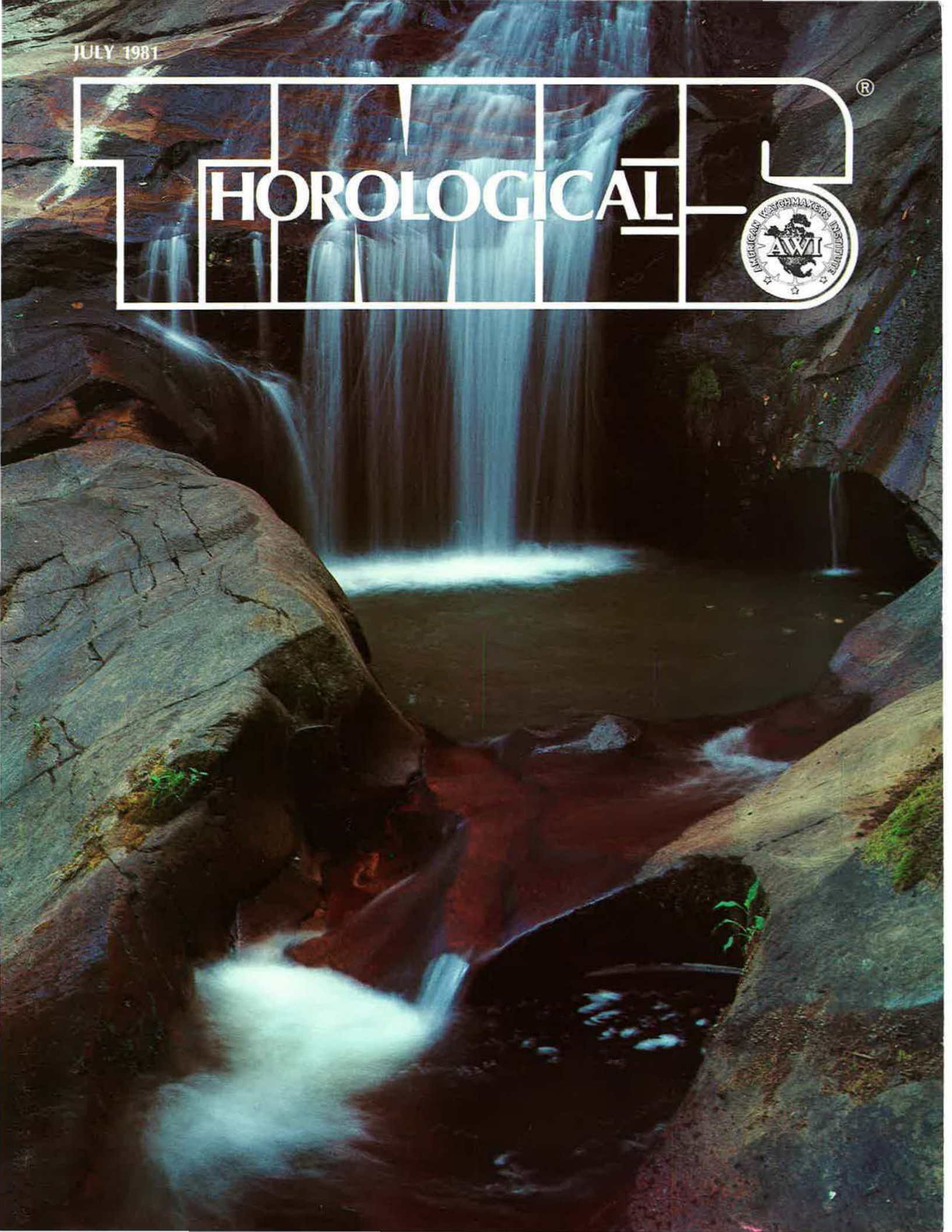


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ABOUT THE AUTHOR

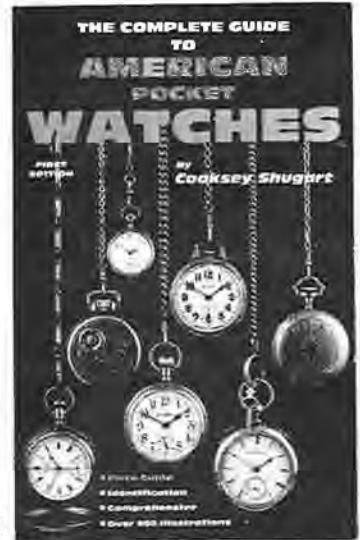
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To some, hats, horns, and spirits define the word "convention." The first items packed in their suitcases are aspirin and antacid tablets. Next, the ingredients that caused them to pack away the first are carefully wrapped in towels and added. Although these individuals won't attend many or any of the technical sessions, they will leave their conventions having gained two things: a break from the everyday chores and pressures of business, and the reunion with old friends, refreshing and rejuvenating their spirits.

Those who are more serious-minded about the assembly derive even more from attending. New products are introduced; new methods are unveiled. Industry projections are discussed, and other conversations may include security, store insurance, customer relations, and many other areas relevant to successful business operations. And once again, add the reunion of old friends, the making of new acquaintances, and the break from the everyday pressures!

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Our July cover features a view of STATIONS CREEK FALLS in George Washington National Forest. This forest serves to protect thousands of acres of timber and watersheds in the unspoiled Shenandoah Mountains of Virginia and West Virginia.

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Joe Crooks

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Our Readers Write

Moved It and Lost It

Due to a change of address, I have not received the May issue of *Horological Times*. The Post Office can lose all the mail they want except my favorite magazine. Thank you all very much.

J. S. Penrose
Lumberton, Texas

CLOCK RESTORATION ENTHUSIAST

First, accept my apologies for not writing this letter sooner. I attended your bench course on Clock Restoration last February. The instructor, Otto Benesh, did as much and more to further the art of clockmaking as all my previous training combined. His willingness to share his knowledge, ideas, and skills benefited me tremendously, as I'm sure it did everyone in the class.

We were also privileged to have Mr. Orville Hagans and Mr. Archie Perkins sit in the class for both sessions. Each contributed his talents and time, further adding to the course.

To Mr. Benesh—three cheers, and please, keep on teaching the course.

To all AWI members—the bench course in clock restoration is a must!

To AWI—bring on the next bench course in clock restoration.

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I have been receiving the AWI publication ever since the first issue and look forward each month to receiving it. I have been a member of UHAA and the AWI for forty years and have been very pleasantly surprised at the accomplishments since the formation of AWI. I would like to compliment each of the many persons who have been a part of the growth in services and numbers. I hope that you understand that we watchmakers who may be too busy to write deeply appreciate the time, effort, and expertise which others have put into AWI for us.

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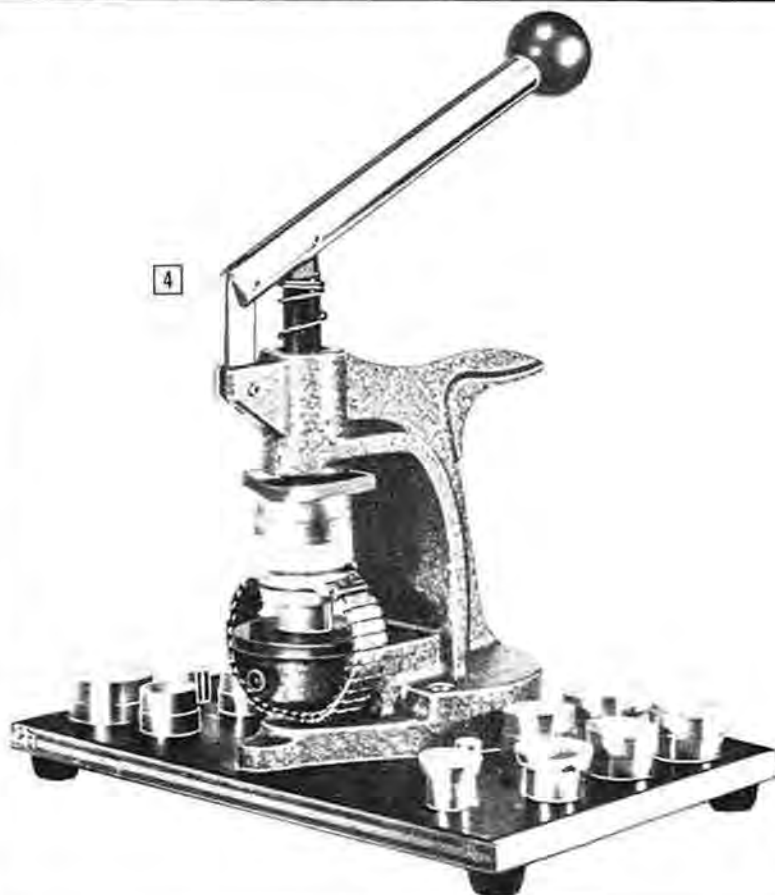
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In Memoriam

Early in 1974, Leontine Rothan introduced herself to me at the AWI office. At the time, AWI was experiencing growing pains and needed additional office help. Lee was interviewing for the job.

I was immediately impressed with her confidence and sincerity. She demonstrated a willingness to "pitch in" and tackle any task at hand. We were fortunate that this attitude prevailed during her tenure at AWI Central.

Lee soon demonstrated an inquisitive mind and a unique mechanical ability. When the AWI Hotline was installed, she enjoyed the challenge of trying to help members solve their problems. As AWI grew, our library and technical files also grew; so did Lee's ability to answer the majority of technical questions which find their way to AWI Central every day. We were indeed fortunate to have Lee and her "can do" approach on the AWI staff.

On Monday, June 1, Lee came to work a half-hour early so she could leave early to join her daughter on what was to be a happy event—shopping for a bridesmaid's gown. Typical of Lee, she worked well beyond her intended quitting time. When she had finished all of the day's requests, she bid the crew a casual good-bye and left the office. Only seconds later, the squeal of brakes pierced the air. Lee lay unconscious in the street in the crosswalk she had traveled hundreds of times.

The emergency squad took her to a nearby hospital; we were all grieved to learn that the prognosis was not favorable. Lee clung to life, never regaining consciousness. On June 7, she was mercifully relieved of her pain and suffering.



Only now, the realization that Lee will not return to her desk is becoming apparent. There are so many little things that come up each day to remind us. I'm certain that her family feels a far greater measure of emptiness at her passing than we do; we sympathize with each of them!

If I were a more eloquent writer, I could better express the feelings

of all of us at AWI Central. It will have to suffice to say that we are grateful for having had the opportunity to be associated with Lee for a portion of her sixty years. We will miss her greatly, as will those who regularly benefited from her willingness to help with their daily problems. As difficult as it is to understand, we must conclude that this was God's will.

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Special Feature, American Shelf Clock, Hour Strike

(Ansonia Clock Co. Patented Oct. 10, 1876)

This clock has several special features which will be discussed along with a review of the common striking mechanism involved. Also, to make this article more interesting, we shall try to answer the question which may occur to many concerned clock mechanics, namely, "What do all those little steel wires do?"

Our clock movement, patented by Ansonia in 1876, is of the early square-cornered variety and was probably manufactured at the old plant in Connecticut around 1880. Figure 1 shows the actual clock in its case.

The going side has an unusual escape wheel with short and very shallow teeth. Also unusual is the pallet (anchor) with teeth bent at very similar angles; this is quite different from the common steel strip anchor. Also unusual is the fact that the pallet itself is self-adjusting in that the crotch arm is movable between the sides of the pallet saddle. This arrangement ensures that if the pendulum bob is started on its swing at some point outside the normal arc, the beat of the clock will self-adjust. See Figures 2 and 3. The mainsprings on both the going and strike sides are controlled by stopwork. This allows the clock to run efficiently for approximately eight days. These features may be observed in Figure 2, looking at the front plate.

Another special feature on the going side is a brass tripping piece, counterpoised and working in conjunction with the steel unlocking pin which is attached to the center arbor between the clock plates. The action of this brass tripping piece can be followed in Figure 3, a rough diagrammatic sketch.

First observe that the brass tripping piece is cylindrical and loosely mounted over the center arbor. When the center arbor rotates, the loosely mounted tripping piece does

not move until it is literally picked up by the steel unlocking pin which is itself permanently fixed to the center arbor. When the hands are moved forward in the normal manner, this action causes the tripping piece to move the unlocking lever which activates the strike train. However, should the hands be moved in reverse, the steel unlocking pin follows an angled slot cut into the body of the tripping piece. In so doing, the tripping piece is allowed to pass lightly by the strike unlocking lever without upsetting the striking mechanism or its adjustment.

For a summary revision of the strike mechanism, consult Figures 4 and 5. When the minute hand moves forward, the unlocking lever ("a" of Figure 4, rear plate, and Figure 5) is actuated by the unlocking pin, indirectly freeing the warning pin on the warning wheel. This allows the warning wheel to rotate part of a revolution. This action also frees the strike train until it is locked, momentarily, by the warning lever (Figure 5) holding against the warning pin on the warning wheel. This momentary period, occurring immediately before the actual striking sequence (when the minute hand reaches its zenith and the strike mechanism is again freed without immediate restriction), is known as the "warning period." This prepares the clock for striking at the hour.

At the hour, when the warning pin on the warning wheel is freed by the warning lever freeing the strike train, the locking wheel next to it is also freed and commences to rotate. Permanently attached to the locking wheel is the locking disc. The latter has two slots cut into it and carries a pair of brass gathering (or striking) pins. These pins move against a strike hook to rock the hammer for physical striking against its bell fixed in the clock case. Also, during the striking process, a hook on arbor B (Figure 5) lifts and lowers the count

Essence of Clock Repair



Figure 1

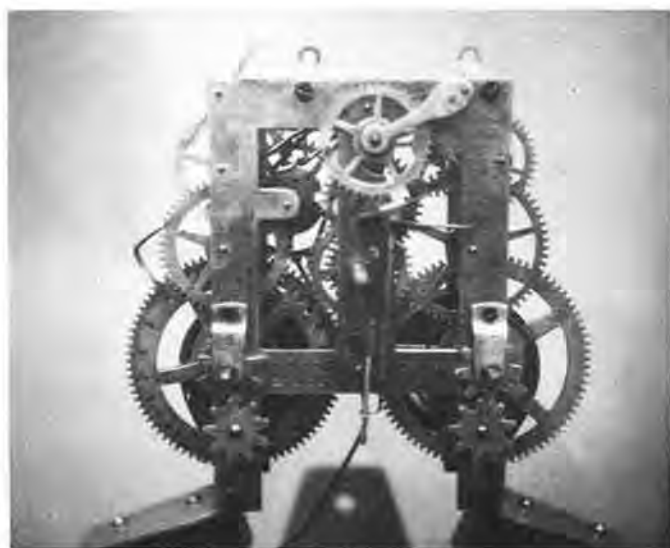


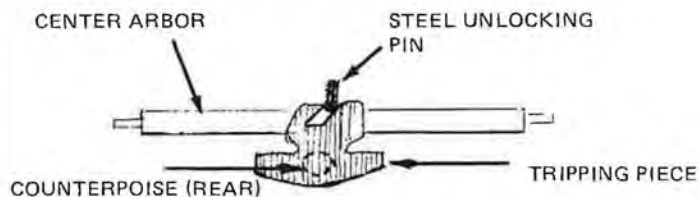
Figure 2

hook until the hook falls into one of the deep slots in the count wheel and striking ceases. At this point, the locking hook has fallen into one of the locking disc slots. The warning wheel locking hook is attached on the same arbor as this locking hook. When the arbor turns, the warning wheel locking hook falls against the warning wheel pin and the strike train is also simultaneously arrested.

In our accompanying photos and sketches, Figures 2 through 5, we have endeavored to denote all the components mentioned. However, we have yet to answer the question of the steel wires. We'll try to locate them for you and emphasize the purpose of each.

Special Features:

(i) THE ARRANGEMENT FOR ALLOWING REVERSE TURNING OF HANDS WITHOUT STRIKE DISRUPTION



(ii) SELF-ADJUSTING FRICTION PALLET

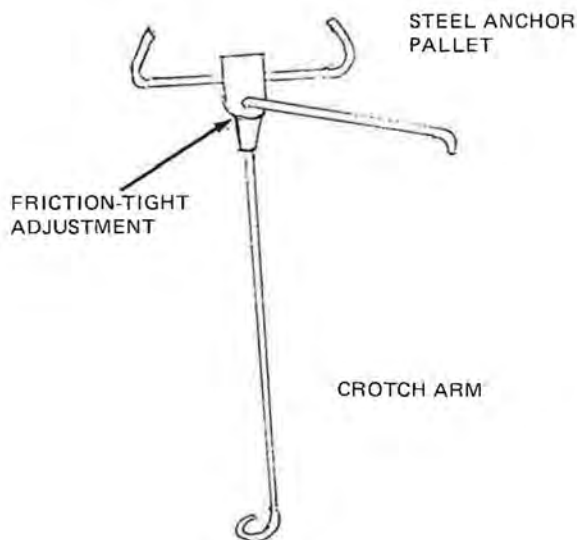


Figure 3

Near the top of the clock movement, close together and running between the two plates, are two arbors. (A and B of Figure 5.) First, examine arbor A (the one on the left looking down, facing front). There are three "wires" attached to this arbor. The wire next to the back plate is the warning wheel locking hook which arrests the warning wheel pin at the end of the strike sequence. The middle one is the locking wheel locking hook which works in conjunction with the locking disc attached to the locking wheel. The one next to the front plate is the count hook working in conjunction with the count wheel.

Looking at arbor B (the one to the right looking

down, facing front), we observe that it also carries three "wires." The "wire" next to the back plate is the warning lever which holds against the warning pin on the warning wheel at the commencement of the warning. Close to the warning lever and the middle of the three "wires" is the unlocking lever which, as initially described, is the prime mover in unlocking the strike train. Third, next to the inside of the front plate, we have the lifting hook which lifts and lowers the count hook on arbor A.

Arbor C (Figure 5) is set between the plates in the

lower center of the clock movement. This arbor carries the strike trip hook which is operated by the pair of gathering pins on the locking disc when freed during the striking period. Attached also to this third arbor is the hammer arm itself, shown clearly in Figure 2, with the brass striker at its extension.

Our thanks, once again, to our mechanic Stan Warren for the loan of this clock from his personal collection and for his help in its preparation. TLES

Figure 4

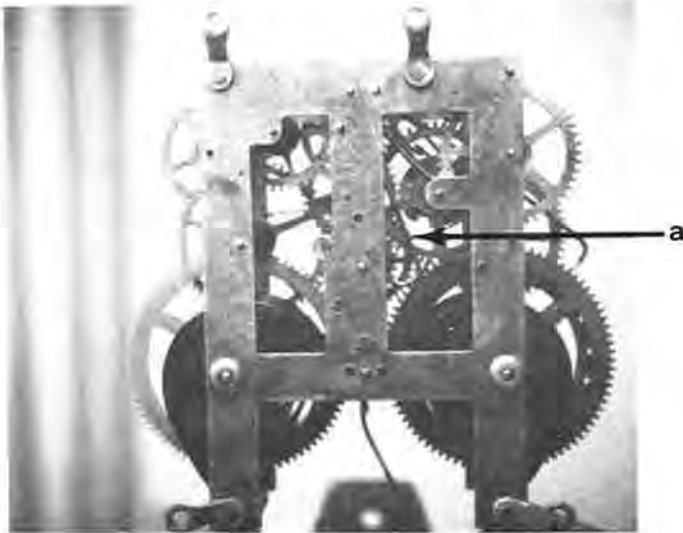
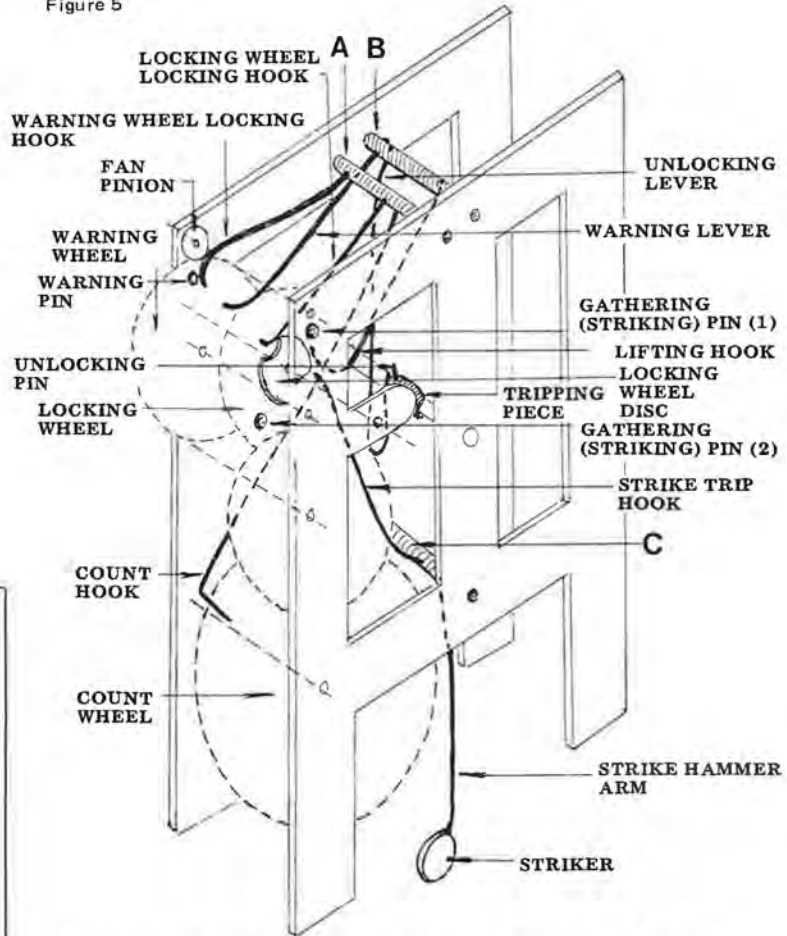


Figure 5



DIAGRAMMATIC SKETCH OF UNLOCKING & LOCKING LEVERS & HOOKS, ANSONIA MANTEL STRIKE CLOCK

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Patek Philippe?

Q Enclosed please find two pictures of a watch that I have owned for several years. The watch is a 17 L. and the case is 18K yellow gold. On the main plate and in the case there is engraved "Made for Tiffany and Co. by Ed Koehn, Geneva Swiss." The movement number and the case number are the same, No. 86366. It has 21 jewels and seven adjustments.

