supplied. Heavily and lightly knurled rollers are supplied to suit different kinds of paper.

Two steel ball steadies may be used either on the front tape roller or on the tapes themselves. They should be set so that the balls only, and not the holders, touch the sheet. The pin across the top of the holder should not rest on the ball.

The two ball-bearing feed-control rollers should always be used at the tail end of the sheet when at the lays. Should these ball-bearing rollers become sticky, they should be thoroughly washed in paraffin, then held for a few seconds against the rim of the revolving flywheel so as to spin them at speed and force out any grit remaining. One drop of sewing-machine oil should then be put on the ball race.

The feed tapes can be adjusted laterally and also for tension by the jockey pulleys (Ref. 17, Fig. O) under the board, but they must be positioned so that they will not foul the levers (Ref. 18, Fig. O) which work the side lay bars. All tapes should have equal tension.

Position the smoother rods (Ref. 14, Fig. B) evenly across the sheet, keeping one close to each edge.

Should the sheet not be fed squarely to the front lays, adjustment should be made to the height of one or other of the draw rollers. Lowering of a draw roller will bring down either that end of the sheet on which it is operating, and raising it will have the opposite effect. If adjustment of the draw rollers does not correct the fault, check that all sheet guide rollers, tape front rollers and tape jockey pulleys are perfectly free to revolve, and that the tapes are correctly tensioned.

The pile is automatically fed upwards when the machine is working. The adjustment of the distance from the top sheet to the suckers when the latter are in their lowest position should be such that the top sheet is blown up to the suckers. The suckers should only come down on to the pile when working heavy stock, otherwise several sheets may be fed because the air blast cannot function properly. Normally, there is no need to adjust this height when changing papers unless there are great differences in the weight of stock handled. The automatic pile feed is adjustable by means of the small knurled screw (Ref. 19, Fig. O) located on the control side of the feeder in the small lever (Ref. 20, Fig. O) which works in conjunction with the feeler (Ref. 21, Fig. O). Clockwise adjustment raises the pile, anti-clockwise lowers. After adjustment, lighten the lock nut. The feed table can be raised or lowered by means of a hand-wheel after lifting pawl (Ref. 5, Fig. R) away from ratchet wheel (Ref. 6, Fig. R). If the leading edges of the paper are curled upwards or downwards, the suckers can be suitably adjusted, i.e., so that the suckers will stand at right angles to the leading edge of the sheet. This adjustment can be made by means of the threaded sleeve on the top end of the spring shaft (Ref. 22, Fig. O). To facilitate this adjustment, press the sucker bar backwards by hand.

The side lay bars are timed so that they complete their working stroke just before the grippers close on the sheet, and the side lay itself is timed so that the fibre roller comes into contact with the bar, and incidentally the sheet, just as the bars commence their working stroke. This ensures that the fibre roller will be lifted before the bars commence their return stroke and before the cylinder commences to revolve.

Feeler needles (Ref. 18, Fig. M) stop the machine automatically in the event of a mis-feed or damaged sheet coming from the feeder. The action of the feeler needles is controlled by a switch (Ref. 15, Fig. B). When the machine is not being fed with paper, this switch should be in the down position. The feeler needles should be set in the grooves of the side lay bars when the latter have completed their return stroke and the needles are at their highest point. The position of the needle points should be about $\frac{1}{8}$ " (3 mm.) behind the forward end of the grooves, as shown in Fig. W, and the needles may be moved to this position by loosening their clamping screws (Ref. 16, Fig. B).

