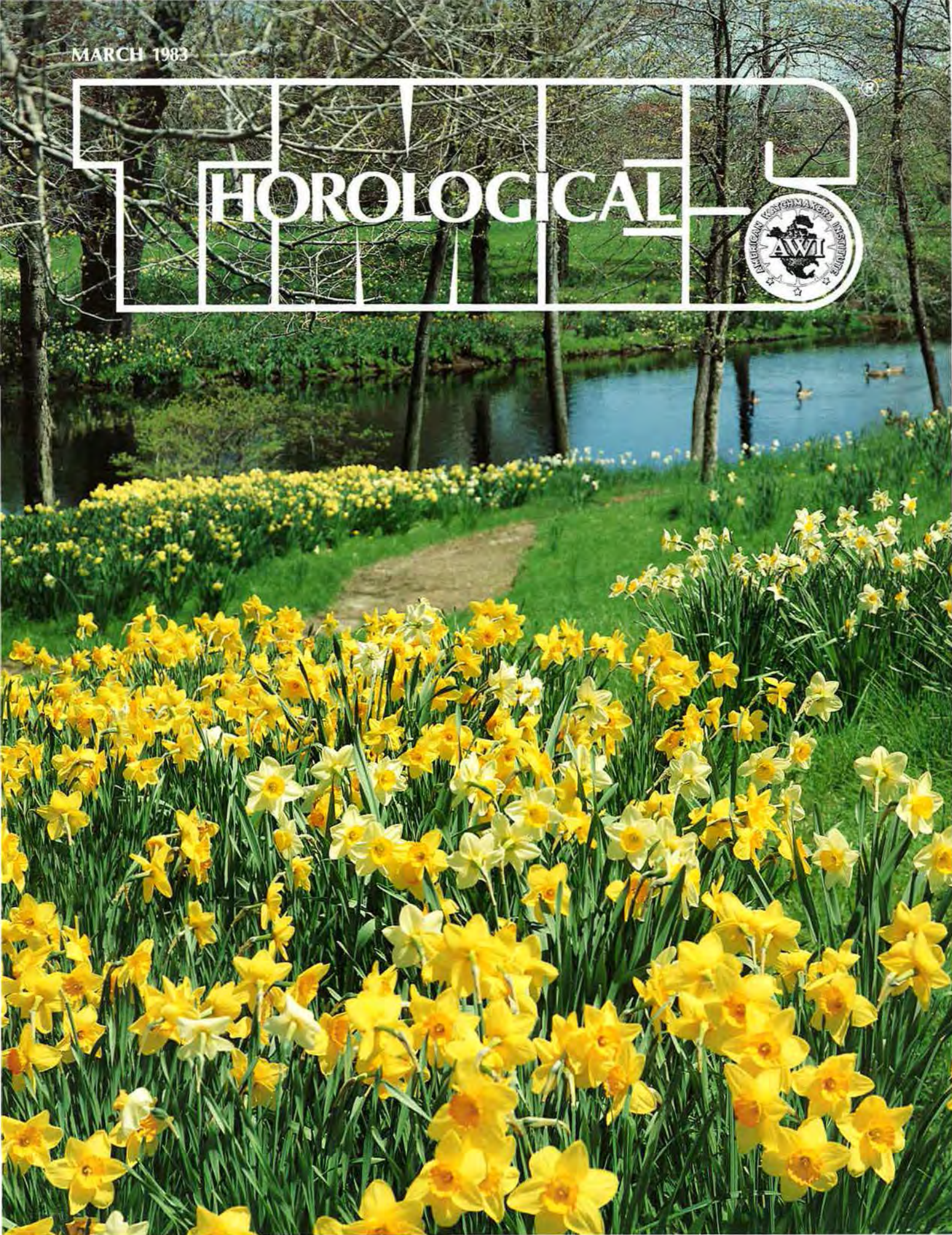


MARCH 1983

THE JOURNAL OF HOROLOGICAL ARTS



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Editorial

A simple bench tip is often the most valuable acquisition the watchmaker gains from association with his peers, directly or indirectly. It matters not whether he gains this tip from reading trade magazines, periodicals, technical bulletins, attending seminars, or classes of instruction, or simply conversing with someone at a meeting. The important thing is that a "tip" has been passed along and the recipient and the entire industry is better off for it.

Bench tips per se are often treated as "fill ins" in magazines, lectures, and class instruction. It should be different! Tips should be presented in bold type headlines or strongly emphasized by lecturers. For isn't that what it is all about?

When all the reams of written articles and all the oratory of lectures are sifted for content worth committing to memory, 'Bench Tips' are among the most valuable nuggets of knowledge retrieved. Each and every one of you have a special tip. Send it to Joe Crooks c/o Horological Times.

Walter Hanson
Executive Secretary
North Carolina Watchmakers Assn.

On the Front

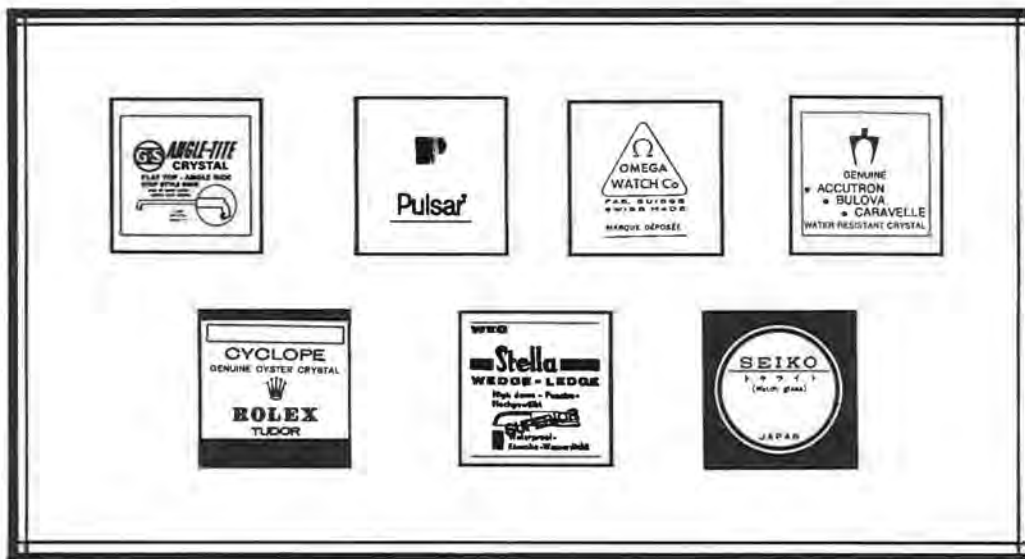
Yellow blossoms line the banks of a gently flowing stream. The budding branches promise to burst open at any moment and confirm that "Spring is here!"

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Membership Packet

If you have sent AWI your annual dues in November or December, then every year shortly after the first of January you will receive a membership packet that contains the following: 1) your dues card to carry in your billfold, 2) a certificate showing that you are a member in good standing which can be displayed in a frame on the wall of your place of business. This shows your customers that you are a professional watchmaker or clockmaker keeping up to date through AWI.

This year the membership packet also contained a new index to the library of books that can be borrowed from AWI's library. It also explains the ground rules for getting these books. Also contained in the packet is an updated list of technical bulletins available by writing or using the "hot line" (513-661-INFO, for faster service). Application blanks for both technical bulletins and library books were enclosed.

On page 13 of the January issue of *Horological Times* is a picture of a membership card with an explanation of the code numbers on the right hand side. The one on the top is your AWI number. In any communication with AWI Central, please use this membership number as it will make it easier to process your correspondence. Plus, you will receive

quicker replies.

Being a member of the American Watchmakers Institute gives you access to the many services being provided by the institute for members or groups. Watchmakers today that do not belong must be missing out on many profitable repairs, for in some of the modern timepieces it is next to impossible to make repairs without access to the latest available technical information. Today, AWI is about the only source for this benefit, as well as giving educational training on the new electrics or electronic watches.

Since the holidays, from looking at watchmakers and salesmen, I would judge that repairs are coming in much better than they were a year ago. If this is so it may be an indication that the economy is improving. Or perhaps it means that customers are getting their old pieces repaired instead of buying new ones. Whichever it is, we can be thankful. With positive thinking we can be prepared to get more business and make these repairs profitable. When business is slow, if we spend our time complaining about it, likely it will get worse. But if we spend our time looking for ways to make it better in a positive manner, business will no doubt improve.

TMB

JOHN CASSEDY HONORED AS WMJDA "MAN OF THE YEAR"

John R. Cassedy, President of the Cas-Ker Co. in Cincinnati, Ohio, has been named as the "Man of the Year" by the Watch Material & Jewelry Distributors Association (WMJDA). The official presentation of the award was made at a special luncheon meeting during the group's annual convention at The Pointe in Phoenix, Arizona on March 4. The honor is presented annually to recognize individuals who have made outstanding personal contributions to the progress of the watch, clock and jewelry industry.

Cassedy is a native of the Cincinnati area. He attended St. Xavier College before entering the military service during World War II. He served as a fighter pilot with the U.S. Fifth air force, flying P-47s and P-51s on 126 combat missions from bases in Okinawa and the Philippine Islands. His many war experiences included being a witness to the second atomic bomb blast over Nagasaki, Japan as he returned from a routine mission!

After the war he returned to Cincinnati and started as a watch repairman at the Cas-Ker Co. He has worked in every department of the watch material and jewelry distributorship and now serves as President.

Cassedy continues to play an active role in the development of the WMJDA. He has served on the Board of Directors; worked his way up through the chairs as Second Vice-president; First Vice-president and served the association as President from 1979-1981. He has chaired several important committees for the organization in addition to his official duties.



Mr. John R. Cassedy

Karl Esslinger, current President of WMJDA, comments that: "John Cassedy has always served the organization well in any tasks he was asked to perform. He was active on important committees before he served as President, and continues to serve in any capacity we request, now that his official term is completed. We are proud to present him with this award to show our appreciation!"

Cassedy and his wife, Marilyn still reside in the Cincinnati area. They have raised a family of eight children.

The WMJDA Annual Meeting was held March 1-6 at The Pointe in Phoenix, Arizona. The "Man of the Year" luncheon was one of the highlights of the full business and social program planned for the occasion.

TMB

Our Readers Write

Reader Finds the Answer

I am delighted with the professionalism of your organization. I have benefitted tremendously by my reading of *Horological Times*. Information given in this publication is difficult to come by elsewhere.

For example, for years I have had a Eureka clock with a problem. It would only work for a few months and stop. I have a pretty well-stocked collection of horological books and literature but have found very little information regarding this clock. In the January 1983 issue of H.T., Pat Monk wrote an excellent article on the servicing of the Eureka which helped solve my problem.

This is just one of many, many instances where your articles have been helpful to me in my repairs and saving of time. Thank you and please keep up the good work.

Paul Richter
Fair Lawn, New Jersey

QUICK SERVICE! . . .

Thank you for quick service on the technical information and your reply regarding the battery information I sent. Keep up the good work!

K.L. Kunath
Spencer, Iowa

COMPLIMENTS TO MR. WHITNEY

I just received my materials packet and my AWI membership card. I am long overdue in writing, but I wish to say congratulations on the superb magazine. The authors are all excellent, but I would like to single out in particular Mr. Marvin Whitney and his series on the chronometer. It was a very scholarly series and worthy of publication.

Jarrel Hofer
Macomb, Illinois

GRATEFUL FOR A TRADE

I just want to take a few minutes out from a busy day to thank all of you for the wonderful work you have done for your fellow watchmakers.

This new year has found me very grateful that I have a trade. It has helped put food on the table, put my husband through school, and with two little babies now, it is helping me keep my sanity.

Each month when I receive H.T., my husband is the first to open it up and admire the cover. Many thanks again for your help and support.

Tamea Lawhorn
Roanoke, Virginia

READER RESPONDS TO JAUCH MOVEMENT ARTICLE

Dear Mr. Conover:

As a member of AWI and a Colonial employee, it was with great interest that I read your article on the Jauch movement in the December 1982 issue of *Horological Times*.

There seems to be some confusion regarding the identification numbers and the movement portrayed.

The movement line drawing is of a Jauch No. 41-2800/B. Colonial uses four versions of this movement, each version using a different pendulum length. Our movement numbers and corresponding pendulum lengths are as follows: 620664 12cm., 620667 37cm., 620668 24cm., and 620672 18cm. I suspect that the 1968 movement that you viewed has a pendulum length of 27cm., our old Movement No. 238.

The movement used in the pictured Model 1410 Sunburst clock is a Jauch No. 52-2800/S, our Movement No. 620654. This movement has hammers on the side of the movement plates. Model 41-2800/B has hammers underneath the movement plates.

The movement number referred to in your column, No. 620652, is in fact the part number for a lyre pendulum used on Kieninger movements.

I hope that this information clears up the confusion. Keep up the good work.

Terry Casey
Zeeland, Michigan

Dear Mr. Casey:

Thanks for your letter commenting on the Jauch movement identification numbers. The error is entirely mine. I asked your purchasing director for pictures of Colonial clocks with the 620654 movement, and he provided them. Apparently, the 620654 has a different hammer arrangement from the movement discussed in the article, although the basic movement is the same.

Your other comment concerns the number 620652 which appears in the article. This is a typographical error; number 620654 was intended.

I appreciate your taking the time to let us know of this correction.

Steven G. Conover

H.T. COVERS

Just wanted to applaud your January cover. Someone does a superb job in selecting subjects for cover-use, and I've been moved many times to say so and somehow haven't gotten around to doing so.

H. L. Mitchell
Pasadena, California

(Continued on Page 27)

Essence of Clock Repair^{© 1983}

By Sean C. (Pat) Monk, CMW



The Eureka Clock (Part II)

MAINTENANCE, FURTHER OBSERVATIONS

As mentioned in our introduction to the Eureka clock (Part I), the biggest problem with the clock is contact wear, especially with the worn fixed contact. However, both the fixed and moving contacts can be restored to normal usage with some maintenance knowledge and a measure of skilled craftsmanship.

One of the signs that the contacts are in poor condition is a considerable reduction in the amplitude of the balance swing. Poor contacts, however, may not be the only reason for this as we shall mention later. There is certainly no question that if the fixed silver contact is badly worn it must be replaced. If the wear is not too considerable, the entire contact may be removed and turned so that a smooth and unworn surface presents itself to the moving contact. Should this fixed contact repair be made necessary, it is advisable that the outside face of the contact be covered with a thin layer of epoxy resin in order to improve the insulation during the return swing of the balance, i.e. when the moving contact touches the outside face of the fixed contact.

The maximum arc of the balance should be 360-degrees. The time involved between the contacts opening and closing has been established as "about 1/80th of a second" (B.S.T. Wallace, England). The contacts are arranged to open just before the central armature position (Figure 1) which allows for magnetic flux decay to minimize the effects of sparking and subsequent contact erosion. The recommended distance between the fixed and moving contacts should be no more than the thickness of a cigarette paper. Mr. B.S.T. Wallace, who tested the first Eureka's, says, "During assembly this gap can be adjusted to a few thousandths of an inch by means of a tiny brass wedge fitted under the armature."

We have established that the electrical contacts are the main source of problems with the clock. However, one certainly cannot assume that mechanical problems, also, may not exist. Should sufficient balance rotation be unobtainable following the electrical checks and corrections, if necessary, the mechanical parts of the clock must be carefully examined.

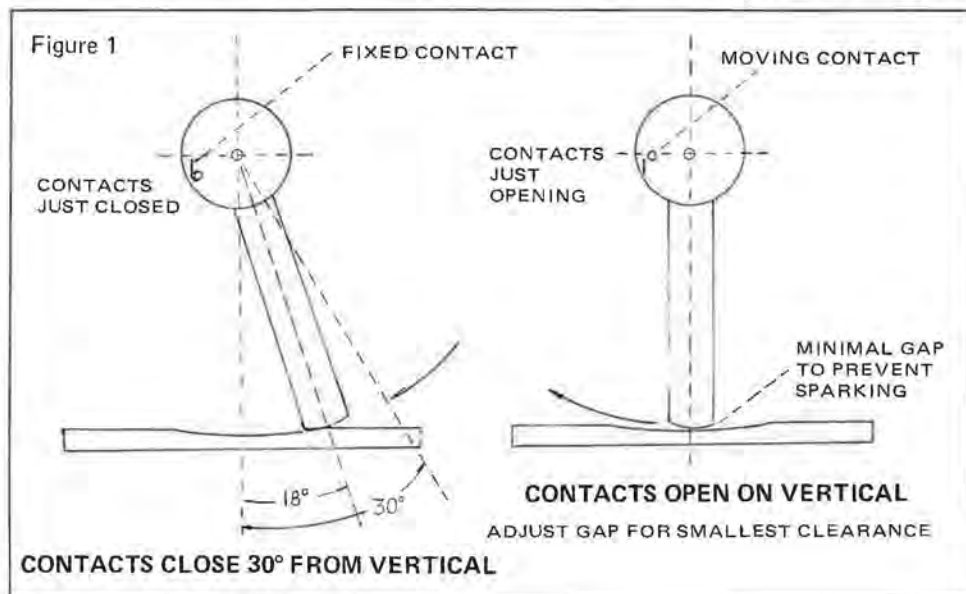
First, in regard to the mechanics, it should be understood that there are no manufacturer's adjustments to the mechanical parts of the Eureka. Second, no oil should ever be used on the contacts.

Mechanically, just as in any other type of clock (or watch) repair, the train must be thoroughly examined under the loupe for pivot wear, worn holes, etc. In addition, the roller and arm, ratchet and ratchet wheel, and the bearings of the balance arbor itself, should be examined. The ball races of the latter should have sufficient oil in their cup to allow for a working modicum of lub-

rication to be transmitted to the balance pivots. The ball races sometimes become pitted through normal abrasive rotation, especially if running dry, or through rust, and must be removed, cleaned and repositioned for better contact if possible. If the existing races are in such poor condition that they cannot be adequately serviced, suitable substitutes may possibly be found from suppliers using small ball race equipments. If the end glasses are worn through poor ball bearing rotation, one may wish to reverse them for better performance.