I was under the impression that the watch was a Patek Philippe. I thought that Ed Koehn was probably a case maker who contracted with Tiffany and Co. for a certain number of watches, made the cases and bought the movements from Patek Philippe. Last year when Mr. Banbery of Patek Philippe requested information, I sent him the pictures along with this information. A few weeks later, I received a reply from Mr. Banbery's secretary (Y. Galley) stating that Mr. Banbery was away on a business trip, but the watch was not of their manufacture.

I cannot find Ed Koehn listed anywhere as having been a watch manufacturer.

Can you supply me with any information about this watch as to the manufacture, etc.? Several years ago, I wrote to Tiffany and Co. and they said records had been destroyed and they could be of no assistance.

Roy Powers
Cheraw, South Carolina

A Ed Koehn was born in 1839 and died in 1908. His father Carl started his career as an engraver on copper plates, maps, and coats-of-arms. Becoming interested in watchmaking, he went to Geneva where he became so proficient in horology that he was eventually made a court watchmaker.

His son Edouard also learned watchmaking in Geneva. He worked for Patek Philippe after spending some time at L'Ecole de Horlogerie. He did



so well at the Patek concern that he was accepted into partnership there. He retired from Patek Philippe in 1891, buying out Ekegren, then a very reputable maker of fine watches. He kept Ekegren as his head watchmaker. When Edouard

Koehn Sr. died in 1908, his son Edouard Jr. (who had become a watchmaker under Ekegren's instruction after finishing medical college) carried on until the late 1920's.

I hope this fills you in.

Q Do you know where I can purchase a combination clutch lever and spring for an 8 ligne Meylan old Swiss watch. I need it badly for a nice platinum and diamond case. I have tried Bonded Messenger service for the clutch lever, but with no luck.

Thank you.

Bernie Thill
Eau Claire, Wisconsin

A Meylan clutch lever/spring combinations are no longer available since the calibre and maker are long gone. I remember that in the 1920's, I used to make these to order for my boss (with or without a sample) for \$5.00 each. I made these at home on weekends. He in turn got \$12.00 each for them from the material jobber or watchmaker. That five dollars per piece was a good fraction of my weekly salary as a youngster, but my boss thought it took me a couple of days when it actually took me about two hours or so.

I have some old movements and some of these may have the clutch lever to fit. If you wish, send the sample, and if you're good enough you may make it fit if it doesn't exactly.

Bonded Messenger doesn't exist anymore since Mr. Moses died recently.

Q I have a New Haven U.S.A. brass watch the size of the dollar Ingersoll. It has a built-in winding key with a button in back for setting. Can you give me an approximate date (Continued on page 31)



Your customers may be better off if you supply a brand new movement.



FACTORY FRESH

NEW MOVEMENTS

ALL 17 JEWEL*—ALL INCABLOC SHOCK PROTECTED*



59-21



1977-2



69-21



969



6498

Often, your customer will be better off if you supply a brand new movement. Listed below are a number of movements we carry in stock. We suggest you save this page for future reference as the need develops. (List is in order of size.)

CALIBER	SIZE	HEIGHT	FEATURES	PRICE
FHF 59-21	3¾ x 10L	3.50mm		\$27.70
AS 1977-2	5½ x 6¾L	3.60mm		25.40
FEF 6632	5½ x 6¾L			29.10
ETA 2442	6L round	3.20mm		47.30
ETA 2412	6¾L round	3.40mm		26.10
FHF 69-N	6¾ x 8L	3.55mm		18.65
FHF 691	6¾ x 8L	4.10mm	Sweep Second	20.05
ETA 2512-1	7¾L round	2.90mm		25.15
ETA 2551	7¾L round	2.90mm	Auto, Date, Sweep	34.95
FHF 371	8¾L round	4.05mm	Sweep Second	20.95
P 7040	10½L round	3.10mm	Small Second	26.80
FHF 969	11½L round	4.55mm	Sweep Second	17.95
FHF 969-4	11½L round	4.55mm	Sweep, Date	19.80
AS 1951	11½L round	4.50mm	Sweep, Date	20.30
AS 2066	11½L round	5.95mm	Auto, Day/Date Sweep Second	31.50
ETA 2783	11½L round	5.20mm	Auto, Date, Sweep	34.30
AS 5206	12L round	6.50mm	Auto, Day/Date Sweep Second	22.60
UT 6497	16½L round	4.50mm	Small Second	26.35
UT 6498	16½L round	4.50mm	Hunting case type, Small Second	26.35

QUARTZ ANALOG

CALIBER	SIZE	HEIGHT	FEATURES	PRICE
ESA 102.001	3¾ x 10L	3.50mm	QUARTZ ANALOG	41.60
ESA 961.001	6¾ x 8L	3.50mm	QUARTZ ANALOG	25.65
ESA 960.111	11½L round	4.50mm	QUARTZ ANALOG Sweep, Date	27.30

*Except QUARTZ ANALOG, or if otherwise indicated.

Write for complete watch movement interchangeability listing and clock movement brochure.



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Technically WATCHES

By Archie B. Perkins, CMW, FNAWCC
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THE CYLINDER ESCAPEMENT © 1981

Part III

When replacing a cylinder that is broken with the lower part missing, measurements must be taken from the watch in order to select a new cylinder.

To take measurements from the watch, some type of depth gauge is needed. A simple type of depth gauge is shown in Figure 1. View A shows the body of the gauge which is a piece of clock bushing wire. A piece of piano wire of a size that fits the hole in the bushing wire is placed through the hole in the bushing wire which is shown in View B. A pivot small enough to go into the jewel hole of the watch is turned and finished on the one end of the piano wire. Different sized pivots can be turned on other pieces of piano wire to be used when a certain size of pivot is needed. A watch crown is soldered on the other end of the piano wire. This is shown at View C and is used to move the piano wire back and forth in the bushing wire when setting it to a particular measurement. When a measurement is taken, the amount the pivot extends from the end of the gauge can be used for comparison purposes, or this amount can be measured with a depth micrometer to determine the distance in millimeters or inches.

There are three very important measurements that must be taken from the watch when replacing the cylinder.

One is the distance from the lower cap jewel to the top of the rim of the escape wheel. This measurement determines the position of the passage slot in the cylinder for the rim of the escape wheel. Figure 2, View A shows the depth gauge being used to take this measurement. The pivot of the gauge is placed in the lower jewel hole and the gauge is adjusted until it goes down on top of the escape wheel rim. Then this measurement is transferred to the lower end of the cylinder to determine the position of the wheel passage slot in the cylinder. This is shown in Figure 2, View B. The rim of the escape wheel should go through the center of the wheel passage slot. There should be .20mm to .30mm clearance between the top of the escape wheel rim and the top of the wheel passage slot. The second important measurement is the height of the balance wheel on the cylinder. The balance wheel must be high enough to clear the escape wheel cock but low enough to clear the regulator key. Figure 3 shows the depth gauge being used to determine the height of the balance wheel. View A shows the gauge being used to measure from the top of the balance cock to the top of the pallet cock. View B, Figure 3 shows this measurement being used to compare the height of the wheel on the cylinder. The wheel should be raised on the cylinder .20mm to .30mm so it will clear the escape wheel cock by

Figure 1

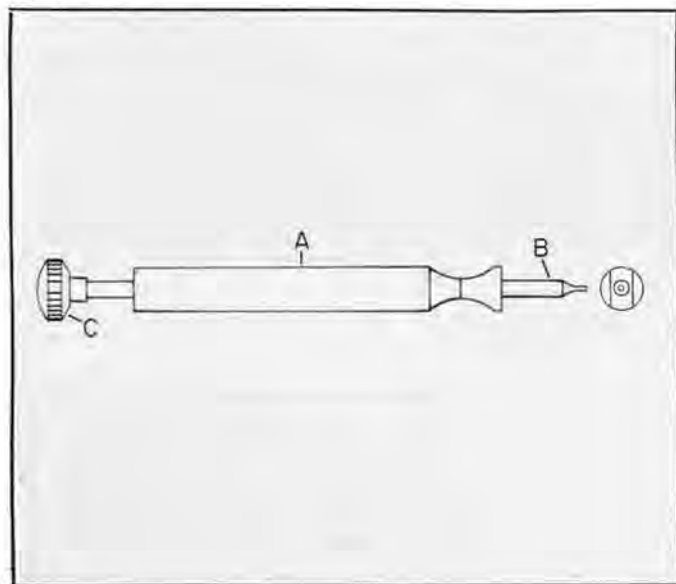
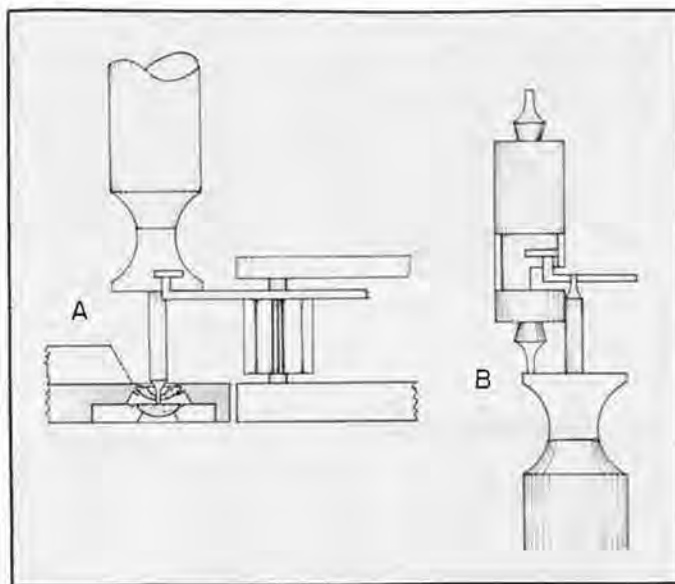


Figure 2



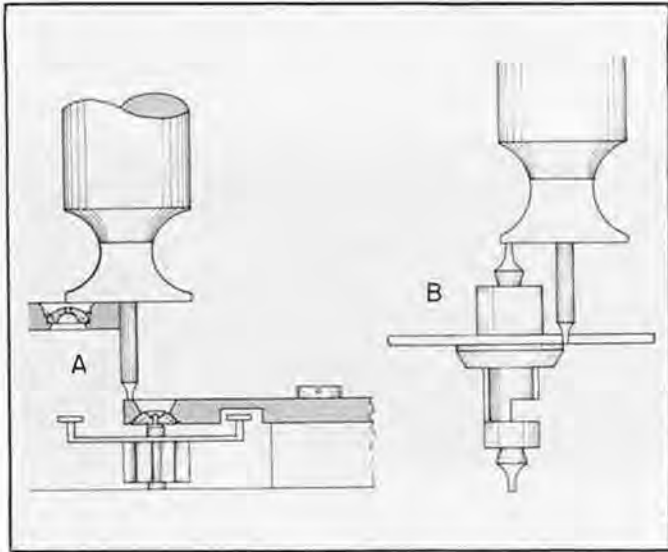


Figure 3

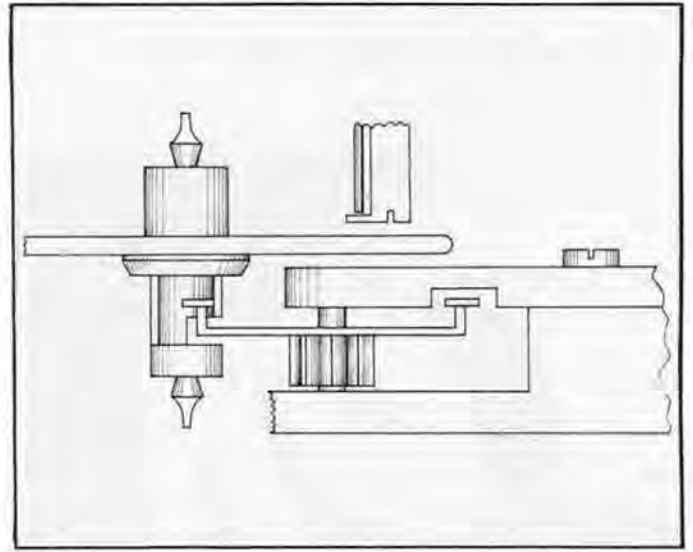


Figure 4

a sufficient amount.

Figure 4 shows the proper position of the balance wheel in relation to the escape wheel cock and the regulator key. The proper position of the escape wheel rim in the wheel passage slot is also shown in Figure 4.

The next important measurement is the total length of the cylinder. This measurement is obtained by measuring from the outside of the balance cock to the outside of the lower plate when the balance cap jewels are removed as shown at A, Figure 5. Then measure the depth of the sink for the lower cap jewel which is represented by B in Figure 5. Subtract measurement B from measurement A, less .02mm for the end shake which will equal the total length of the cylinder. If the micrometer spindle is small enough to enter the sink where the lower cap jewel fits, then the measurement can be obtained directly without subtracting the depth of the sink for the lower cap jewel setting. Of course, the .02mm would need to be subtracted from the direct measurement to get the correct length for the cylinder.

Another critical measurement is the diameter of the pivots on the cylinder. To get this measurement, plug gauges

can be used to try in the pivot holes, or different sized pivots can be used instead of the plug gauges. When the plug gauge is selected that will go into the jewel hole without any lean from a vertical position, then the correct pivot size will be .01mm smaller than the pivot gauge.

When fitting a new cylinder, there are times when the correct size is not available and a new one must be made. Before proceeding to make a new cylinder, measurements should be taken from the escape wheel to determine the diameter of steel rod needed and the diameter of the drill needed to drill the hole through the rod for making the tube for the cylinder. Figure 6 shows how these measurements are obtained. View A illustrates how the prongs of the roller jewel gauge can be used to measure the distance between two teeth of the escape wheel. The roller jewel gauge has seventeen different thicknesses of prongs that are graduated .02mm apart, starting with .28mm and ending at .60mm. These prongs can be used singly or in combinations to gauge the space between two teeth of the escape wheel. Another method which can be used to measure the distance between two

(Continued on page 38)

Figure 5

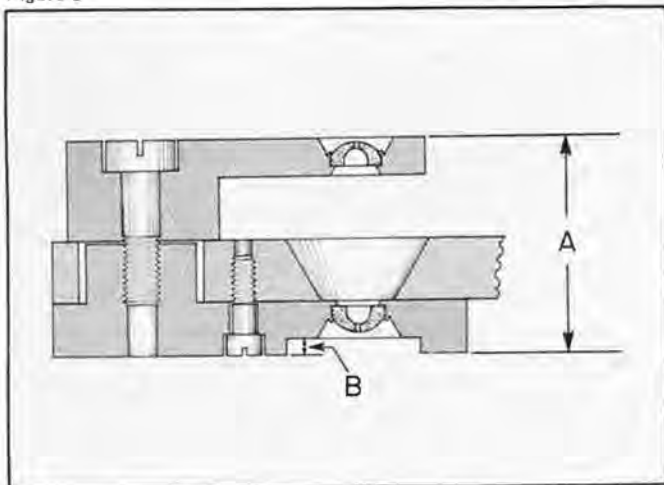
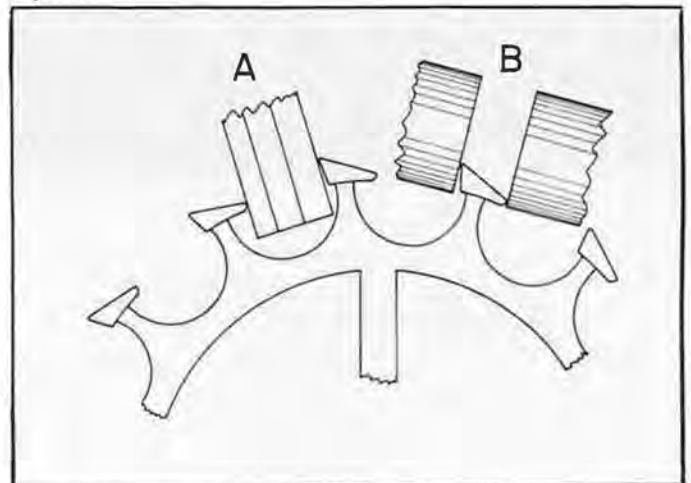


Figure 6



Basel...

The European Watch, Clock & Jewellery Fair



*Watches Feature Delicate,
Slim Styling Without Sacrificing
Accuracy & Dependability. Mechanicals
Rebound in Popularity.*

The Swiss watch and clock industry displayed its wares in an atmosphere of cautious optimism during the annual European Watch, Clock and Jewellery Fair held April 25 to May 4, 1981 in Basel, Switzerland.

Encouraged by a resurgence in the popularity of the traditional mechanical watch and confident that their technological expertise has earned them a solid foothold in the quartz electronic market, the Swiss are entering an era which will stress the efficient and prolific output of existing models.



Top executives of the Swiss watch industry held a press conference on the opening day of the Basel Fair. Above, left to right, are Dr. Kurt Hubner, Director General of Ebauches Electronics; Henry Schaeren, President of the Swiss Exhibitors Committee; Daniel A. Kellerhals, Vice-President of External Affairs for FH, and R. Schild, Head of the Swiss Watch Manufacturers Information Center.



The AWI Horological Tour attended the Basel Fair as one of the major stops on their 1981 schedule. Members of the group are pictured above, enjoying luncheon at the Fair. Tour Director Henry Fried and his wife Tina are in the foreground. The tour also included stops in the Middle East.

Mr. Henri Schaeren, President of the Swiss Exhibitors Committee, stated, "While in years past, and most particularly in 1980, the (Swiss) industry concentrated on innovations and asserting its mastery of the newest time technologies, 1981 is the year of applications of these technologies to the production area."

"In horological electronics," he continued, "Swiss watchmakers will be turning out close to 20 million units this year compared to 13 million just one year ago. One out of three watches or movements will be of the electronic kind."

Schaeren stressed that the industry was increasing its self-sufficiency year after year, together with its competitiveness. Reorganizing its capacities and facilities to streamline production is one major achievement. In addition,

they have implemented a program of technical standardization while striving to preserve the appeal of personalized products.

"It is only by combining profitability and quality," added Schaeren, "that the Swiss watch industry can expect to remain the pioneer it has always been—a commitment often called into question but ceaselessly and tirelessly reaffirmed," he concluded.

Having stated their objectives and documented the statistics, the Swiss aim to market product lines that satisfy, and even anticipate, the shifting tastes and demands of customers all over the world. Models on display featured styling with a light touch. Sleek, extra-slim cases dominate in both men's and women's designs. Yellow gold continues to be the favorite in top-of-the-line models, although the two-tone look is still popular. Elongated "baguette" styles are prominent in the selections offered.

Increased interest in mechanical watches has spurred activity in this category, particularly at the high-end of the market. A variety of skeleton movements, double-face or multiple-dial pocket watches were shown. Self-winding models are also back in demand. A new "back to front" movement which displays the "ticking mechanism," very thin repeater models, and even movements featuring a tourbillon were included in the displays. The tourbillon ranks as one of the most ingenious developments in the history of watchmaking. Famous watchmaker, Abraham-Louis Breguet, invented this complex and delicate system back in 1801.

The Swiss attribute the rebound of mechanical popularity to several factors, including some resistance to electronic timepieces in certain countries and the personal satisfaction an owner enjoys from wearing a "living" possession with a self-generating power system which is backed by a competent, efficient servicing system developed from over a century's experience.

Authorities feel confident that the Swiss watch industry's investment in electronic research and development over the past few years is beginning to pay off. Quartz electronic watch exports grew by 48.5% in 1980. Having achieved a firm foothold in the technological phases of this market, the Swiss see 1981 as a year to concentrate on production of the many existing innovations already developed. Electronic units account for approximately 33% of the production at present. Dr. Kurt Hubner, Director General of Ebauches Electronics S.A. in Marin, predicts that they will increase their portion of the total substantially in the future.



A new solid-state module with multiplexed display featuring six digits, 4 flags (function symbols) and 2 electronic hands. The digital readout has the following functions: time of day (12 or 24-hour cycle), minutes and seconds or date and day, 24-hour countdown timer, alarm with modulated signal, second time zone chronograph to the 1/100th second and intermediate times, night-light.

(Top, left) BULOVA: The Thermatron quartz watch (electricity produced by body heat) announced in its experimental stage by Bulova last year will be introduced on the market this coming fall with sales priority in the United States. (Top, right) AUDEMARS PIGUET: This pocket watch with repeater features a compact movement (17½") notable for its thinness: a mere 3.75mm—an impressive technical feat in this category. 29 functional jewels. Strikes hours, quarters, and minutes. (Lower, left) PATEK PHILIPPE: Now for what is probably the only skeleton-type Tourbillon movement ever made. A mobile cage contains all the components of the escapement along with the balance and effects one turn per minute. This complex and ingenious mechanism ranks as one of the finest horological developments ever devised. (Lower, right) PATEK PHILIPPE: A skeleton movement with self-winding mechanism, the better to show off the movement's graceful, openworked tracery. It has been fitted with a small, off-center 22K gold rotor.

The superbly modern facility at Marin now employs 1,200 people. Established about 10 years ago, the electronic facility is designed to work on battery-operated watch movements, as well as integrated circuit and component displays. The entire operation is computerized to produce the maximum number of units at the best possible cost.

Hubner indicates that they find it most efficient to design the marketable watch and then work backwards to develop the batteries, etc. to fit the case. Quality of the electronic movements is always of uppermost importance in the production process. Different price levels for the finished

(Continued on page 42)

THE ROCK QUARRY

By Fred S. Burckhardt



How Much Are You Worth?

An article appeared recently in one of the national trade magazines concerning watch companies, watch repairing, and watchmakers. A couple of months later, there appeared a response to this article from a watchmaker. In his letter, the watchmaker blamed the sad state of the watchmaker today on the watch companies and jewelers, saying that these parties have been abusing the watchmaker for many years. The letter also said that with the average salary of the watchmaker being \$200.00 per week, employers should look around and see what plumbers and electricians are getting paid and pay the watchmaker a decent price. "Only then will you be rewarded with much satisfaction," the letter stated.

First of all, I don't know about anybody else, but I don't need anyone making statements like this on my behalf. If I have something to say, I'll say it for myself. Secondly, what difference does it make what plumbers and electricians earn, and why should a person make as much just because he/she is a watchmaker? This is what's known as *ad hominem* reasoning. If someone eats too much spaghetti, gets a bellyache, and goes around cursing all Italian people, that would also be *ad hominem* reasoning.

Let's stop blaming everyone else for our own state of affairs. Many watchmakers aren't worth more than what they are getting paid. Of course, we all feel we are worth much more than what we are getting paid, but are we? We should take a hard look at ourselves and ask, "How much am I worth?"

