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HOROLOGICAL TIMESTM

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President's Message



Twenty-four months have passed since I began writing this column. Now I am two years older and wiser in many facets of our profession. By the time you read this a new President will be in office and will occupy this space next month.

Events have a way of occurring in their own good time, and this was never more true than in the last two years of AWI's history. I was fortunate to be in place when the opportunity arose to sell a few pieces of our AWI collection. The proceeds from this sale have enabled us to proceed with projects long desired, but lacked funding. Now our workshops have increased in quality and quantity, and are heavily subsidized. No longer are we forced to cancel because of low registration.

Our regional seminars have been well received, and will be continued. Sooner or later we will come to your area. Our first technical conclave was held recently in Lancaster, PA. Five state organizations cooperated, and those attending thought it to be a resounding success.

I am sure you have noticed that *Horological Times* is bigger and better, and will continue to grow.

Other less visible changes are having a positive effect on our membership. Our Material Search Network is producing good results, and our Second Opinion Diagnostic Service is getting underway. We have a full-time librarian who is busy making our library the best technical information source in our profession.

The future looks bright. Exciting new plans in education are underway, and for those skilled, plenty of work at good income will be available.

It would be nice if the President could take credit for these changes, but in truth, many have been responsible. In particular, Milt Stevens has been the creative and driving force behind most of these. He is an educator, and his heart and soul is dedicated to the improvement of horology. I thank him, Mike Danner, the office staff, and others too numerous to mention for making my job a pleasure.

I know you will support your new officers as you did me. Much success to all of you.

Robert F. Bishop

ON THE FRONT: This view of the Grand Canyon is by Mr. Harold Bertha of Pearl River, New York.

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UP FRONT

AWI's continuing effort to bring favorable publicity and create positive public relations will feature this multi-media release. It will appear in suburban newspapers and on local radio and TV stations. This makes our third multi-media release this year.

By using this method of generating releases of general interest, we have been able to achieve exposure in print, on TV, and radio which if purchased would have a value of \$225,000. The actual cost to us has been less than 10% of the market value of such exposure.

RADIO ROUNDUP
a collection of features, oddities,
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THE POWER OF TIME

TIME MAY WAIT FOR NO MAN, BUT MANKIND HAS MADE
REMARKABLE PROGRESS IN HARNESSING THE POWER OF TIME. AS
THIS BRIEF LOOK AT THE HISTORY OF WATCH AND CLOCKMAKING
REVEALS. THE EARLIEST CLOCKS WERE USED IN MONASTRIES OF THE
MIDDLE AGES. POCKET WATCHES FIRST APPEARED IN THE
SIXTEENTH CENTURY, LONG AFTER PORTABLE TABLE AND CARRIAGE
CLOCKS WERE COMMONPLACE. IT WASN'T UNTIL THE 1700S THAT
FINER, MORE ACCURATE WATCHES BECAME AVAILABLE. AMERICAN
MASS PRODUCTION FILLED THE NEED FOR AFFORDABLE WATCHES IN
THE FAST-PACED WORLD OF THE INDUSTRIAL REVOLUTION OF THE
1800S. WHAT MAY THE FUTURE HOLD? MAYBE WATCHES THAT
AUTOMATICALLY SYNCHRONIZE TO A BEACON SATELLITE; OR
WATCHES THAT CAN MONITOR HEART DISEASE AND OTHER
CONDITIONS. REPORTS THE AMERICAN WATCHMAKERS INSTITUTE.
ONLY TIME WILL TELL WHAT REMARKABLE ACHIEVEMENTS ARE YET
TO COME IN THE HISTORY OF WATCH AND CLOCKMAKING.

140 WORDS, 56 SECONDS

THEN and NOW!

The Power Of Time



American mass-production filled the need for affordable clocks and watches in the 1800s.

Time may wait for no man, but mankind has made remarkable progress in harnessing the power of time, as this brief look at the history of watch and clockmaking reveals.

Then: During the Middle Ages, monasteries developed clocks to guide the monks in punctual performance of increasingly complex devotions. Nearby villages often relied on these tolling bells to lend order and rhythm to burgeoning urban activities. Early clocks often had no hands or dial; indeed, the name comes from the medieval English word for bell, *clocke*. Early clocks were inaccurate and subject to repeated breakdowns, yet they were tantalizing symbols of order and precision.

Complicated astronomical clocks date to the fourteenth century. Pocket watches first appeared in the sixteenth century, long after portable table and carriage clocks were commonplace. By the early Renaissance, there were complex clocks, miniature clocks and decorative clocks, but there were still no truly accurate clocks. Galileo Galilei, Robert Hooke, Christian Huygens, Isaac Newton and many others worked to improve the art and science of timekeeping. It wasn't until the 1700s that finer, more accurate watches became available.