In regards to the Eureka's timekeeping performance, there seems to be much conflict as to what is considered satisfactory. The timekeeping propensities of this clock are, of course, dependent upon its original adjustments; yet according to the original manufacturers, they were very accurate. For a domestic clock, 1906-1917, one minute per month was considered good.

Unfortunately, as we have previ-



Essence of Clock Repair

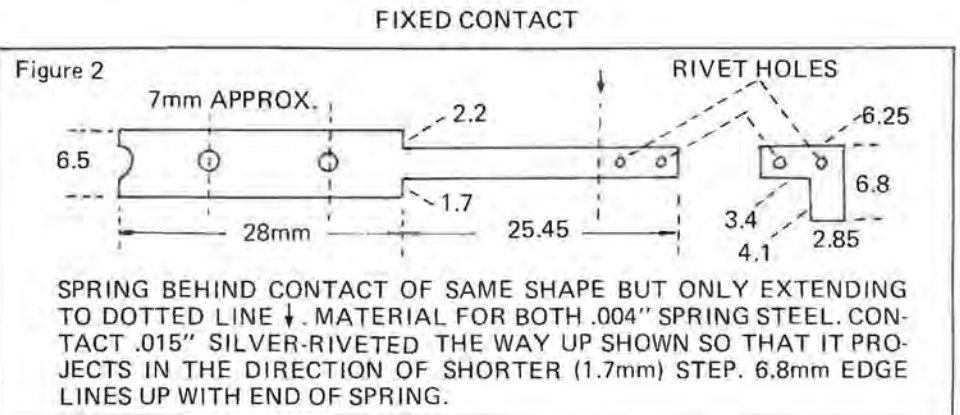
ously mentioned (in Part 1) many otherwise good Eureka clocks fell into the unskilled hands of too many would-be clock repairers who did not understand the "modus operandi," and whose poor efforts destroyed all hopes for good timekeeping. Therefore, we cannot class them as poor timekeepers as has been previously stated by so-called examining experts.

In regards to the general maintenance of the Eureka we must return to the electrical again. Also, we shall make reference to some sketches sent to our advisor Robert Phillip, in Cookstown, Ontario, Canada. With Mr. Phillip's permission we have attempted to copy these sketches and hope that sufficient information exists in them to serve a practical purpose in contact restoration.

During 1965, whilst doing research on the Eureka, Mr. Phillip was in correspondence with Mr. R.H. Miles of Saffron Walden, Essex, England, himself the owner of a Eureka who apparently solved the electrical problems and restored his model to good life.

Mr. Miles wrote: "Some years ago I was faced with a similar problem with regard to the replacement of contacts in a Eureka Clock. Fortunately, I had the article by B. S. T. Wallace ("Watchmaker, Jeweller & Silversmith," August 1955) and enough of the original contacts to make an accurate reconstruction. Incidentally, these contacts have now run for six years without any appreciable sign of wear. Most of the trouble in Eureka clocks seems to be: (i) the use of a file on the contacts, and (ii) leakage across the insulation in the moving contact. The balance should swing through 360-degrees, with a 1.5 volt battery and a current of about 7 milliamps."

Continuing, Mr. Miles reports: "Clocks that were numbered below 3000 had an adjustable fixed contact with slots at the lower end instead of round holes. Above 3000, an additional spring was placed behind the contact spring to give additional contact pressure. I think the drawing supplied will be sufficient for you to construct this contact. The moving contact is more difficult and requires the use of a good lathe. The contact itself is of silver wire (18 SWG). Around one side is a half cylinder of phosphor-bronze separated, in the original, from the pin by a red fibre insulating material. I used "Tufnol" for the replacement. It is the insulator which is difficult to turn and cut into a half cylinder. You will see the various bits are slot-



ted to enable the outer brass to squeeze the whole lot up solid.

"The balance, if set in oscillation to 180-degrees each way, should carry on without power for 3½ minutes."

After reading Mr. Miles' practical observations and rechecking his sketches of the contact repairs, one should suppose there exists a moral in his report: With care and ingenuity, the Eureka contacts can be reconstructed even if the originals have been virtually destroyed.

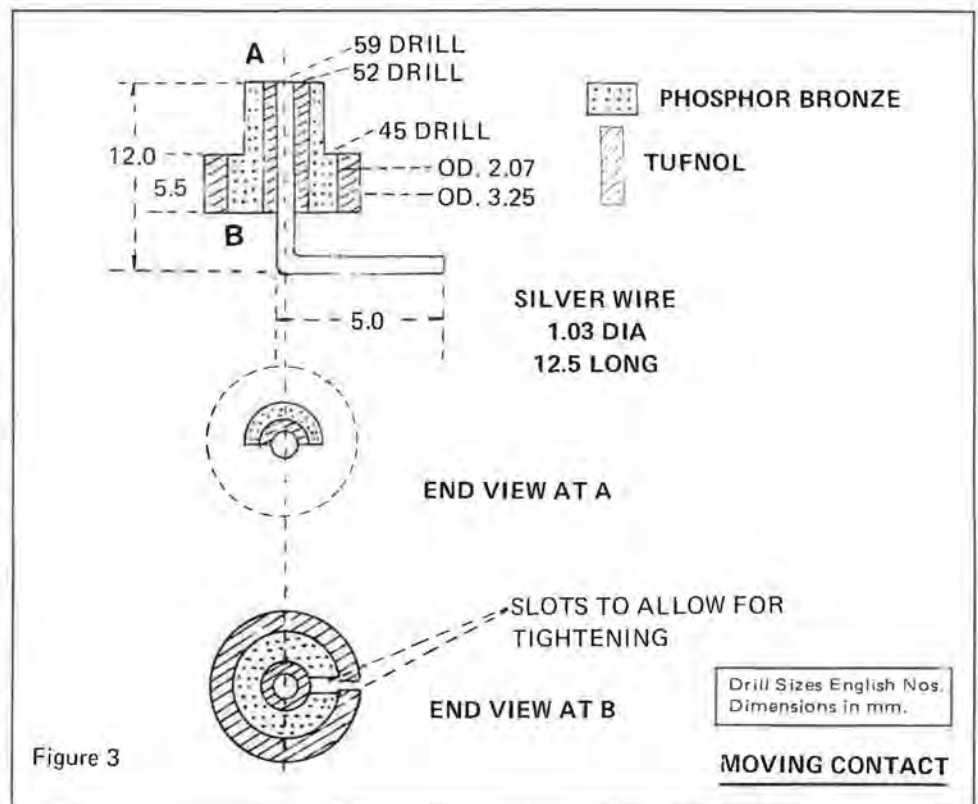
The insulator "Tufnol" is an English product which may or may not be obtainable in the U.S. It is a fiber insulator and, of course, can be supple-

mented by a number of such U.S.-made materials. The drill sizes in Mr. Miles' sketches (reproduced) are English.

Figure 1 depicts the opening and closing of the contacts, showing relative positions of the armature.

Figure 2 depicts the "fixed" contact as constructed by Mr. R.H. Miles of England.

Figure 3 depicts the "moving" contact as constructed by Mr. R.H. Miles of England.





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

Is it a Watch?

Q I have a customer with a watch which seems to be some type of a timer. I have never seen one like it and wondered if you have any information on a piece like this. I am sending a photograph that I double-exposed to show front and back hoping it will help. I couldn't find much for markings, just the name "Leonidas" and "Swiss, 1945." There are no jewels.

Ray E. Mincemoyer
Rockford, Illinois



A I have examined the photos of your "watch," the Leonidas, and after some thinking I arrived (and confirmed) what it really is. It is no watch.

This is a counter, since the area left for a movement could not possibly index all those little notched discs around the dial. I thought at first that since the steelwork was rather heavy and the central area for a movement so small, the whole business had to be indexed by pressure on the crown, that indeed it was a counter for either sports or industry. Now, eighteen is very odd for an industry, so therefore it had to be for a sport. Few sports have eighteen innings, quarters, or number of players. However, my own favorite, golf, does have eighteen holes (not counting the one in the clubhouse) and each hole therefore could be counted by twisting the crown bring-

ing the next hole into play; that had to be it.

I then contacted Heuer, who now handles the Leonidas name. Mr. Schrag looked in his old catalogues (1945) and there it was . . . the golf counter.

Q I have a customer who showed me a watch as described:

Face: New Columbian (Columbus?) Time King. This has a 3 o'clock stem wind. Back (Inside screw off bezel [cover]):

Columbus Time King
500506
21 Jewels

The watch has some engraving on the case, and the movement inside the back is highly engraved.

Could you tell me the following about the watch?: a) time of mfg., b) Who and where was the Columbus Company, and c) Is this a rarer model?

T.S. Cooley
Carmichael, California

A The Columbus Time King 21 jewel was a product of the Columbus Watch Company of Columbus, Ohio. They were in business from 1883 to about 1903. They made about 500,000 watches. At the end of their manufacturing career, they sold the business to the South Bend Watch Company. The company grew out of that founded by Dietrich Gruen and W. J. Savage.

The Time King model is considered rare. Illustrations of this show it to be a highly decorated, engraved movement. The Time King models with more than 21 jewels are still rarer and much sought after, as is the Columbus Time King with jewel model as well. Winding

at the 3 position indicates that the movement was most likely designed for a hunting case.

Q I have five timepieces that my watchmaker tells me are all in perfect condition and quite valuable. All are in their original cases and no parts or pieces have been replaced. Could you tell me how much they are worth or how or where I could sell them?

All five watches date back to WWII. Two are military navigational stop watches, some of the gears are gold. On the back of one is printed "Wakmann Watch Co., Inc., N.Y.," and the other: "Breitling Watch Corporation." Both have the word "Breitling" stamped on their faces. Both watches are 1 7/8" across, and have a black face with white numerals and hands. Two are Ulysses Nardin sport watches, sterling silver cases. They are 2 1/8" across and 3/4" thick. They have white porcelain faces with black Roman numerals for the hour and Arabic numerals for the minutes. The hands and sweep second hand are blue steel. This pair has the consecutive serial numbers 124140 and 124141. The words "Locle Suisse" are printed beneath "Ulysses Nardin."

The fifth watch was one I got from a Sikorsky XR4 helicopter that crashed at the U.S. Coast Guard Air Sea Rescue Base, Floyd Bennet Field, New York. It is an Elgin, shockproof, 1 1/8" across, 1/2" thick. The case is brass, black face and the hours are from 2 to 24 in white. The hands and sweep second hand are white. There is a bolt and lug on the back of the case to secure it to a panel.

I'll appreciate any help or advice you can give me in evaluating and/or selling these watches.

John F. Horstick
Hershey, PA

(Continued on Page 26)

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By Archie B. Perkins, CMW, FNAWCC
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HOW TO USE The Modern Watchmaker's Lathe ©1983 Part VII

Any time the watchmaker's lathe is used for making or altering watch and clock parts, there is a need to be able to measure the items accurately. The measuring devices used are the Vernier caliper, the outside micrometer, and the depth micrometer. These measuring instruments can be obtained in both inch and metric graduations. The measuring instruments most used in the watch and clock trade are of the metric type since the metric system has started to be used almost universally throughout the world. Although the metric system is used almost exclusively, there is still the need to be able to measure with instruments which have inch graduations.

Linear metric measurement is based on the meter. The unit of length, the meter, was intended to be, and is very nearly, one ten-millionth part of the distance measured on a median from the equator to the pole. The following table shows a comparison between the metric and inch systems:

| | | |
|------------------|-----------------------------------|------------------|
| 1 meter = | 10 decimeters = | 39.37 inches |
| 1 decimeter = | 10 centimeters = .1 meter = | 3.937 inches |
| 1 centimeter = | 10 millimeters = .01 meter = | .3937 inches |
| 1 millimeter = | 1000 microns = .001 meter = | .03937 inches |
| .1 millimeter = | 100 microns = .0001 meter = | .003937 inches |
| .01 millimeter = | 10 microns = .00001 meter = | .0003937 inches |
| 1 micron = | .001 millimeter = .000001 meter = | .00003937 inches |

The metric system is easy to use since it is a decimal system. For example, given numbers are multiplied by ten or divided by ten, thus a base of 10. There are 25.4 millimeters in one inch.

To convert millimeters to inches or inches to millimeters, the following formulas are used:

$$\text{Inches} = \frac{\text{millimeters}}{25.4}$$

$$\text{Millimeters} = \text{Inches} \times 25.4$$

One of the most common gauges used by the watch and clock maker is the Vernier caliper. This caliper is capable of dividing the inch or millimeter into smaller parts. The Vernier principle was invented by Pierre Vernier (1580-1637), a French mathematician.

Figure 1 shows a metric Vernier caliper by G. Boley of Germany. This caliper is sometimes called a Boley gauge or slide gauge. View A shows the head of the gauge. The slide is shown in View B. The tongue is shown in View C. View D shows the locking lever for the slide. View E shows the two straight jaws of the caliper. View F shows the two curved jaws. View G shows the main millimeter scale, and View H shows the Vernier scale.

The principle of operation of the caliper is as follows: The main scale G of the caliper is graduated in millimeters and centimeters. This scale has 100 millimeters or 10 centimeters. The numbers on the main scale indicate centimeters. There are 10 marks between each number indicating millimeters. A long mark midway between the numbers indicates 5 millimeters.

The slide B has a Vernier scale that has 10 divisions which makes it possible to divide the millimeter into 10 parts, or tenths. The distance between two Vernier marks is less than one millimeter. In fact, the 10 marks cover a linear distance of 9 millimeters. In other words, the distance between two Vernier marks equals 0.9 of a millimeter. This makes it possible to divide the millimeter into 10 parts.

Figure 1

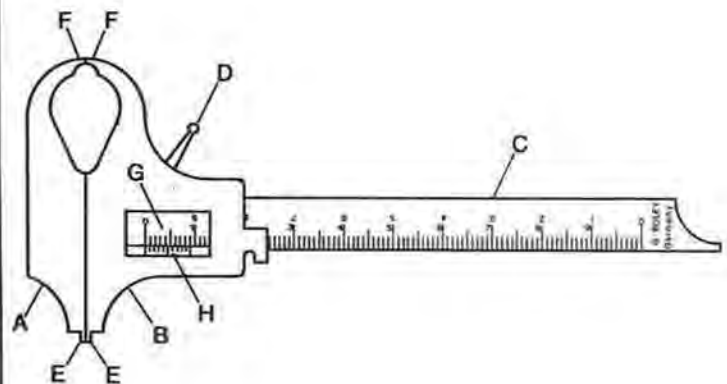


Figure 2 shows three Vernier caliper readings. View A shows the main scale "a" and the Vernier scale "b." This view shows the two scales set at zero. In other words, the gauge is completely closed. Note that the first line on the Vernier scale is lined up with the zero line on the main scale. Also note that the 10th line on the Vernier scale is lined up with the 9th line on the main scale. As the gauge is opened slightly, the second mark on the Vernier scale will line up with the second mark on the main scale, indicating 0.1 millimeter. If the gauge is opened until the second marks line up, the gauge will indicate 0.2 millimeter.

View B, Figure 2 shows the gauge set at 0.3 millimeter. Numbers have been added to the marks on the main and Vernier scales in order to clarify the reading of the scales. When reading the gauge, first determine where the zero mark of the Vernier scale is in relationship to the marks on the main scale. This will determine how many millimeters the gauge has been opened. Then to determine the number of tenths, find out which Vernier mark lines up exactly with a mark on the main scale. When counting the Vernier marks, do not count the zero line on the Vernier scale. NOTE: Only one Vernier mark will line up exactly with a main scale mark. There are times when no Vernier marks line up exactly. When this occurs, the measurement can be estimated. For example, if the 3rd mark is slightly past a mark on the main scale but the 4th mark has not quite reached a mark on the main scale, then the measurement would be three and one-half tenths, or 0.35 mm.

View C, Figure 2 shows a reading of 1.6 millimeters. When there is a reading that appears to be an exact number of millimeters without any tenths, the tenth line on the Vernier will line up exactly with a line on the main scale. Otherwise, there must be some tenths present.

Figure 3, View A shows another caliper reading. To interpret this reading, note that the zero mark on the Vernier scale is past the 15 millimeter mark, as is indicated by the 2 centimeter or 20 millimeter mark which shows up in the center of the window. The zero mark on the Vernier

is slightly past the 16th mark on the main scale. This means that we have the gauge opened for 16 millimeters plus some tenths. When the tenths are counted, we find that none of the lines are lined up exactly. The second line is slightly past lining up and the third line is just before lining up which gives us two and one-half tenths. This gives a measurement of 16.25 millimeters.

View B, Figure 3 shows another reading. The zero line on the Vernier scale is past the 33 millimeter mark on the main scale, but not quite to the 34th mark. When the Vernier scale marks are counted, it is found that the 9th mark lines up exactly with a line on the main scale. This gives a total measurement of 33.9 millimeters.

Figure 4 shows four different ways of using the Vernier caliper to take measurements. View A shows how the straight jaws are used to measure a round or flat object. These points can also be used to measure the length of an object. View B, Figure 4 shows how the ends of the straight jaws are used to measure the inside diameter of a mainspring barrel. The width of the end of each jaw is 1.00 mm; therefore 2.00 mm should be added to the reading to get the correct reading for an inside measurement. View C, Figure 4 shows how the curved jaws of the Vernier caliper are used to measure the thickness of the bottom of a mainspring barrel. This measurement cannot be done with the straight jaws. The curved jaws should not be used for measuring a round object. View D, Figure 4 shows how the depth of a mainspring barrel is measured. This is done with the end of the tongue of the caliper using the end of the Vernier slide against the top of the barrel.