First of all, what do we mean by worth? Worth is a quality within a person that renders him useful, desirable, and valuable. We're not talking about a person being worth a million dollars. We've all seen wealthy people, who as persons aren't worth very much.

How Much Are You Worth to Your Employer?

Do you do just enough to get by, or do you put out a little extra effort and do more than is necessary? I was talking to a watchmaker once who was complaining because he wasn't making enough money. I told him he should talk to his employer and he said that he had, but was told that the amount of work he put out didn't justify a raise. When I asked how much work he turned out each week, he said, "Just enough to cover my salary." He couldn't understand that his employer should be entitled to some profit from his work. He said his employer was making enough money now, so why should he work harder to make him even more money? When I asked how he expected to get a raise if he didn't turn out more work, his reply was, "When I get paid more, I'll turn out more work."

As you can see, there's not much future in a situation like this. This is why many employers feel that the repair department is a necessary evil and that it doesn't make any profit. We all know that a repair department should show a profit unless there isn't enough work or the people in the department aren't producing. If all you want is 144 square inches and the right to do the least you can—fine. But don't complain if you are paid accordingly!

How Much Are You Worth to Your Family?

Are you giving them a fair shake? If you have the ability to make a much better living and you're not, then you are not being fair to them and you're not worth what you should be.

Wouldn't you like to be able to afford some of the better things—better clothes, better car, better home, spare cash in the bank and in your pocket, going out to a nice restaurant once in a while instead of the "Golden Arches?" Are you able to do more

for your family, perhaps give them many advantages you didn't have yourself?

One employer to whom I spoke mentioned that he offered to pay the expenses to any seminar or bench course his watchmaker wanted to attend, but the watchmaker never took advantage of the offer. Do you think the watchmaker was being fair to his family when he had the opportunity to make more money but didn't?

If you are able to do these things for your family and you're not, then you are not worth what you should be to them.

How Much Are You Worth to Your Customers?

The only reason customers come in to you is because they have problems. Do you help to solve their problems? Do you treat them fairly and give them their money's worth? Do they have to worry whether or not you'll do a good job? It may sound corny, but are you kind to your customers? I'll never forget an experience several months ago when a woman brought in her watch because it wouldn't run. It was a pin-lever with rhinestones around the case. I told her I would look at it to see if the problem were just something minor. The balance bridge screw came loose, so I tightened it and the watch started to run. When I gave it back to her, she couldn't thank me enough. She went on to relate how she had taken it to another store and the watchmaker had looked at it and then threw it on the counter, saying it was just a piece of junk and wasn't worth fixing. The sad part about the story is that the watch had been given to her by her husband for their fifteenth anniversary, and he had been killed in an auto accident a few days later. She said she knew it didn't cost much, but that it had been all he could afford. Just a piece of junk not worth fixing? You couldn't have bought it from her

for a thousand dollars! Don't be callous with your customers. Without them, where would you be?

How Much Are You Worth to Your Guild and Association?

What if your association made a ruling that the membership had to be limited to only fifty members; to qualify for membership, a proven record of work for the past year would have to be approved by a committee. Would your name be included on the membership list?

Have you ever served in an office of your guild or association, or have you always been too busy? Are you one who complains all the time about the way the organization is run, yet never accept the opportunity to serve? Or, worse still, do you accept an office but don't do the job to which you were elected?

I always get a kick when someone says an organization is run by a clique. They say the same people are elected year after year, but what they don't realize is that these people serve because they are usually the only ones willing to do any work. All

of them would be happy to turn over the reins if someone else would accept the position. Don't always take; try giving a little. Your worth is directly proportional to what you are willing to give! If you are willing to put a little more into it, you'll get a little more out of it.

How Much Are You Worth to Yourself?

Are you like an eight cylinder engine that only runs on four cylinders? Sadly enough, many people are like that. Who is worth more, the person who tries to do a good job but may not have the ability, or the person who has the ability to do a good job but doesn't?

It's like the Parable of the Talents where one servant was given five talents and doubled them; another was given two and did likewise. The servant who was given only one buried it in the earth and didn't even try. We can either make our talents grow and blossom, or like the servant, bury them, never knowing what we could have done.

At a convention, I overheard a group talking, and one person was

saying that the opportunity for young people in this business just isn't there anymore. Hogwash! There's more opportunity now than there ever has been. If you want to learn about opportunity, do yourself a favor and get a copy of Dr. Russell Conwell's book *Acres of Diamonds*. It's a copy of the speech he has given thousands of times across America. It's not about the jewelry business, as the title may imply, but it's about opportunity. It's only sixty pages long and will erase any doubt in your mind that opportunity is there if you'll only look for it.

You see, it's up to you. Nobody can make you worth anything except that person you see in the mirror each morning. That's the person who can make or break you. It's not your boss or the watch companies or the jewelers—the person in the mirror is the one to blame. Try putting a little more into it. Make yourself more useful, desirable, valuable. The returns will be well worth the effort!

TTT

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19	E	Roanoke, VA	Nelson
19	A	Chicago, IL	Jaeger
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AUGUST

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29,30	H	Indianapolis, IN	Benesh

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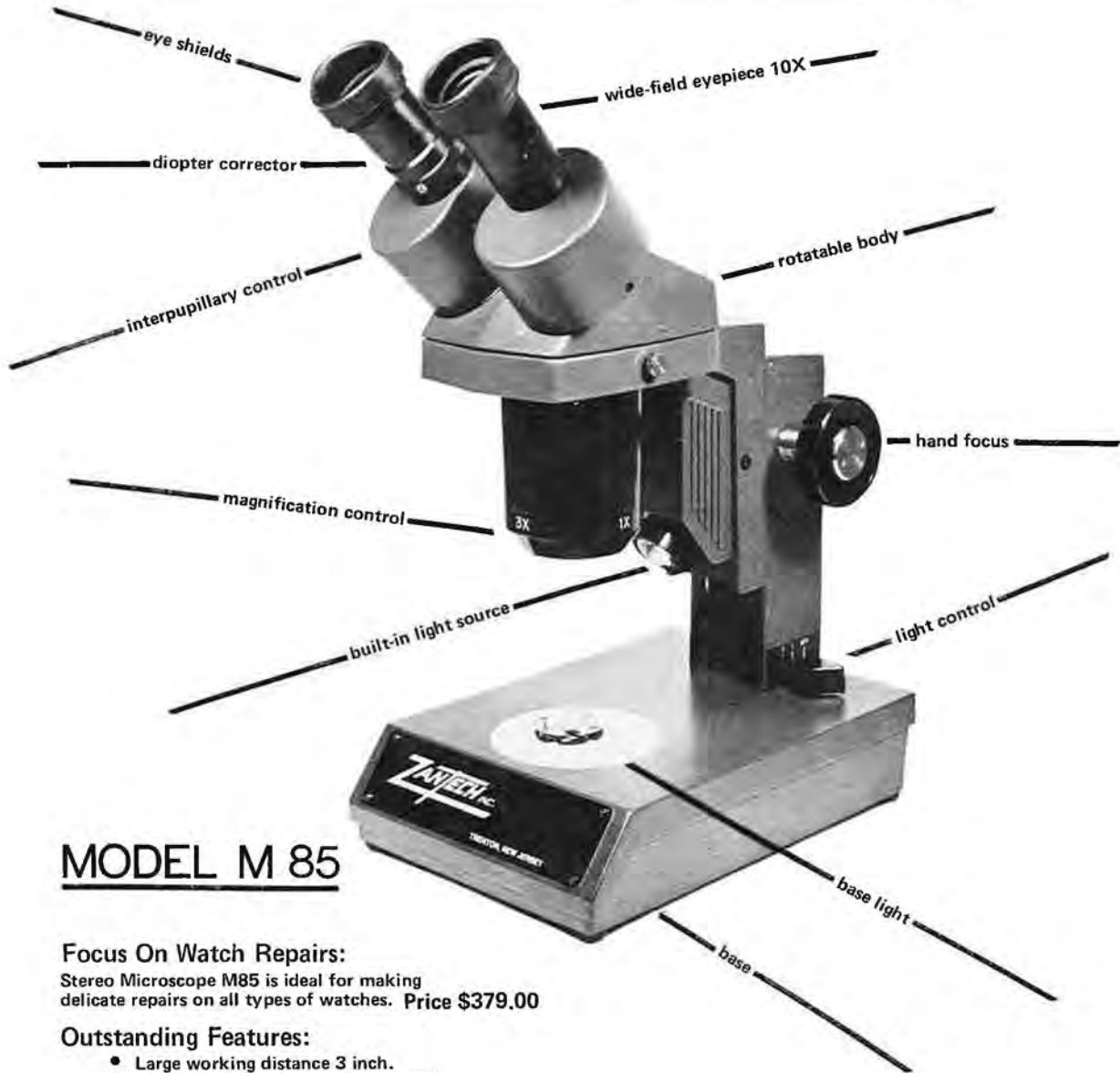
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Tortoiseshell And Silver Mounted Bracket Clock

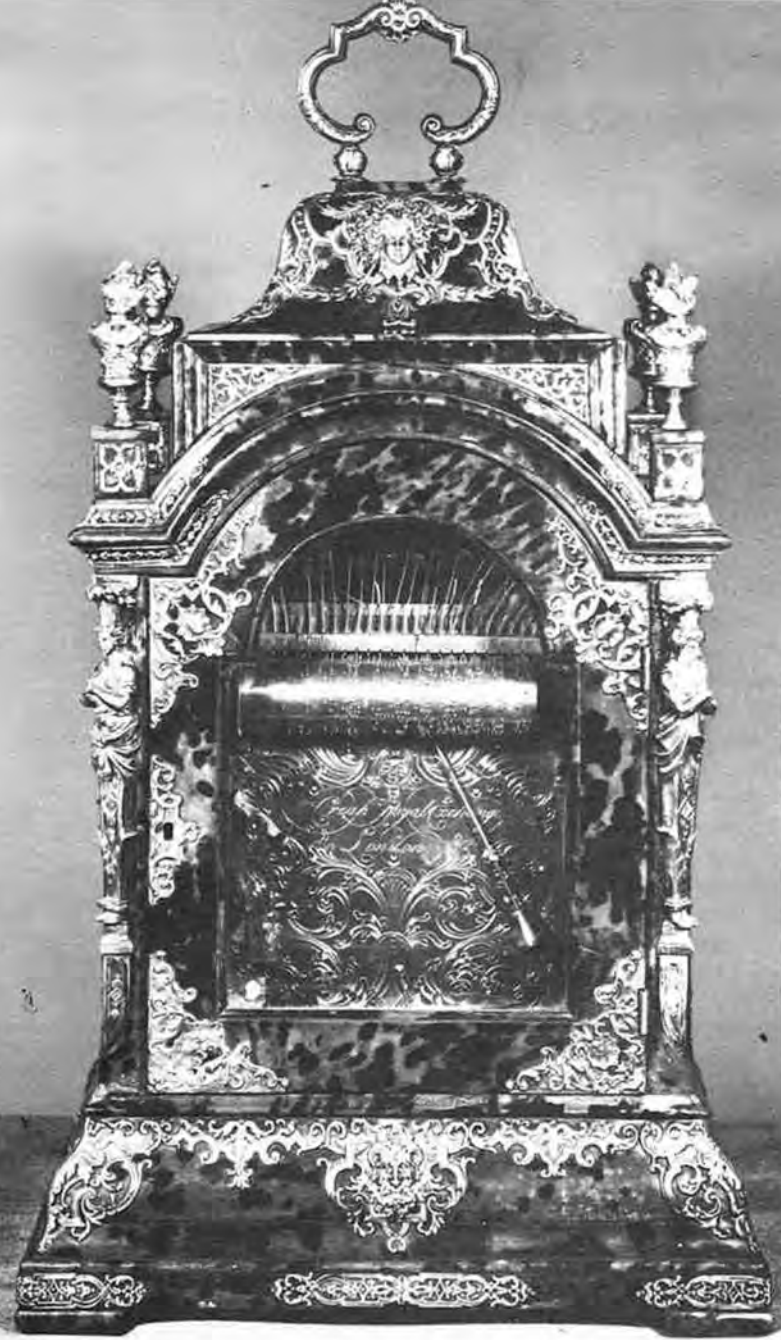
*From the Manuscript and Photo Library of
Orville R. Hagans, CMC, CMW, FAWI, FBHI*

This clock is probably the most important silver mounted bracket or table clock extant. It was made by William Creak, Royal Exchange, London, between 1754 and 1763.

The clock was exhibited at the Festival of Britain as an outstanding example of British horology. Originally, the Festival intended to show Lord Mostyn's celebrated Tompion, but the owner changed his mind. Therefore, at the last moment, after the catalog was in print, the Selection Committee requested the loan of this clock. At that time, the owner was Mr. C. D. Rotch, Curator of Furniture of the Fitzwilliam Museum, Cambridge.

Front View





← Back View

Side View



The clock has a three-train movement. It plays six tunes and has a pull string for repeating tunes. It will be noted from the photograph that all the elaborate pierced and engraved panels are intact, a very unusual feature in eighteenth-century clocks. The case is identical, back and front, and the movement is finely engraved. The clock had to be ornamental back and front because it was made to stand on a library table. When shown at the Festival of Britain, Lion & Unicorn pavilion, the movement was exhibited apart from the case. It had been carefully cleaned and put in going order by Frodsham & Company.



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By Marvin E. Whitney, CMC, CMW

American Chronometer Makers

Part IX

This month, we continue with our discussion of the careers of American chronometer makers.

MONTANDOW, J., Watchmaker, located on the north side of Pennsylvania Avenue between 12th and 13th Streets, Washington, D.C. Again we have the mention of an individual who repaired and serviced chronometers, but about whom little is known regarding his background and trade experience. Mr. Montandow was called upon by the Navy's Depot of Charts and Instruments several times between the years of 1833-1839 to repair chronometers and watches belonging to the Navy.

Navy records show that he repaired the first chronometer purchased by the Navy (Parkinson and Frodsham No. 682) in March, 1834,

and again in January, 1838. Records also show that on July 7, 1836, he repaired and rated a chronometer issued to the USS *Natches*, and in March of 1839, he did the same for a chronometer issued to the USS *Constitution*. He also repaired a Poskell No. 473/4080, a 56-hour chronometer which was purchased for \$300 by the Captain of the *Delaware* during her last cruise in the Mediterranean. After he completed repairs to this instrument in July, 1836, it was reissued to the *Delaware*.

OAKES, JOHN, 140 Maiden Lane, New York City. Mr. Oakes was listed in the New York City Directories of the early 1850's as a chronometer maker. However, there is no mention of his name in any of the Naval Observatory records.

POLLTZER, M. 75 Wall Street, New York City. His name appears in the same listing as Oakes, but again, that is where the trail ends; his name does not appear in any of the Naval records.

PORTER, GEORGE E., Boston, Massachusetts. Mr. Porter was a very highly motivated craftsman and, because of his mechanical talents, was hired by Bliss and Creighton and placed in their chronometer-making training program where he was trained to be a finisher. After completing his training, he worked for a short time in the firm's New York shop and then was placed in charge of their Boston shop. When the Bliss and Creighton business began to falter in the early 1850's and the two partners became embroiled in a bitter argument and lawsuit, Porter left the

Figure 1. The operation of Potter's Chronometer Escapement, Patent No. 73,646, during impulse.

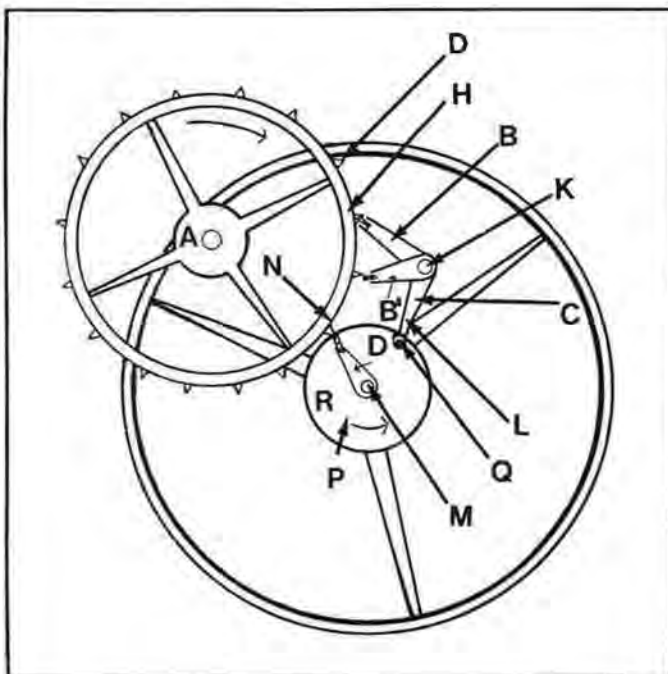
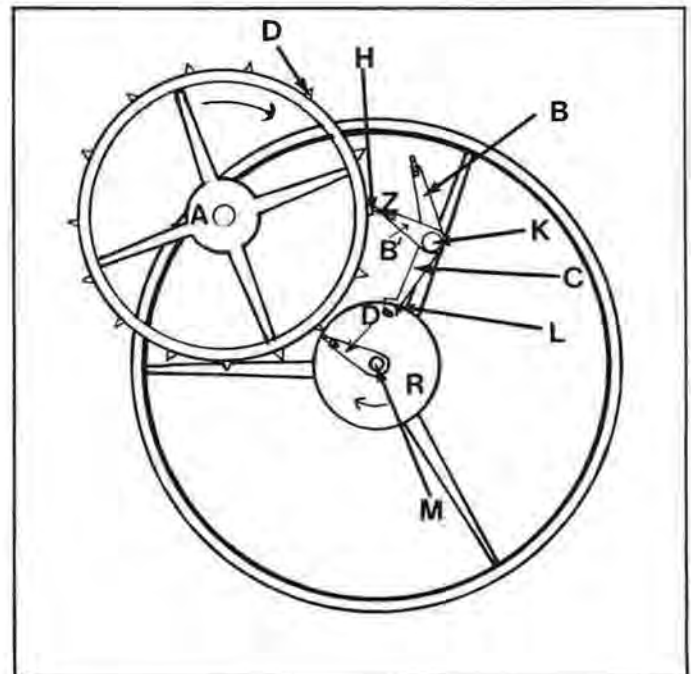


Figure 2. The operation of Potter's Chronometer Escapement, Patent No. 73,646 at the conclusion of impulse.



firm. He went into business for himself in the Boston Merchant Exchange Building where he was involved in the making of hairsprings until his death in 1861.

POTTER, ALBERT H., New York, Havana, Minneapolis, Chicago, and Geneva. Mr. Potter was born in Mechanicville, New York, on July 13, 1836. He was christened Arnold Potter but later changed his name to Albert H. At the age of sixteen he was indentured as an apprentice watchmaker to the firm of Wood and Foley in Albany, New York. Three years later, he left Wood and Foley, traveling to New York City where he opened a watch repair shop at 19 John Street. Subsequently, he moved to 84 Nassau Street, where he began designing and manufacturing watches.

Before leaving New York, he produced some thirty-odd movements which were fitted in gold cases. The quality of his work was such that he commanded rather high prices for his pieces, anywhere from \$225 to \$350 each. His watches were very diversified in that some were fitted with either chronometer (pivoted detent) or lever escapements, fusee or going barrel, key wind, bridged or three-quarter plate movements.

In 1861, he closed out his New York business and went to Havana. There he opened another watch repair shop which also proved to be a very successful venture. He remained there until 1866 when he returned to the United States, settling in Williamsburg, New York. During his stay in Williamsburg, he worked on the designs of several different types of escapements, a project which he had had in mind for some time. For one of these escapements he was granted a patent, January 21, 1868, No. 73,646, entitled "Improvement in Chronometer Escapement."

Shortly after receiving his patent, he moved to Minneapolis. He remained there until 1870, at which time he took up residence in Chicago. In 1872, he and his brother entered into a partnership, the firm being known as Potter Brothers. The partnership was short lived. When it was dissolved in 1875, Albert left for Geneva where he began producing the famous Potter watch. However, before he left, he applied for and was granted another patent. This one, No. 168,583, dated October 11, 1875, was entitled "Improvement in Compensation Balance for Watches."

Mr. Potter spent his remaining years in Geneva, a city he loved because of its beauty and tranquility. However, life was not easy for him, for in 1895,

he began having spinal problems which left him partially paralyzed. Finally, his illness necessitated his being placed in a sanitarium, where he remained until his death on January 25, 1908.

Albert Potter was a very skillful craftsman. He was a man of rare ingenuity and a mechanical genius whose horological skills excelled in every phase of the art. Among his most distinguished accomplishments were his experiments which resulted in the designs of fourteen different escapements.

Albert is best known for his fine watches and pocket chronometers, but he also made some standard marine chronometers. His pocket chronometer No. 774 has a constant force escapement employing a pivoted detent. Another unique feature about this chronometer is that it is fitted with a self-starting device which starts the balance when it is wound.

His marine chronometer No. 110 is fitted with a going barrel which has an ingeniously designed safety feature. The barrel and ratchet wheel is firmly attached to the arbor, while the main wheel is free to revolve about the arbor, being driven by a small screwed stud projecting from the edge of the barrel. The stud protrudes through a small hole in the main wheel, and thus, as the barrel revolves, it causes the main wheel to revolve also. Should the mainspring break, causing the barrel to reverse its direction, the threaded stud revolves and retracts from the main wheel, allowing the barrel to spin harmlessly until the unspent power is exhausted.

Potter's first patent, entitled "Improvement in Chronometer Escapement" was basically an invention for pocket chronometers, although he claimed that it is "new and useful for other timepieces."

In Figure 1, the escape wheel (A) is somewhat similar in construction to the standard marine chronometer escape wheel except that the teeth are more obtusely pointed and shorter. Of the two pallets (B and B'), B serves to lock and unlock only, while B' serves to lock and give an impulse. The pallets have vertical slots in which the jewels are set. The lever (C) with its fork (L) is of nearly the same construction as that in the regular lever escapement. The pallets (B and B') and lever (C) are rigidly attached to the arbor (K), which is pivoted between the plate and bridge of the movement. The roller (R) is rigidly attached to the balance staff (M). The impulse pallet (D) is also firmly attached to the staff (M).