American mass production filled the need for affordable watches in the fast-paced world of the industrial revolution of the 1800s. Soon everyone carried a pocketwatch and after World War I, the popular new wristwatch took over.

Now: When the first bulky quartz clocks were built in laboratories in

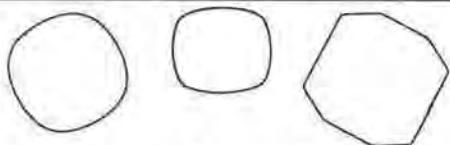


Watches of the future may include quartz watches that do not need batteries and watches that synchronize to a beacon satellite.

the late 1920s, nobody could imagine they would ever be miniaturized and carried on the wrist. Yet affordable and accurate quartz watches are now the standard of the industry and mechanical timepieces are relegated to the prestige market, reports the American Watchmakers Institute (AWI).

Today it's difficult to imagine the widespread adaptation of the remarkably accurate atomic clocks which can keep time to one second in 370,000 years, or the proposed stored-ion laser-cooled clocks that could be accurate to one second in 50 million years. Not to mention watches that automatically synchronize to a beacon satellite; quartz watches that do not need batteries; wristwatch pagers and cellular phones; and watches that can monitor heart disease, high blood pressure, diabetes and more. Yet only time will tell what remarkable achievements are yet to come in the history of watch and clockmaking.

TIMES



THE F-BLK-50 ASSORTMENT

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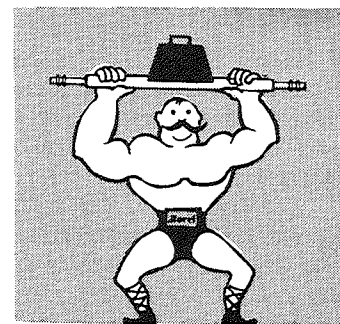
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You'll find a Spring Bar in this assortment for nearly every need. Greater quantity is supplied of most popular sizes: $\frac{5}{8}$ ", $\frac{11}{16}$ ", $\frac{3}{4}$ ".



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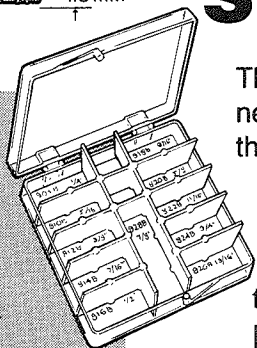
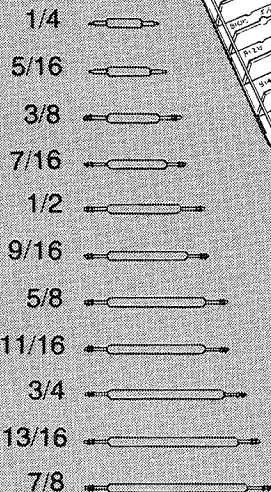


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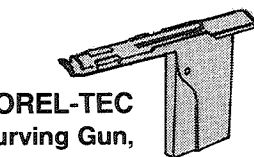
These spring bars are used in many new watches where band fits close to the case. This assortment contains 66 bars, 6 each of 11 sizes, in a small partitioned plastic box.

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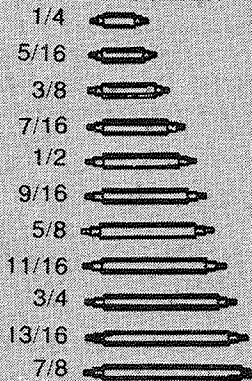
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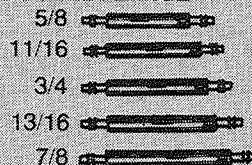
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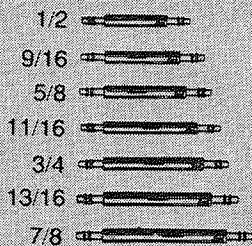
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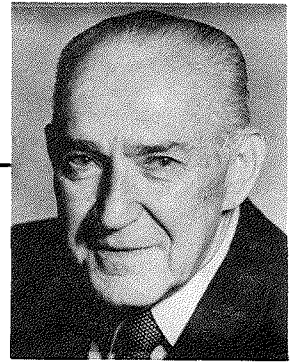
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Questions & Answers

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



A 48-Hour Pocket Watch

Q I am looking for any information about a large pocket watch. I am enclosing several photos that may help you identify where it came from and the year it was made.

The watch is large—80.7 mm in diameter. It has a large winding crown and a small push button alongside it for setting the hands.