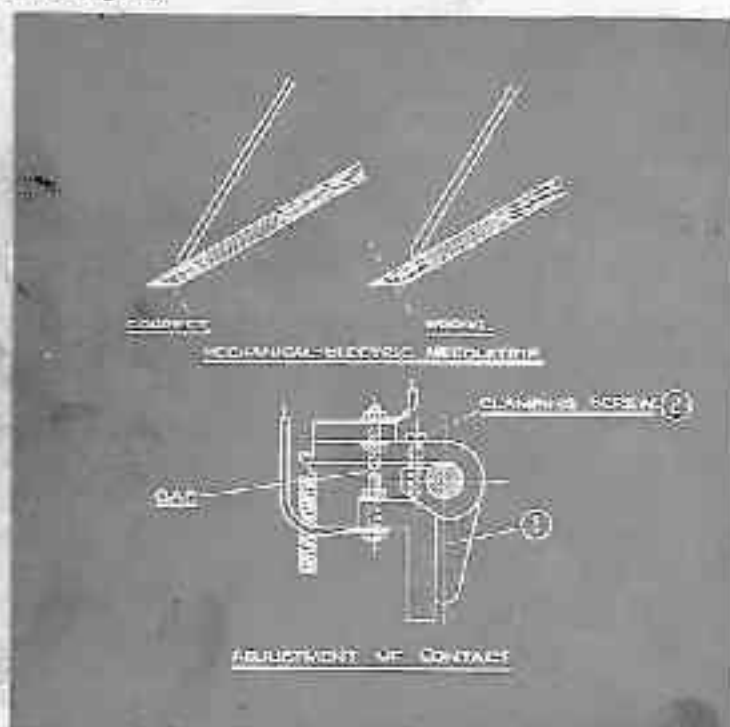


Fig. W

The feeder tapes are driven through an eccentric gear which causes them to slow down as the sheet approaches the front lays. This is adjusted at the works so that the sheet arrives at the lay when the tapes are travelling at their lowest speed. If this should move, however, it should be reset after loosening the two socket set screws in the boss of the eccentric gear as follows: Turn the machine forward by hand until the cylinder grippers have only just finished their opening movement, then turn the upper tape driving

roller until the slowdown mechanism assumes the position as shown in Fig. X. Then lock set screws and check that the sheet arrives at a point approximately 2" (50 mm.) from the front lay when grippers commence to open, and re-adjust slightly, if necessary.

SIDE LAYS

Adjust the sheets sideways in such a position that they arrive at the front lays in a position approximately $\frac{3}{8}$ " (9 mm.) away from the side lay. The pile must be set accordingly. The sheet runs below the lifted side lay body (Ref. 19, Fig. M). The roller will then drop and move the sheet sideways and outwards. The body of the side lay, which is designed to prevent the formation of crease during the sideways movement, must be adjusted in height to approximately double the thickness of the paper. The sectional view of the Printomatic side lay (Fig. Y) shows it in the lower or operating position.

When setting the lay, turn the machine by hand or by inching until the lay is fully down in the position as shown, then note that there is a definite gap of not more than $\frac{1}{16}$ " (1.5 mm.) between the point marked (Ref. 1, Fig. Y) and the lever which operates on it. This can be adjusted by loosening the lever (Ref. 1, Fig. W) by means of its clamping screw (Ref. 7, Fig. W) and turning the shaft to the correct position, afterwards re-clamping the lever. This lever is to be found under the guard (Ref. 6, Fig. E).

If this adjustment is necessary, the feeler needles (Ref. 18, Fig. M) will require re-setting. Then, by means of the thumb-screw (Ref. 2, Fig. Y), adjust the setting of the lay body to give a gap of approximately double the thickness of the sheet to be printed between the smoothers (Ref. 3, Fig. Y), and the feed plate. After setting, lock the adjusting screw securely by means of the lock-nut (Ref. 2A, Fig. Y).