Figure 5 shows the Vernier caliper being used to measure the length of a pivot. Note that the end of the tongue is being used and that the Vernier scale A is above the main scale B, whereas the Vernier scale was below the main scale when the caliper was used to measure the diameter or thickness of an article. Also, the numbers on the main scale that were upside down when the caliper was being used for measur-

(Continued Next Page)

Figure 2

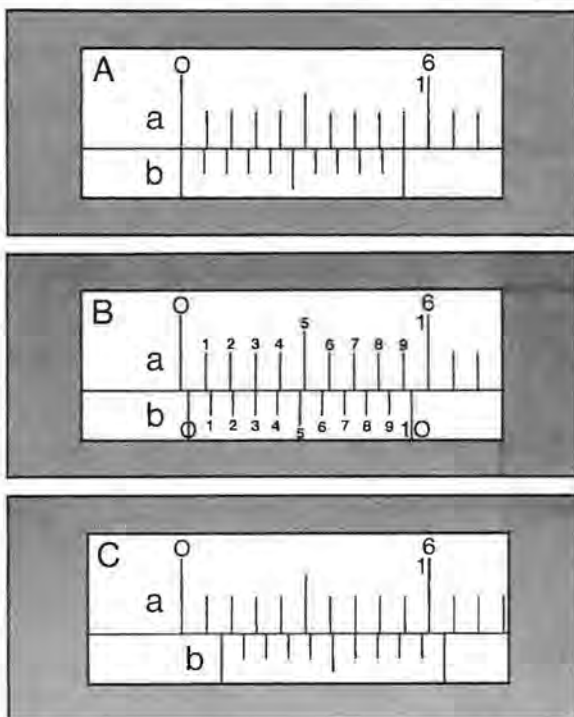
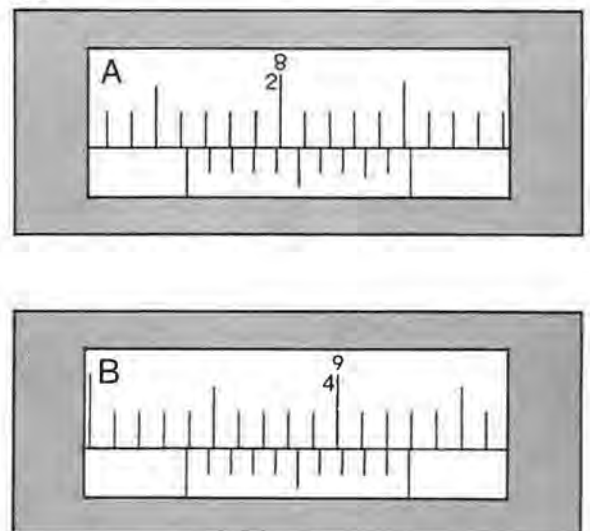


Figure 3



ing diameters are now right side up, and the former numbers are now upside down. Regardless of which end of the caliper is being used, the Vernier scale is read from left to right and this is true regardless of whether the Vernier scale is above or below the main scale. The arrow in Figure 5 points to an enlarged view of the reading of the measurement of the length of the pivot being measured. When the reading is analyzed, it is found that the zero line of the Vernier scale is past the one on the main scale which indicates that the measurement is more than ten millimeters. By counting the tenths, it is found that the 8th line on the Vernier scale lines up exactly with a line on the main scale which gives a total reading of 10.8 millimeters. Before using the Vernier caliper to measure the length or depth of an item, be sure the end of the tongue and the end of the slide are even and flush with each other when the scales are set on zero. Otherwise, the measurement will not be accurate.

Figure 4

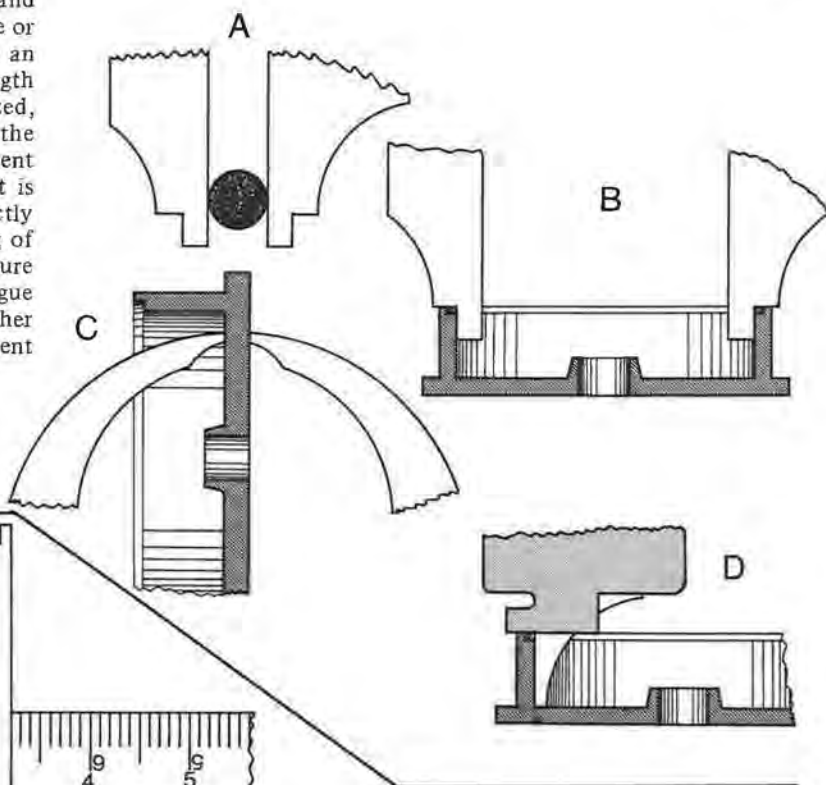


Figure 5

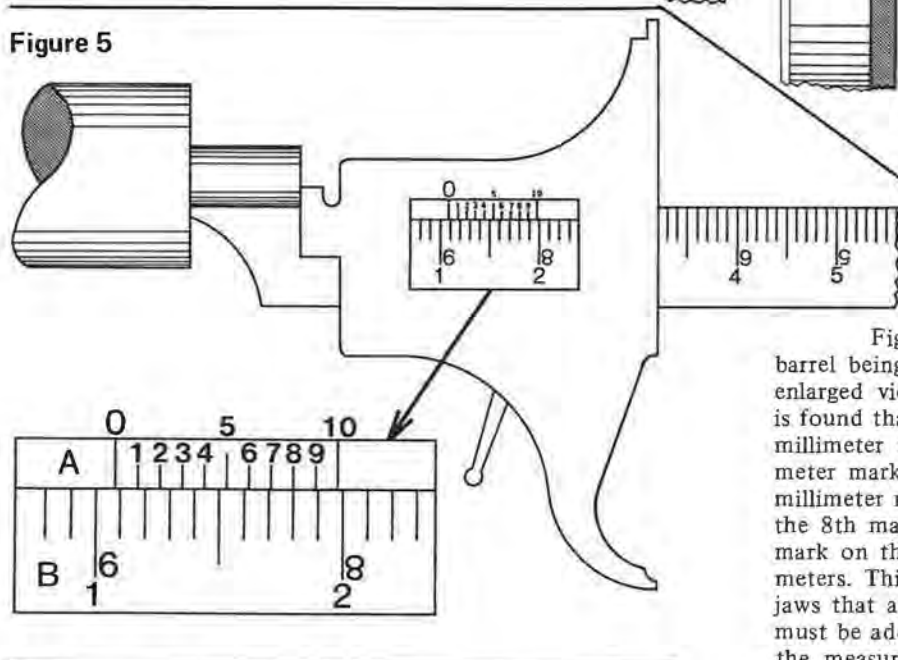


Figure 6 shows the inside diameter of a mainspring barrel being measured. The arrow in the figure points to an enlarged view of the reading. When the scale is viewed, it is found that the zero mark on the Vernier scale is past the 20 millimeter mark. To be more exact, the zero mark is past the 18 millimeter mark. When the tenths are counted, it is found that the 8th mark on the Vernier scale is lined up exactly with a mark on the main scale which gives a reading of 18.8 millimeters. This reading does not allow for the width of the two jaws that are inside the barrel. The width of these two jaws must be added to the reading to obtain the correct reading of the measurement. The ends of the jaws are supposed to be 1.00 mm each. Therefore, by adding 2.00 millimeters to the 18.8 reading, we obtain a total measurement of 20.8 millimeters. NOTE: Sometimes it is found that the jaws are not exactly 1.00 millimeter wide each. When this is the case, their exact measurement should be added to the scale reading to obtain the correct measurement. Before measuring with the Vernier caliper, make sure the ends of the jaws are not bent, and when the jaws are completely closed, the two scales should be on zero.

How to use the "Modern Watchmaker's Lathe" and measuring will continue next month.

T.M.E.S.

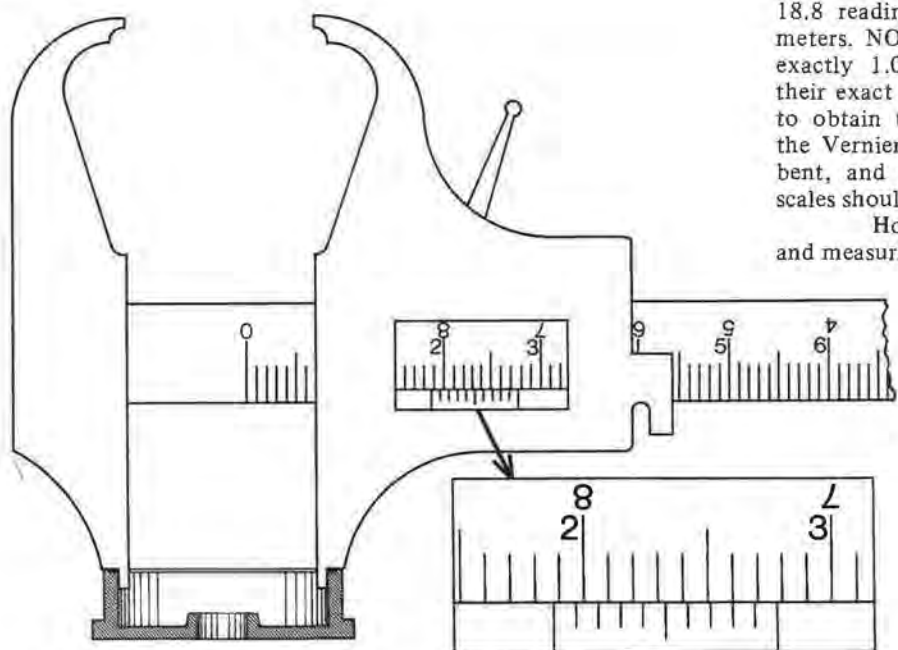


Figure 6



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| 354 | .67 | 393 | .65 |
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THE PICKLE BARREL

By Marshall F. Richmond, CMW



Repairing Watch Dials

Regular watch dial refinishing and repair services are available with very good service. It usually takes ten days to two weeks for a dial to be returned when sent in for refinishing and repair. The workmanship is very good, so on most dials this is the practical way to go. But on porcelain dials that were used on most old pocket watches, I have been told that there is no place that makes them anymore.

Filling in Chipped Porcelain Dials

When we have a watch with a porcelain dial with a piece chipped out of it, we can fill it in with a chalk white wax-like substance listed in the material distributors catalog as "Dial Enamel." This can be applied with a small metal spatula or flattened wire heated with an alcohol lamp. As it hardens, it can then be instantly shaved off flat with the surface using a razor blade. It blends in with the porcelain so it is hardly noticeable.

Repairing Dial Pegs With Broken "Feet"

When dial pegs or "Feet" are broken off from a porcelain dial, this is an entirely different matter. If a butt joint is used, soft soldering them back will not hold long enough to tighten the dial screws. Repairing these is almost a must because if they are not repaired, the dial can shift causing the watch to stop or run in an erratic manner. I have observed these dials with makeshift repairs that never held, including some that were glued to the pillar plate. Replacement would be the best way to go. However, no new dials are available, and a used dial identical to the broken one possibly would be, but the cost of locating it and the time involved would make replacement prohibitive. I have discovered a method for making the replacement of dial feet on porcelain dials that is strong and durable, however very slightly noticeable on the number side of the dial.

As dial feet on pocket watches are 1.25 mm in diameter, the material needed is a piece of brass or copper wire that is 1.50 to 2 mm in diameter. The tools needed are a watchmakers lathe, a flex shaft tool or high speed small grinding tool that will hold small drills and diamond points, a drill 1.25 mm in diameter, a tapered diamond point and a flatend diamond point, a torch or soldering iron and possibly a tapered broach.

As a porcelain dial is a thin copper disc with the porcelain applied on both sides, the number side usually is a very white white and the under side tends to be a dirty white or even gray or blue tone. For a broken off peg to be soldered on, holding with a butt joint would require hard soldering. To make hard solder flow, the copper must be heated red hot.

The porcelain, however, would not take this kind of heat, and in order to soft solder, the process requires more surface to be soldered onto the copper. If a peg is turned in the lathe with a flat nail-like head and soldered to the under side, it would protrude too far. Also, the dial would not seat tightly against the pillar plate so the plate must be drilled completely through the copper plate and the enamel in exactly the spot where the broken peg was attached.

Centering the Hole

I first use a point tapered diamond point and remove any enamel just around the peg where it is broken off. Then, turning the dial face up, calculate the exact position where the hole will come through on the porcelain's face side. This can be done with dividers or vernier calipers, by first getting a mark on the edge and then measuring how far from the edge of the dial the center is. Marking can be done with a soft lead pencil making a cross intersecting where the hole is to be centered. Upon determining this with a flat bottom diamond point about 2 mm to 2.5 mm, the porcelain

can be countersunk until the hole reaches the copper plate. Turn the dial over with the bottom side up. With a sharp pointed graver, center the broken-off peg or foot. Measure a remaining foot to get the diameter. Or you can measure the hole in the pillar plate with a piece of wire which fits in case all feet are broken off. Then measure the diameter of the wire with micrometer or vernier calipers to get the drill size to use to drill through the copper plate. This will also give the size of the dial foot that will be turned in the lathe after the copper is drilled. Drill the hole using the flex shaft tool, or drill it in the watchmakers lathe. Make sure the copper is clean around both sides of the hole. The hole for a 16/s American pocket watch is approximately 1.25 mm in diameter, so to make the replacement foot a piece of copper or brass wire at least 1.5 mm in diameter will be chucked into the lathe. To get the length, if a foot is remaining on the dial with micrometer or vernier calipers, measure from the end of the foot to the upper (number) side of the dial or the thickness of the pillar plate plus the thickness of the dial.

With the wire chucked in the lathe it should protrude the length of the footend dial as measured plus a little extra to have room to cut it off. Next turn the wire to the correct diameter and length and then cut off leaving a thin head about half (or less) the thickness of the porcelain on the top side of the dial. Before cutting, the end should be slightly rounded or even tapered to allow it to enter the hole in the pillar plate when installing it on the watch.

Making a Neat and Strong Bond

When the foot is finished, place the dial on an asbestos pad and soft solder it to the copper. Using a torch will work best but a soldering iron will work, but it is difficult to control the flow of the solder. I have found a solder paste that is

both flux and soft solder combined. By filling the hole in the porcelain after the foot has been put in place and applying heat with the mini or little torch from the under side, it will make the solder flow through to the underside of the dial. This will make a neat and strong bond.

How to Patch Up the Hole

Now we have a dial complete with a new foot but a sorry looking hole in the dial. The first step is to clean it by scrubbing with soap and ammonia solution, and then rinsing. This should make it perfectly clean. Make sure it is thoroughly dry.

As I mentioned previously, the dial enamel, which is powdered porcelain in a wax base, is next to be applied. A small spatula (such as the kind that comes with luminous kits or a small strip of thin copper) can be heated and the enamel then applied. This may require heating the spatula more than once to get an even flow of enamel in the hole, but as long as the hole is filled without any pores it will make a good patch. A sharp razor blade will trim off the excess flush with the surface of the dial that will blend in and hardly be noticeable except if part of a number or the calibrations have been removed. These can be filled in with a fine point speed ball pen using India ink (see Figure 1-a and b). This job should please even the most discriminating customer and the dial will be the original with no changes. As all the old American watches with porcelain dials are now antiques and most of them collectors items, it is important to remember that any changes from the original in dials, hands, cases or even movements greatly lessens the antique value of the watch.

A Point to Remember

In repairing these old timepieces remember this: Try and restore them as nearly to original as possible. That is the difference between repair and restoration. Repairing means to get it in working order in any practical way possible. But restoration is putting it back in its original state. Restoration usually takes more time than repair, but customers, especially collectors, will pay a premium for a fine job of restoration.

Dial Repairs by Dial Companies

Regarding the repair of regular dials it is not generally practical to repair them or try to refinish them, because we still have excellent facilities furnished by several dial companies throughout the United States. Their work ranges from good to excellent, and the service, too, is good. Usually within ten days to two weeks a dial will be returned and the charges, although not cheap, are fair. The dial companies will replace broken or missing feet on regular dials but as they are hard soldered, the dial must be heated red hot so all the finish and numbers will be burnt off. Since they are in a position to be refinished to original or as requested, this is the practical solution for dial refinishing and replacing broken feet.

A Pressure Job

Occasionally, when a dial foot is broken off, two weeks is not enough time to get the repair made, due to some pressure on the job. A few weeks ago, I had such an experience. The watch and the dial were like new. Time would not permit me to send it to a refinisher, so I figured out a way to make this repair sturdy enough to be permanent, and yet very slightly noticeable. I drilled a hole

through the dial exactly the size of the dial peg. As the dial peg was 0.78 mm in diameter, I chose a piece of brass wire 1.20 mm in diameter and chucked it in the lathe. The wire is turned to the exact diameter of the old broken peg back toward the chuck to almost the length of the broken peg. Then a shoulder is turned to look like the rivet part of a balance staff. It will be long enough to go through the dial and rivet flush with a round bottom punch using the watchmakers staking tool.