The operation of the escapement

is as follows: The escape wheel in Figure 1 is moving in a clockwise direction. The tooth (H) is locked on the pallet (B) where it will remain until the jewel pin (Q) which is set in the roller (R) enters the fork slot (L) in a counterclockwise direction (shown by the arrow "p"), carrying the lever (C) with it. It will be seen that since the pallets (B and B') are firmly attached to and moving on the same center with the lever (C), the tooth (H) will now be disengaged from its locking at (B). The escape wheel is free to advance, causing the tooth (N) to drop on the impulse pallet jewel (D) which has arrived at that moment in a position to receive the tooth (N) and its impulse.

At the conclusion of this impulse, the escapement will assume the position shown in Figure 2. The tooth (H) is now being locked by the pallet (B'). It will remain in this condition until the force of the impulse and the momentum of the balance are overcome by the tension of the hairspring. As the balance reverses its direction, the jewel pin (Q) enters the fork (L), causing the lever (C) to move just far enough to allow the flat end of the pallet (B') to slide past the tip of the tooth (H), at which time it will become unlocked and the face of the tooth will contact the back face (Z) of the pallet (B'). This results in an impulse being transferred to the roller (R) through the medium of the lever (C), fork (L), and the jewel pin (Q). At the conclusion of this impulse, the next tooth (P) will lock on the pallet (B), as shown in Figure 1.

Although Potter employs the lever and fork principle as found in the detached lever escapement, the impulse communicated through it differs widely from that used in the lever escapement. He claims that inasmuch as the construction, arrangement, and operation of the pallet does away with the inclined-plane impulse type of pallets, there is no need for oil. In addition, there is another advantage, he states, in that the escape wheel is stronger and more durable because the teeth are short and stubby.

Potter's second patent involving improvement in the compensation balance was primarily for watches. However, I believe it to be noteworthy and deserving of a brief description. Potter, like so many of his contemporaries, was striving to devise a balance which would overcome the middle temperature error. His effort provides an insight into the workings of his gifted mechanical mind.

Potter constructed his balance with adjustable loaded auxiliary bows which could be attached either near the
(Continued on page 35)



Removing Crystals

This month, a fine tip comes to us from none other than our good Editor of the Horological Times, Mr. Hal Herman.

I have a method for successfully removing pressure-fitted LCD crystals without breakage. Cut about a quarter of an inch from the end of an emery stick, creating a rectangle of wood to fit on the inside of LCD crystals. Use a large straight-walled cup on the bottom in the press, large enough to clear the crystal. Then place the bezel on upsidedown; place the wood block on the crystal with a smaller straight-walled cup, the diameter not quite the length of the block. The crystal pokes out easily with no danger of breaking.

Thanks, Hal. This sure is a timely tip for the watchmaker. Many of us have broken this type of crystal trying to remove it

from the bezel in order to clean the case. Heat could darken the red color and a solvent could take off the manufacturer's name or trademark. Some of these crystals are plastic, some are glass, and then there are those that have some type of red coating on them. All are expensive to replace (if you can find a replacement), so the watchmaker holds his breath when trying to remove one.

Your method puts even pressure completely around the outside of the crystal, making it practically impossible to break it when trying to press it out. Any tip that saves me money . . . I like it, I like it.

Another method for removing clear glass or mineral crystals that have been epoxied in the bezel comes to us from Mr. S. T. Jenssen, 1200 Connecticut Avenue, Washington, D.C. 20036.

After listening to some rather involved procedures for removing epoxied crystals that were presented at our annual convention, I would like to share mine.

I keep a sixty-watt bulb on constantly and place the case on it for a few moments. While the bezel is heating, I place a piece of clock peg wood upright in the vise. When the bezel is hot, I just put it on the peg wood and out comes the crystal very easily. While the bezel is still warm, the epoxy is removed.

Thanks for the tip, Skee. I'll try it. Caution: Before someone burns his hand and I get a good cussing, use a towel to remove the bezel from the light bulb. Those bulbs get plenty hot!

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QUESTIONS AND ANSWERS

(Continued from page 14)

of manufacture and an idea as to its value or scarcity? The regulator is in front, left of the dial.

Thank you.

Cecil Thomas
Huntsville, Alabama

A The New Haven watches with the key in the watch (swiveled so that the caseback could be shut) are now considered rare. These were made during the first decade of this century, and a few large models (1 3/4 in., 1 7/8 in., and 2 in. diameters) were made in the 1890-1900 era.


Q What can you tell me about an 18S keywind watch which is marked "Bristol Watch Co. Bristol Conn. No. 70808." Would this be a number sought after by collectors?

Earl Webb
Bristolville, Ohio

A The Bristol Watch Company was a name used by the Edward Ingraham Company on some pin-lever, non-jeweled watches. However, I have a Bristol Watch Company movement in my own collection and I believe it to be a Swiss product. Without a photo of your watch and its movement, I cannot be sure. In either case, it is not considered a desirable item to collectors—yet.

Q Would you please send any information you might have on the mailing address of the firm that manufactures Intermatic timers? I have two that are in need of motors.

Tom Towey
Dade City, Florida

A The Intermatic is a trade name owned and used by the International Watch Company of Schaufhausen, Switzerland. Their New York office is at 580 5th Ave., New York, NY 10036. 

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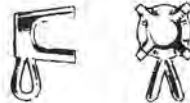
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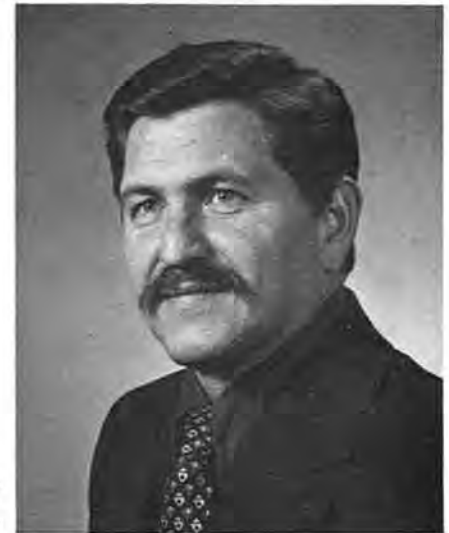
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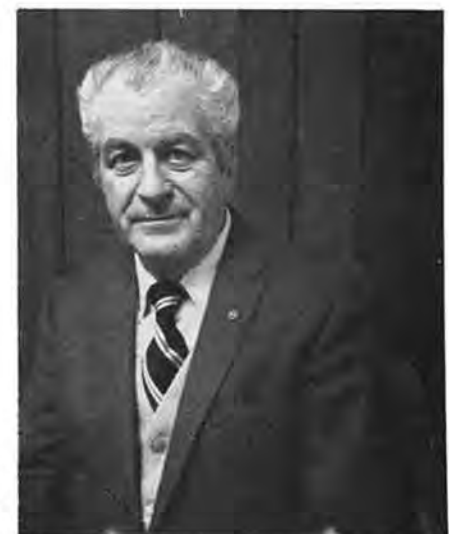
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THE SHIP'S CHRONOMETER

(Continued from page 29)

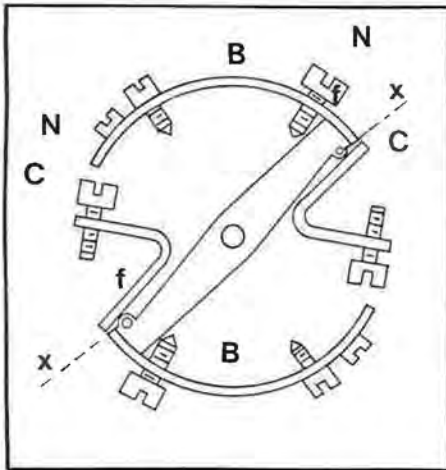


Figure 3. A face view of Albert H. Potter's Improvement in Compensation Balance for Watches, Patent No. 168,583.

extreme ends of the balance arms or at any part of the arc-shaped sections of the balance rim. The bows, being adjustable, are so arranged that the expansion or contraction resulting from a change in temperature causes their loaded extremities to move radially toward or away from the axis of the balance. The result is that the moment of inertia on the balance corresponds to the changed tension or elasticity of the hairspring. See Figures 3, 4, and 5.

Each bow (C) is attached to the end of the arm supporting it by a pivot (f) which permits the adjustment of the bow with its outer or free end at a greater or lesser distance from the axis of the balance arm. The pivot where each bow is attached in place is snug or tight enough to hold the bow in any position to which it may be turned, and yet permit such turning or adjustment of the bows around their points of attachment as may be required.

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It will be noted that any change in the curvature of the bow from the straightening thereof will have the effect of moving the screw or load (N) on an arc more or less concentric with the pivot (f), by which the bow is attached to the balance arc, i.e., in a direction substantially radial to the axis of the balance.

Therefore, if the bows are ad-

(Continued on page 51)

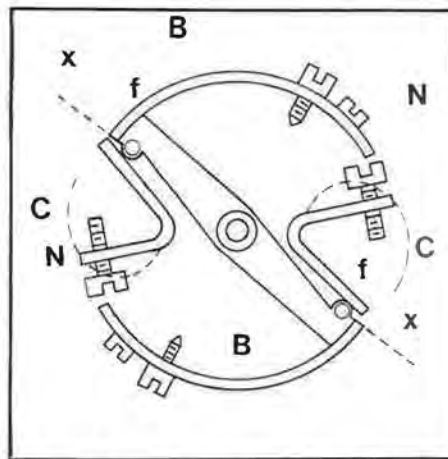


Figure 4. An obverse view of the same bow as in Figure 3.

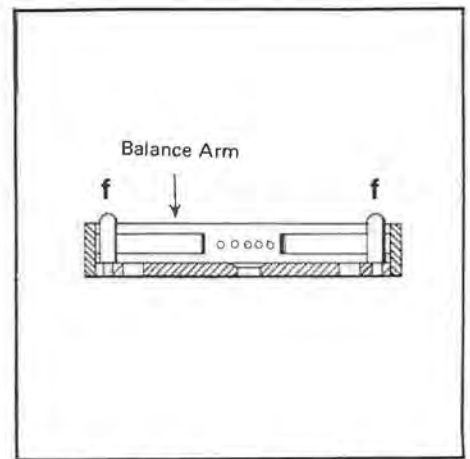


Figure 5. A transverse sectional view in the line x of Figures 3 & 4.

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Credit and Cash

Credit or cash? That's the first question we are asked at most department stores when we go to pay for the items we have selected. The first word we hear is "credit," as credit is emphasized. We pay at a cash register—which should perhaps be called a "credit" register.

Although much credit is encouraged and given, many jewelers still use the good old cash-and-carry method, clinging to the adage that "a bird in the hand is worth two in the bush." Even though they usually do accept checks, stores on a cash-only basis are limiting their volume of business. Also, some people seem to think that when they are out of checks, they are out of money, and as long as they have checks, they have money. It's sort of like driving their cars very fast so they will not run out of gas.

The lay-a-way plan, as an alternative to credit, guarantees the merchandise to the customer at the present price and assures us, as the merchant, of receiving all of the money for the merchandise. However, it too has disadvantages in that it ties up merchandise which we may not be able to afford to restock until many payments are made.

Another lay-a-way method is to let the customer take the merchandise after making a certain number of payments. One customer told me that he had made such an arrangement at a certain store several years ago and was told that he could take the diamond ring set after he had made half of the payments. The store then refused to let him remove the merchandise. He said he was very angry and bought elsewhere.

Lay-a-way has the same disadvantage that open account credit has: that is, we lose the "use" of our money for some time. As for those stores on a cash-only basis, although they have all of their money to reuse, they are sometimes severely limited in their volume of business.

Most small watch repairs are generally paid by cash, but larger sales are usually made on one of the forms of credit. Credit cards, which are one form, offer the advantage of allowing our customers to buy almost anything they want, up to the limits of their credit cards, and the result to us is the equivalent of a cash sale. Letting our customers use their credit cards gives us a chance to increase the unit sale. It allows our customer an opportunity to spread out payments.

Although eight out of ten people have credit cards, there are thousands of people who do not use them or do not choose to use the cards they have. Some of these people ask for open account credit. Giving this credit can substantially

"The lay-a-way plan, as an alternative to credit, guarantees the merchandise to the customer at the present price and assures us, as the merchant, of receiving all of the money for the merchandise."

"Although eight out of ten people have credit cards, there are thousands of people who do not use them or do not choose to use the cards they have."

increase one's volume of business. It can also lessen the amount of operating capital one has. If we give a lot of open-account credit, we could check credit ratings with a local credit bureau. After dealing with open accounts for a while, we learn that most people are trustworthy, but a few will fall by the wayside and eventually end up in the bad account file. On these, we must use more drastic collection methods; however, we must give our customers a chance to "save face." Remember, the older the bill, the harder it is for our customer to come in.

One large jewelry store uses the following method on some of its bad or very slow-paying accounts: They phone the person and tell them, "We have not seen you for quite a while and your account balance is getting so low we were wondering if you would like to make another purchase from us now." Of course, this would only be used on certain types of accounts.

To sum up how credit and cash affect us, let's use a hypothetical situation. Let's suppose for a moment we have only one piece of merchandise in our store. This one item is our complete inventory, and it is worth \$50,000.00 retail. Let's say it cost us \$30,000.00.

SITUATION A: Suppose we sell this for \$50,000.00 cash. We can then use \$30,000.00 to immediately restock and we have made a nice profit. Business continues as usual.

SITUATION B: Suppose we make our \$50,000.00 sale but on credit. Terms are \$5,000.00 down and \$5,000.00

a month. This means it would be five months before we would have enough cash to completely restock, presuming all payments were made on time.

Of course, our businesses don't work like that, since we do have more than one item to sell. If we sell a few items on credit and a few for cash, we are not out of business for five months. We simply "borrow from Peter to pay Paul."

Credit is here to stay, but cash business has definite advantages. Maintain a good balance between the two. Let's cash in on all of the benefits and be a credit to our business. As far as credit cards are concerned, I would not leave home without them.

Cash or credit, ask your customers to buy now!

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TECHNICALLY WATCHES

(Continued from page 17)

escape wheel teeth is to turn down a piece of brass rod that will just go between two teeth. The steel rod selected to make the new cylinder should be slightly larger than the distance between two teeth of the escape wheel. The length of the teeth can be measured with a micrometer as in View B, Figure 6. The drill used to drill the hole for the cylinder should be about .05mm smaller than the length of an escape wheel tooth.

To make the new cylinder, the following procedure is used: select a piece of high carbon steel drill rod, slightly larger than the distance between two escape wheel teeth. Chuck the rod in the lathe; enough of the rod must extend from the chuck to make the cylinder without having to disturb the rod during the process. Make sure the rod runs true. Adjust the T-rest close to the rod and face the end of the rod flat with the graver as in View A, Figure 7. Adjust the T-rest to be parallel with the end of the rod and spot a center in the end of the rod with the graver as in View B, Figure 7. Note: When the center is being spotted, the lathe is reversed so the headstock is turning clockwise when the end of the rod is being viewed. Select the drill for drilling the hole to form the cylinder tube. Drill the hole as in View C, Figure 7. The lathe head should be turning coun-

terclockwise when the rod is viewed from the end as the hole is drilled. The hole should be drilled deeper than necessary to make the tube. After the hole has been drilled, check the hole to make sure it runs true before reducing the diameter of the tube. If the hole runs true, use the graver to turn down the diameter of the tube as in Figure 7, View D. Leave the tube about .02mm oversize for finishing.

The finishing can be done with a sapphire burnisher, then boxwood and Linde A or diamantine. This is shown being done in View E, Figure 7. The tube should be ground and polished until it will go between the teeth of the escape wheel with about .02 to .04mm freedom.

After the tube has been finished to the proper diameter, it is then cut off as in View F, Figure 7. Note: After the hole has been drilled, if it doesn't run true, then the procedure for holding the tube while finishing the outside is different. In this case, the tube is cut off first and is chucked up on a rod that has been turned down to fit the hole in the tube tightly. Then the tube is finished on the outside.

To finish the inside of the tube, refer to Figure 8, Views A and B. The tube is chucked up true in the lathe, and a special lap made from soft steel wire that is charged with Arkansas stone powder and oil is moved back and forth in the tube as the tube is turning to grind

out the hole. If the watchmaker possesses a pivot polisher that has a tapered hole in the end of the spindle, these laps can be made to fit the spindle and used in the pivot polisher to finish the hole in the tube. See Figure 8, View A. When a tooth of the escape wheel will just enter the hole, then the hole is polished with a lap made from boxwood or hard French pegwood of the same shape that has been charged with Linde A or diamantine. The lap is kept damp with clean denatured alcohol. Note: When changing from the grinding lap to the polishing lap, the tube must be cleaned to remove any grinding compound.

After the hole has been ground and polished to the same size throughout, the hole in the ends of the tube is ground and polished to a slight taper to receive the plugs. Before grinding the taper, a broach can be used in each end of the cylinder to help establish the amount of taper needed. The grinding is done with a steel taper pin that is charged with oilstone paste made of Arkansas stone powder and oil. The polishing is done with a tapered lap of boxwood or hard French pegwood that is charged with Linde A or diamantine and alcohol. A round toothpick also makes a good lap for polishing. After the tube has been finished inside and outside, the slots are cut for the escape wheel. The slots can be milled or filed. The cylinder is

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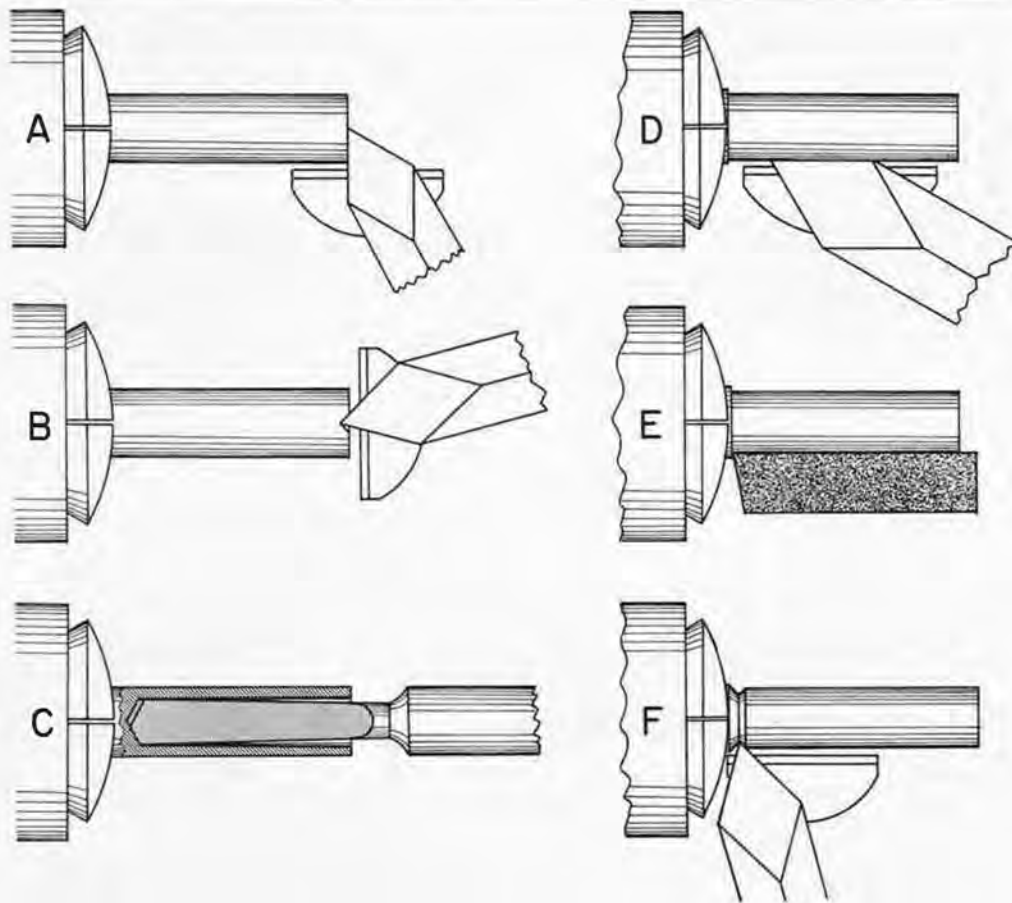


Figure 7

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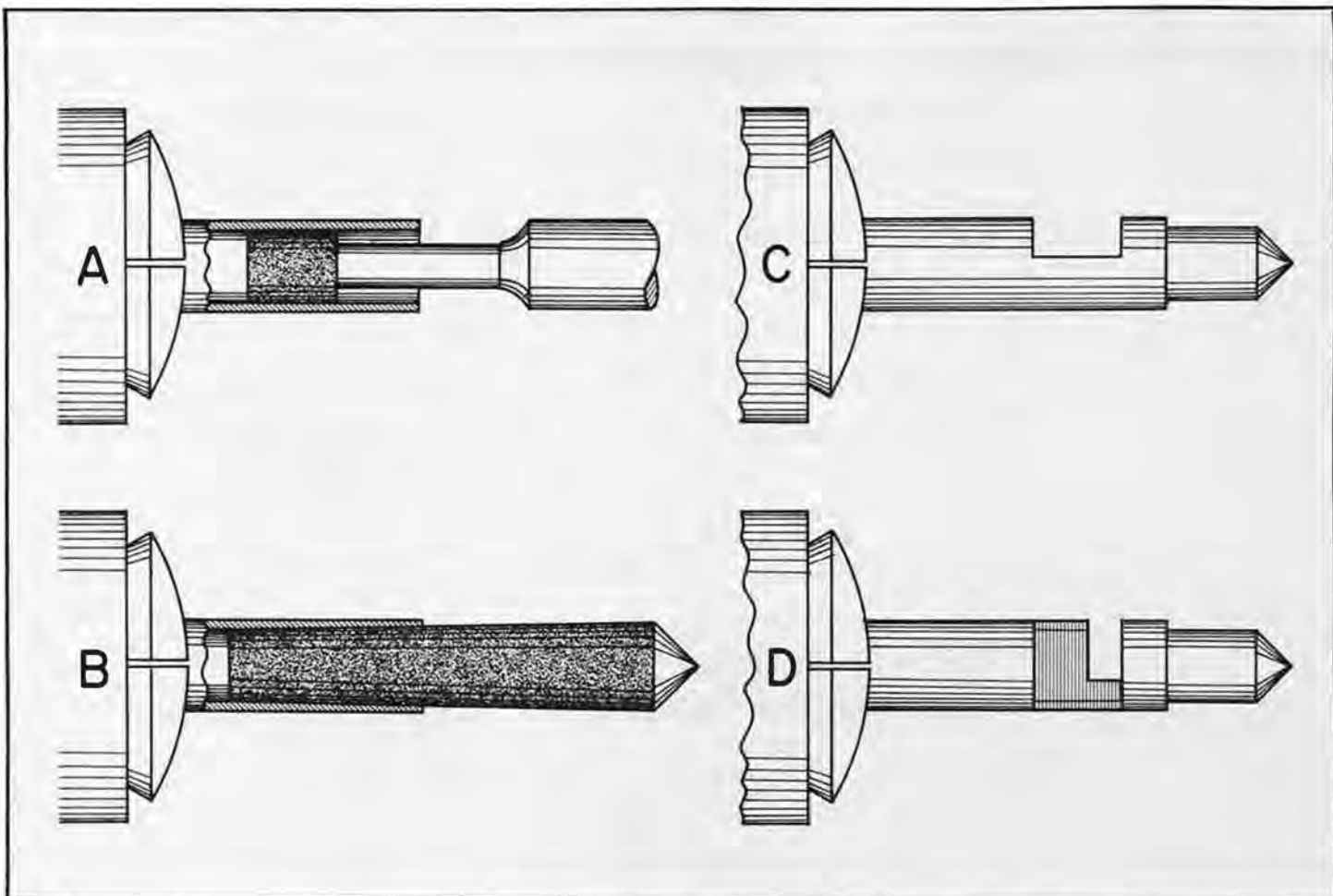