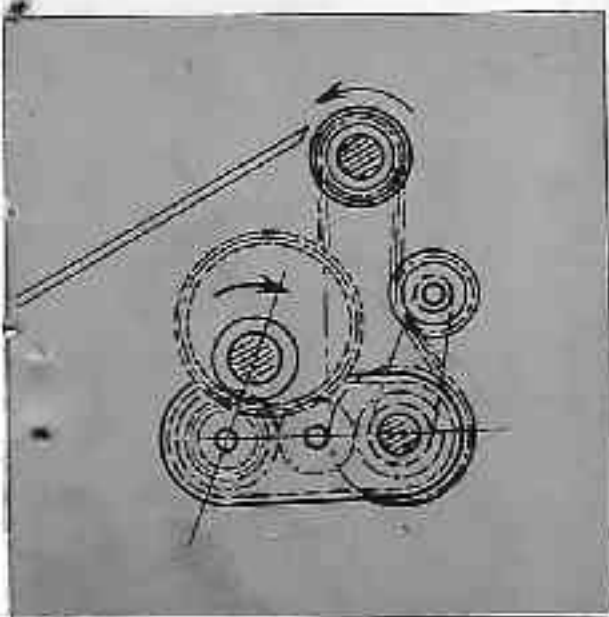


Fig. X.

Next adjust thumbscrew (Ref. 4, Fig. Y), to give a gap of $\frac{1}{32}$ " to $\frac{1}{16}$ " (0.8 mm. to 1.5 mm.) between the end of the screw and the lay body at (Ref. 5, Fig. Y) locking the screw by nut (Ref. 4A, Fig. Y). Turn the fibre roller to several different positions, and see that this gap is maintained at all positions. If there is no gap here the lay will not operate satisfactorily, if at all, and if the gap is too large the fibre roller will not be lifted high enough on the upward stroke.

The adjustment (Ref. 6, Fig. Y) and locknut (Ref. 6A, Fig. Y) control the spring pressure on the roller, and this should be adjusted on the run. Too much pressure will cause the sheets to buckle at the lay, whilst too little pressure will result in some or all of the sheets not being drawn up to the lay. Thin papers require little pressure, strong papers and board more pressure.

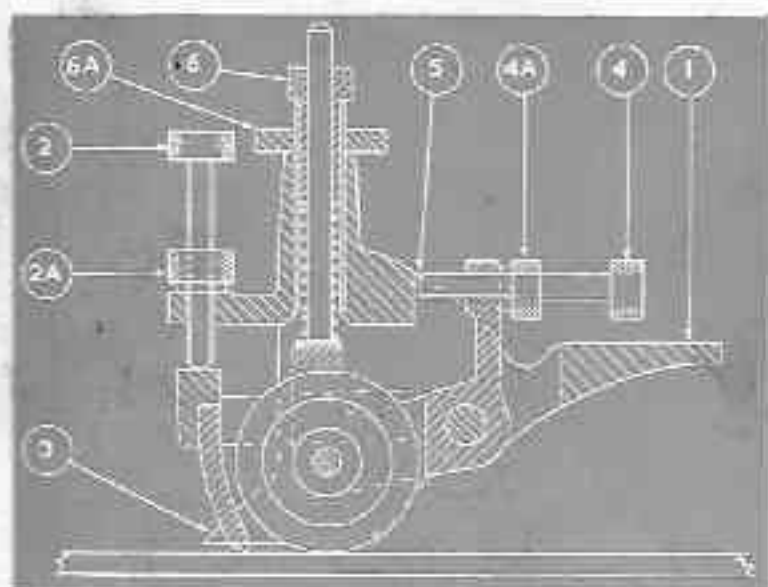


Fig. Y

The whole side lay body is adjustable sideways by a micrometer adjustment. This can be clearly seen in Fig. Z. By loosening the "T" handled bolt (Ref. 1, Fig. Z), the whole side lay can be moved to its approximate position, where the "T" handled bolt should be relocked. Fine adjustment can then be carried out by means of two knurled nuts (Ref. 2, and 3, Fig. Z). Should it be necessary to move the side lay inwards, slacken the nut (Ref. 2, Fig. Z), then move the side lay along by turning the nut (Ref. 3, Fig. Z). If it is desired to move the side lay outwards, reverse these operations.