Next a taper is turned slightly larger than the shoulder to look like the countersink head on a screw. This should be done so the head will be just the thickness of the dial. Mark the cutoff point with a graver and then cut it off with a jewelers saw, while turning in the lathe. With a tapered broach, enlarge the hole in the dial so the shoulder of the peg fits tightly. Then with a countersink bur in a pinvice, countersink the hole so the head of the foot (that was turned in a taper like a countersink screw) will fit in the countersink around the hole in the dial. Set up the staking tool with an inverted punch very slightly larger than the head of the foot. Using a round bottom punch that just fits freely over the dial peg from the top, gently stake the shoulder until it becomes tight. Then use a flat bottom punch the same size and finish staking it as you would a staff. Use very light taps on the staking punches. You do this because, unlike a hardened staff, you are staking a very soft metal. This should make a strong enough repair to stand the stress and strain that a dial is usually subjected to.

(Continued on Page 28)

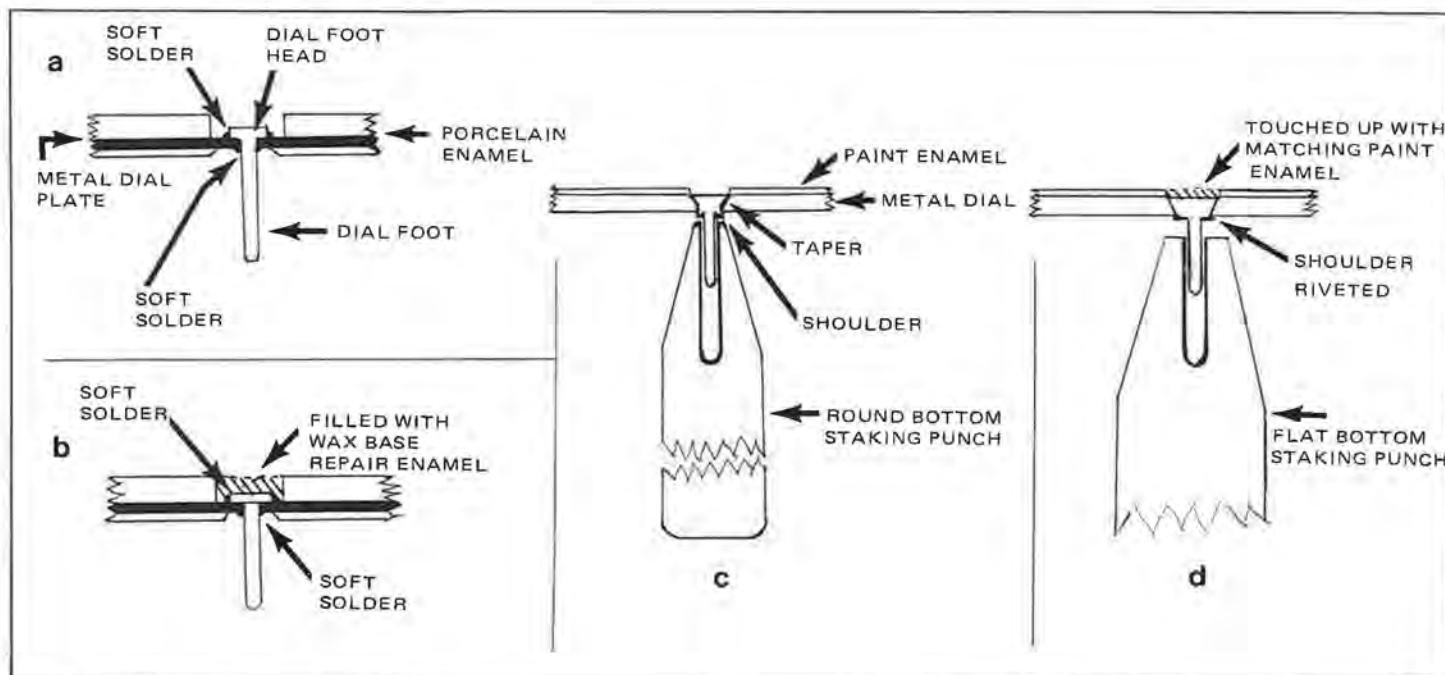


Figure 1



THE BROCOT ESCAPEMENT

By A. L. Rawlings and J. E. Coleman

Part I—J. E. Coleman

With the possible exception of the lever escapement, invented by Thomas Mudge (born 1715, died 1794) in 1759, no other escapement has had the far-reaching influence upon the entire horological world than the one devised by Achille Brocot (born 1817, died 1878), when he was about twenty years old and known by his name.

The exact date of honest George Graham's dead beat escapement is in dispute but it is certain that he was a mature man with a seven-year apprenticeship plus about thirteen additional years' training under the great Tompion, and had obtained some position in The Clockmakers Company, as well as notice from The Royal Society, when he originated it.

Many clockmakers do not understand it; a few despise it and most watchmakers are not aware that it is directly responsible for some features of precision watch manufacturing in America today.

On one of his visits to Nashville, I showed to Dr. Rawlings a fine old Ansonia clock with Brocot visible escapement, where some bright young "mechanic" had turned the pallet jewels over so that he was using the "flat" side for the impulse surface. During this discussion of the Brocot escapement, I suggested that he write an article on it, volunteering to furnish some photos to illustrate same. He returned to New York and the photos were sent up, then came a communication saying, "Oh, no you don't; you induced me to write the technical stuff, I should have the privilege of seeing your name with mine as joint author and you can't back out now. Let us make the article in two parts—part 1, historical, part 2, technical. Now you get busy on part 1." Thus having made a lengthy plea about the need for such a paper, holding up that piece of "botch" work as a horrible example, how was I to say the good Doctor nay?

I was soon to discover that biographical data upon Monsieur Achille Brocot seemed non-existent and that facts about his horological accomplishments were very, very hard to come by. Thus this portion (part 1) has been delayed more than a year while frantic letters were dispatched to England, France, Erie, Switzerland. The sum total result is far from satisfactory but we feel that nothing will be gained by further delay.

As a starting point we might take the obituary notice from an issue of "Revue Chronometrique" in 1878, written by his close friend, Monsieur A. Redier. Baillie lists: "Antoine 1817, died 1892, an eminent maker of clocks and registering instruments. Published several memoirs. Successor of Duchemin of Paris. Used aluminum in gridiron pendulums and for escape wheels."

Two copies of this obituary notice were received within a couple of days of each other. Mr. N. de Woyna, editor of "Bijoutiers Horologers," Paris, sent French copy and some additional notes. Mr. G. Riviere (Paris) supplied a French copy to friend Reni Laussage (36 Rue Jean Janres, Lizzy sur Ourcq, France) who translated same and mailed it over.

Laussage Translation

Parisian horology has lost one of its masters. Achille Brocot, who was a tasty creator and an untiring searcher, a revelator worthy of his name, passed away on the 19th of January, 1878. He was born on the 20th day of July, 1817. He was less than 61 years old,

To relate such a well-filled life would be a teaching as precious for the heart as for the intellect; to follow his career in its incidents would mean to learn courage, discernment and straightforwardness in their liveliest and most delicate expressions.

We merely sketch this feature by having known which part of modern progress belongs to this eminent artist; the first, in the important branch of horology. Brocot made but modest studies. At 15 years of age he left school to set himself to workbench despite the fact his masters spoke so highly of his aptitude for mathematics and that they had solicited his parents for them to achieve his preparation to "polytechnique College." His father resisted, himself being a searcher and having the sentiment of what lacked in him, he made haste to join himself to a son whom he believed learned enough and who already in fact, with a great facility solved the theoretical questions of the craft.

Achille Brocot was only 16 when he invented his rack strike work without a snail. It was one of the more elegant applications of a theorem of elementary geometry, his striking works so sure in their effect, so logically conceived would have become classical had the manufacturers not resisted in renewing their tooling. Our young geometer's father had much passion for his art; strong, demonstrative, a brilliant talker, he delighted in gathering a few confreres in his little academy, where he dispensed thousands of interesting questions.

Achille, admitted in these reunions, knew how to listen, tried out some useful remarks and at times astonished most of his confreres. They discussed much the condition of a good suspension, when one day during his father's absence, Achille Brocot swiftly made the model of the suspension which bears his name since, and which is so perfect that it has

(Continued on Page 38)



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Battery Replacements

(PART II)

As we mentioned last month, most testers would serve our needs, or that is to say, most of the time.

TESTING UNDER LOAD

If a battery shows "dead" under any tester, we know it must be replaced. However, if a cell tests "good" on our regular tester, it still may not run our watch. Otherwise, it may not work under "load" conditions. Since the watch has a certain amount of resistance, we must simulate this condition by placing the battery also under "load" as we make our test. Some battery companies do have a "load" built into their testers. The best kind of course would be one that has a variable control to change the amount of resistance.

Figure 1 shows a variable load cell tester attachment unit by Zantech which attaches to their Quartz Analyzer machine. By setting the numbers higher or lower, one can adjust the resistance and quite accurately predetermine the cell's potential. There may be other machines on the market

which do the job also. The important thing to check is the adjustable resistance feature, so that when a cell is placed into the tester the readout will simulate the true watch running conditions.

As mentioned before, in most cases our simple testers are all right, but those with adjustable "load" testing capabilities are very desirable. If we do not make a "load" test on the old battery that still shows "good," we may think that something is wrong with the watch and it only needs that simple, new cell. So when in doubt and without having a "load tester" we may want to presume the cell is needed and then inform our customer that if we are wrong, additional repairs may be needed. Honesty with our customers is the best policy.

This reminds me of the time I told an Accutron customer (after changing a "border line cell" and tightening a slightly loose coil strap screw) that I was not sure if this slightly loose screw was all of the problem. He was happy to try his watch and if it stops again, he would be understanding when he returned his watch for more repairs.

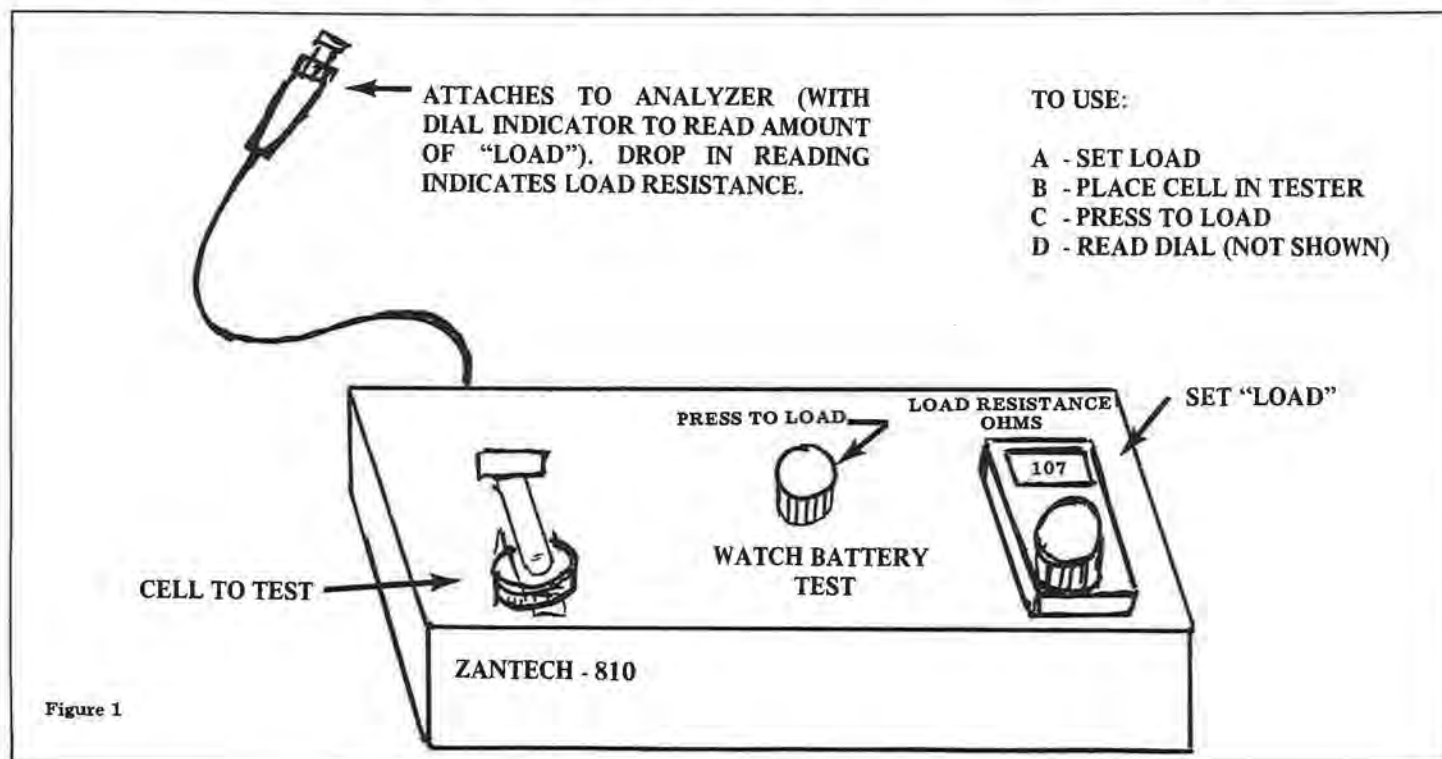


Figure 1

SELECTING NEW BATTERY

In the August 1982 issue of *Horological Times*, the article "The AWI Battery Number System" by Ewell Hartman, CMW, explains the new and hopefully future universally accepted battery numbering system. I believe that this article and the follow-up article by Milton Stevens in the October 1982 issue should be required reading for all of us. It is our own AWI system which will hopefully be adopted by all people in our field, including the various battery manufacturers. Now we can use this one AWI chart and fit all cells instead of having ten or fifteen sheets, charts, or booklets from various battery companies, etc.

Generally, selecting a new battery is easy. We look at the old cell and presuming it is correct, we simply select one to match. This is done by observing the brand and number and replacing it with the same or equivalent brand and number. We should test all new cells on our battery tester, just to be sure we are installing a good one. Even with a long shelf life it is best not to take a chance, because occasionally we might find a bad cell. Next, it is very important to know the date we replaced the battery, so we should use our "marker" or "scribe" and scratch the date and our initials (or store mark) on the cell.

Time passes fast and some customers have been known to think that their cell was replaced only four months ago, instead of what might have been a year. If we can quote from our "scratch" mark, it can assure our customer that the cell was actually replaced at the time that we said.

Now that we are using the AWI Battery Number

System (hopefully everyone is), we should mark this AWI cell number in the cell compartment or as close to the cell area as possible for easy future viewing by us or others. It is suggested we mark the AWI cell number, above which we should place the letters "AWI." While using this system, we will still be buying the brands we want. Now we can start learning these AWI "universal" numbers, or just look them up as needed.

Next we check the cell polarity (positive up or down) and place the cell into the watch, repositioning the cell strap (if one). Then, after the back is tightened down, we should re-set the watch for our customer.

Battery replacement is generally quite easy as we simply use a cell like the old one. But we must be careful. For example, if a 1.35 volt cell is put into service in a watch requiring a 1.5 volt, it might actually work for a while since a watch designed for a 1.5 volt cell may run down to about the 1.35 volt level without stopping.

Naturally we must take care in handling the cell. Plastic tweezers are a good guard against "shorting out" a cell or contamination from fingerprints, etc. In replacing a cell we must take the same care we would use in any other repair job.

It is so easy for our customer to drop in at the supermarket and buy a battery. Supermarkets are open in the wee hours when we are closed. But we need to convince our customers that we are the professionals for their battery replacements.

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A Real Sense of Accomplishment

I recently had the pleasure of speaking to the National Watch & Clock Collectors Association at the National Museum in Columbia, Pennsylvania.

As I walked around and looked at all the fine watch and clock pieces, I had a good feeling knowing that they are being well taken care of, and on display for present as well as future generations to see. It is also nice to know that people are still being trained to repair these museum pieces. I can't speak for all watchmakers and clockmakers, but I have a great feeling of accomplishment and pleasure when I repair one of these fine old pieces, knowing it will perform for years to come.

Many questions were raised at this meeting, among which were: Where do I get my watch or clock repaired? Since our watchmaker has recently retired, how do I know I can trust someone else with my watch?

Naturally, a collector has a great deal of pride in his timepieces that he was able to acquire. This particular person

should be a graduate of a reputable technical school, an AWI member, and possibly a Certified Master.

After talking to these collectors, I realized that most individuals have no idea what it takes to repair a clock or watch. I was fortunate in having along with me a student who was still learning watch repair, another who was an experienced watchmaker, and also a retired clockmaking student. The student clockmaker brought along the clock he is making and a wooden works clock he is repairing and explained both movements.

We completely disassembled a fine Hamilton pocket watch, reassembled it, oiled and regulated it. It did not need a staff replaced or a new mainspring or any escapement work. We also replaced a staff in a balance wheel and trued and poised the wheel. The amount of care and time required to do both jobs impressed everyone present, because they now know such operation requires more than just blowing out the dust or lint.

Where does all this take us? *Students*. The people present at the meeting found out the importance of education for an individual to become a competent repair person. Also important is the time and effort required on their part to do a restoration job.

As an instructor and an AWI representative, I felt a real sense of accomplishment in being able to put on this program in showing the attendance the results of a good training program.