Figure 8

supported on a brass wire while the slots are being cut. The brass wire should fit tightly inside the cylinder but should not be driven into the cylinder as this could distort the cylinder wall. After the wire is inserted into the cylinder, the cylinder is chucked in the lathe as in Figure 8, View C. Note: The end of the wire needs a tapered center that can be supported by the tailstock of the lathe while the slot is being cut. Then the main slot is cut to form the locking and impulse faces for the escape wheel teeth. This slot is cut to a depth that is somewhat less than one-half of the diameter of the cylinder. When the impulse faces

are finished, this slot should be to a depth of about five-twelfths of the diameter of the cylinder. This slot should be long enough to allow for the escape wheel passage slot being cut at its lower end. The index holes and index pin in the lathe pulley can be used to index the cylinder when the slots are cut. The pulley is locked up with the index pin at one of the 90° markings. Then the first slot is cut. Now the headstock pulley is turned counterclockwise 90° or 15 holes if the pulley has 60 holes. Then the second slot is cut which is the wheel passage slot. This is shown in Figure 8, View D. This slot is cut to a depth of

about two-thirds the diameter of the cylinder. The length of this slot is usually less than half the length of the first slot. Now the impulse faces are shaped, smoothed, and polished. This can be done by draw filing with a small sapphire burnisher or they can be scraped with a small scraper made from a small carbide rod. The polishing of the impulse faces can be done by the use of a piece of boxwood or French pegwood and Linde A or diamantine. The receiving impulse face should be a semicircular shape and the discharge impulse face should have a longer curved shape from

(Continued on page 53)



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Book Review

By Henry B. Fried, CMW, CMC, FAWI, FBHI

The American Clock 1725-1865. By Edwin A. Battison and Patricia E. Kane. 25.5cm x 24cm, 207 pages, hard covers with dust jacket. 80 illustrations, 7 figures. Published 1973 at \$19.95 by N.Y. Graphic, Inc., copyrighted by Yale University Art Gallery with introduction by Derek deSolla Price.

In 1930, Frances P. Garvan made a most gracious gift of American artifacts to Yale University, later adding three additional clocks to the beautiful and magnificent items donated earlier. This motivated others to donate further rare examples of American horological effort. This book is a descriptive catalog of this famous collection of American clocks.

The photographs in this book are the work of Charles Uht, a well-known photographer. The combined efforts of many highly respected American horological authorities went into the preparation of the clocks and into this book's eventual publication.

Forty-eight clocks are excellently illustrated. Most show the movement and dial with cases and important details photographed in fine critical detail. The descriptions of each clock reflect the attention to the finest details of the wood, dimensions, description of the case, its condition, the gift source and general detailed comments.

Thirty-six clocks are of the tall-cased variety, among which are included products of Connecticut, Delaware, Maine, Massachusetts, New Jersey, New York, Pennsylvania, Rhode Island, and South Carolina. Representative makers include the Willards, Mulliken, David Wood, Rittenhouse, Brokaw, Godschalk, and Hoff.

There are eight shelf clocks originating from Massachusetts, Willard and Wood dominating there. Others are by Nathaniel Munroe, Gilbert, Grant and Company of Connecticut.

Four wall clocks complete the cataloged collection. These are by Jabez Baldwin, Willard, and one by Cummins.

Professor Derek deSolla Price of Yale—probably the world's leading authority on the history of technology—provides a most interesting four-page introduction, "A Cultural History of Clocks," citing the introduction of toothed wheels in Greece. A foreward by Charles F. Montgomery describes the history of the collection and the elements which made this study and publication possible, including a grant from The National Association of Watch and Clock Collectors.

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BASEL FAIR

(Continued from page 19)

watch are greatly influenced by the cosmetic details: case, band, accessories, etc.

The Swiss indicate that they have faith in the future of the analog quartz electronic watch. They show an air of caution when the digital read-out is discussed, however. LCDs are definitely included in their projected product mix, but their years of producing traditional analog timepieces whose accuracy depends on precision mechanical construction and engineering cause them to move a bit slowly in accepting a digital read-out approach.

They pledge themselves to produce only units built around ultra-sophisticated quartz movements and modules which are now in quantity production. Swiss watchmakers state that they plan to merchandise only models which satisfy the following requirements: availability, diversity, quality and reliability.

Now that the design and production phases have been analyzed and improved, the industry is set to examine the administrative groups that guide its future. Talks are underway concerning possible opportunities for collaboration between the two giant Swiss watchmaking groups, ASUAG (The General Corporation of Swiss Horological Industries, Ltd.) and SSIH (Societe Suisse Pour L'Industrie Horlogere SA).

Reports indicate that the groups are exploring ways to combine their efforts to eliminate duplication of activities, but would retain their independence in other areas.



As Director General of FH, Rene Retornaz represents a major influence in the new marketing strategies that the Swiss are developing to improve their share of the U.S. market.

Spokesmen for the Federation of Swiss Watch Manufacturers (FH), the country's leading trade organization, think it is important to consider major changes in the methods of marketing, particularly in the United States. Rene Retornaz, Director General of FH, states that the U.S. continues to be the number one market for finished watches. The methods of marketing are much different than those successful in Europe, however. Omega and Tissot remain strong in other areas, but the former has suffered heavy losses in the U.S. Specialized plans are being tailored to recoup the lost market position.

So, the Swiss approach the future with cautious

**BULOVA
DEBUTS
ACCUTRON
SWISS
LINE
AT BASEL**



Andrew H. Tisch, President of the Bulova Watch Company, reads the announcement of Bulova's new Accutron Swiss line to the press during a special news conference in Basel. Harold L. Rapp, Bulova Director of Communications, stands to his left, along with members of the trade press.

The Bulova Watch Company of Flushing, New York, chose the Basel Fair as the background for introducing its new Accutron Swiss line of quality watches to sell in the U.S. in the \$200 to \$10,000 price range.

Andrew H. Tisch, Bulova President, presided at a special press conference to introduce the new line to the trade

**OMEGA INTRODUCES REVERSIBLE WATCH
WITH TWO FACES**

One of the interesting new products introduced at Basel was the Omega Equinoxe which offers the best features of two watch styles—a dial on one side and a multi-memory digital readout on the other.

To change from the analog face to the instrument face, the wearer need simply slide the case horizontally from left to right as far as it will go, then flip it over and push into place.

Features include an analog hand-display watch that is legible day and night due to its tritium hands. The reverse side has a 6-digit LCD display, including hour, minute, second or date, a repetitive alarm, chronograph, and an hourly signal. The battery is said to last approximately two years with average use of the sound signals. The unit offers plus/minus 5 seconds precision per month at normal temperatures.





Among materials furnished to Accutron Swiss retailers are an identification plaque for the window and a special tray to be placed in the counter case for the display of watches.

press. "The Accutron Swiss name instantly communicates the very best of both the technological and styling attributes that comprise this line of watches," he stated. "Swiss, to the American marketplace, and the world, connotes the following: a heritage of fine watchmaking; superiority in craftsmanship and design, and an inherent sense of public trust. Thus it is fitting to introduce this product here, in its country of origin."

Bulova spokesmen state that no one brand dominates the four-million-plus watch market in the U.S. in the over \$200 range. They will aim their efforts at this slice of the market.

Bulova spokesmen feel confident that the names "Accutron" and "Swiss" will convey an image of good craftsmanship, styling, and technology for the new line. Distribution will be confined to jewelers and fine jewelry departments.

optimism. They are aware that the Japanese are currently one lap ahead in the race to be the world's leading watchmaker. However, they still feel confident that their tradition of technological brilliance in intricate assemblies, plus their penchant for style and quality, will keep them a leading contender in the everchanging watch and clock market in the years to come.



Daniel A. Kellerhals (left, above), Vice-president of External Relations and Markets for FH, considers competing price-wise as a key to Swiss success in major markets. He is shown above with Rudolf Baerfuss of the Federal Office of Foreign Economic Affairs.



Dustproof Crowns



● Spring Style

● Valvic Style

No. 6 Spring Dustproof Crown Assortment

COMPLETE RANGE 5 TO 11 1/2 LIGNE • CORRECT TAP SIZES TO FIT EVERY POPULAR SWISS AND AMERICAN WATCH • NEW MODERN HEAVY KNURL FOR EASY WINDING.

BOT	COLOR	DIA.	HGT.	POST	TAP	BOT	COLOR	DIA.	HGT.	POST	TAP
1	Y.G.F.	4.1	2.3	.80	10	13	W.G.F.	4.1	2.3	.60	10
2	Y.G.F.	4.5	2.3	.80	10	14	W.G.F.	4.5	2.3	.60	10
3	Y.G.F.	5.0	2.3	.80	10	15	W.G.F.	5.0	2.3	.60	10
4	Y.G.F.	5.0	2.3	.80	9	16	W.G.F.	5.0	2.3	.60	9
5	Y.G.F.	5.4	2.5	.70	10	17	W.G.F.	5.4	2.5	.70	10
6	Y.G.F.	5.4	2.5	.70	9	18	W.G.F.	5.4	2.5	.70	9
7	Y.G.F.	5.4	2.5	.70	8	19	W.G.F.	5.4	2.5	.70	8
8	Y.G.F.	5.4	2.5	.70	7	20	W.G.F.	5.4	2.5	.70	7
9	Y.G.F.	5.7	2.6	.70	10	21	W.G.F.	5.7	2.6	.70	10
10	Y.G.F.	5.7	2.6	.70	9	22	W.G.F.	5.7	2.6	.70	9
11	Y.G.F.	5.7	2.6	.70	8	23	W.G.F.	5.7	2.6	.70	8
12	Y.G.F.	5.7	2.6	.70	6	24	W.G.F.	5.7	2.6	.70	6

48 CROWNS

REFILLS AVAILABLE

No. 5 Valvic Dustproof Crown Assortment

COMPLETE RANGE 5 TO 11 1/2 LIGNE • CORRECT TAP SIZES TO FIT EVERY POPULAR SWISS AND AMERICAN WATCH • NEW MODERN HEAVY KNURL FOR EASY WINDING.

BOT	COLOR	DIA.	HGT.	POST	TAP	BOT	COLOR	DIA.	HGT.	POST	TAP
1	Y.G.F.	4.1	2.3	.60	10	13	W.G.F.	4.1	2.3	.60	10
2	Y.G.F.	4.5	2.3	.60	10	14	W.G.F.	4.5	2.3	.60	10
3	Y.G.F.	5.0	2.3	.60	10	15	W.G.F.	5.0	2.3	.60	10
4	Y.G.F.	5.0	2.3	.60	9	16	W.G.F.	5.0	2.3	.60	9
5	Y.G.F.	5.4	2.5	.70	10	17	W.G.F.	5.4	2.5	.70	10
6	Y.G.F.	5.4	2.5	.70	9	18	W.G.F.	5.4	2.5	.70	9
7	Y.G.F.	5.4	2.5	.70	8	19	W.G.F.	5.4	2.5	.70	8
8	Y.G.F.	5.4	2.5	.70	7	20	W.G.F.	5.4	2.5	.70	7
9	Y.G.F.	5.7	2.6	.70	10	21	W.G.F.	5.7	2.6	.70	10
10	Y.G.F.	5.7	2.6	.70	9	22	W.G.F.	5.7	2.6	.70	9
11	Y.G.F.	5.7	2.6	.70	8	23	W.G.F.	5.7	2.6	.70	8
12	Y.G.F.	5.7	2.6	.70	6	24	W.G.F.	5.7	2.6	.70	6

48 CROWNS

REFILLS AVAILABLE

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THE PICKLE BARREL

By Marshall F. Richmond, CMW



MISCELLANEOUS JEWELRY REPAIR

Part III

A problem often encountered by the jewelry repairman is the removal of rings from fingers where swelling is involved or the finger has just outgrown the ring. Over the years, I have removed many rings from swollen or enlarged fingers. Most of this work was done in the shop, but on occasion, I have made house calls to relieve people of the discomfort they were experiencing. I have never made a charge for this service, but have always advised the customer to wait until all swelling goes away and then come to me to have the finger measured and the ring(s) sized to fit. This service I do charge for, and I feel that it easily compensates for the free service.

The jeweler can remove rings from a customer's finger which the customer cannot for two reasons. Experience and know-how help, but having two free hands is often necessary. As the customer has only one free hand, all he can do is pull, which bunches any loose skin against the knuckle and makes the ring tighter. With two hands, the loose flesh and skin can be worked back under the ring as it is worked toward the end of the finger and over the knuckle. Sometimes a lubricant such as petroleum jelly or a heavy soap solution will help.

Of course, it is best if the ring can be removed without cutting, but if this is impossible and the ring must be cut from the finger, there is a special tool that is available for this. It is a small, circular metal saw which is mounted on a handle and has a guard that slips between the ring and the finger. The saw can be rotated by turning a key, and usually a few turns will cut through the shank.

In any ring removal, good common sense should be used because often the ring must be removed due to a nervous condition which causes the swelling. Sometimes the customer needs to be reassured that there will be no pain involved, and then one must be careful

in removing the ring that none is experienced. The first step in cutting the ring is to study it to see where the best place to cut it will be. On stone rings the best place to cut is directly opposite the stone. On band rings, if a solder joint can be found, it should be cut there. After determining where the cut should be, the ring can be turned on the finger so this point is located on the back side of the finger (opposite the palm). If the customer is instructed to make a fist, this makes for an easy location to cut the ring, as there is room to insert the cutter and turn the key. After the cut is made, it can be spread with two pairs of chain nose pliers and slipped off the finger. It is best after the cut in the shank is opened a little, to grasp the ends with the chain nose pliers, covering the sharp edges of the sawed place in the shank. This reduces any chance of these sharp edges cutting the finger.

Some rings needing removal have the underside of the shank worn very thin and can be cut with a pair of side cutting pliers; then one can remove the ring with the two pairs of chain nose pliers. This is quicker than using the saw.

Allergy to gold is a claim made by some customers. Some claim to be allergic to yellow gold, some to white gold, and some to any gold. This is no doubt true in many cases, but in other cases where a skin rash, swelling, or obvious skin irritation around a ring is evident, it is really a chemical burn or irritation. This should be considered in the case of stone-set rings with crevices around and under the stone(s), which encourage a build-up of soap and soap detergents from washing the hands, washing dishes, or whatever. This build-up will often cause a chemical reaction when it comes in contact with body oils and/or salts, resulting in irritation or even be a chemical burn. Usually if this is the case, remounting in a mounting of a different metal will not eliminate

the cause, but will only prolong a re-occurrence. The residue will build up again unless the rings are kept clean. Of course, in this case, the problem could have been eliminated by cleaning the old rings and keeping them clean. Whenever I have been confronted with this problem, I have first recommended that a doctor be consulted. Then I have cleaned the rings and told the customer not to wear them until the irritation disappears. After this, the rings should be worn and kept very clean. If the irritation returns, I remount the rings if a doctor recommends it or if the customer insists on it.

It seems to be quite common knowledge that, in different people, body chemistry varies, so it is no doubt true that some people are allergic to white gold and others to yellow gold. This could be because yellow gold has a high copper content and some people are allergic to the copper, while white gold is high in nickel content and some people could be allergic to nickel.

Optical repairs seem to end up on the bench of the jeweler, who is probably more qualified to make them than most optometrists. Most optometrists do not want to make repairs on plastic frames, nor do they want to do gold soldering on gold filled frames, so people with broken eyeglasses often turn to the jewelry repairman. As many people cannot see well enough to function without eyeglasses, they are sometimes desperate when they come to you. It is indeed a fine service to make these repairs and restore good vision to your customers whenever possible. This is also a profitable part of the jewelry repair business, as charges can be made comparable to those for repairing fine jewelry.

Gold filled frames often break on one side of the nose bridge or in the channel rim around the glass or plastic lens. See Figure 1, View A, point a. These breaks can be repaired by gold

THE PICKLE BARREL

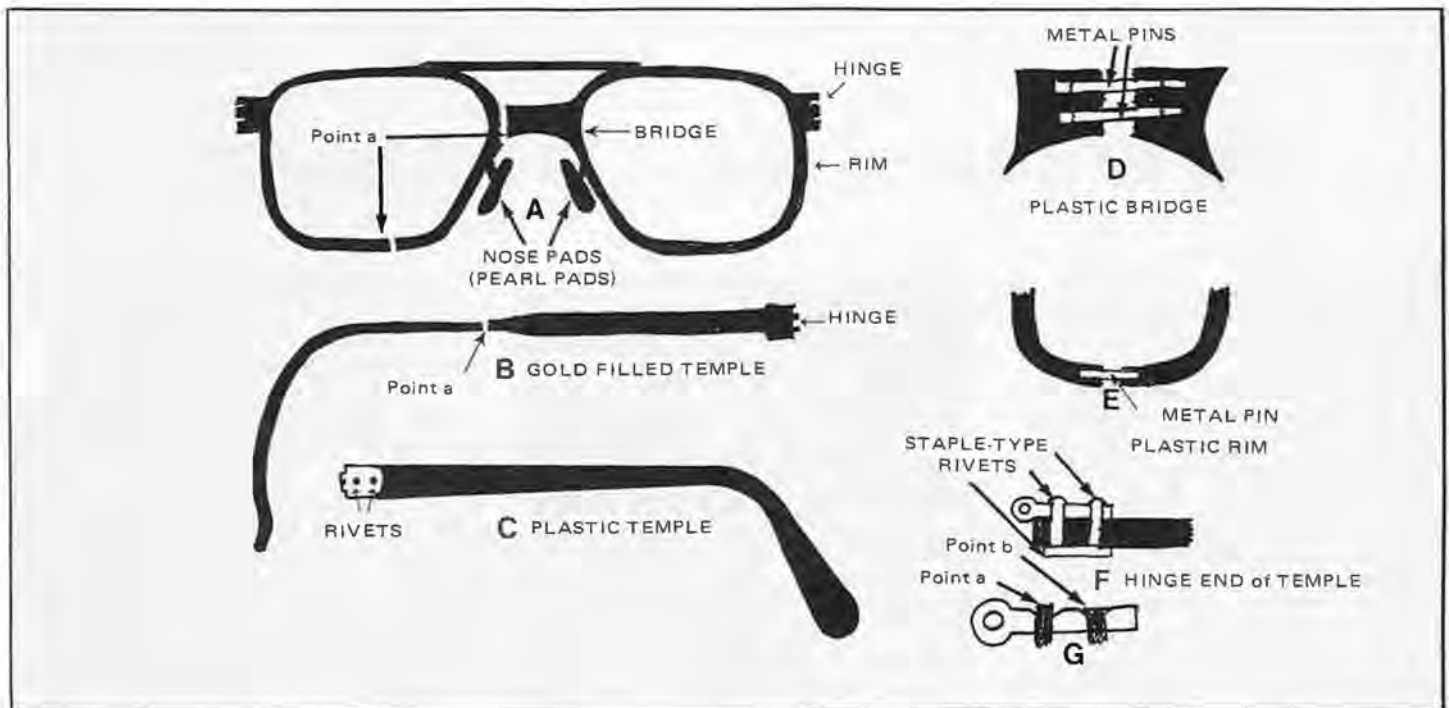


Figure 1

soldering. First, the pearl pads must be removed, as well as one or both lenses, because these parts will not take heat. Glass lenses may break from expansion when heated, and plastic lenses and plastic pads will melt or burn if heated very much. When the frames are stripped, they can be aligned on the asbestos pad by using either the third-hand tool or weights, such as steel bench blocks or heavy files. When properly aligned, heat and flux; then apply a small chip of gold solder over the break and apply heat with a torch or soldering machine until the solder flows. Both sides of the break must be heated evenly so the solder will flow to both sides simultaneously and not flow to one side or the other. Excess solder can be removed by filing or using metal or abrasive burs in the flex shaft machine; then polish with tripoli and rouge on the polishing motor using hard felt buffs. (Soft cotton buffs can catch in the frame and bend or mangle the frames badly.) When properly finished, there will be no evidence of the repair.

The small wires that hold the nose pads in place are gold soldered to the lens rims just below the bridge. These occasionally break off. After removing the pad, the wire can be gold soldered back in place, the excess solder filed off, the spot polished, and the pad replaced. The third-hand tool is an excellent holding device for aligning this repair and holding the wire in place while soldering.

Gold-filled frames occasionally break at the temple, usually at the point where the flexible hook that goes around the ear joins the staple shaft that is hinged to the frame. See Figure 1, View B, point a. This flexible part is steel cable, gold filled, so it can be gold soldered back in place. The only difference in this soldering procedure is that, due to the steel cable, Aircosil flux works better than regular hard solder flux. The part of the cable that is soldered will no longer be flexible, but when properly shaped after soldering, this will make no difference in the fit of the temple or permanency of the repair.