For stiff stock and very small sheets such as envelopes, post-cards, etc., remove the side lays and use the push lays, which can be set by means of screws in the tapped holes of the laterally reciprocating lay bars which are nearest to the cylinder and in front of the lay bars used in connection with the ordinary pull side lays. The push side lays are small brass pieces which come fitted to the machine and must be removed when pull side lays are used.

For small sizes, it is desirable to work with two push side lays in order to secure highest possible production by feeding two sheets down.

FRONT LAYS

The front lays are housed in the cylinder and are easily and accurately adjustable by an eccentric which is provided with a screwdriver slot. Only two front lays should be used for each sheet. Brass smoothers assist the sheet to the front lays. These smoothers are provided with thin steel strips which help to obtain perfect front lay register at speed.

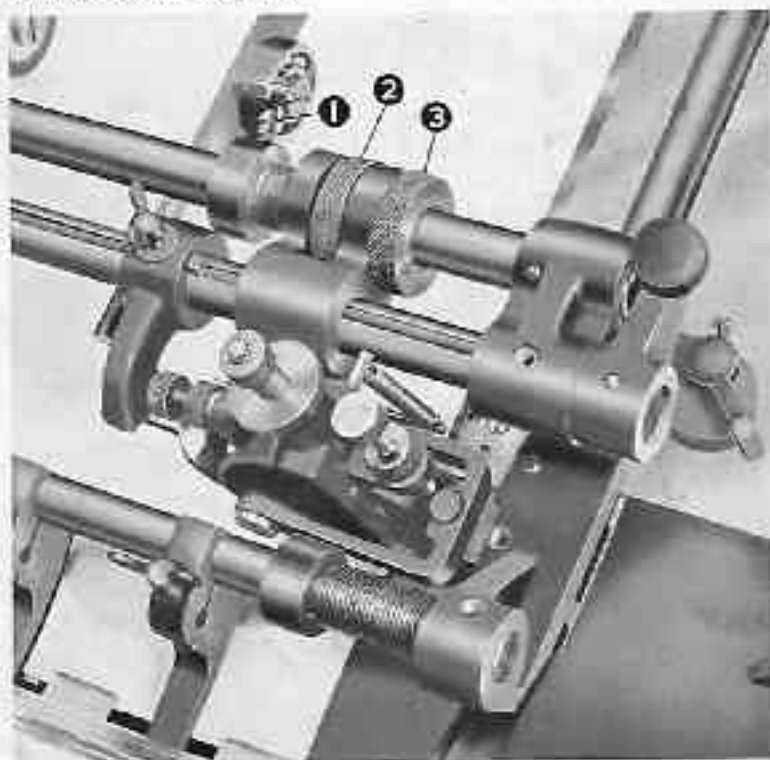


Fig. 2

HINTS ON OPERATION

CYLINDER PACKING

The correct cylinder packing is 0.058" (1.5 mm.). This gives enough thickness to adjust the packing to suit the job to be printed. The operator will decide how the cylinder packing should be composed. The packing sheets must first be folded sharply about $\frac{1}{4}$ " (6 mm.) from the front edge, folding and creasing each sheet separately so that the combined sheets do not stand higher than the tympan clamp bar at the grip edge, as this would cause the sheet to buckle when the grippers close. The front edges will then be clamped by means of the tympan clamping bar.

MAKE READY OF THE FORME

The exceptionally strong construction of the cylinder and its journals, together with the unyielding forme carriage which travels on four slides, ensures a perfectly rigid basis for impression. Consequently, make-ready is reduced to a minimum, provided good blocks and type are used. When making ready, care should be taken to ensure that the packing needed to obtain sufficient impression is equally divided between increasing the cylinder diameter and raising the block above type high.