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Battery News

By Ewell Hartman, CMW

Refer to your BNS booklet to make the following up-date:

Corrections:

- S13 (AWI): change SR730W (Maxell) to read SR736W
- S13 (AWI): remove SR736SW (Toshiba)
- S10 (AWI): change 604 (Bulova) to read 242

Additions:

- S01 (AWI): add 604 (Bulova)
- S13 (AWI): add 49 (Renata)
- S17 (AWI): add TR726W (Seiko)
- S14 (AWI): add 51 (Renata)
- S34 (AWI): add TR616SW (Seiko)
- S42 (AWI): add 329 (Eveready)
- L08 (AWI): add CR1620 (Renata)
- L10 (AWI): add CR2016 (Renata)
- L10 (AWI): add SBT-11 (Seiko)
- L12 (AWI): add CR2025 (Renata)
- L14 (AWI): add CR2032 (Renata)

New Listings:

- S56 (follows S54, AWI): 1.50 (voltage), 5.8 (diameter), 2.1 (height), 379 (Eveready), 50 (Renata)
- S58 (follows S56, AWI): 1.50 (voltage), 6.8 (diameter), 1.4 (height), 52 (Renata)
- M16 (follows M14, AWI): 1.35 (voltage), 11.6 (diameter), 3.1 (height), 47 (Renata)
- R13 (follows R11, AWI): 1.50 (voltage), 9.5 (diameter), 2.6 (height), 48 (Renata)

Industry News

This month's Battery Number System up-date includes information supplied by Mr. Henry Kessler of Sy Kessler Sales, a distributor, along with the Seiko Time Corporation, a manufacturer, and Mr. K. L. Kunath, an AWI member. Contributions from all segments of our industry make it possible for our members to have the most complete and current listing of watch batteries available. The booklet and cabinet labels are available from AWI for \$2.00 postpaid. "ENTHUSIASM MAKES THE DIFFERENCE!"

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THE ROCK QUARRY

By Fred S. Burckhardt



What are Friends For?

It started out as a nice quiet day. I had just finished putting on those little metal ends of my shoelaces and started to get down to the more serious business of cleaning out the holes in my bench block, when the phone rang. It was an old friend of mine, Bert Gramm.

Bert and I started out many years ago. I always liked Bert because he wasn't pretentious, and not only that, he wasn't a show-off. I must admit, there were times when I didn't think his balance wheel was poised, but other than that, he was okay. He asked if I was still turning screws. This question brought back some fond memories. When we were in school, we would take turns removing all the screws in a chronograph. After all the parts were mixed, the other one would have to put it back together. Bert had no trouble with this. It would take me several days just to figure out where the mainspring went.

I asked Bert what he was doing now. He said he had given up watchmaking and moved to Alaska. A friend had convinced him to put his life savings into a business venture that couldn't miss. "Being's" he was tired of sitting at the bench, he decided to make a clean break and go along with the deal. For some reason, he was a little hesitant to tell me what kind of business it was. I finally pried it out of him. He was partners in an ice manufacturing plant located in the Alaskan tundra. He said things were a little slow right now but they expected it to pick up in the next few years. I felt like saying, "That's not the only thing that's a little slow," but instead said, "Bert, how come you went for a deal like that?"

After a moment's hesitation he said, "Remember, Alaska is one of the last few frontiers. They need all kinds of businesses up here. You should consider coming up and starting a business for yourself."

"No thanks," I replied. "I'm not much when it comes to grizzly bears and moose. Besides, I scream a lot when the weather gets cold. When it gets below 20 degrees, the only thing I can do is crawl in a corner in a fetal position and cry. Give me the sunshine and warmth. Besides, business is good. There's plenty of repair work and I'm using all my spare time inventing some new sizes of watch batteries. There are not enough sizes and we have to keep the watchmakers busy trying to figure out which battery to use. You know how it is. Gets kind of boring if you find the right battery too easily.

I'm also investing in a printing shop. New battery charts have to be printed every few months. Why not get in where the big bucks are?"

"You know, you've always had a keen sense for business," Bert replied. "I wish I would have thought of something like that before I came up here. I was planning on putting some of the profits from this business into an oil pipeline that would run from here to the States, but I heard there was already one like that."

"Don't let that stop you," I said. "We can always use another pipeline. The best part is, you won't have to have any pumping stations. We could get some of the "Blow Hards" in this business at this end. If they can suck in as hard as they blow, oil should start to pour out in no time!"

"Hey, that's a great idea," said Bert. "Let's work on it."

A customer came in, so I said, "Sorry, I have to go now, Bert. It was good talking with you again. Let's keep in touch."

"Okay," said Bert. "In the meantime, if you should change your mind about coming up here, or if you ever need any ice, let me know."

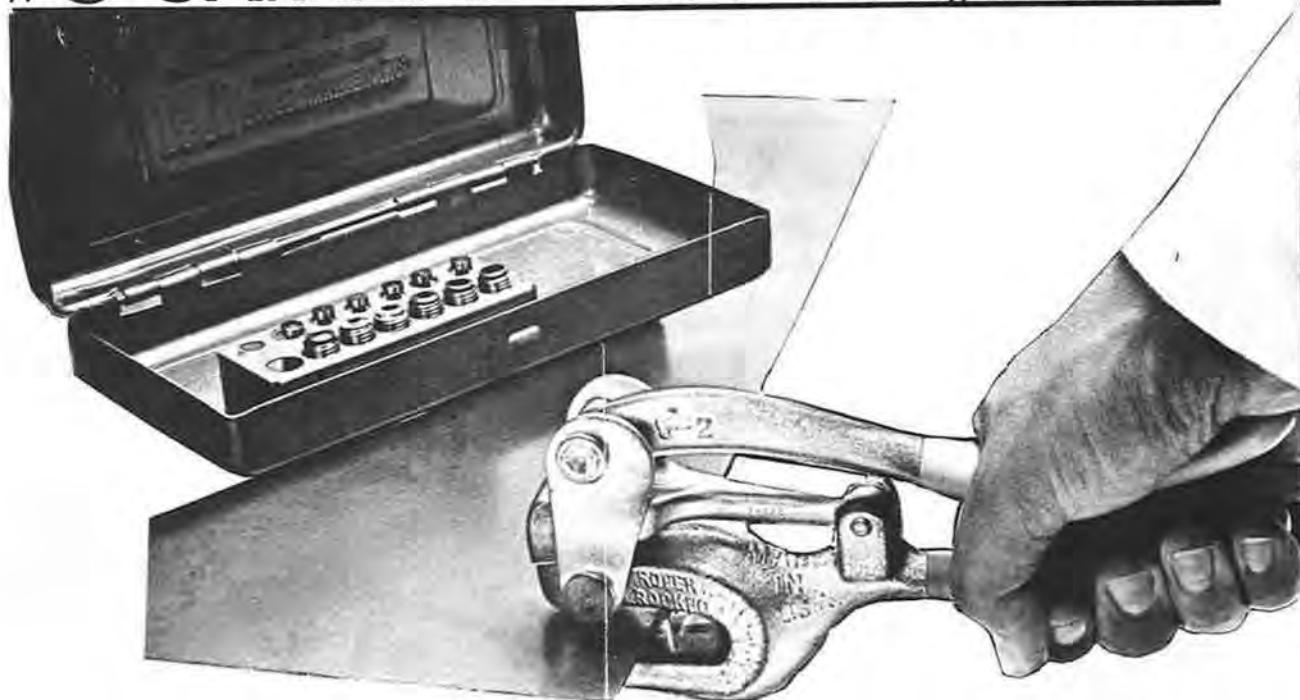
The customer who came in was a middle-aged woman looking for a 50th anniversary present. I showed her some very nice gift items; a solid brass spittoon (in classier circles called a "cuspidor"), which could also double for a centerpiece. I told her it could also be used to soak the teeth in at night—both sets. I've always been a sucker for sentimentality. She was then shown a gold-plated plaque with intertwined wedding rings, and a beautiful verse depicting "togetherness" for fifty years. She gave it some thought and then said, "No, this will never do. They hate each other's guts."

After looking at several other items, she said, "I just don't see anything I think they would like. I want to get something nice because they are dear friends of mine, but I don't want to spend a lot of money."

I showed her a brass clock and told her it would run eight days without winding. She said, "That's wonderful. I'll take it. By the way," she added, "How long will it run if it were wound?"

I think I'll call the airlines and see how much it will cost for a one-way ticket to Alaska.

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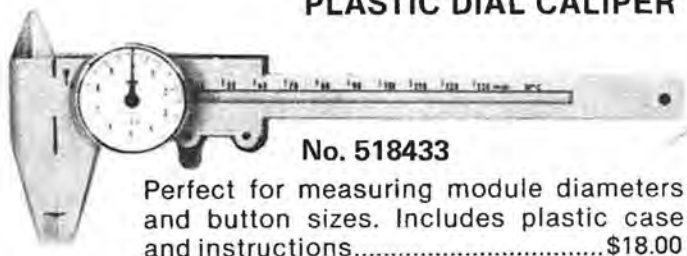
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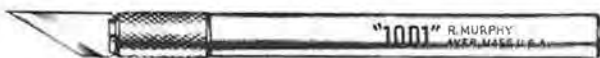
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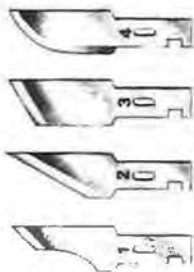
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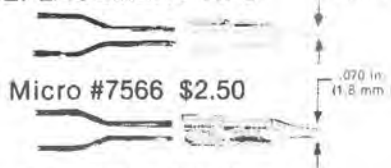
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(Continued from Page 8)

A I have read your letter with interest and will attempt to answer as best as I can.

Your watches unfortunately do not have very great value in the current, depressed market. However, there are collectors that specialize in older military and precision watches into which your watches fall.

Occasionally, in examining auction catalogues, I may see items such as you possess up for bids. The Elgin military dial, white on black, was produced in many quantities with both the Hamilton, Waltham, and Elgin labels. The highest prices, about \$125.00, go for the Hamilton models, and the Waltham lower with Elgin lowest. The Ulysses Nardin should bring a bit higher than the Hamilton.

To sell these it might be best to put them up for auction or to give them to some dealer who'll sell them for you at a commission. For names of such people, I can only refer you to the MART of the National Association of Watch and Clock Collectors. Many dealers

advertise for sale and wants (one must be a member to advertise). However, if you know someone who is a member, borrow a copy of their current MART, study it and pick out your own dealer or dealers from among this list who, in your judgment, can do the best job for you.

Q I have read and enjoyed your books for many years. For the last five or six years I have been trying to start some type of repair (machine only) service doing repivoting (mfg. balance staffs, etc.). However, I've never come up with the volume to justify the cost of the tooling.

We have made many watch parts, including balance staffs, winding stems, pallet arbors (much repivoting, balance staffs, cylinder escapements) and even a rack for a ¼-hour repeater, although we never got paid. I have been able to turn pivots to .002 inch.

If you have any ideas or sug-

gestions along these lines, please write.

Joel Levine
Lilburn, GA

A To enter the professional service such as you are prepared to offer requires that you become more familiar with the type of customer you seek.

I do not know to what professional horological organization you belong, but regardless you should become familiar with the AWI institute and its publications, the more important one, the Horological Times. Also, there are over 8000 members in this institute among whom are many that seek services such as you claim you can supply. Also, the National Association of watch and clock collectors (Box 33, Columbia, PA 17512), with its 37,000 amateur members also has many who could use
(Continued on Page 28)

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READERS WRITE

(Continued from Page 5)

MANY SERVICES

Thank you for the many services I have received from the AWI since I joined last May. My membership fee was the best money I ever spent.

Ken Yeates
Manitoba, Canada

LEARNED A LOT

A little late, but here are my dues for 1983, an expense I will gladly pay. I really miss the *Horological Times*. Besides Henry Fried, which I had the pleasure to talk to a few times, I think I learned more from the *Times* than any other publishing of its kind. Thank you very much.

Heinrich G. Greipl
Kelmescott-Perth, Australia

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The Principle of the Riveted Balance Staff

At this point the repair is done, but there is a spot on the face of the dial that would be quite noticeable. The way that I cover this up is with the use of enamel. I have small bottles of enamel (paint) that can be bought in most any hobby shop or variety store in most any color or shade imaginable. I choose a color and shade that closely matches the dial, and with a small camel hair brush just touch over the spot. When installed on the watch (See Figure 1-b and c) under a crystal it is hardly noticeable. What made me see that a repair could be done in such a way was a particular repair that was brought into my shop many years ago. It had the dial pegs broken off and they were replaced with flat-headed screws through the dial. Other than them being unsightly and not fastened to the dial, they did make the dial secure. I devised the aforementioned repair using the principle of the riveted balance staff.

Scrubbing the Dials

Regular watch dials that are painted

usually have a coating of clear lacquer sprayed over them to make the finish more durable. Oftentimes due to moisture or age, the lacquer flakes off in spots. As you have probably found, it makes a completed repair job look shoddy even though the movement is in excellent condition and the case and crystal are polished to look like new. Sometimes a customer will not agree to the extra expense of a dial refinish. Usually on any watch good order job, I try to make the watch run and look as nearly like new as possible. In a situation like this I scrub the dial with a solution of soap and water, being very careful not to loosen the numbers, letters or calibrations. Then I rinse it in cold water and dry under a heat lamp. Using a can of clear lacquer (aerosol spray can) I spray a very thin coating of the lacquer over the surface and again dry under a heat lamp. Although this does not usually make the dial look like new or a newly re-finished dial, it does greatly improve the appearance and sometimes the dial will really look as good as a refinished one.

Anything we can learn that will keep us from giving an unfinished or shoddy repair back to a customer greatly enhances our image as watchmakers and jewelers.

This article is not written with the intention of even suggesting that these repairs be put to constant use in everyday repairs, but instead to help get

out of tough situations or be able to make repairs where sources of parts are not available.

In the next article we will discuss methods of fastening in jewelry repairing.

TUES

QUESTIONS AND ANSWERS

(Continued from Page 26)

such services. The latter organization also has two publications, one called the MART, available only to members. It contains wanted and for sale sections including advertisements for these services. You might consider joining and advertising therein. Attending meetings of such organizations, chapters of which exist close in your area, will bring you into personal contact with many who could learn of your skills and services.

Also, personal canvassing of jewelers and trade and regular watchmakers and clockmakers should result in some business for you.

I hope that I have given you some ideas, best answered from reading your letter, and hopefully again, interpreted correctly. Best wishes. - H. Fried

TUES

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TUES

A LETTER FROM HENRY FRIED

George T. Gruen, one of the most prominent figures on the American horological scene, died at the age of seventy-seven. Mr. Gruen was active in all sectors of the watch industry.

Mr. Gruen was the grandson of Dietrich Gruen, founder of the Gruen Watch Company. George T. Gruen was educated horologically in Switzerland, graduating from the Technicum du Locle, after which he returned to Time Hill, Cincinnati, site of the Gruen watch factory where he later became Secretary and Director of the Gruen Watch Company. He held that post for 32 years. During that time he also assumed the position of Technical Director and Dean of the prestigious Gruen Watchmaking Institute.

Mr. Gruen also served as a major officer of the Horological Institute of America and he was instrumental in the founding of the American Watchmakers Institute, resulting from the combining of the Horological Institute and the United Horological Association of America.

During the war years, as a civilian Mr. Gruen served as Senior Purchasing Officer, Procurement Office of Transportation at the Pentagon in Washington, between 1942 and 1944.

His keen interest in horological production as well as in education brought him in contact with all the leading horologists of his day. When the American Watchmakers Institute started their museum, Mr. Gruen donated much of his own collection of rare and unusual watches.

Mr. Gruen's outside activities included: Member, Bd. of Trustees, Deaconess Hospital, Cincinnati, Ohio for 30 years, 15 years as Secretary, Management Comm. Williams Y.M.C.A., Board of Trustees of the Heart Association of southwest Ohio, Technical Consultant, Goodwill Watchmaking Institute, Cincinnati, Ohio, Charter Member of SCORE (Service Corps of Retired Executives), and their Chapter Chairman 1969-1970.

Mr. Gruen leaves a family of two children, Sara Gruen Lavers of Castle Rock, Colorado, George John Gruen III of Oakland, California, five grandchildren, a brother, Robert D. Gruen of Indianapolis, Indiana, and a sister Emily Gruen Seaman of Widby Island, Washington.

HTF

Henry B. Fried

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1983 European Watch, Clock & Jewelry Fair Opens in April

The eleventh edition of the European Watch Clock and Jewelry Fair will open its doors on April 16 and run through April 25, 1983 in Basel, Switzerland. 1377 exhibitors from 16 countries will be on hand to welcome thousands of visitors from every part of the world. The American Watchmakers Institute 1983 Tour Group, under the guidance of Henry Fried, will be among the honored guests.

Once again, Switzerland dominates the "Time Industry's" representatives in the show. 267 exhibitors are already signed up. They expect a brisk business climate to prevail. The Federation of the

Swiss Watch Industry's most recent survey on economic conditions in Switzerland notes that: "Inventories have been reduced significantly and the industry as a whole is now close to normal in this respect." A poll of Swiss manufacturers early in the year indicated that they will be highlighting mid-range product lines. Many new entries are expected in the low-end, as well.

The Swiss will lead off their marketing drive with their most recent quartz technological achievements. 15 years of experience in quartz electronic technologies and advanced production engineering have provided a high degree of manufacturing efficiency and economy measures which are the key to competitive pricing, according to Swiss spokesmen. Mechanical watches will still be an important part of the displays, particularly at the upper end of the market. Examples of Swiss horological talents will cover the entire market range, it is reported. Their inventive designs and precision workmanship expect to help them reaffirm their claim that the European Watch Clock and Jewelry show in Basel is the showcase for the most prestigious spring collections in the world!

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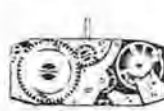
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How to End Motor Barrel Problems

This tip comes from our Editor, Hal Herman, a Master Watchmaker who thinks out any problem.

One of the most exasperating things to happen to a watchmaker is to have something go wrong after the service work is supposedly finished. The resultant re-work is frustrating, especially since now the watchmaker feels that he or she is not earning wages.

Looking back over the years, the Waltham motor barrel often caused me problems when the mainspring would slip, and the aggravation increased because it could not be tested until it was assembled, and of course then all was hidden by the arbor cover of the barrel.

Years ago when the carbon steel spring was the only one around it could be bent just where the catch portion of the hole began. Most often, it would not slip, but when the alloy mainspring came into use, it was quickly apparent that this new material would not accept a sharp bend without breaking. Those of you who tried to decrease the diameter of the inner arbor loop will attest to the breaking characteristics of the alloy spring.