Plastic frames can also be repaired. However, any repair made on a break in the plastic can only be considered a temporary repair as plastic becomes brittle with age, and in a short time, will probably break in another place. One of the most common breaks occurring in plastic frames is the temple or frame becoming unriveted. This hinge is usually fastened to the temple with a staple-shaped double rivet. See Figure 1, View C. The other half of the hinge is attached to the frame in the same way. The riveted ends sometimes break off, leaving no protruding metal to rivet; however, by countersinking the holes in the hinge, enough metal will protrude to rivet into the countersink, and the hinge will be as strong as it was originally. See Figure 1, View F, and Figure 1, View G, points a and b. To rivet these, place

the back of the staple on a steel bench block or anvil with a round-bottom staking punch until the staple is tight.

Breaks in the plastic can only be repaired with cement, but can be reinforced by drilling and inserting brass or nickel silver pins. Breaks usually occur in one of two places: in the bridge or in the rim around the lens. See Figure 1, View A, point a. If the break is in the bridge, two holes about 1/4 in. deep can be drilled into each end of the break with a number 63 drill in the flex shaft tool. Cut two pieces of wire (brass or nickel silver) about .9mm in diameter and 3/8 in. long. Coat one end with epoxy cement and insert the pins; then coat the other end with the cement and fit the protruding pins into the holes of the other end, pushing the ends together until they fit tightly. Although epoxy cement will usually set in two to four hours, it does not reach its holding strength for about 24 hours, so it is better to let it set as long as possible. Where the ends were pushed together, an excess of the cement should form a protruding ring around the repaired break. After 24 hours, this can be removed by filing, and then the joint can be polished with small buff wheels in the flex shaft tool or on the polishing motor with plastic crystal polishing abrasive. Aron-alpha cement will also make plastic repairs, but it sets so fast that there

(Continued on page 47)

"We Fit the Program..." At Hot Springs

Horology is an ideal vocation for the handicapped individual. Schools of horology will gladly accept handicapped students, as they have proved themselves to be at least as dedicated, reliable, and stable as those students not physically impaired. The percentage of handicapped graduates who become successful, practicing horologists is unusually high. Their sense of achievement and accomplishment is even sweeter because of obstacles overcome and challenges met that do not face other students.

To my knowledge, the only horology school which will accept a student *only* if he or she is handicapped is Hot Springs Rehabilitation Center in Arkansas. The fact that both instructors are themselves handicapped affords the students the understanding and patience so vital to their rehabilitation. In the words of George W. Brown, one of the instructors, "We fit the program to the individual. We have to because our students may have physical strengths and weaknesses that are quite different from other trainees."

Both Brown and his fellow-instructor, James E. Johnson, are well qualified for their positions. They completed the Center's horology program themselves, and before joining the faculty, owned businesses of their own.



George Schlehr

Completion of horology training at the Center usually takes 18 months for the average student. It includes concentration on theory with Henry B. Fried's *Watch Repairman's Manual* as the textbook, as well as instruction in jewel setting, hairspring manipulation, material systems for stocking and supplying parts, service and theory of electric watch movements including the use of electronic testing equipment, basic clock repair, and the fundamentals of jewelry repair.

The program offers the only

formalized horology training in Arkansas and has a capacity of 25 students. Normally, there are 15 to 20 students, including females as well as males. Some, like Brown and Johnson, may be confined to wheelchairs. Others may be on crutches or handicapped otherwise in a mobility sense.

Upon admittance to the Rehabilitation Center, a student is put through intensive personal evaluation procedures. The purpose is to determine the student's areas of vocational interest, his aptitudes and capabilities, and to help him and his rehabilitation counselor make a decision on a vocational objective for him.

Let us say that during the initial evaluation, the student demonstrates an interest and aptitude for watchmaking and jewelry repair. He is then assigned to the horology program. There he receives a second evaluation, which entails tedious, routine-type work for two weeks, the idea being to further test his desire to enter the serious part of learning the profession.

It is during the second evaluation, Brown says, that the student reaches the crossroads. One route leads to a washout, while the other leads to full enrollment in the program, which in addition to the subjects previously men-

Instructor George Brown gives individual instruction to Clinton Thompson, one of his students.



Instructors George Brown and James Johnson lead their students in a discussion of horology as explained in Henry B. Fried's "Watch Repairman's Manual."



tioned, includes emphasis on meeting and dealing with the public, particularly customers, and advice that, although watchmaking and repair work may be tedious and repetitious at times, it pays well.

Once fully enrolled, the student can expect to attend class on a daily basis for a total of 2,160 hours. When he has completed the program, he is virtually assured of employment.

Upward of 90% of the students completing the program go immediately into employment. Some go to work for Timex, which has three Arkansas plants, while others secure employment with department stores or small jewelry stores. Other graduates strike out on their own, establishing small businesses; however, their instructors tell them that it is advisable to work for at least a year under an experienced professional's supervision before venturing into one's own enterprise.

No matter how the graduate decides to use his newly acquired skills, the fact that he completes his training is at the very heart of the state/federal rehabilitation program. Rehabilitation for any eligible disabled person is designed to enable the individual to make the most use of his abilities in a productive way, either through employment or through freeing a family member to become a wage earner. This is the essence of re-

habilitation and it is followed assiduously by staff and faculty at the Hot Springs Rehabilitation Center, which is operated by the Arkansas Division of Rehabilitation Services, Department of Human Services.

Every Minute Counts

PICKLE BARREL

(Continued from page 45)

is not enough time to align the ends properly when using the reinforcing pins. Figure 1, View D shows a bridge with the pins fitted, but with the break still open.

A break in the rim around the lens can be repaired in a similar manner, but using only one pin. The size of the pin to be used can be determined by the thickness of the plastic rim; however, most plastic frames are thick enough to accommodate the .9 mm wire in a hole drilled with the number 63 drill. Figure 1, View E, shows the bottom of a lens rim with the pin fitted before pushing together to close the gap. The lens must be fitted back in the rim before pushing the ends together. Then rubber bands can be used to keep constant pressure on the cement joint until the cement hardens. Epoxy and Aron-alpha cements, when properly hardened, can be filed and polished so that the repair hardly shows. Reinforcing pins usually do show, as most plastics are semi-transparent, but these pins are necessary in order to make a strong repair.

Years ago, eyeglasses were very much a related part of the retail jewelry store, and most jewelers sold and fitted eyeglasses. When the Indiana licensing law was passed for optometrists, many of the jewelers who sold glasses obtained this license without examination under the grandfather clause in the law; however, with the licensing laws, this part of the business has been removed almost completely from the retail jewelry store. The fact still remains that a jewelry repairman with his knowledge and skill is well qualified to make repairs on eyeglass frames.

In the next article, we will explain how to handcraft a hinged name bracelet.

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Farewell Address

This is my twenty-fourth and last Affiliate Chapter column. By the time you read this, a new Affiliate Chapter Director will have been elected, and he will be sharing his views with you beginning next month.

The last two years have been a pleasurable and rewarding experience (except for the frustration of trying to convince the typewriter to spell properly and correct my grammar). I will look back on it as a very important part of my life.

The stewardship of each Affiliate Chapter Director has been a period of growth, both in numbers and strength. Each term of service has seen a few more bricks placed on the road of progress. The past two years have produced our own set of By-laws, the introduction of the Annual Affiliate Chapter Report Form, the establishment of the Annual Affiliate Chapter Achievement Award, the release of the AWI membership list to chapters to aid in the recruitment of new members, the attempt to encourage each chapter to promote the use of the AWI case mark (Pos-I-dent) by its members and to inform local law enforcement officers of its existence, and the introduction of a convention questionnaire designed to improve your state convention by drawing on the experiences of others.

All of these projects were designed to promote the feeling of family among our chapters. The 1979 World Champion Pittsburgh Pirates used the hit record "We Are Fam-a-lee" as their theme song and motto. Perhaps we should do the same because we *are* a family. We need the sharing of the family. We need the caring of the family. We need the strength of the family. True, some of these programs require extra work—but that is a small price if but one



Robert F. Bishop

chapter benefits by the experience shared by a brother chapter.

Much remains to be done, however. All chapters have problems: some major, some minor. Our glossary series attempted to cast light on some of the more common problems of the average chapter, and to offer possible solutions. The chapter profile format presented an in-depth look at how the typical chapter began and how it operates. We need a renewed dedication to our brother watchmaker; a commitment to bring him into the quartz age and raise his professionalism. We must get behind the Pos-I-dent program to make it effective. I recently had the experience of participating in a news conference in Pittsburgh, and the importance of our case marking program to the Pittsburgh Police was demonstrated by the fact that Robert Coll, Superintendent of Police, gave Pos-I-dent his unqualified endorsement. He believes that it can be an effective tool in law enforcement *if* enough of our members participate. The news conference received extensive

newspaper, radio, and TV coverage. It is a newsworthy and worthwhile project for your chapter, and I would hope that the new Affiliate Chapter Director will continue the effort.

Another area in which your chapter can be of real service to the member is the Membership Assistance Program. By the time you read this, the program, which was developed by the Potomac Guild of the Horological Society of Virginia, will have been discussed at length by the delegates at the Affiliate Chapters meeting. This is an organized program to assist the family of a member who is seriously disabled or taken by death by organizing and completing, if necessary, unfinished repairs and aiding in the disposal of tools and equipment. This is a job for experts, and I would hope that your chapter would consider providing this service.

Money is a growing problem with many chapters. As I write this, at least one chapter may not be able to send a delegate because of the high cost of travel. Perhaps some sort of "creative financing," such as is used to sell homes, should be examined. The experience gained by your delegate at the annual meeting is worth the effort necessary to raise the funds. Be creative—explore means of financing worthwhile projects other than through dues. It can be done.

With continuing dedication to the purposes of AWI and the Affiliate Chapters and a striving toward the feeling of "family," I can see nothing but a bright future for us. Give your new leaders your support; tell them if you think they are wrong. Then you as a member will grow along with your chapter.

So long! —and thanks for your support!

RFB



MASSACHUSETTS

The March meeting of the Massachusetts Watchmakers Association was called to order at 8:07 p.m.

President Norman Rubin reported on his visit to the North Bennet Street Industrial School. Mr. Rubin was invited by the school to sit in on their Watch Repair Course and to give his impressions and opinions of the class. The school also requested information on the AWI Certification Course.

Door Prize Chairman Jose Piatti was absent, but due to the generosity of Mr. Gerard Progin and Portescap, nine door prizes were provided.

The meeting was then turned over to Program Chairman, Giacomo Cappabianca, who introduced the guest speaker of the evening, Mr. Progin of Portescap. Mr. Progin showed slides of different types of tools, machines, watch components, and other products which Portescap makes. He also spoke about the new quartz watches and the number of analog and digital types being sold. Mr. Progin also said that mechanical watches are still going to be around for quite a while, for in countries where it is very wet, or where watchmakers have little or no experience with electronic watches, materials and service are still very hard to come by.

Mr. Progin's talk was very informative, and it was enjoyed by all who attended. The generosity of Mr. Progin and Portescap are very much appreciated.

NEW YORK

On Monday night, May 4, 1981, at the Hotel Sheraton, before a multi-faceted horological audience composed of Henry Fried, Jacques Reymond, Don DeWolfe, Harold Perlman, Jack Schector, Al Rudnick, and others, past-president Irving H. Albert presented a seminar titled, "Servicing Stepping Motor Quartz Watches at a Profit."

Mr. Albert reached into his bag of 40 years of experience, and in simple language using effective visual aids, persuaded his audience that ser-



Irving Albert of the Horological Society of New York.

vic-ing SMQ watches is not difficult or expensive.

Being a technical writer for the Bulova Watch Company, he used some of the contents of his latest "General Service Manual for SMQ Watches" as a basis for the lecture.

His lecture was divided into four sections: a comparison of the components of a mechanical watch with an SMQ; how an SMQ functions; analysis and servicing; and questions and answers.

Perhaps the most important point brought out by Mr. Albert's presentation was his urging that the uninitiated involve themselves in the servicing of SMQs because of the simplicity of the tests used to determine the reason for the malfunction within the watch. The meeting ended with a resounding round of applause from a grateful audience for a job well done.

The New York State Watchmakers Association regrets the passing of two members earlier this year: Mr. Eric Samuel and Mr. Francis X. Distel. Mr. Samuel passed away following an operation in January. Mr. Distel was killed in an auto accident later in March. Our thoughts and prayers are with their families.

On July 26, 1981, Milt Stevens

and Jerry Jaeger will present the bench course, Basic Electricity and Use of Meters. This will be held at the Best Western in Syracuse.

The NYSWA will have its convention on September 26 and 27, 1981. Linda Spicknall has lined up nearly 10 hours of programs for this convention at the Hotel Syracuse. These include: "The Essence of Clock Repair" by Sean Monk; a slide program on polygraphs from the American Polygraph Association; a Bulova program by Henry Frystack; "Temperature Effect on Quartz Watches" from L & R; a slide program on a group of individuals who restore clocks, by Tom LaRose; "Horologists are Made, Not Born" by George Schlehr of Mountain View College; "Once Upon a Robbery" and "Sticky Fingers"—programs with a speaker on store security, presented by the Syracuse Police Department; and a slide program on push button replacement (on quartz watches) by Louis A. Zanoni of Zantech.

OHIO

Eighteen watchmakers attended a seminar at Perrysburg, Ohio. Tom Love, membership chairman, reports five new members this month and ten renewals. The Ways & Means Committee, chaired by Howard Opp, submitted six items for the directors' consideration at the April 26th Board meeting. These were considered and discussed. Four were accepted; one is being checked, and one was amended before being accepted.

The Annual Convention will be held Friday, Saturday, and Sunday (July 24, 25, and 26, 1981) at the Marriott Inn East in Columbus, Ohio.

COLORADO

The Colorado Horological Society charted a "one-on-one" course for the coming year as president Milton G. Lyon challenged each present member to try to enroll a new member in the coming year. Citing the contributions of the current active membership, Lyon said, "We need all the involvement we can

get to make this as great an organization as I think it can be."

Designated to carry out this program are the officers for 1981-1982: president, Milton G. Lyon of Castle Rock; vice-president, Raymond B. Renemeyer of Littleton; secretary, Raymond P. Rice of Aurora; and treasurer, Loren E. Magnuson of Aurora.

The Board of Directors for the coming year includes Emery Brittenham of Arvada, Charles S. Christiansen of Greeley, Ted Cuyler of Brush, Lyle S. Evans of Golden, Harold W. Hein of Golden, and Phillip Lombard of Pueblo.

ONTARIO

The Ontario Watchmakers Association held its annual Members Meeting, President's Reception and Banquet on Sunday, April 26, 1981, at the Loews Westbury Hotel, Toronto. Mr. Marvin Whitney, representing AWI, gave an excellent lecture and slide presentation on the Chronometer. The 1980-81 officers were elected by acclamation for a further term of one year.

The guest speakers at the President's Banquet were Mr. Marvin Whitney representing AWI, and Mr. James Fraser, representing Ebauches SA and the Watchmakers of Switzerland.

The OWA used the President's



(Above) Marvin Whitney, Joseph Rugole, Robert Phillippe, and Victor Failes.

(Left) Marvin Whitney receives OWA Achievement Award.

Banquet as the time and place to honor Marvin Whitney, Joseph Rugole, and Victor Failes with the OWA Achievement Award for their contributions to horology.

Marvin Whitney, CMW, CMC was honored for his contribution to the watch repair profession as a technician with the U.S. Navy, a teacher, and a

director of the American Watchmakers Institute.

Joseph Rugole, B.A., CMW is known as a teacher and writer and is a director of the Ontario Watchmakers Association.

Victor Failes is a Charter Member of the OWA and is Niagara District representative on the OWA Board of Directors.

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THE SHIP'S CHRONOMETER

(Continued from page 35)

justed within the circumferential line of the balance, the straightening of the bows from an increase in temperature as described, will throw their free or loaded end inward toward the axis of the balance. This will diminish the moment of inertia. Thus, by adding to the primary compensation afforded by the section (B), it will provide an auxiliary compensation for the errors caused by the difference between the change in the energy of the hairspring. Since the bows may be adjusted upon their pivots or points of attachment to the balance, and, since the screws (N) with which they are fitted may be adjusted to give greater sweep to the free ends of the bows, the secondary compensation arising from the action of the bows may be readily made to correct the differences of the primary compensation. By adjusting the screws either in or out as the case may be, their position may be fixed in such relation with the axis of the balance that their auxiliary compensation action will neutralize the errors caused by the difference in the two ratios. That being, the moment of inertia of the balance wheel and the elasticity of the hairspring do not change in the same proportion.

REED, GEORGE P., Boston,

Massachusetts. Mr. Reed first saw the light of day in Grafton, New Hampshire in 1827. He was first indentured as an apprentice to a harness maker at the age of eighteen. However, he found working with machines more challenging than working with leather. Reed's mechanical aptitude was soon put to the test when he found the verge broken in his own watch. He proceeded to file one from a harness needle. Although somewhat crude, it performed rather well.

To satisfy his mechanical aspirations, he relinquished his harness-making apprenticeship and entered into a different one with Jacob Carter, a watchmaker in Concord, New Hampshire. He remained under Mr. Carter's tutelage for two years. Having reached the age of twenty-two and being satisfied with his progress, he left Mr. Carter and his home state for Boston. He worked in the Boston area as a journeyman watchmaker until 1854 when he went to work as a pinion finisher for Messrs. Dennison, Howard and Davis (The Boston Watch Company) of Roxbury, Massachusetts and later of Waltham.

Shortly after the firm was moved to Waltham, the country was stuck by a large-scale depression. The company was forced into receivership, resulting in a major reorganization with management changing hands.

During his employment with the

Boston Watch Company, Mr. Reed was granted a patent, No. 17,055, for his patented Mainspring Barrel and Maintaining Power. It was so designed that, should the mainspring break, it would not damage the train.

When the partnership of Messrs. Dennison, Howard and Davis was dissolved, Mr. Edward Howard returned to Roxbury where he started his own factory in the old defunct Boston Watch Company building, which eventually became the famous E. Howard Watch Company. Mr. Howard thought so highly of Reed's talents and skill that he offered him a supervisory position, which Reed accepted.

Around the time that the firm of Dennison, Howard and Davis was folding, Mr. Reed was in the process of designing and constructing a prototype model of a new watch. Shortly after Howard opened his new factory, he began producing Reed's newly designed watch. This watch was rather unusual in design in that it had six pillars. However, because a writer in describing it referred to it as having seven pillars, it became known as the "Howard's Seven Pillar Watch." All of Howard's early watches had Reed's patent barrel and were fitted with either gold or steel balances. Later, he utilized a compensating balance which was designed by and made under Reed's supervision. Howard had purchased from Reed

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the rights to use his patent barrel for which he paid Reed a royalty of one dollar on each movement made.

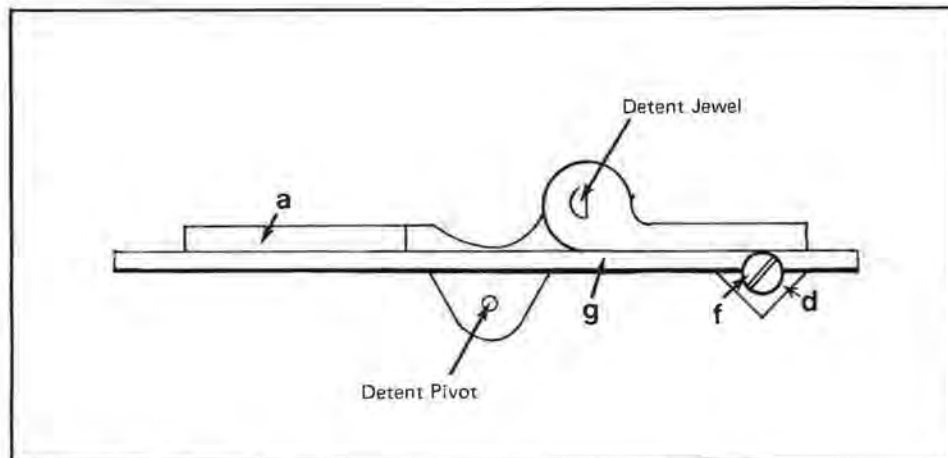
Mr. Reed remained with Mr. Howard until 1865 when he quit to go to England. Upon his return from abroad, he settled in Boston where he opened his own business on School Street. Mr. Reed continued to adjust watches and began working on his ideas as to how to improve the chronometer (pivoted detent) escapement. He desired to simplify its construction so it would be easier to repair.

On April 7, 1868, Mr. Reed was granted a patent, No. 76,346, entitled "Improvement in Chronometer Escapement." He produced thirty very fine pocket chronometers in which he incorporated his improved escapement. During this same period, he designed a stem winding device to be used in conjunction with his patented barrel.

The beauty and quality of workmanship in his timepieces was soon recognized by the populace, and the demand for his timepieces increased. He used both the lever and the chronometer escapements in his pieces. Because of this increased demand, he was forced to enlarge his facilities and hire additional help. As his business continued to prosper, once again he had to seek larger quarters. This time he took over the building at the corner of Main and Tremont Street in Melrose (a suburb of Boston) which was formerly occupied by the Tremont Watch Company. Here, in connection with his watch manufacturing business, he also added a retail jewelry and watch repair department.

On March 9, 1869, Mr. Reed was granted another patent entitled "Improvement in Chronometer Escapement." In describing this patent, he stated, "The patent issued to me on the 7th day of April, 1868, forms no part of my present invention . . ."

In 1870, Mr. Reed was granted another patent, No. 49,154, for a micro-



Figures 6, 7 and 8. George P. Reed's "Improvement in Chronometer Escapement," Patent No. 76,346, April 7, 1868.

meter "whip lash" regulator which unquestionably was copied and used more widely throughout the horological industry than any other design.

Mr. Reed remained in the old Tremont building until it was sold in 1881. At that time, he purchased a house on Main Street in which he opened a retail store and also continued to manufacture watches. He remained at the Main Street address until his retirement. Mr. Reed passed away in 1907.

Reed's patent, No. 76,346, April 7, 1868, "Improvement in Chronometer Escapement" consisted of a design change in the material and manner in which the lift spring was attached to the pivoted detent. Reed used a small piece of steel hairspring wire for the lift spring which he claimed would be much easier to install and adjust. This was accomplished by cutting a narrow slot in the upper face of the free end of the detent just wide enough to accommodate a piece of hairspring wire and to a depth slightly less than the width of the spring. See Figures 6, 7 and 8.

In the larger end (d) of the detent (a), a screw (f) is positioned near the slot so when seated, the downward

pressure of the head would bear against the narrow feather spring (g). The narrow strip of spring, cut from a steel hairspring, is inserted in the narrow slot at one end. The spring extends along and between the pivot and detent of the lever (a).