PRINTING REGISTER

The driving of the cylinder by the forme carriage through accurately machined rack and gear ensures accurate and slur-free impressions. Rack and gear mesh before the impression cylinder makes contact with the forme. The machine will give excellent register for multi-colour printing, and it is NOT necessary to run the various colours at the same speed. Different colours can be printed on additional "Printomatics" at different speeds and perfect register will be obtained. Register will not be affected if the press speed is varied during the printing of any colour.

Make sure that the cylinder brush is set so as to remove all air between the sheet and the cylinder. The brush is adjustable and its pressure on the cylinder can be varied. Register will suffer if the brush is not functioning properly. As long as the brush is kept clean and free from dried ink, and is properly set, its bristles will not mark the sheets even though the previous colour is not completely dry. To ensure perfect register, all rollers running in conjunction with the tapes should be kept absolutely free, and only best oils used. The jockey rollers, tape feed rollers and sheet guide rollers must always run freely. The rollers at the tail of the sheet when it reaches the front lays should be close enough to prevent the sheets from rebounding from the front lays, but not so close that they trap the sheets and prevent the side lays from pulling them. If any difficulties arise due to the sheets rebounding, use the two steel balls provided on the front tape roller nearest the lay, either between or on the tapes. Almost any paper can thus be fed at top speed, ensuring first-class register.

CHANGE OF COLOUR & CARE OF LINKING UNIT

The advantages of the hinged ink duct will be appreciated when changing colour (see page 22). The forme inkers must be removed individually and it will be found advantageous to put them into the racks just above the forme under the forme guard. Also remove the vibrator from the machine, and put it in the same place for cleaning. All steel rollers, and the large rubber cylinder, are disengaged by a single lever for washing-up. The top steel roller and the rubber cylinder can easily be turned by hand for clearing purposes. The two lower steel distributors can be turned gradually for cleaning purposes by means of the inching push button.

CLEANING OF ROLLERS

Use only the cleaning mediums recommended by your ink suppliers, or by the suppliers of your roller composition, for cleaning the composition rollers and rubber cylinder. The synthetic rubber composition of the rubber cylinder has been carefully selected to give the maximum possible life. It will, however, be appreciated that any rubber composition will be attacked in time by chemicals

contained in some printing inks and cleaning materials. How long this time will be depends upon so many factors that it is impossible to forecast the probable life of a roller under varying conditions and treatment.

The effect of a dried film of ink is very detrimental to these rollers and they should be thoroughly cleaned after use. Paraffin or white spirit is recommended as a "wash-up" medium. These mediums not only clean, but keep the rollers in good condition. Clean the rollers daily with clean rags. If ink should cake on the rubber, coat the cylinder once again with printers' oil and clean again. Should carbon dope have been used, clean first with water, then with paraffin. It does not matter if a slight violet sheen remains on the roller. The treatment of the rubber roller is no more difficult than that of a composition roller.

SUITABLE INKS

Consult your ink suppliers. Special inks are now available for fast-running automatics. They have numerous advantages for use on "Printomatics"; they cover well, they do not "pull" when running fast, they reduce the use of thinners to a minimum. The best results will be obtained only with suitable inks.

CLEANING OF MACHINE

If the machine becomes sluggish and becomes harder to turn, until perhaps it stops altogether, it is probably due to cleaning and oiling having been neglected. If this trouble occurs make sure that all the driving members are free. Make sure the various racks and gears, particularly those of the drive of the carriage, are not full of paper fluff, grease or other foreign matter. Always keep the machine clean. The bright parts should be polished occasionally. There are many preparations on the market which will clean the machine and at the same time safeguard from rust.

Make sure particularly that the brake lining is kept free from oil, also the driving belts and all rubber rollers. Keep the lubricating agents clean. Any fluff or other foreign matter in the lubricant will cause the bearings to seize. The grease gun should be kept clean. The tin grease container must be kept closed. The same applies to the oil can and all tools.

SHEET COUNTER

The normal cause of failure is lack of lubrication. The sheet counter on the "Pritomatic" is fitted with an instantaneous zero adjustment. The counter will count only when the impression is on.