So Joe, here is a picture story of a surefire way to end motor barrel problems. I might add that the hole does not break out and the preparation time is less than two minutes.



Figure 1. Motor barrel



Figure 2. Alloy mainspring as it comes from the factory holding edge of hole.

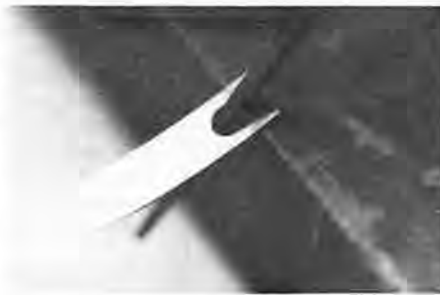


Figure 3. Four-sided file cutting approximately 30° angle into holding edge of hole.



Figure 4. Filed hole



Figure 5. Removing excess metal from tail of spring with grinding stone.

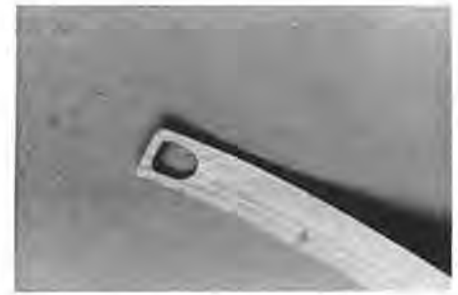


Figure 6. Finished spring



Figure 7. Installed into barrel, never to slip again.

Thanks for the tip, Hal. More and more of these old antiques are coming into our shops for overhaul, and a watchmaker would be foolish not to replace the mainspring with an alloy spring while the watch is being repaired.

Unfortunately, the thickness of these alloy mainsprings seems to be thick-

er than the hook in the barrel and you covered this solution very well with your photographs.

Sometimes the hook in the barrel is rounded off until, no matter what you did to the mainspring, it would still slip off unless the hook was worked over.

(Continued Next Page)

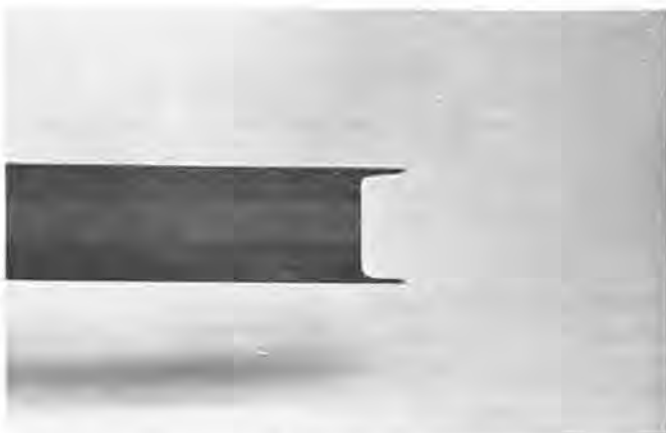


Figure 1

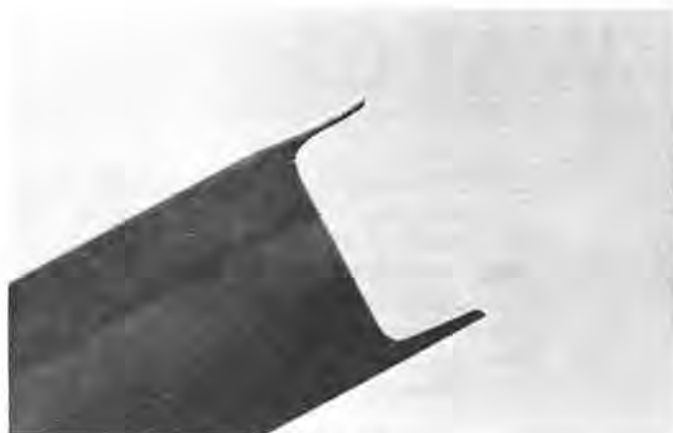


Figure 3



Figure 2

Grind off one end of a screw head file (Figures 1 and 2), leaving one cutting edge about one mm wide and four mm long. Stone one edge of the file (see Figure 3). With this shape, you can cut a new notch in the hook and it's almost impossible for the modified mainspring to slip out. Watch next month for this additional solution.

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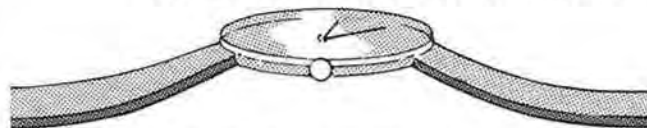
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EDITOR'S NOTE: Many watch repair techniques are timeless—the same procedure that solved a problem in the past may work equally as well today! In a constant effort to serve our readers better, the editors of HOROLOGICAL TIMES magazine are proud to present a new feature—"WATCHES—Inside and Out!"

These columns will explore a variety of subjects in future issues. Some of the articles will be reprints of information that has appeared in this magazine or other publications. Some will be published, here, for the first time. ALL of the articles will be designed to help today's watchmaker do his or her job more easily and to operate a more profitable business as a result!



THE MAINSPRING BRIDLE

by Harold J. Herman, CMW

Although the self-winding watch dates back several hundred years, it never became a production item until about the time of World War II. Rolex (Figure 1) and A. Schild (Figure 2) were among the first to utilize the detached bridle method of preventing overwinding by the oscillating weight and geared mechanism. LeCoultre designers invented a stop-lock type of mechanism that prevented the oscillating weight from moving when the barrel was near full wound. But favor turned to the bridle style, and many companies began production of this new and exciting "perpetual motion" type of timepiece.

The wearer found a greater degree of accuracy from the self-winding watch that had a properly adjusted bridle.

Even though the escapement and balance portions of the watch were not manufactured with better quality, the greater number of hours that the watch ran full wound reduced isochronal errors. It seems that always along with the good must come the bad. For the owner who wore a watch where the bridle was slipping, an overnight stoppage would occur. Every morning, the watch would have to be reset and the crown cranked a few times to get the mechanism running once again. And the bridle that had too much tension caused re-banking or galloping and time would literally fly. In a nutshell, the bench watchmaker was challenged with making corrections on a new mechanism, one about which little or no technical information was available. Today, little technical information is available to the bench watchmaker on the adjustment of mainspring bridles.

A few manufacturers decided that the proper adjustment of the bridle should not be left to the skills of the watchmaker. After the mainspring, bridle, and arbor were placed in the barrel, they peened or permanently riveted the barrel edge over the cap (Figure 3). The watchmaker who attempted to remove the barrel cap met with total destruction of the entire assembly. Fortunately, this manufacturing process has ceased.

Other manufacturers, still believing that the watchmaker's skills should not be used, stamped "sealed barrel" (Figure 4) or some such instructions on the barrel lid. Fortunately, the barrel lid or cap was of the standard snap-on



Figure 1.



Figure 2.



Figure 3.

type. Here was a bridle, even though stamped "sealed" by the maker, that could be properly adjusted.

Then there were most who did not change the design of the barrel, and left the half moon or a square cut out of the lid. The challenge of correct adjustment was placed squarely on the shoulders of the repair mechanic.

Since assembled cleaning methods and assembled immersible lubricating methods are in vogue, this article will dwell upon the checking of bridled barrels when overhauled in that manner. It can well enough apply also to the old-



Figure 4.

fashioned strip down method of cleaning and hand oiling. After the watch has been cleaned and oiled, insert a wide blade screwdriver into the ratchet wheel screw slot and wind the watch fully so that the bridle slips. Six to eight revolutions of the ratchet screw is usually a full wind. Continue to wind so that the bridle will revolve eight or ten times around the inside barrel wall (Figure 5). The purpose of this maneuver is to assure that lubricant is evenly distributed between the bridle and barrel.

Release the power from the barrel (Figure 6). With the wide blade screwdriver, slowly wind the mainspring in



Figure 5.

the barrel, counting the turns of the arbor until the bridle begins to slip. Assume that it took seven full turns before full wound occurred. At this point, four different actions can occur.

1. After the seven turns have been accomplished and the bridle begins to slip, the power necessary to turn the screwdriver further should not be greater than it was to wind the mainspring up to its full wind or point when the bridle began to slip. After a short period of time, carefully place the screwdriver in the ratchet screw slot and release the ratchet wheel click (see Figure 6). Slowly unwind, counting the number of turns it takes to completely release the power. If it is seven full turns, then the bridle is in good operating condition and reconditioning of the watch may proceed.

2. All feels the same as in situation No. 1, except that when the mainspring is slowly unwound, there may only be five complete turns of the barrel arbor. This means that the bridle is very slowly slipping around the barrel and unwinding the mainspring. This action, termed the "slow slipper," is the most difficult to detect by feel when winding. The result of this fault could be poor timekeeping or overnight stopping of the watch.

3. After seven turns have been accomplished, the torque needed to turn the ratchet screw increases consider-



Figure 6.

ably. The result is a watch that runs very fast due to galloping or rebanking.

4. After several turns have been made on the ratchet screw, a whipping action is felt (and sometimes heard). This watch, of course, is a poor timekeeper and a definite overnight stopper.

Next month, a repair method for Nos. 2, 3, and 4 will be explained. In some areas of the country, it has been used for nearly twenty years with exceptional success, so prepare yourself for something different in the adjustment of mainspring bridles. □

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Executive Committee Meeting Highlights

The AWI Executive Committee consisting of President Marshall F. Richmond, 1st and 2nd Vice Presidents Joseph G. Baier, Ph.D and Otto Benesh, Secretary James H. Broughton, Treasurer Marvin E. Whitney, Immediate Past President Joe Crooks, along with AWI Administrators Milton Stevens, Michael P. Danner and Harold Herman, met at AWI Central, January 29th and 30th. Some of the highlights from that meeting will be touched upon in this month's column. Anyone seeking more details of any activity mentioned in this report should contact me at AWI Central and I'll be glad to fill you in.

Treasurer Marvin Whitney reported that while our finances do reflect the sluggishness of the country's economy, the modest adjustment of an additional \$5.00 in annual dues should permit us to maintain the level of programs and activities that members have come to expect from AWI. Whitney noted that there has been no noticeable resistance to this adjustment and many notes enclosed with annual payments reveal that members still think that AWI offers a real value for the modest \$35 annual dues.

Mike Danner and I reported on headquarters activities for the first half of our fiscal year. During the last annual meeting in June '82, the Affiliate Chapter delegates had requested that AWI publish a 5-year index for the first five years of the *Horological Times* and that AWI prepare a microfiche series of technical information. The 5-year index was included in membership renewal packets this year and will be included in all new-member packets so long as the supply lasts. I reported on the availability of an AWI microfiche technical series in my February column.

Part of an administration plan presented to the Executive Committee in 1980 included the search for a computer system that would enable many of the AWI functions to be computerized. The search for a system has been narrowed down to two and by the time this appears in print we will have signed a purchase agreement. Mike and I have developed a three-stage plan for getting the AWI operation on the computer.

Progress is being made on several of our new publications. The Sean Monk book *Essence of Clock Repair* has been typeset and pasted up. A few minor cosmetic changes need to be made and we will be ready to print it by the time you read this article. The *Essence of Clock Repair* will be one of the most comprehensive books on clocks and clockrepairing ever to appear in print. Monk covers more than fifty different clocks ranging from the more common types seen in the repair shop frequently, to some of the rare types seen perhaps once in a lifetime. Many illustrations and photos appear with the variety of clocks presented.

Henry B. Fried has completed work on revising his *Electric Watch Repairers Manual* and AWI will be the publisher. The book presently is being typeset at AWI Central. Mr. Fried has greatly expanded the scope of his original book to include specific details for the repair of quartz watches presently being seen in the repair shops across the country, as well as important information on batteries, equipment and repair techniques. We expect to have this much sought-after book off the presses by June of this year.

After reviewing the report of the Area Representatives, the Executive Committee decided to try to end the confu-

sion that has existed over Area Representatives and Chapter Delegates. The Board defined them as follows:

Area Representatives are to be appointed by the President of AWI to provide representation in those areas in which there is no AWI Director. The President will be the sole judge as to what areas require such representatives. Representatives are charged with the responsibility to act as liaison between AWI and local associations and AWI members. The area representatives serve a term of one year which expires when new Executive Officers are selected during the Annual Board of Directors meeting.

Chapter Delegates are those delegates selected by the various Affiliate Chapters of the Institute to represent them at the annual Affiliate Chapter meeting which is usually held in conjunction with the annual Board of Directors meeting in June each year. The official status of a Chapter Delegate ceases upon the completion of these annual meetings.

The New Guild Liason Committee reported that the Tennessee Watchmakers Association has officially joined the AWI family of Affiliate Chapters. Chairman Robert Bishop presented their charter to them January 15, 1983. The Sacramento Watchmakers Guild has met the requirements to become an Affiliate Chapter, and their charter will be presented by Calvin Sustacheck when he does a technical program for them in March. The mid-Kansas Watchmakers Guild has almost met all requirements to become an Affiliate Chapter. It is expected that they will have their charter very soon.

There has been a reported increase in interest in technical workshops this year. Many of them are being filled

“There has been a reported increase in interest in technical workshops this year...”

to capacity long before the program is held. In some cases applicants have been turned away because the workshop was full.

Recognizing this new surge of interest in quartz watch repair, the Seminar Committee is preparing a residence workshop designed for those who have the skills required to service mechanical watches but not analog watches, and for those who service digital watches but not analogs. We hope to offer the first class in Cincinnati, Ohio in July of this year. More details will be given in a future column.

A new form of traveling workshop is being developed by Ewell Hartman, a member of the Seminar Committee. This workshop will use the Seiko 43A ladies' quartz movement; the unique

feature is that the materials, including instruction on cassette tape, will be shipped to the group holding the program. That group then will present the workshop without the assistance of a traveling instructor. It is expected that if successful, AWI will be able to reach many of the smaller groups who cannot support the expense of a traveling workshop.

The “Introduction to Clock Repair” workshop held January 24 through 28 was well attended and received acclaim from those who attended. Last month's column discussed the “Advanced Seminar for Striking Clocks,” a course which will be held April 11 through 14. This course is conducted by Dr. Joseph G. Baier and promises to be over-subscribed. At the time of this

writing a few openings still exist. Both courses will be repeated again this year.

Robert Nelson, Chairman of the Visual Aids Committee, reported that several new slide-tape programs have been completed and are in the AWI library ready for loan for watchmaker meetings, which include:

- Fitting Mineral Crystals
- Stems & Crowns
- Making Slide Programs
- Gemology for the Watchmaker

Many other reports were considered during this meeting. If you seek information about any activities not covered in this summary, please drop me a note at AWI Central.

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AWI Bench Courses 1983

| PROGRAMS | | INSTRUCTORS | |
|----------|---|------------------|--|
| A | Basic Electricity & Use of Meters | Jaeger | |
| B | AWI Certified Citizen Quartz Watch Technician | Carpenter | |
| C (a) | Citizen LCD Multi-Alarm | Broughton | |
| C (b) | FHF 965 | Broughton | |
| C (c) | Pulsar | Broughton | |
| D | Seiko Quartz Analog and LCD | Smith | |
| E | Intro. to Solid State Watch Repair | Nelson | |
| F | Fundamentals of Solid State Watch Repair | Opp | |
| G | Repairing the ESA 900.911 Digital/Analog | Biederman | |
| H | Clock Restoration | Benesh | |
| I | Introduction to Striking Clocks | Baier | |
| J | Common Sense Quartz Watch Repair | Bishop | |
| K | Introduction to Clock Repair | Benesh & Whitney | |
| L | Bulova Quartz 262 and 2500 | Sustachek | |

| MARCH | | | |
|-------|---|----------------|-----------|
| 5-6 | J | Pittsburgh, PA | Bishop |
| 13 | G | Huntsville, AL | Biederman |
| 20 | C | Orlando, FL | Broughton |
| 24 | L | Tacoma, WA | Sustachek |
| 27 | L | Portland, OR | Sustachek |
| 26-27 | J | Annapolis, MD | Bishop |
| 30 | L | Sacramento, CA | Sustachek |

| APRIL | | | |
|-------|---|----------------------|-----------|
| 10 | C | Des Moines, IA | Broughton |
| 10 | B | Columbia, SC | Carpenter |
| 10 | G | New Philadelphia, OH | Biederman |
| 11-14 | I | Cincinnati, OH | Baier |
| 16-17 | J | Ft. Myers, FL | Bishop |
| 16 | C | Clare, MI | Broughton |
| 17 | G | Clare, MI | Broughton |
| 22 | F | Wisconsin Rapids, WI | Opp |

| MAY | | | |
|-----|---|-----------------------------|-----------|
| 15 | C | Toronto, Canada | Broughton |
| 20 | L | Texas Watchmaker Convention | Sustachek |

| JUNE | | | |
|------|---|----------------|------------------|
| 6-10 | K | Cincinnati, OH | Whitney & Benesh |

| SEPTEMBER | | | |
|-----------|---|----------------|--------|
| 17-18 | J | Huntsville, AL | Bishop |
| 19-22 | I | Cincinnati, OH | Baier |

| OCTOBER | | | |
|---------|---|-----------------|--------|
| 1-2 | J | Toronto, Canada | Bishop |

I AM INTERESTED IN YOUR BENCH COURSE TO BE PRESENTED ON _____ AT _____ . PLEASE SEND ME MORE INFORMATION.

NAME: _____

ADDRESS: _____

CITY, STATE, ZIP: _____

IN THE SPOTLIGHT (Continued from Page 16)

not been re-touched hitherto. His father was delighted and he busied himself to the preparation of a fabrication of this precious mechanism which took him entirely a short time after.