To move the spring in either direction longitudinally within the slot or to remove it, it was only necessary to loosen the screw which frees the spring.

Reed's second chronometer escapement patent, No. 87,707, dated March 9, 1869, was also entitled "Improvement in Chronometer Escapement." Here his invention did away with the coiled spring mounted on the arbor of the pivoted detent, whose function was to return the detent back against the stop or banking pin. It also eliminated the need for a separate lifting spring, since both functions were performed by one spring. See Figures 9 and 10.

He used a narrow, feather-type spring as before, only longer. The thin spring (d) was fitted in a slot (e), which was cut within the face of the outer or free end of the detent. The spring was held in place by a screw (g), the head of

(Continued on page 54)

Figure 7

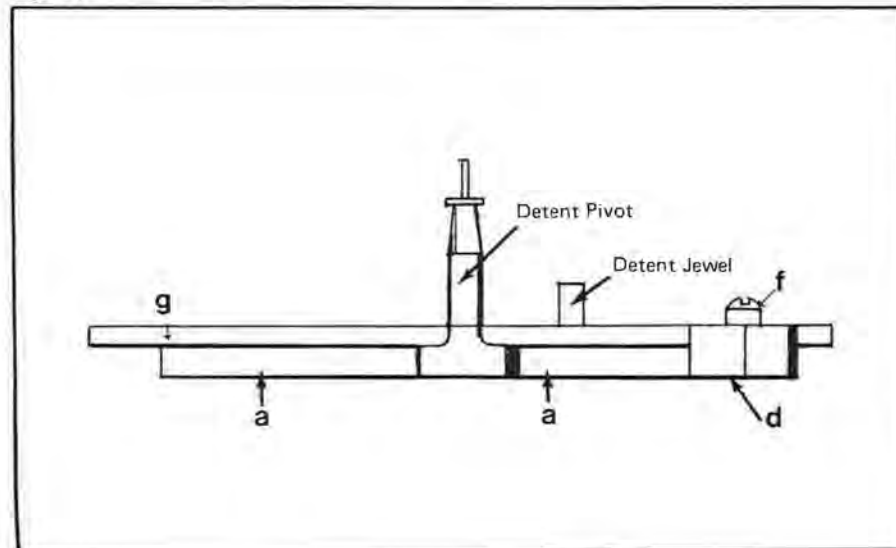
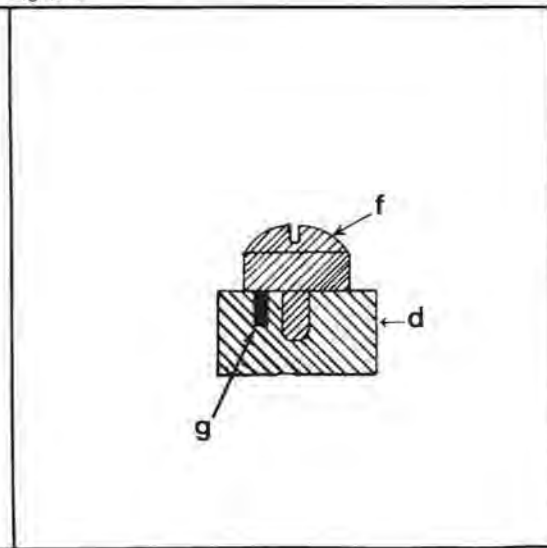


Figure 8



TECHNICALLY WATCHES


(Continued from page 40)

the inside of the cylinder outward. After the impulse faces are shaped, the cylinder is hardened and tempered. First remove the cylinder from the brass wire. Then fit it onto a steel wire that fits the hole snugly. Now place the cylinder in the alcohol lamp flame for an instant to warm it. Then place the cylinder into some powdered boric acid. The boric acid adheres to the cylinder and makes a coating that keeps the surface of the cylinder from oxidizing when the cylinder is heated for hardening. The cylinder is heated in the alcohol lamp flame until it becomes a medium cherry red. Then it is quenched, end first, in cold tap water. When the cylinder is quenched, the boric acid will shed off, leaving the cylinder clean.

To temper the cylinder, first support the cylinder on a wire while the outside surface is polished with boxwood and Linde A. This is so the surface will show the correct tempering color. Now fit a brass taper pin into each end of the cylinder. Then take an old pair of tweezers to hold the cylinder across the impulse faces. This is to prevent the impulse faces from getting the heat when the brass taper pins are heated in the alcohol lamp flame to temper each end of the cylinder. Each end of the cylinder should be tempered to a greenish blue color, while the impulse faces should not show any change of color. This means that the impulse faces are left dead hard while the ends of the cylinder are soft enough to allow the plugs to be pressed in without splitting the cylinder. The tempering color can be removed from the cylinder by polishing the cylinder or dipping it into a rust remover compound. If the rust remover is used to remove the tempering color, then the cylinder impulse faces should be repolished as well as the inside and outside surfaces of the cylinder. Now the plugs can be made and staked into the cylinder. Then the cylinder is pressed into the hub of the balance wheel and the balance wheel trued and poised. After this, the hairspring collet is pressed onto its shoulder. Please refer to the "Technically Watches" column in the June, 1981 issue for methods used in replacing cylinders and cylinder plugs.

Occasionally the brass hub that the cylinder fits into is damaged and must be remade. The following procedure is used in making a new hub: First select a piece of brass turning rod slightly larger than the outside diameter of the hub. Then chuck the rod up true in the lathe. Let the rod extend from the chuck far enough to make the complete hub and have room enough to cut off the finished hub. Spot a center in the end of the rod with a sharp graver. Select a drill that is

.02 to .04mm larger than the cylinder. Use the drill to drill a hole in the end of the rod deep enough to make the complete hub. Proceed to make the hub by first marking off the length from the balance seat to the end of the hairspring shoulder. Then turn the diameter for the balance wheel, leaving a close fit with a flat seat for the balance wheel to fit against. Turn the hairspring shoulder and, at the same time, undercut the rivet for the balance wheel. Now turn the diameter of the hub. Then mark off the length of the large part of the hub and cut the hub off. Now the hub is chucked up by the hairspring shoulder while the bottom of the hub is faced flat and the edge beveled to the proper shape. The hub can now be staked into the balance wheel.

This concludes our discussion of cylinder escapements. 



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THE SHIP'S CHRONOMETER
 (Continued from page 52)

which overlapped the upper edge. The end (h) of this spring acted as the lift spring. By increasing the length of the feather spring (d), he was able to bend its outer portion (a') to form a yoke. The free end (i) of the yoke was bent inwardly and positioned nearly parallel to the lifting portion (h) and rests against the stud (j). This stud is fixed to the plate and below and slightly to one side of the arbor of the detent. The outer end of the extended spring passes through a large notch (k), cut in the upper part of the detent; it is secured to the detent by the screw (l) which prevents any displacement of the spring.

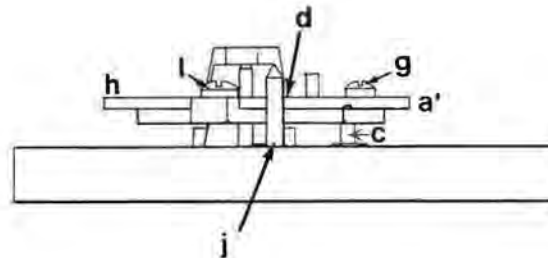
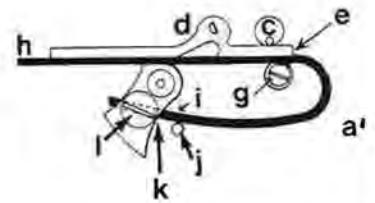
The elasticity of the (i) portion of the spring, acting against the stud (j) keeps the detent against the banking pin (c), except when it is being lifted by the action of the escapement. Since the stop (j), which supports the return position of the spring (d), is in close proximity to the arbor or fulcrum of the detent, the lighting of the detent is very easily done.

Reed states, "The use of my present invention dispenses with these parts (collet, stud, and screw) as well as with the coiled spring itself, with a consequent reduction of the number of

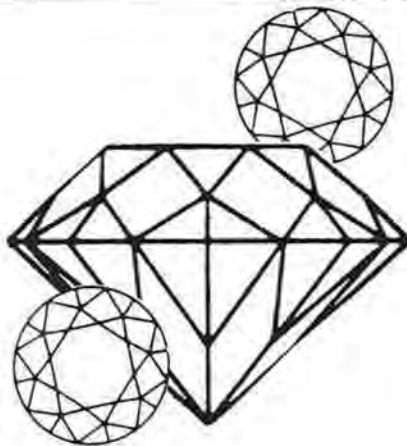
parts of a chronometer, as well as its cost, and with an increased facility for repairing or manipulating the works of such chronometer.

"In addition to these advantages, however, one great value of my invention is the fact that the friction of such detent and its adjuncts performed in a sensitive and perfect manner."
 TIMES

Figures 9 and 10. Figure 9 is a top view, while Figure 10 is an edge elevation, of George P. Reed's second chronometer escapement, Patent No. 87,707, March 9, 1869.



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Make Telephone Cost Control A Profit Center In Your Business

By Bryan E. Milling

You can cut your telephone bill by 30% or more without any reduction in service. When you recognize that fact, you will make telephone cost control another profit center in your business. After all, the money you save by reducing telephone costs goes directly to your bottom line. Moreover, you get that profitable benefit month after month after month.

Significantly, reducing your telephone costs doesn't require the aid of an expensive consultant. Nor do you need a degree in communications engineering.

However, you do need to recognize the elements that make up the total telephone costs in a business. Then you must eliminate any costs that prove excessive or unnecessary.

From the perspective here, telephone cost control actually has three elements. Thus, you minimize telephone costs when you practice effective:

1. Equipment cost control
2. Billing cost control
3. Internal cost control

Let's review the profit potential held in each element.

Equipment cost control rests on an obvious premise. That is, you should justify the costs that arise from every phone employed in your business. Every excess station becomes an excess expense.

However, equipment cost control proceeds beyond a realistic restriction on the number of phones employed in a business. Indeed, every special feature added to the basic black dial phone also increases your monthly equipment costs.

For example, you pay \$15-\$20 annually for every phone that has a winkhold light to remind the receiver that he has a call holding. Some busy executives find that feature useful. However, many others recognize the winkhold light—and the associated expense—as dispensible items.

Of course, standing alone, any specific special feature cost may appear insignificant. However, multiply each charge by the number of phones employed in a single business and the cumulative costs quickly become more noticeable.

Moreover, those cumulative costs often remain hidden in the lump sum bill for equipment rendered each month by the phone company. In many instances, up to 50% of that lump sum represents special feature costs. Noting that fact again should make those costs more noticeable.

Also, note that your internal equipment does not have to come from the telephone company. Instead of paying perpetual monthly rental fees—that rise along with other prices—you often can save substantial amounts by purchasing comparable or superior equipment from independent sup-

pliers. Alternative suppliers are increasingly common, and commonly cheaper than the telephone company.

To effect billing cost control, periodically request a computer printout from the phone company that itemizes the charges that make up your monthly bills. Any other supplier has to substantiate his invoices. You shouldn't release the phone company from that obligation.

Next, compare each specific charge against the proper rate identified in the phone company's tariff, i.e., the price list approved by the appropriate regulatory agency. Most overcharges commonly fall into three categories.

One category includes equipment rental charges. As suggested above, you incur a separate charge for every piece of equipment, as well as every associated special feature. That complex billing system naturally encourages many errors, often including charges for equipment that no longer exists. Certainly you shouldn't have any unnecessary equipment and neither should you pay too much for that employed.

The second category of common billing errors includes excess "message unit" charges for local calls. Of course, in smaller cities, the phone company often charges a flat rate for local service. However, in more densely populated areas, a business typically pays a monthly charge derived from the message units used by the firm. For example, a business may incur a message unit charge for each local call. Then, additional

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message unit charges may accrue for a call to an outlying local area. Still more message unit charges may arise from the length of time each call employs the telephone lines. In any instance, you must verify the application of the correct message unit rate for your circumstances.

The toll charges for long distance calls make up the third category of charges commonly subject to billing errors. You may find charges for calls never made—or an unknown party might bill charges to your phone. The phone company may apply the incorrect rate to lengthy long distance calls. Verifying these charges can be tedious, but that task can also be profitable.

Observing one more fact should add some zest to your billing cost control effort. That is, identifying an overcharge does more than restore your telephone bill to its proper place. Indeed, the telephone company is obligated to refund accumulated excess charges from previous months or even years. Over extended periods, unnoticed overcharges easily can accumulate to hundreds of dollars. Your initial control effort may uncover a substantial windfall profit.

Internal cost control stands as the final element in the management battle to reduce business telephone bills. That element encourages—or requires—prudent employee practices that reduce the toll charges for long distance calls and the message unit charges for local calls.

You are on the path to lower toll charges when you recognize how those charges are affected by:

1. The time you execute a long distance call.
2. The way you execute a long distance call.

As you will see, properly planning long distance calls can reduce telephone costs significantly.

Naturally, executing any type of long distance call from 8:00 a.m. to 5:00 p.m. imposes the largest expense on a business. Making the same call—unless it is person-to-person—from 5:00 p.m. to 11:00 p.m. reduces that expense by 35%. A \$3.00 toll charge drops to \$1.95. Finally, making the same call during the 11:00 p.m. to 8:00 a.m. time frame earns a 60% reduction from the daytime rate. The cost for a \$3.00 call drops to \$1.20.

The potential profits from properly timing a long distance call increase if you commonly communicate with businesses in other time zones.

For example, if it is 5:15 p.m. in the Eastern Time Zone, a long distance call to any of the other three time zones qualifies for the lower evening rate. Moreover, since it is still within the normal business day in those zones, the receiver is likely to be at his or her desk.

Indeed, a business with a high volume of calls to

other time zones may find it profitable to stagger the workday for some employees. That facilitates the opportunity to gain the maximum potential benefits for the lower toll charges.

The way you execute a long distance call also affects your toll charges. Of course, in any time frame, dialing that call directly remains the least expensive, most efficient alternative.

The average expense per call increases by 30% when you seek an operator's assistance to complete a call. Credit card calls, calls charged to a third number, and calls that request time and charges fall into the category of the higher-cost, operator assisted calls.

Of course, a person-to-person call remains the most expensive long distance call. That call may cost as much as 180% more than the same call dialed directly. Thus, a \$2.00 call dialed directly becomes a \$3.60 call if made person-to-person.

Moreover, the cost for the first three minutes of a person-to-person call holds constant twenty-four hours a day. Any available savings for such calls accrue only after the initial three minutes.

Indeed, the high cost makes it difficult to justify a person-to-person call at any time. Moreover, the innovation of a special one minute rate for calls dialed directly reinforces that claim.

You don't have to pay the three minute rate for a direct dial call that finds your party out. If you keep that call under one minute, your cost may be as little as 30¢.

Using your one minute effectively can enhance the potential savings. For example, use that minute to leave a message or find out when the party will return. Then, a subsequent call dialed directly should prove more fruitful—and less expensive—than a person-to-person call.

Indeed, research indicates that over 50% of the long distance calls executed actually answer the need for one-way communication, e.g., to confirm an order or make a request. In such instances, it makes sense to employ the less expensive—if less personal—communication avenues through the TWX or Telex system.

Should you lack a TWX or Telex unit, you still might reduce toll charges with Western Union's Mailgram service. That service can electronically transmit up to 100 words across the country for \$2.00. The post office delivers a hard copy of the message the following business day. Significantly, next day delivery actually occurs 98% of the time.

Finally, a business with a sufficient volume of long distance calls might gain a significant cost reduction by installing the phone company's Wide Area Telephone Service, i.e., a WATS line.

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*Of and For the
Clockmaking Profession*



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This book is the most significant work on clock repair to be published in this century! The authors, Joseph G. Baier, PhD, CMW; James L. Tigner, CMC; and Marvin E. Whitney, CMW, CMC, are recognized as being among the leading contemporary horologists in the field.

They follow the same format as was used in AWI's popular "Questions and Answers of and for the Watchmaking Profession," which was published in 1970. The original Q & A book has been widely used by students and schools of horology. It is about to go into its third printing. The new "Clock Q & A" book will be a companion to the earlier text.

The book contains 224 large, 8½ x 11 in. pages and includes many original drawings and photographs. The economical but durable soft cover helps keep the volume in a price range easily affordable by students and beginners as well as professionals.

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TIMERMATE: NEW AID FOR THE WATCHMAKER

Maurice Lareau, President of the South Central Florida Watchmakers Guild, recently introduced to the Guild his Timermate, a multi-function machine for the professional watchmaker. He designed and built the machine which features a programmable automatic watch winder for testing and winding the self-winding watch, a built-in watch cell tester with mini-clip for holding the cell, 200 milliwatt audio amplifier (connects by cable to a timing machine), a digital quartz clock, a 24 hr. piezo alarm, a stopwatch, a "to the second" switch, and D.C. sockets for a mini-lite or small electroplating. For more information on the Timermate, write: 1408 Robin Ct., Longwood, FL 32750.



PRETTY CARAVELLE LADIES' QUARTZ WATCH
New for this fall is this bracelet watch, one of seventy Caravelle models being introduced by Bulova. It features a goldtone

integrated case and bracelet with a bark finish. Its gilt dial has a vertical linen finish. Model 49045 retails at a suggested \$120.



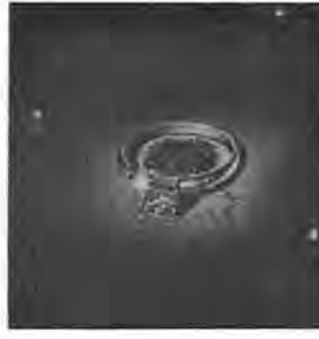
MINIATURE SCREW PRODUCTS WON'T JAM AUTOMATIC FEEDERS

A wide range of precision English and metric miniature screw products for technical applications requiring periodic adjustment or disassembly for repair is available from J. I. Morris Company of Southbridge, Massachusetts.

The J. I. Morris line of Miniature Screw Products includes screws, hex nuts, and round, flat washers that feature dimensional tolerances as close as 0.001". Free of burrs, they won't jam automatic assembly feeders and seat properly every time.

Offered in more than 1000 stock sizes from 0000-160 to 2-56, J. I. Morris Miniature Screw Products are typically made of stainless, brass, aluminum, and steel; special orders are accepted. Applications include computers, instruments, electronic connectors, and jewelry.

For more information contact: J. I. Morris Co., John B. Dirlam, Elm Street, Southbridge, MA 01550. (617) 764-4394.



SWEST OFFERS FREE MOLD MAKING INFORMATION

A brochure entitled "MOLD MAKING: Everything You Need & Everything You Need to Know" is available free on request from Swest, Inc.

"This 8-page brochure contains a wealth of information on jewelry mold making," says Earl R. Weaver, president of Swest, "and we feel it will be an aid to anyone involved in mold making, whether a beginner or a professional."

The brochure gives detailed instructions on vulcanized rubber molds as well as infor-

mation on RTV molds, transparent mold compound, injection wax specifications, and wax injector procedures. All equipment and accessories for mold making are pictured, described, and priced.

For a copy of "Mold Making" contact Swest, Inc., 10803 Composite Drive, Dallas, TX 75220, or 1725 Victory Blvd., Glendale, CA 91201.

NEW ENVELOPE SIMPLIFIES REPAIR PROCEDURES

Watch repair shops can simplify their over-the-counter procedures by using a new repair envelope available from Impact Manufacturing Co. The specially designed envelope features detailed take-in instructions on the front and provides customer and store copies for future reference.

Write Dept. 101, Impact Manufacturing Co., 2422 Park Central Blvd., Decatur, GA 30035.

MOE DIAMOND WEIGHT CALCULATING SYSTEM EVEN MORE USEFUL

Expanded tables applicable to stones from .18 to 27.52 carats make the Moe diamond weight calculating system even more useful to jewelers and appraisers. Without removing a diamond from its setting, an estimator can reliably estimate weight by measuring the stone's diameter and depth with the Moe diamond gauge and matching these figures with the Moe tables. Weight tables booklet, No. 24-105-01, is available at lapidary and jewelers' supply houses priced at \$5.15.

The complete Moe diamond weight calculating system No. 24-105—weight tables booklet and gauge—comes in a vinyl case which folds to 3½" x 5¼". The special Moe diamond gauge is now black with contrasting figures for improved readability and includes a point attachment which permits measurement of stones having a crossbar back of the mounting.

For more information, contact GFC, Box 243, Carlstadt, NJ 07072.



Moe Diamond Weight Calculating System No. 24-105

the watch boasts an accuracy of plus or minus 3 seconds per year. Citizen has brought together the latest in quartz technology and high styling in a men's watch featuring an 18K gold case and leather strap. Available in fine department and jewelry stores across the country, the Citizen Quartz Mega carries a retail price of \$3,500.

LONGINES-WITTNAUER'S NEW COLOR CATALOG FEATURES 1981 LINE

Longines-Wittnauer's 1981 Watch Company catalog, with 114 pages of color and black and white photographs of the company's latest styles, is being distributed to jewelers across the nation.

The catalog is available to authorized dealers by writing to: The Longines-Wittnauer Watch Company, 145 Huguenot St., New Rochelle, NY 10802. **TIME**

FROM BOREL'S NEW SOCIETY COLLECTION

As part of its new Society Collection, Ernest Borel introduces a new men's watch that combines the strength of steel with the elegance of gold. Equipped with a quartz movement with calendar, this fine timepiece is available in both men's and ladies' sizes.

The watch has a suggested retail price of \$275.00 keystone. Distributed by Borel Watch Company, 1008 Walnut Street, Kansas City, MO 64106. Reference 4542.



New men's watch from Borel



Citizen Quartz Mega

INTRODUCING THE CITIZEN QUARTZ MEGA

Uniting accuracy with thinness, Citizen Watch Company introduces the Citizen Quartz Mega—the world's most precise watch for its size. Only 2.5 mm thin,



BULOVA SCHOOL WINS AWARDS

The Bulova School of Watchmaking in Woodside, New York has recently been awarded honors by two national educational associations for their outstanding program to serve disadvantaged and disabled students, according to an announcement from James Devaney, Director.

The Academy for Educational Development presented the school with its Certificate of Achievement at a dinner in New York early this month. The National Association of Trade and Technical Schools chose the school to receive their annual Community Service Award recently. The formal presentation of the award was made during the NATTS Annual Conference in Denver, Colorado.