ADJUSTMENT OF INKING ROLLERS

Normally, these can be adjusted to a type high gauge which is obtainable from all type foundries. For multi-colour work and big plate formes it is recommended to adjust the rollers to the actual forme. When setting rollers, always watch that the composition or rubber rollers are not set too hard on.

GRIPPER EDGE

The amount by which the impression cylinder grippers take hold of the sheet can be varied from a minimum of $\frac{3}{16}$ " (4 mm.) to a maximum of $\frac{7}{16}$ " (7 mm.) by adjustment of the front keys. Although on individual machines it may be found possible to exceed one or other of these limits, a grip of less than $\frac{1}{2}$ " (4 mm.) will usually affect the sheet transfer and lead to delivery troubles, whilst too much grip will generally lead to tearing. Try to keep midway between limits.

DELIVERY

If you get streaks from the guide rollers just below the cylinder, it is possible to move these guides sideways, but they must not be placed in line with grippers or keys. When printing stiff board with abnormal tension it is advisable to lack a blind rule at the end of the forme to avoid the back edge of the board hitting the forme. If the star-wheels cause trouble these can also be moved laterally. It is, however, possible to run these star-wheels over the fresh ink if there are no white spaces, without the sheet being marked. Make sure that they revolve freely on their seats. If these star points pierce the paper, reduce the ink slightly by means of a thinner recommended by your ink suppliers. Normally the cause is that

your ink is too strong and "pulls." In the case of full forme it is always advisable to thin the ink slightly with a few drops of thinner. The two rubber tyred rollers, running against the cylinder between the point of impression and the sheet take-over from one gripper to another, aid the sheet transfer, and are particularly useful when no block or type is being printed at the moment the sheet takes over. These rollers can be moved sideways but must clear grippers and lays.

Should the motion of the delivery tapes become erratic, possibly accompanied by an occasional knock which seems to come from the operator's end of the front tape roller, this is a sign that the chain which drives both the delivery tapes and the feeder needs tightening. This can be done by adjusting the jockey sprocket which is to be found inside the tachometer mounting, which latter is held in position by two bolts. When replacing the tachometer mounting, which also acts as a guard, scrape off the old scaling compound and apply a new coat.

FORMATION OF STREAMS OR LINES WHEN PRINTING

This is also usually caused by the ink being too strong. If the lines do not disappear when the ink is thinned a little, check whether the rollers are still in good shape. If they are not, they will not carry enough ink. Change rollers or treat them with glycerine. It may be necessary to under-lay the forme slightly to give proper impression.

FRESH TAKING ROLLERS

Do not use freshly covered rollers immediately after their arrival especially in hot weather. Keep the rollers several days in a cool dry place. Before putting them into the machine, make sure that they are of room temperature. Fresh rollers should be adjusted very slightly and re-adjusted at short intervals.

SHEET DELIVERY

If sheets are delivered at an angle, this is usually due to faulty sheet transmission between sets of grippers. To adjust this, see page 45. It is necessary to adjust all grippers from the impression cylinder

enwards, and this work should be carried out by a competent printers' engineer, if possible, since very few operators will have sufficient engineering knowledge.

ANTI SET-OFF EQUIPMENT

This outfit is not manufactured by us, but is obtained for "Printomatic" users from firms such as Messrs. Smyth Horne Limited, 4/5 Empire Yard, 566 Holloway Road, London, N.7. The manufacturer, whose name-plate is on the outfit should be consulted direct in case of difficulty.

The following general directions will be of assistance in the operation of machines fitted with Smyth Horne equipment:—

If the unit is delivered complete with air compressor unit, first see that compressor is filled with oil to the correct level.

Connect the rubber hose from the nipple sited on top of the air container which is mounted at the side of the air compressor, to the air nipple at the end of the operating valve.

Set the tap on the air receiver so that a very small quantity of air passes continuously. This will ensure that any moisture collected in the air receiver is drawn off.