Inventor of the model and collaborator of his father for the tooling, we can consider Achille Brocot as the creator of the suspension. The escapement modified, the suspension created, the striking work completed, it seemed that both of them had put a final hand to clock horology. Brocot the father was proud of these results; however, he did not face his son's career without worrying. He seemed to tell himself that all being fulfilled in horology, nothing was left to insure one's existence in a world full of perils. Nevertheless, Achille Brocot did not delay in proving that there is no end to progress. Complete calculator as he was, he drew very well and his taste for geometry had taught him the calm to be found in lines. Sober in profiles, he got up the forms which were conveyed to England and Russia. It is from him that these marble and bronze forms, more or less mythological, have rendered to horology the importance which it deserves. He rehandled at the same time the visible escapement, imagined his calibers which have become classical, and did the first compensating pendulum for economical horology. All of these dispositions had an earnest cachet in all details which has not weakened to this day and which reminds us of the most beautiful old time Paris school works.

Watch for Part II of "The Brocot Escapement" in next month's issue of the *HOROLOGICAL TIMES*.

TTES

OBITUARY

Louis Waldman died February 2 at the age of 69. He was retired and living in Florida. He had been active in the horological industry as Vice-president of the Waldman Crown Co.

He was a member of the 24-Karat Club in New York City; WMJDA; MJSa and other industry groups. He received the "Man of the Year" award from the Golden Circle in 1966 and served as president of the organization in 1965. His military service was spent in the U. S. Navy during WWII.

He is survived by his wife, Ruth, a son and daughter, grandchildren, and a brother, Jack. Condolences may be sent to 18 Connel Drive, West Orange, New Jersey 07052.

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- Lesson 5 The Theory of Electron Flow and Ohm's Law
- Lesson 6 Using Meters to Measure Current and Resistance
- Lesson 7 How Magnetism Can Generate Electricity
- Lesson 8 Generating Electric Pulses at Your Bench
- Lesson 9 Introduction to Diodes and Transistors
- Lesson 10 Experimenting with Diodes, Transistors, and Capacitors
- Lesson 11 The ESA Electronic Watch, Calibre 9158
- Lesson 12 Electronic Principles of the Accutron
- Lesson 13 Quartz Crystals and Electronic Reduction
- Lesson 14 Bench Practice on the ESA 9180
- Lesson 15 LED and LCD Solid State Watches
- Lesson 16 Bench Practice on the LCD Solid State Alarm Watch
- Lesson 17 Summary

In addition to the written lessons, students will be involved in servicing two electronic watches, as well as working with concept teaching kits. AWI will provide the watches and kits. This course will prepare individuals for the AWI Certification Examination of CERTIFIED ELECTRONIC WATCH SPECIALIST.

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Start Planning For June Meeting

When I realize that by the time you read this it will be March already, it makes me think that it is only three months until the annual meeting of the Affiliate Chapters, which is not any too soon to start your planning. If you have not yet appointed a delegate and alternate, I would suggest that you do it now because there are many plans to be made between now and then.

The first thing that should be done is for the new delegate to get together with the delegate from last year and have the former delegate advise the new one on just what to expect. It would be better still to reappoint last year's delegate, as this would add a lot of continuity to the meeting. I realize that some of the chapters have constitutions which preclude this sort of thing and I am not suggesting that you change your constitution, but it certainly would help. Another point that I would like to bring out is that if you have a person who is qualified to move up in the AWI family and is so inclined, three days exposure at the annual meeting is hardly enough time for him to get acquainted. These are just a few points to ponder.

Last month, I mentioned the fact that some watch repair school graduates were having difficulty finding em-

ployment. From what I have been able to ascertain, it is more of a problem than I realized. I can't tell you what the answer to this problem might be, but we should be doing something to help. I can understand an employer not wanting to hire inexperienced help, but perhaps we can convince said employers that even though this person has little practical experience, he or she has been thoroughly instructed in all phases of watch repair and is capable of doing an acceptable job of repairing watches. In fact, I would like to see every chapter set up an education committee with the expressed purpose of encouraging and helping interested young men and women to enter the field of watch/clock repair and to assist these persons to find employment after graduation, should it be necessary. I don't know how these committees should be set up, since this would be up to each individual chapter. Something should be done to alleviate the situation, and what better place to start than with us.

I've done enough rattling for this month, but please *do* give it some thought, and let me know how you feel about it. We could do so much in helping the young person get started. And don't forget about the meeting in June!

THWES

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Michigan Survey Suggested Repair Prices Now Available

The Michigan Watchmakers' Guild, Inc. announces the availability of their 1983 Suggested Minimum Repair Price Cards. Categories covered include: (a) Suggested Minimum Watch Repair—RETAIL; (b) Suggested Minimum Watch Repair—TRADESHOP; (c) Suggested Minimum Watch Repair—DIGITALS; (d) Suggested Minimum Clock Repair—RETAIL; (e) Suggested Minimum G/F Clock Repair—RETAIL and Suggested Minimum Jewelry Repair—RETAIL.

The cards are available to members of the Michigan Guild at no charge. Non-members may obtain the 6-card set by sending \$7.50, check or money order, to: Michigan Watchmakers' Guild, Inc., 1202 Catalpa, Royal Oak, MI 48067.

OHIO

The Watchmakers Association of Ohio, Inc. will sponsor a seminar in New Philadelphia, Ohio, at the Delpian Inn on April 10, 1983. AWI instructor William Biederman will present his program on "Swiss Digital and Analog Watches." There will be a hospitality room reception on the night before, April 9. Those interested in attending are asked to contact Larry Hilvers, Seminar chairman, 505 High St., Napoleon, Ohio 43545. Phone (419) 592-5898.

Plans for the annual WAO Convention are proceeding smoothly. The event will be held in Columbus, Ohio July 29-31. Activities open on Friday night with a dinner, possibly in the Hawaiian motif. Saturday will feature informative speakers to be announced. A Swap and Shop table is under consideration. Members are invited to send ideas or suggestions to Norm Basch, WAO Convention Chairman, 6530 McKenzie Rd., North Olmsted, OH 44070.

OREGON

The Oregon Watch and Clockmakers Guild is planning a two-day seminar and convention to be held late in August or early in September of this year. The event would start at noon on Saturday with speakers and demonstrations. A Saturday night banquet would be included. Sunday would feature a round-table discussion of pertinent topics. Members are urged to sign up now if they wish to attend the gathering.

Members who have not paid their 1983 dues are requested to do so at their earliest convenience. Paid-up members should be receiving their certificates in the near future, according to R. F. Van Winkle, Secretary. He can be contacted at 1360 Commercial St., Astoria, OR 97103.

NEW YORK

In January at the Hotel Summit in New York the Horological Society of New York presented the American Watchmakers' slide-tape program on "Installing Mineral Crystals."

The slide presentation covered many types of mineral crystals: crystals with gaskets, crystals with sleeves, and those which are held by epoxy. In each instance the case construction was displayed and the proper installation procedures were carefully described. The instructions included information on equipment and special supplies. It was a comprehensive presentation.

Since repairers know that mineral crystals are expensive, difficult to install, easily damaged and will fall out unless properly replaced, the audience interest was extremely high.

At the end of the slide presentation, Ben Matz of Bulova and Jack Schechter of Seiko, who helped create the AWI slides, were on hand to answer questions.



From left to right: V.P. Morton Silver, acting as M.C., Ben Matz of Bulova, and Jack Schechter of Seiko answering questions on the Mineral Crystal slides which they helped create.

MASSACHUSETTS

James D. Tolliver, President of the Massachusetts Watchmakers Association, Inc., passed away recently. All those who knew him acknowledge his many contributions to the association and horology, in general. He and his many



Shown at the luncheon arranged by Indiana Jewelers Assn. during a pause in the discussion are (From left to right): John Moser, Philip Nelson, Senator Farrell Duckworth, Raymond Goodman. Shown seated at the far right against the wall are: Patrick Clancy, David Felstein, Dan Moyer, Herman Logan, Ben Delk, Grant Monyahan, Samuel and Frederick Sipe. Shown center right rear: Herb Pazol, Joseph Ashcraft, Stephen Reid, Normagene Murray, Morris Davis, Kathryn Snider, Eric Townsend,

AWI activities will be sorely missed.

TEXAS

The Texas Watchmakers Association, Inc., held a recent meeting at which a slide and tape presentation furnished by AWI was shown. Written by Wes Door, the topic, which has been discussed for many years, is the problem of overcoming objections and how technical one should be with watch repair customers.

INDIANA

Plans for the second ALL INDIANA JEWELRY SHOW, the 1983 Super Spree, are set for Saturday and Sunday, March 12th and 13th, 1983 at the Atkinson Hotel, located at Illinois on Georgia Street in downtown Indianapolis.

At a noon luncheon in January, deadline day for filing bills in the Indiana General Assembly, Indiana Jewelers Association and Watchmakers Association of Indiana arranged a luncheon meeting with State Senator Farrell Duckworth of Bloomington, Indiana to point up the many hardships a 10% luxury tax on fine jewelry and furs by the state of Indiana would cause for these industries within Indiana. Thanks to the group's efforts, the bill was not introduced in the Senate.

ETA INDUSTRIES STARTS U.S. OPERATIONS

ETA Industries, Inc., the U.S. sales representative for Switzerland's ETA Group, the largest manufacturer of movements for the Swiss Watch Industry, began operations in New York the first of the year.

The new organization will sell ETA movements to watch importers and distributors and provide technical and marketing support services for importers, distributors and retailers.

J.P. Savary has been named chairman of the board of ETA Industries. Kurt Schaller, who was named executive vice president, will serve as chief executive officer and marketing director of the new firm. He formerly was a technical and marketing executive with the parent company in Switzerland. Joseph Coan was appointed sales manager.

ETA Industries is located at 608 Fifth Ave., New York, NY; Phone is (212) 307-5276.

PACESETTER MEETING AT THE 21 CLUB

Members of the Diamond, Jewelry and Watch division of UJA-Federation held a pacesetter meeting recently at the 21 Club. Pledges of over \$200,000 were made to the 1983 Campaign. Gerry Grinberg of the North American Watch Company and Andrew H. Tisch, president of the Bulova Watch Company, were hosts for the event.



From left to right: Gerry Grinberg, Robert Pliskin, and Andrew H. Tisch

SHORE APPOINTED EXECUTIVE VICE PRESIDENT OF MARKETING

Barry F. Shore has been appointed executive vice president of marketing for Presidium, Inc., Saugus, CA. The announcement was made by James Austin, president. Presidium, Inc., is known worldwide as a manufacturer and distributor of professional gemological instruments, including the GEM Diamond Master and the Okuda Diamond Color Checker.

Shore is well known to the trade as owner of Gemma Corp., president of University Gems, Inc., author of a best-selling book published by PreciouStones Newsletter. He is a former GIA instructor and lecturer.



Barry F. Shore, Executive V. P. of Marketing for Presidium, Inc.

WESLEY OFFERS AWARDS AND REBATE

Wesley and Company has announced that it will offer its customers a choice of prizes: an Eveready W40 battery tester, an Eveready 5209 Fluorescent Lantern, or a \$10 cash rebate when they order the Eveready TS10P battery assortment. The Eveready TS10P assortment includes a selection of popular,

high volume batteries and an assortment of new, small diameter thin cell batteries. Customers may call Wesley at (800) 447-6438 (800/322-2649 in Illinois) for more information.

AGS' HEADQUARTERS DESTROYED BY FIRE

A raging fire that burned for 1½ hours virtually destroyed the American Gem Society's headquarters in Los Angeles early in January, 1983.

The Society had occupied the second floor of the two-story building located at 2960 Wilshire Boulevard since 1975. Firemen believed that the fire started in the law offices which were located on the first floor. Fortunately, no one was on the premises during the destruction. Fire officials are uncertain (as of this writing) of the cause of the fire.

AGS executive director Alfred Woodill estimates Society damage at approximately \$150,000 to \$200,000. Woodill anticipated that most of the AGS' historical records and all personal files have been destroyed. However, all of the Society's financial and membership data is intact because AGS' computer tapes are routinely stored outside the building on evenings and weekends.

Currently occupying temporary office space, the American Gem Society will continue full operations. Plans for the 1983 Conclave in Colorado Springs (April 22-27) are continuing uninterrupted. The new AGS headquarters is located at: 3460 Wilshire Blvd., Suite 914, Los Angeles, CA 90010; Ph. (213) 387-7375.

JAZ PARIS SWEEPSTAKES

Jaz Paris, one of Europe's most

popular watch and clock brands for the discriminating fashion-conscious consumer, announced plans for a six-city "April in Jaz Paris" sweepstakes in the United States market beginning mid-April. The Grand Prize winner in each city will win a fabulous all-expense paid seven-day trip for two to Paris. The cities include New York, Chicago, Dallas, Houston, Los Angeles and San Francisco.

Jaz Paris recently introduced to leading department, fine jewelry and specialty store-buyers in each of the six-city markets its stunning collection of men's and ladies' analog quartz watches specifically styled for the American market in the revered French fashion tradition—reflecting a wide variety of personal tastes.

Consumers in each city will be invited through newspaper advertisements to participate in the sweepstakes by visiting the local Jaz Paris retailer, filling out an entry form and depositing it in the special Jaz Paris sweepstakes ballot box provided. No purchase will be necessary.

A special drawing will be held for each of the six cities. Store managers will forward their sealed ballot box to a central clearing house where winners from each city will be drawn. The retailer responsible for the entry of that city's grand prize winner will receive a case of fine French champagne.

In addition to the grand prize trip to Paris offered in each city, there will be second place prizes of luggage and third place prizes of fashion French scarves.

In making the announcement, Ron Klass, general manager, stated that the response by retailers to the "April in Jaz Paris" promotion has been tremendous.

Contact: Jaz N. America, 2 Pearl Ct., Allendale Park, Allendale, NJ 07401.

GIA OFFERS BASIC AND ADVANCED FACETING CLASSES

For the past five years, GIA has offered a two-week basic faceting (gem cutting) class at its facilities in Santa Monica, CA, and will continue to do so in 1983. This is a valuable class for the jeweler or gemologist who wishes to expand his knowledge of gems to include cutting, as well as to the layman who wants to embark on a most satisfying avocation.

The basic class covers the optics and geometry of faceting and the use of faceting equipment. Students learn to cut the round brilliant, emerald cut, oval, marquise, and pear shape. Additional information on other cuts is presented, as is treatment of rare and difficult stones.

This year, GIA announces that it will also offer, by popular request, one four-week Advanced Faceting Class, to be held from May 2 through May 27, 1983. This class is for those who have already taken the basic class or who have gem-cutting experience; prospective students must, at least, be able to cut a standard round and/or an emerald cut.

For more information, contact The Gemological Institute of America, 1660 Stewart St., P.O. Box 2052, Santa Monica, CA 90404; (213) 829-2991.

ALUKONIS NAMED EXECUTIVE V.P. OF GROBET FILE COMPANY

Grobet File Company of America, Inc. has appointed Robert A. Alukonis executive vice-president and chief operating officer. Jean M. Robert, president, made the announcement, and further commented, "We are especially

happy to have Mr. Alukonis with us because of his broad experience in manufacturing, marketing, management, and distributor relations and his commitment to excellence and improved sales performance." Mr. Alukonis had been vice-president and general manager of VR/Wesson division of Fansteel, Inc., Waukegan, Illinois since 1979.

Grobet File Company of America, Inc. is a manufacturer of Grobet-USA brand tungsten carbide and high speed steel rotary files, Arrow-brand precision tweezers and tongs; and Dixcel-brand felts and brushes. The company also markets Grobet brand Swiss precision files and American pattern files. Other units of the company include: William Dixon Company, supplier of tools, equipment, and accessories to the jewelry trade; Hammel, Riglander and Company, supplier of tools, equipment, and accessories to the watch, clock, jewelry and lapidary trades; Maxon, which specializes in precision tools for modelmaking professionals and hobbyists; and Holland Scissors Co., manufacturer of scissors and shears. Plants and warehouses are located in Carlstadt, New Jersey, Charlestown, New Hampshire, and Glendale, California.



Robert A. Alukonis, newly appointed Executive V. P. and Chief Operating Officer of Grobet File Co. of America, Inc.

NORTH AMERICAN WATCH ACQUIRES ZENITH-MOVADO

North American Watch Corp. and Zenith Movado Lelocle, S.A. announce that they have agreed in principle to the acquisition by North American Watch Corp. of Movado Time Corp., a wholly owned subsidiary of Zenith-Movado, as well as all of the trademarks and trade names of Movado worldwide.

The proposed transaction will be subject to the execution of a definitive agreement and the approvals of the Board of Directors of North American Watch Corp. and Zenith-Movado.

North American Watch Corp. markets Piaget, Corum, Concord and Concord Collection gold watches.

MARCI ZIMMER APPOINTED REGIONAL SALES MANAGER

Bulova Watch Company has promoted Marci Zimmer to the position of Central Regional Sales Manager of Presentation and Incentive Sales, it was reported by Joe DeLisle, Director of the Presentation and Incentive Sales Division.

Ms. Zimmer joined Bulova six years ago and was District Sales Manager of the division for the past three years. She will be based in Chicago and will be responsible for the Midwest and South Central regions.



Marci Zimmer, Regional P & I Sales Manager

ROBERT E. RYAN JOINS BULOVA

Robert E. Ryan has joined the Bulova Watch Company as Brand Manager for Bulova/Accutron[®], it was announced recently by Jerry Josephson, Vice President in charge of Marketing.

Mr. Ryan has more than 12 years of marketing and business development experience and was Corporate Manager-Business Planning and Product Development, for the Timex Corporation. "Among his successes was the development and introduction of the Timex men's and ladies' quartz collection," Mr. Josephson noted. "In his new position for the company, he will be responsible for product development and marketing strategy for the Bulova and Accutron Swiss product lines."

Mr. Ryan, who lives in Basking Ridge, New Jersey, is a graduate of Cornell University and received an MBA at Dartmouth's Amos Tuck School.



Robert E. Ryan, Bulova/Accutron Brand Manager



SWEST INTRODUCES REY PLUMB SOLDERS

In compliance with the Gold and Silver Stamping Act, all solders supplied by Swest, Inc. now have plumb gold content. Prior to the act, many solders were of lesser gold content than the work for which recommended. This was true of the SSR yellow gold solders supplied by Swest prior to the act, as with many other suppliers. SSR white gold solders always contained plumb gold.