GIA GEMOLOGY COURSES TO BE OFFERED IN CANADA

Negotiations between the Gemological Institute of America and the Canadian Jewellers Institute, the education division of the Canadian Jewellers Association, have culminated in an arrangement whereby Canadian home study gemology students will have direct contact with their instructor in their own country. Effective July 1, 1981, current students and new enrollees in Diamonds, Colored Stones and Gem Identification curricula will correspond directly with the Canadian Jewellers Institute in Toronto, Ontario.

The Diamond course of study presents the geologic origins, history, mining and marketing of diamonds. Physical, chemical, and

optical properties are covered, along with new material on diamond grading and diamond substitutes and simulants.

The Colored Stone course covers 20 major gemstone species and their varieties. Gem Identification teaches the use of instruments and techniques for identifying gemstones and distinguishing them from substitutes.

The completion of these courses earns a GIA diploma in Gemology. Additional attendance of two one-week classes on Diamond Grading and Gem Identification leads to the diploma of Graduate Gemologist.

Further information on these programs can be obtained by writing Canadian Jewellers Institute, Royal York Hotel, 100 Front Street West, Toronto, Ontario M5J 1E3. Phone: (416) 368-8372.

PULSAR NAMES NOLAN TO NEWLY CREATED SALES POSITION

Pulsar Time, Inc. has named Ron Nolan to the newly created position of National Sales Manager. The announcement was made by Arthur Schwartz, Pulsar president.

Pulsar, now entering its third year, has experienced rapid growth and specializes in watches selling in the popular \$50 to \$160 range.

"Mr. Nolan's appointment further strengthens our rapidly expanding sales and marketing management group in the company," stated Mr. Schwartz. "We are fortunate to have an executive with such an outstanding

managerial record in sales and marketing. He will play a major role in Pulsar's long-range program for continued sales penetration in the United States," he added.



PJC STUDENTS RECEIVE BULOVA QUARTZ TRAINING

Twenty-two Paris Junior College students and area watchmakers completed a quartz training cer-

tification program given at PJC recently by Bulova Watch Co., Inc. The eight-hour program was conducted by Calvin Sustachek of Jackson Heights, NY, field service instructor for Bulova.

Those completing the program will become certified Bulova quartz technicians, according to Paul Clayton, chairman of PJC's horology and jewelry technology division. They will be entitled to technical assistance from the company, and a decal and diploma for store display. Emphasis was placed on diagnosing, trouble-shooting, and efficient servicing of quartz watches.

Sustachek, a certified master watchmaker, worked for the American Watchmakers Institute, jewelry companies, and an electronics firm before joining the Bulova Watch Co. A Wisconsin licensed watchmaker, he attended Elgin Watch College and was a watchmaker apprentice for three years.

Paris Junior College spon-



sors these training programs for students and area watchmakers throughout the year.

A NEW VENTURE FOR GERARD PROGIN

Gerard Progin, formerly vice-president of Portescap US and presently a member of the 24-Karat Club of New York City, has formed his own company to serve the watch and jewelry industry.

Using the knowledge of the industry acquired during his 12 years with Incabloc and Vibrograf, Progin is associating himself with some of the top-of-the-line European manufacturers of watch cases, watch bands, watch dials, and complete watches.

Under the name Gerard Progin, Inc., this new venture will represent the following interests in the U.S.: Francis Miserez LTD, a manufacturer of gold-plated watch cases and bracelets; Golay-Guignard SA, a Swiss manufacturer of genuine lizard, crocodile, calfskin, and leather watchbands; Metalem SA, a Swiss manufacturer of quality watch dials with painted or applied marking; Delma Watch LTD, a Swiss manufacturer of quality watches featuring a line of more than 200 styles, including the latest developments of the Swiss watch industry.

For more information, contact Gerard Progin Inc., 60 Sutton Place So., New York, NY 10022. (212) 752-0659.

TWO OKLAHOMA STATE TECH STUDENTS GIVEN WOSTEP SCHOLARSHIPS

Steve Gray and Kevin Monaghan, both Oklahoma State Tech watch repair students, have been awarded a scholarship to attend a specialized watch repair school sponsored by the Watchmakers of Switzerland (WOSTEP).

Gray of Sand Springs, Oklahoma, and Monaghan of

Dodge City, Kansas, are among the six Americans to attend the international school.

They will leave the United States July 30, for Neuchatel, Switzerland, where they will spend five months studying unique Swiss watch movements and practicing watchmaking techniques.

Upon completion of the school, both students plan to return to the United States and begin careers in watch repair. Both hope to someday own their own shops.

RAY-O-VAC TO OPEN NEW ALKALINE PLANT IN OHIO

Benno A. Bernt, president of Ray-O-Vac Corporation, has announced a major expansion program in alkaline batteries for the American market. Initially this will involve a new plant in Lancaster, Ohio, and additional major investments in Ray-O-Vac's Fennimore, Wisconsin facility over the next five years.

"Since alkaline batteries have gained a position of performance leadership in the consumer's mind, we are going after a leadership position in both alkaline quality and value," Bernt said. "Our major investments in both of our alkaline plants will pay off in increased productivity and more consistent product quality," he added.

BATT-TRONIC CORP. APPOINTED DISTRIBUTOR FOR RENATA BATTERIES

Mr. Kurt Zehntner, Director of Renata, S.A., and Mr. William Hillson, President of Batt-Tronic Corp., are all smiles on the appointment of Batt-Tronic Corp., Orangeburg, New York, as United States distributor of Renata watch power cells.

Renata manufactures thin, precision batteries for some of the world's most fashionable Swiss quartz movement watches. Batt-tronic is one of America's largest

distributors of watch and calculator batteries.

Known as "The moving force behind the Swiss movement of prestigious watches," Renata will soon introduce the "Thin-Line" of lithium batteries in the United States. Presently, about 50% of all Swiss quartz watches are factory-fitted with Renata batteries.

As a full-service distributor of Renata watch batteries, Batt-tronic Corp. is now "The Swiss Connection" for over 40 different types of Renata silver oxide batteries.



VARTA APPOINTS ROBERT G. ERRICO

Varta Batteries, Inc. announces the appointment of Robert G. Errico as Group Marketing Manager for Consumer Products.

He is a graduate of the University of Rhode Island with 19 years of watch and hearing aid battery marketing experience with a leading U.S. battery manufacturer.

According to Varta Batteries, Inc. President Arthur M. Muti, "Mr. Errico's primary responsibility will be to continue and increase our efforts in the watch battery market, and he will add much expertise to our efforts for all consumer products."

Varta, one of the international leaders in battery research, development, manufacturing and sales, markets its lines of Vartachron watch bat-

teries, Power One hearing aid batteries, and a wide variety of specialized industrial batteries including the Mempac computer stand-by power source. Varta's U.S. branch, based in Elmsford, NY, recently introduced the line of Vartaphoto batteries to the consumer photographic market.



SEIKO'S NEW SERIES OF TECHNICAL SEMINARS CONTINUES

Seiko Time Corporation is presenting an entirely new series of technical seminar presentations to watchmakers' groups throughout the nation.

Themed "Servicing the Exterior of a Seiko," its goals are to improve watchmakers' expertise in the proper opening and closing of watch cases for the purposes of crystal insertion and gasket and battery replacement. Covered extensively is the use of proper tools in these operations. This instruction will enable watchmakers to provide customers with maximum on-the-premises after sale service for all Seiko watches.

Conducted by Jack Schecter, the seminar program began on April 13. The up-coming schedule includes: July 25, Ohio Watchmakers Association Annual Convention, Columbus; October 5, Horological Society of New York, New York City; October 28, Kansas City Watchmakers Guild, Kansas City, MO.

Classified Ads

Regulations and Rates

Ads are payable in advance \$.35 per word, \$.45 per word in bold type. Ads are not commissionable or discountable. The publisher reserves the right to edit all copy. Price lists of services will not be accepted. Confidential ads are \$4.00 additional for postage and handling. The first of the month is issue date. Copy must be received 30 days in advance.

Horological Times, P.O. Box 11011, Cincinnati, OH 45211. (513) 661-3838

Tradesman

SELL BUY used LED & LCD watches for parts (delivered & in the case @ \$1.50). Repair Center, Beacon Hall No. 11C, Pt. Pleasant Beach, NJ 08742. (201) 295-8608.

BARREL TEETH BROKEN? Send SASE for dimensions and low prices of 32 different German chime clock barrels, c. 1950. CTE Box 171T, Bronxville, NY 10708.

DIGITAL WATCH REPAIR SPECIALIST, LED and LCD, Tuxedo Electric, Tuxedo Square, Tuxedo NY 10987. Phone: (914) 351-5678.

Pearl and Bead Restringing. All types. Fast service. Jean A. Gruenig, P.O. Box 12007, 1279 Inglis Ave., Columbus, Ohio 43212.

PULSAR WATCH REPAIRS. Complete repairs on all L.E.D. PULSARS except calculators. Prompt service. Leo G. Kozlowski, 55 E. Washington Street, Chicago, IL 60602. 312-236-8052.

ANTIQUA POCKET WATCH REPAIR. Fast service, quality work, thorough repairs. Electroplate and polish your own watch cases to their original brilliance. **NO POCKET WATCH IS UNREPAIRABLE;** it is just a matter of economics. Now accepting new accounts \$15.00 and up. Mail order is my specialty. **FREE** estimate given on your watch. **JOHNSON WATCH REPAIRS (NAWCC, AWI)** Box 121, Keenesburg, CO 80643. (303) 536-9235.

CLOCK SERVICES, wheels, gears, barrels, retooling, repivoting, mainspring winding, bushing, jeweling. Send sample for estimate. Roy H. Niegel, CMC, 21837 Woodbury, Cupertino, CA 95014. Phone (408) 253-4927.

WATCH REPAIR FOR THE TRADE: AC-CUTRON, STEP-MOTOR QUARTZ, DIGITAL ANALOG & MECHANICAL. The Watch-Repair Shop, 2616 Kendall Ave., Madison, WI 53705. 1-608-231-3606.

CLOCK WHEEL AND PINION CUTTING Fast Service—Write for free brochure and price list. Fendleys, 2535 Himes St., Irving, TX 75060.

DIAL REFINISHING, CRYSTAL FITTING & WATCH REPAIR. 48-hour Services on Dial Refinishing & Crystal Fitting. Finest Quality. Quantity works welcome. Send your works to: Kirk Dial & Crystal Co., 625-4th & Pike Bldg., Seattle, WA 98101.

WHEELS, Pinions, barrels or whatever, repaired or made new. Repivot arbors. Parts made to order. Send sample for free estimate. No watch parts. Ken Leeseberg, Ken-Way Inc., 19 W 672 Army Trail, P.O. Box 219, Addison, IL 60101.

WATCH REPIVOTING, WHEEL and PINION CUTTING expertly done by **EUROPEAN WATCHMAKER** with diploma from **GLASHUTTE** \$15.00 and up. Specializing in **REPEATERS, CHRONOMETERS, TURBILLONS, KARRUSELS,** watches with **PERPETUAL CALENDAR, UNUSUAL ESCAPEMENTS,** etc. I can make any part for any watch; it is just a matter of economics. Send **SASE** for **FREE** price list. **FREE** estimate given on your watch. **PHILIP PONIZ (NAWCC, AWI, MBHI),** 1207 Scrub Oak Circle, Boulder CO 80303. 303-494-9666.

Superior Tweezer Resharpener. \$2.50 each, including return first class postage. Minimum of three tweezers. Advance payment required. Harvey C. Watkins, CMW, P.O. Box 1738, 1204 West Cason Street, Plant City, FL 33566.

Clock repair material and tools. Manufacture of clock springs, dials, escape wheels, verge kits, weights, all types of brass and steel stock and custom made parts. Catalog postpaid \$2.00; Tani Engineering, Box 338, Atwater, Ohio 44201. (216) 947-2268.

CLOCK WHEEL AND PINION CUTTING, repivoting, retooling, escapement work. J.C. Van Dyke, CMW, CMC, CMBHI, 1039 Rt. 163, Oakdale, CT 06370.

Help Wanted

WATCHMAKER WANTED. Large, family-owned, well established jewelry business in the Milwaukee, Wisconsin metropolitan area has immediate opening for an experienced watchmaker with related sales ability. Wages will be commensurate with experience. Fringe benefits include paid vacation, profit and pension plans, five-day work week, and paid health insurance. Send resume and references to *Horological Times*, Dept. HW7811, P.O. Box 11011, Cincinnati, OH 45211.

Situations Wanted

Watchmaker/Jeweler with over 30 years of experience would like to relocate, preferably in the West or Midwest. Reply to: *Horological Times*, Dept. SW7811, P.O. Box 11011, Cincinnati, OH 45211.

British trained young American horologist specializing in antiquarian horology seeks employment in this field commencing in the Fall of 1981. This uniquely talented craftsman will consider any opportunity that can make use of his specialized skills and training. Contact: Coleman Fund Committee, c/o *Horological Times*, 3700 Harrison Avenue, Cincinnati, OH 45211.

Wanted To Buy

Want Hamilton Model 21 & 22 chronometer movements, boxes, parts—any condition. Buy/sell/trade pocket watches. Send SASE for list. Ray Rice, Box 31481, Aurora, CO 80041. (303) 755-4740.

GOLD FILLED and ROLLED GOLD PLATE RGP \$3.50/t.o.; 1/10 10k \$16/t.o.; 12k G.F. \$8.75/t.o.; 14k G.F. \$14.75/t.o.; 25 year watch case \$17/t.o. Prices based on \$600 gold. Send for schedule. **CASH or CHECK.** Ship to **AVON METAL SERVICE, LTD.,** P.O. Box 17484, Milwaukee, WI 53217. (414) 351-0933.

IMMEDIATE CASH PAID!! Old Mine and Old European cut diamonds. Especially needed: Stones over 1 carat. Ship with phone number for highest offer, or call Mr. Neff, (404) 938-0744. W. F. N. Enterprises, Inc., HT, 2300 Henderson Mill Rd., NE, Suite 318, Atlanta, GA 30345.

STERLING FLATWARE STOCKS—New or used needed. Call us before you sell for scrap. Also wanted: silver, diamonds, gold scrap, coins and coin collections. Call or write: Mr. Neff, HT, WFN Enterprises, 2300 Henderson Mill Rd., N.E., Suite 318, Atlanta, GA 30345. Ph. 404/938-0744.

IMMEDIATE CASH PAID for Gold, Silver, Platinum, any form! Jewelry scrap, filings, gold filled, sterling! Immediate top dollar cash offer return mail! Satisfaction guaranteed. Ship insured/registered mail to: American Metals Co., St. Andrews Branch, P.O. Box 30009H, Charleston, SC 29407.

IMMEDIATE CASH PAID for American/European pocket watches, keywinds, RR's, repeaters, unusual escapements, complicated watches, cases, dials, movements, etc. Ship insured/registered with asking price; you'll get immediate reply. **SATISFACTION GUARANTEED OR YOUR MERCHANDISE RETURNED PROMPTLY.** Daniel Weiss, P.O. Box 14540, Philadelphia, PA 19115.

For Sale

RETIRING. Busy watch, clock repair and engraving business. One-man store in small town just south of Santa Maria, California. Clean air, healthy climate, relaxing life style. Very reasonable rent with lease. Priced at a low \$2,800. Stock, tools and parts extra/optional. 805-937-1218 mornings only 'til 1 p.m. 149 S. 1st Street, Orcutt, CA 93455.

Established Clock, Watch & Jewelry Repair Shop. Sales also. Owner wishes to retire. New shopping center—Good lease. Call Ocala, Florida: 904-622-7986 (days); 904-694-5289 (nights).

BOLEY HIGH PRECISION LATHE and ACCESSORY KIT. Best offer around \$2,250. Used very little. Call (503) 747-7362.

U.S. HEADQUARTERS FOR ALL SCHATZ PARTS. PARTS FOR THE NEW 400-DAY ELECTRONICS. ALSO FOR KUNDO ELECTRONIC. GREENHILL CLOCK SERVICE, P.O. BOX 172, SANTEE, CA 92071.

'A' QUALITY SWISS SPRING BARS. WRITE FOR FREE SAMPLES. P.O. Box 774, GREENVILLE, MS 38701.

American pocket watches, movements, cases, material and tools for sale. Write for list. **Want to buy watchmakers tools, American pocket watches, related items.** Dasho Horological Services, 5349 Basilica Circles, Virginia Beach, VA 23464. (804) 420-2631.

QUARTZ BATTERY CLOCK MOVEMENTS: Regular or Mini: \$7.95 each, 3 for \$22.65, 6 for \$42.90. Hands included. \$2.00 handling. **CALDAK TIME,** Box 3181, Camarillo, CA 93010.

For Sale—Timing Machines, Watchmaster Timers, Vibrograf Timers. Factory rebuilt. All machines guaranteed. Terms available. Also available Ultrasonic Watch Cleaning Machines. Write Vibrograf sales representative Robert Swensgard, 2630—A Jett Hill Road, New Richmond Ohio 45157. Or phone (513) 553-2113. Territory: Southern Indiana, Kentucky, Michigan, Ohio, Tennessee, and West Virginia.

Metal Cutting Lathes, Bench Mills, Drillpresses, Unimats (accessories also), Maximats, Sherline, Machinex, the new Maximat Super Eleven. Lathe Catalog, \$1.00. Precision tools, inch or metric, aluminum, brass, steel, all shapes, miniature screws, taps, drills, saws, collets. Tool Catalog, \$1.00. Campbell Tools, 2100 Selma Road, Springfield, Ohio 45505. Phone (513) 322-8562.

ESEMBL-O-GRAF LIBRARY in 28 volumes, Pittsburgh, 1955. Chronograph repairing is made easy by step-by-step procedure. Each small step of removing and replacing each part and making adjustments is clearly illustrated. No concentrated study is necessary. \$200.00. Write EOG, P.O. Box 11011, Cincinnati, Ohio 45211.

Miscellaneous

Digital Watch Service Training. Zantech, Inc. offers training and instruments for servicing all types of digital watches. Course includes diagnosis of watch malfunctions and repair methods, including techniques in wire bond repairs using silver epoxy. Louis A. Zaroni, Zantech, Inc., 77 Shady Lane, Trenton, NJ 08619. (609) 586-5088.

The Book You've Been Waiting For

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J.E. COLEMAN: CLOCKMAKER

For more than 28 years, Jess Coleman helped working horologists solve their day by day technical problems in clock repairing by answering and analyzing their questions in his column "Clockwise & Otherwise." This feature appeared monthly in the pages of *American Horologist & Jeweler* magazine.

Since the death of Coleman, many clockmakers have felt the void created by the lack of personal attention which Coleman always gave to their specific, professional problems. Now, the present generations of horological craftsmen can enjoy all the benefits of Coleman's more than 28 years of experience. His columns have been skillfully compiled into a single reference volume.

The book is designed to aid those who are interested in solving the everyday problems confronted in practical clock repairing. This attractive, hard-bound, 544-page encyclopedia of horological information is published by the American Watchmakers Institute Press. The price is just \$30.00, postpaid.

The unique, 9-page index and cross-reference information, prepared by Coleman's contemporary, Orville R. Hagans, is a valuable, extra feature which allows today's working horologist to consult the store of knowledge which Jess Coleman spent a life time creating and recording.

Send \$30.00 payable to AWI Press, addressed to The Best Of Coleman, 3700 Harrison Ave., Cincinnati, Ohio 45211

USE THIS HANDY ORDER FORM

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Dates To Remember

JULY

- 4-10—Christmas in July Gift and Jewelry Show; Dallas Market Center, Dallas, TX
- 6-8—University of Maine at Orono, Second Annual Course in Antique Jewelry and Gemstones; Orono Campus, Orono, ME
- 11-18—Pacific Northwest Jewelers Association, and Washington, Alaska, and Oregon State Jewelers Association Quadrennial Western Jewelers Conference; M/V Sun Princess, Inside Passage, British Columbia and Alaska
- 19-24—93rd California Gift Show; Los Angeles Convention and Exhibition Center, the Los Angeles Mart, Los Angeles, CA
- 19-22—SJTA Atlanta Show; Hyatt Regency Hotel, Atlanta, GA
- 19-22—New Orleans Gift & Jewelry Show; Rivergate Convention Center, New Orleans, LA
- 24-26—Watchmakers Association of Ohio Annual Convention; Marriott Inn East, Columbus, OH
- 25-29—JA Fall International Jewelry Trade Show & Convention; Sheraton Centre & New York Hilton Hotels, New York, NY

AUGUST

- 9-11—Jewelers of America/Central USA International Jewelry Trade Show and Conference; Expocenter and Mart Plaza Hotel, Chicago, IL
- 9-12—Minneapolis Gift & Jewelry Show; Hyatt Regency & Merchandise Mart, Minneapolis, MN
- 15-17—Fall Pacific Jewelry Show; Century Plaza Hotel, Los Angeles, CA

- 15-17—Mississippi Jewelers Association Annual Convention; Biloxi Hilton, W. Beach Blvd., Biloxi, MS
- 22-25—74th Denver Gift and Jewelry Show; Denver Merchandise Mart and Exposition Center, Denver, CO

SEPTEMBER

- 4-9—BIJORHCA Jewelry, Silver, Clock and Gift Fair; Paris, France
- 5-7—Intermountain Jewelers Assn. Convention for Utah, Idaho, Nevada and Wyoming; Prospectors Square, Park City, UT
- 5-9—International Gold and Silver Show of Arezzo; Arezzo, Italy
- 6-7—Ohio, Indiana, Kentucky and West Virginia Jewelers Assns. Mid-America Jewelry Show; Cincinnati Convention Center, Cincinnati, OH
- 6-11—Fall Gift & Jewelry Show; Market Center, Dallas, TX
- 11-14—Florida Jewelers Assn. convention; Marriott Hotel, Fort Lauderdale, FL
- 12-13—Iowa Jewelers & Watchmakers Assn. convention and trade show; Best Western Airport Inn, Des Moines, IA
- 13—Middle Atlantic Travelers Assn. Jewelry Trade Show; The Rouse Building, Columbia, MD
- 19-20—North Dakota Jewelers & Watchmakers Assn. convention. Seven Seas Motel, Mandan, ND
- 20-22—Miami Gift & Jewelry Show; Miami Beach Convention Center, Miami Beach, FL
- 27-29—Phoenix Gift & Jewelry Show; Phoenix Civic Plaza, Phoenix, AZ

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