The following instructions must be observed when starting up:—

- (i) Open the air cock on the air container;
- (ii) Unload the compressor by depressing the knob on the cylinder and twisting the lock;
- (iii) Start motor;
- (iv) Close air cock allowing a slight air bleed. This is particularly important in damp atmospheric conditions;
- (v) Load compressor by releasing knob.

Where the unit is not supplied with an air compressor unit, feed the air through the reducing valve into the air receiver. The same remarks apply regarding draining off moisture collected.

The reducing valve should be set so that when the sprayer is not in use, 30 lb. of air pressure is shown on the pressure gauge. This is controlled on the motor driven unit by allowing air to pass through the safety valve which is set to exhaust air after 30 lb. pressure has been made.

Actuate the operating valve by hand several times to ensure that the needle lifts freely. If the needle does not lift, first unscrew the adjusting spring barrel on top of the nozzle by loosening the locking nut, taking care not to drop the spring which is inside the barrel, then unscrew the nozzle cap.

When the cap is removed and the rubber diaphragm exposed, the needle can be removed with thumb and finger.

Lightly smear the stem of the needle with lubricating oil and push back into the nozzle, moving the needle up and down a few times by hand to ensure that it slides freely.

Replace the cap, spring barrel and locking nut.

Screw the spring barrel down as far as it will go (do not force it when it is at the end of its movement) and then unscrew the barrel a half turn and lock into position with the lock nut, thus the nozzle is adjusted for a general light spray.

Should more spray be required—undo the spring barrel at the top of the nozzle a further quarter turn and continue until the requisite spray is obtained.

After the nozzle is opened one full turn, great care should be taken when allowing more spray to pass, for if the nozzle is kept close to the sheet the spray is likely to hit the paper when moist and will cause sticking.

Always set the nozzle as far away from the sheet as is possible, say 30" (75 cm.); great care must be exercised in the amount of spray being used.

If the normal amount of spray will not stop set-off, attention should be given for possible causes, as spraying sheets where set-off is occurring through either bad inking or bad make-ready will not entirely overcome the trouble.

If the sprayer is to stand some time without use the container should be emptied of spraying fluid and some lukewarm water poured in and then passed through the nozzle with the nozzle well open to dispel any residue of spraying fluid that might be left in the pipes. Care taken on this point will save a good deal of trouble.

If the nozzle does not spray correctly and drops of fluid tend to hang on the front of the jet where the nozzle protrudes, it is usually a sign that the gland washers which fit into the needle chamber are swollen, causing the needle to be sticky and not close right down. Alternatively if drops of fluid are ejected from the small breather hole on the front of the nozzle then the gland washers have shrunk and require renewing. To do this, undo the top cap and withdraw the needle carefully by hand. The needle will pull out with its function rubber washer in place. Replace, if necessary, the gland washer. It is important to see that the hole in the centre of the function rubber is approximately in the centre, otherwise it will cause the needle to bind.

A "T" handle nozzle tool is provided, which should be inserted into the needle cavity, the tongue on the end will fit into the slot on the gland nut. Turn in an anti-clockwise direction and remove the nut, brass washers, spring and leather washers.

To replace the washers, first fit the gland nut on to the tool, then three gland leather washers, then brass gland washer, then spring, then brass washer, then three gland leather washers. The whole should be inserted into the needle cavity and screwed home. After withdrawing the tool insert the needle which should slide up and down with a sticky fit. Push right home and turn two or three times from left to right to ensure that the needle seats home in the jet. Do not revolve the needle a number of complete turns as this will cause a score to appear in the jet and the needle will not seat accurately. Replace the cap and screw spring barrel down until it is solid against the needle. The adjustment is effected by turning this backward up to $1\frac{1}{2}$ turns. This is the absolute maximum of adjustment under which the nozzle will function correctly. If it is turned back more than this amount, the spray will not be completely atomised and the sheets may stick together. For most work this spring barrel is opened $\frac{1}{4}$ of a turn which will satisfactorily stop set-off.