At the same time that the yellow gold content was brought in compliance, the brand name and stock numbering system for Swest solders was changed to Rey, in order to consolidate the various Swest brands.

For descriptions of these Rey plumb gold solders and prices, contact: Swest, Inc., 10803 Composite Dr., Dallas, TX 75220; 5805-A Peachtree Corners East, Norcross, Georgia 30092; 1725 Victory Boulevard, Glendale, CA 91201; and request free brochure/price list.

BANGLE WATCHES FROM BOREL

Bangle watches by Ernest Borel are a fashionable way to tell time. With or without a lid, they have a yellow case with either white, black or red inserts, priced from \$275.00 K. Direct your questions to the Borel Watch Company, 818 Grand Ave., Suite 1111, Kansas City, MO 64106, for more information.



Weems & Plath Inc., a 52-year old nautical instrument company, recently announced that it has started production of a broad range of marine clocks and barometers. These nautical timepieces are available in eight styles featuring high quality solid brass cases with West German movements.

Ships bell clocks are fitted with a unique sound baffling system, coined "Adjust-a-Tone," which allows the user to adjust the bell tone to a desired level. They're said to be the only clocks on the market with this feature. Contact: Weems & Plath, 222 Severn Ave., Annapolis, MD 21403.



Bangle watches by Ernest Borel

NEW, PILFER RESISTANT CHAIN DISPLAY

A fashion neck chain display cabinet with an assortment of 48

chains, either 14K gold filled or sterling silver, is now offered by American Jewelry Chain Co., Providence. The display cabinet features an access port to allow the customer to feel the texture of the chains on display.

The display chains are arranged on velvet-covered batons. At the batons, a specially designed fitting provides pilfer protection. Each chain is pre-ticketed for easy inventory control and pricing. The assortment of chains includes 16-, 18-, 20-, and 24-inch sizes.

American Jewelry Chain's display is constructed of clear

plexiglass with gold and burgundy painted design. The top of the display is hinged with a hidden lock for counter personnel access. The display cabinet measures 5" deep, 10" wide and 16" high.

The display is available from American Jewelry Chain Co. for delivery in April. Requests should be for the "Special Four Dozen Counter Display Package." For more information, contact: American Jewelry Chain, 560 Atwells Ave., Providence, RI 02909; (800) 343-0923.



American Jewelry Chain Co.'s New Pilfer Resistant Chain Display.

FWLER COMPANY EXPANDS ULTRA-CAL FAMILY OF TOOLS

The Fred V. Fowler Company introduces the newest member of the Ultra-Cal family of tools, the 12" Ultra-Cal Electronic Caliper. The newest Ultra-Cal continues the tradition of accuracy and reliability associated with the original Fowler Ultra-Cal, the 6" size.

Special features of the 12"

When requesting information about these products, tell them you read about it in the "Horological Times."

series include longer bottom jaws and "knife-edge" top jaws for measuring threads, slots, recesses and similar work.

Both the new 12" Ultra-Cal and the original 6" size are described in detail in their latest brochure, #83-01. To obtain a free copy and learn more about this new concept in tools, contact: Fred V. Fowler Co., Inc., Dept. L, 66 Rowe St., P.O. Box 48, Newton, MA 02166; (617) 332-7004.

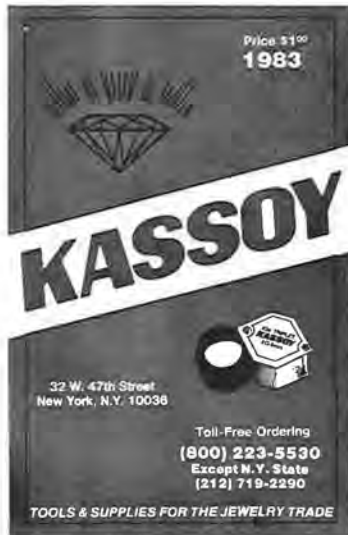


The new 12" Ultra-Cal Electronics Caliper from Fowler Co.

KASSOY '83 CATALOG NOW AVAILABLE

An expanded 112-page catalog of equipment, tools, supplies and displays for the jewelry trades is now being offered by Kassoy.

Kassoy has added many new products in twenty categories including a new security section. Two separate sales and traffic building promotions are also featured. This free catalog is available by writing to: Kassoy, Dept. C, 32 W. 47th St., New York, NY 10036.



New 1983 catalog from Kassoy.

WATER-PROOF-CHECKER JUNIOR

The WATER-PROOF-CHECKER offers the ideal solution for checking the tightness of watches. It works without any fluids whatsoever and therefore precludes any risk of damage of electronic and mechanical watches. The use of the WATER-PROOF-CHECKER is especially valuable because after each battery change, the watch must be rechecked for water-proofness. For more information, write to: Greiner Electronics AG, CH-4900 Langenthal, Switzerland.



Water-Proof-Checker

"TIME IS MONEY"

Bulova's classic \$20 gold piece clock for 1983 multiplies its value with its many uses. It makes a stunning American accent for the living room or den, a fashionable alarm for the bedroom, or an ideal business gift for the office. A quartz movement keeps precise time and its swivel cover closes to give it the look of an oversized gold coin.

This is model "Independence" (#B0675) and its size is 3-3/16" (diameter) x 1-3/4" (depth), and retails at \$49.95. Contact: Bulova Watch Co., Inc. Bulova Park, Flushing, New York 11370.



ENERGY-SAVING CAPSYLITE™ LAMPS

The white light output of the new energy-saving Sylvania 90-watt Capsylite™ lamp brings out the sparkle and clarity of fine jewelry in Diamond Designs' jewelry store in San Diego, CA, G.T.E. reports.

Sylvania Lighting Services, Inc. recently replaced 84 one hundred fifty-watt incandescent units with the new lamps in the store's 3,500-sq.-ft. sales area. The Capsylite™ units produced the same useful light as the higher wattage lamps they replaced while conserving some 18,140 kilowatt hours of energy and approximately \$2,180 annually.

Below: Robert Silverman, president, Diamond Designs, shows a diamond ring to a prospective customer under the new lamps. Unlike conventional incandescent flood and spot units, the heart of the Capsylite™ lamp is a small inner tungsten halogen capsule—a "lamp within a lamp."



Classified Ads

Regulations and Rates

Ads are payable in advance \$50 per word, \$.60 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. (e.g. February issue closes for copy on January 1st.)

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

For Sale

ESEMBL-O-GRAPH 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. Write EOG, P.O. Box 11011, Cincinnati, Ohio 45211.

Digital Watch Repair accessories, parts, tools. Sacrifice. Write for list. E.G., P.O. Box 613, Bethpage, NY 11714.

CLOCK TIMER. Regulate your clocks electronically with the new C.T.I. Clock Timer. Can be used on almost any clock with mechanical escapement. Pendulum clocks large and small, lever or cylinder escapements, anniversary clocks, etc. For information write: Can Tho Instruments, P.O. Box 80113, San Diego, CA 92138.

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: Kentucky, Michigan, Ohio, Tennessee, and Western Pennsylvania.

RETIRED WATCHMAKER SELLING ALL TOOLS INCLUDING LATHE. SOME MATERIAL AND MERCHANDISE. SEND STAMP FOR LIST. LEO BERESH, 1291 NW 46 St., POMPANO BEACH, Fla. 33064.

Metal Cutting Lathes, Bench Mills, Drillpresses, Unimats (accessories also), Maximats, Sherline, Cowsells, Enco, the 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, 2100M Selma Road, Springfield, Ohio 45505. Phone, (513) 322-8562.

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.

North Florida Established Watch & Clock Shop. Watch batteries pay rent. 1200 sq. ft. Long lease available. (904) 829-5003.

M-80 vibrograf timer \$1395. Factory rebuilt, like new. Retiring, R. deNoyer, Box 575, Wahiawa, HI 96786, or Phone (808) 622-1248

Collectors Attention!! 1879 vintage 16 size, serial no. 1079709 Elgin 15 jewel, grade 84. Sweep-second model (very rare) 14KYG Double back engraved case. Movement and case in like new condition — Best Offer. Mail response only: Dr. T. Soesbe, 8006 Oak Star, San Antonio, TX 78245.

Like new ZanTech equipment for digital watch repair, plus LED/LCD modules, buttons, crystals, accessories. Original cost \$5,000. Selling for \$2,500. Evenings (617) 698-0214.

BE ALL THE CLOCKMAKER you can be with **CHRONOS** tools—wheel and pinion cutting machines, etc., catalog \$2.00. Ken Law CMC, Camp Wood Star Route, Prescott, Arizona 86301.

We have purchased all 400-DAY DOMES formerly owned by Horolovar. Send SASE for price list to: C.A. Zimmerman, Box 3562, Littleton, CO 80161-3562.

Tradesman

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

THE QUARTZ SPECIALISTS. All services on analog, LCD, LED, Accutron. Lowest prices on batteries. Free information packet. McBee Laboratories, 302-D So. 16th, Bozeman, MT 59715.

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 and MUSIC BOX parts, mainsprings, material and tools. Custom made to order or repair of gears, pinions, and parts catalog, \$2.00. Tani Engineering, Box 338, Atwater, Ohio 44201. (216) 947-2268.

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

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

Wheels, pinions, barrels or whatever, repaired or made new. Repivot arbors. No watch parts. Ken Leeseberg, Ken-Way Inc., 19 W. 672 Army Trail, P.O. Box 219, Addison, Illinois 60101.

YOUR AD CAN BE PLACED HERE

BALANCE STAFFS CUSTOM MADE AND FITTED. Call or write Lucian L. Lynch & Co., 1148 Brookside Dr., Hannahan, SC 29406, Tel. (803) 747-2586

A/A WATCH REPAIR: THE MOST COMPLETE REPAIR SERVICE IN THE COUNTRY. OUR SPECIALTIES INCLUDE: WATCH BAND REPAIR (LUG REPLACEMENT, PLATING, BUCKLE REPAIR, MESH AND LINK BANDS) ANALOG QUARTZ, ACCUTRON, ELECTRONIC BALANCE, MECHANICAL. ALSO EXPERT CRYSTAL FITTING, PEARL RESTRINGING AND JEWELRY REPAIR. FOR PRICE LIST, CALL TOLL-FREE 800-227-1617, IN CALIFORNIA 800-772-3545, EXTENSION 352, 108 POND STREET, WEST WARWICK, RI 02893.

LED & LCD MODULE REPAIRS complete module repairs on all Bulova, Pulsar, Hamilton, Gruen, Elgin & Waltham, Benrus, and non-brand name modules. E & M Associates, 109 Bank St., Waterbury, CT 06702. (203) 753-5715

Custom made Horological Parts and Tool Repair by: Precision Instrument, P.O. Box 70004, Charleston, SC 29405, Phone: 803-553-1198.

TRADE WATCH REPAIR. STEP-MOTOR, QUARTZ ANALOG, MECHANICAL, ACCUTRONS. 32 YEARS EXPERIENCE. GEBHARDT'S WATCH REPAIR, CMW, P.O. BOX 207, NORTHUMBERLAND, PA 17857. (717) 473-3149.

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

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.

Wanted To Buy

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, Georgia 30345. Phone (404) 938-0744.

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.

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.

Books

HOROLOGICAL BOOKS: The Amateur's Lathe, \$12.95; Lathe Accessories and How to Use Them, \$8.95; Metal Turning Lathes, \$10.95; Using the Small Lathe, \$8.95; Milling in the Lathe, \$8.95; The Watchmaker's Lathe, Goodrich, \$9.95; Shaping Machine and Lathe Tools, \$8.95; The Watchmaker's Lathe, DeCarle, \$20.00; Practical Bench Work for Horologists, Levin \$40.00; Watchmaking, Geo. Daniels, \$65.00. Scanlon, P.O. Box 379, Modesto, CA 95353; (209) 524-9789.

Situations Wanted

Clockmaker seeking position anywhere in the USA. 6 years experience with modern and antique clocks. Also minor watch and jewelry repair. Bruce Villeneuve, 18 Oak Terrace, Castleton, NY 12033; (518) 732-7378.

COMPETENT EXPERIENCED watchmaker, clock repair, Certified Master Watchmaker A.W.I. seeks a position in watch and clock repair. Will relocate if offer is satisfactory (prefer Southern location). Will send resume upon request. Jeff Worth, 5914 W. 88th Street, Overland Park, Kansas 66207.

CERTIFIED MASTER CLOCKMAKER; watch, machining, and electronics experience. Clock repair preferred. Contact Ralph Athey, 1722 West Haven, Champaign, Illinois 61820.

Help Wanted

Sales representatives wanted. Well-established wholesale jewelers's supply and watch material house in the Midwest looking for representatives with jewelry store and/or watch material backgrounds to travel Kentucky and West Virginia. Good benefits. Salary commensurate with ability. Write Box HW 183, 3700 Harrison Ave., Cincinnati, OH 45211.

Outstanding opportunity — Clockmaker is needed in one of Virginia's fastest growing clock shops. Outstanding opportunity for individual who is looking for career and wants to live in one of the south's outstanding growth cities. Excellent Benefits including Health and Accident insurance, Major Medical insurance, paid vacations, and paid holidays. For more information contact Joanne Cossaboon or Joe Pacino, The Clock Shop of Richmond Ltd., 6000 W. Broad St., Richmond, VA 23230. (804) 282-0331.

Experienced watchmaker for a trade-retail shop in a large New England coastal city. Send complete resume to: Box HW 383, 3700 Harrison Ave., Cincinnati, OH 45211.

JEWELER or WATCHMAKER. We have an immediate opening for someone capable to run the complete service department, and eventually work into management of our entire store. This person must be aggressive and want to better himself. We offer many benefits, such as a guaranteed salary, profit-sharing program, vacation, and Blue Million hospitalization. Please send resume to my attention: Melville Love, Love's Jewelers, 1964 Chili Ave., Rochester, NY 14624.

Schools

Correspondence courses in Quartz-Accutron-Watchmaking-Jewelry. Free folders. Watchmaking Institute of Canada, 1012 Mt-Royal East, Montreal, H2J 1X6. Telephone (514) 523-7623.

Miscellaneous

DIGITAL QUARTZ TRAINING — Learn the Zantech 60 second method of testing quartz analog watches. Zantech, the originator of the Two Day Digital Watch Service Program is now also offering a Two Day Quartz Analog Repair Course with expert instructors, Louis A. Zanoni and Anne Louise Brackbill. For application or information, call or write to Zantech, Inc., 77 Shady Lane, Trenton, NJ 08619. (609) 586-5088.

THE DIGITAL WATCH REPAIR MANUAL

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Dates To Remember

Advertisers' Index

MARCH

- 1-6—WMJDA 37th Annual Convention; The Pointe, Phoenix, Arizona. Information: Nadine G. Carlson, Administrative Director; (312) 644-0828
- 5-6—Common Sense Quartz Watch Repair Bench Course (AWI); Bishop, instructor; Pittsburgh, PA
- 5-8—77th Denver Gift and Show, Denver Merchandise Mart and Exposition Center; Denver, CO
- 13—Repairing the ESA 900.911 Digital/Analog Bench Course (AWI); Biederman, instructor; Huntsville, AL
- 10-13—Texas Jewelers Association Convention; Amfac Hotel, Dallas-Ft. Worth Airport, Dallas, TX
- 19-20—Missouri Jewelers & Watchmakers Association Convention; Howard Johnson's Hotel; Springfield, MO

APRIL

- 10—AWI Bench Course; Broughton, instructor; Des Moines, IA
- 10—Spring Technical Seminar; Iowa Jewelers & Watchmakers Association; Best Western Airport Inn; Des Moines, IA
- 10—AWI Certified Citizen Quartz Watch Technician Bench Course; Carpenter, instructor; Columbia, SC
- 9-11—Alabama Jewelers Association Convention; Governors House Motor Hotel; Montgomery, AL
- 11-14—Introduction to Striking Clocks AWI Bench Course; Baier, instructor; Cincinnati, OH
- 19—Oregon Watch & Clock Makers Guild Meeting; Portland, OR

MAY

- 20-22—AWI Bench Course, Bulova Quartz 262 and 2500; Texas Watchmaker Convention; Green Oaks Inn; Fort Worth, TX
- 14—Pulsar & FHF 965 (Swiss) Bench Course (AWI); Jim Broughton, instructor; Toronto, Canada

JUNE

- 6-10—Introduction to Clock Repair Bench Course (AWI), Whitney & Benesh, instructors; Cincinnati, OH

JULY

- 19—Oregon Watch & Clock Makers Guild Meeting; Portland, OR
- 27-30—Franklin Area Chamber of Commerce, 18th Annual Gemboree; Community Facilities Bldg., Franklin, NC
- 30-Aug. 3—Jewelers of America Fall International Jewelry Trade Show and Conference; Hilton and Sheraton Centre hotels, NY

AUGUST

- 15-21—JEWELTIME '83; World Trade Centre, Singapore, for Jewelry, Watches and Clocks; Additional inf. from: Kallman Associates, 5 Maple Ct., Ridgewood, NJ 07450; (201) 652-7070

SEPTEMBER

- 17-18—Common Sense Quartz Watch Repair Bench Course (AWI); Bishop, instructor; Huntsville, AL
- 19-22—Introduction to Striking Clocks Bench Course (AWI); Baier, instructor; Cincinnati, OH

OCTOBER

- 1-2—Common Sense Quartz Watch Repair Bench Course (AWI); Bishop, instructor; Toronto, Canada
- 18—Oregon Watch & Clock Makers Guild Meeting; Portland.

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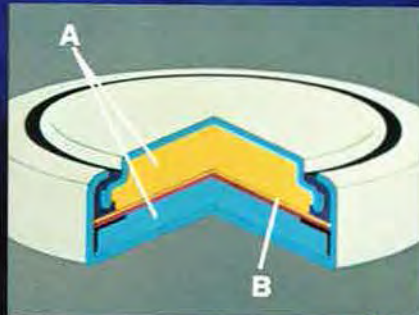
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