OUTPUT OF PRINTOMATIC

The "Printomatic" is built for high speed, and should not be run at less than 1,200 impressions per hour. It is not possible to give set figures for different substances, because the speed depends largely on the form, and the size of the sheet, as well as on the ink. If the grain of the paper runs against the direction of print, it is generally necessary to run the machine slower. Badly stored papers can cause difficulties. Depending on the weight of paper, the crasing speed of the machine should range from 1,800 to 3,000 impressions per hour, the lowest weights being run at the lowest speeds. Under the same conditions the top speeds range from 2,200 to 4,500. If normal papers, inks and job are in use it is quite practicable for one operator to be in charge of two machines. When running board or hard substances it is advisable to run the machine at a relatively slower speed, as well as to keep it under constant control, since a jam can be caused by a collection of several sheets and result in damage to the gripper mechanism and other parts of the machine.

If the top sheet is not taken.

(1) All suckers, right and left of the pile, must be closed, as well as blow-holes.

(2) The distance from sucker to top sheet is too great. Adjust pile height control screw (Ref. 19, Fig. O), clockwise.

(3) Valve 5, (Fig. E) on the sucker bar is not closing properly. Regrind valve correctly; or adjust valve closing plate, if necessary.

(4) Either ball or spring is missing in suction adjustment valve.

(5) There is a leak in the rubber-steel tube connection or in the rubber air pipe. Air pipe may be clogged with dust. This is likely when using papers which dust easily.

(6) Pump 3, (Fig. D) is dirty inside.

Remove lid 22, (Fig. D) and check whether piston rings are still pressing against the cylinder wall, and whether piston ring joints are all staggered. The piston rings must not be too tight, but must be easily movable in their grooves. Check packing glands of both pump lids for leakage. Clean pump at least once every six months.

If the sheet is sucked but drops again.

(1) There is too little suction. Turn adjusting valve 14, (Fig. O), clockwise.

(2) The paper has a very smooth surface. Reduce tilt.

(3) Several sheets cling together. The reason may be due to bad piling, or a bad knife on the guillotine causing burrs.

(4) The back sheet slips 4 (Fig. R), jam the pile. The sheets may be too tightly set to their front guides, causing occasional sheets to be jammed.

(5) Sheets are too damp or are stuck to each other. New paper should be fanned before piling and given enough blow air for separation of sheets (see page 35).

(6) The front edge of the paper is bent or curled upwards or downwards. Adjust angle of sucker bar (see page 37).

(7) The machine is running too slowly.

Two sheets are sucked and fed.

(1) The distance between sucker and pile is too small. Lower table and adjust pile height control screw (Ref. 19, Fig. O) anti-clockwise.

(2) There is too much suction. Reduce suction, especially with thin substances.

(3) Increase tilt.

(4) Increase air blast.

SPARE PARTS

When ordering spare parts, please quote serial number of machine (which is to be found on the frame carriage) and the year when the machine was delivered. Also state the number of the spare part required, if marked with a number.

Thank you for having read this book from cover to cover. You would otherwise surely have run into difficulties sooner or later. Please keep it by you.

Guarantee

The Contract under which "Printomatic" Machines are sold expressly states that "we guarantee that we will, at our option, put right or replace, free of charge, ex-works, any parts which prove unserviceable owing to defective material or workmanship UNDER PROPER USAGE within 12 months . . ." It must be understood that this guarantee does not cover defects arising out of faulty operation of the machine after it is in purchaser's hands; the use of material in its operation other than that which the machine was designed to handle; improper installation; improper lubrication, or other conditions beyond our control.

Every machine is given a test run in our plant, and is in perfect condition when it leaves the works.

We offer this set of instructions to assist in securing satisfactory operation, and invite your enquiry if further information is required.