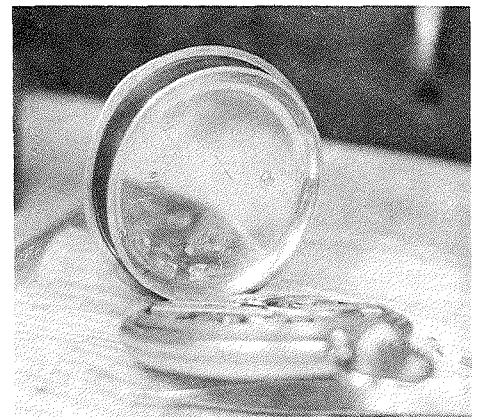
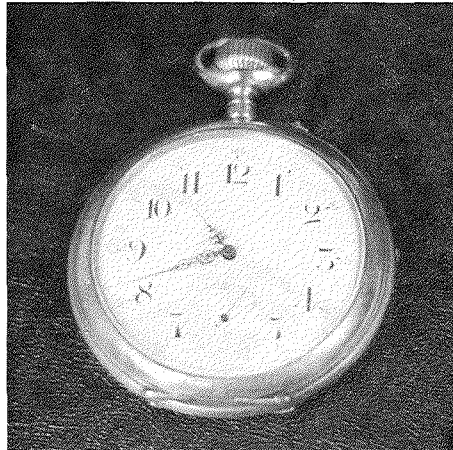
Thanks for your help!

Lowell G. Anderson
White Bear Lake, MN

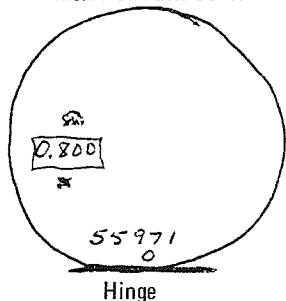
A I have examined the photos of your giant watch. At first glance it has the appearance of an 8-day watch. However, the movement reveals that at best it is a 48-hour timepiece. It is Swiss, of course, of the 1880-1890 period, nicely finished and in fairly good condition.

The marks inside the back cover reveal that it is of mid-class silver, not sterling standard. The various hallmarks are those of the casemaker of which there are no records. The fancy legends merely state that the watch has 15 jewels, has a Breguet hairspring, lever escapement, and is stem wound.

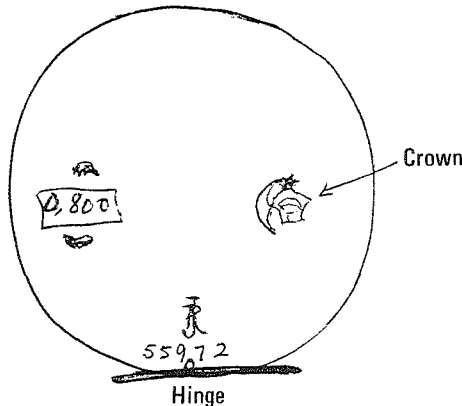
The coat of arms on the back cover is not familiar to me, although there are people and books which list these. Should you like to pursue this further, your local librarian can help. (Continued on page 8)



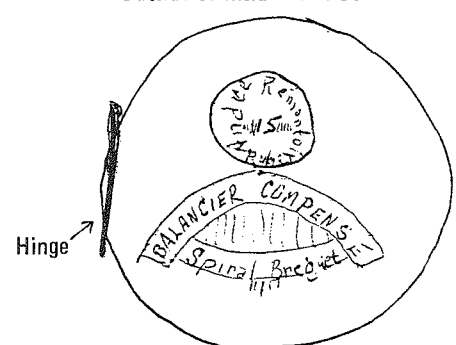
Inside of Back Cover



Inside of Inside Cover



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see page 6

Diamond SELLER
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see page 2

RING SIZER
see page 6

Q I recently acquired the clock shown in the photographs. The name "Imperial" is imprinted in large letters on the upper half of the face and "Made Italy" in small letters appears along the bottom.

The base, case, and top figure are gilt and the elephant bronze. I was unable to remove the works from the case but was able to observe that they contained a thin stainless steel rack.

The previous owner thought the clock was made about 1920. Do you think it is even as old as that?

Any information you can send me regarding the age and value of the clock will be greatly appreciated.

Nancy Schomer
Renton, WA

A A normal examination of your photographs of this clock shows that this is of rather recent import. The castings are rather bright and lacquered to protect the metal finish. If it were of the 1920 or even 1940 era, that color would have faded and the lacquer dulled. Also, examine the dial and hands. These too are of recent design and manufacture, possibly with German fit-up movements supplied to the foundry



assembler and exporter of these clocks.

The movement, if you look closely, is a fit-up of not over twenty

some odd years. The take-up nut is typical of such movements and fit-up.

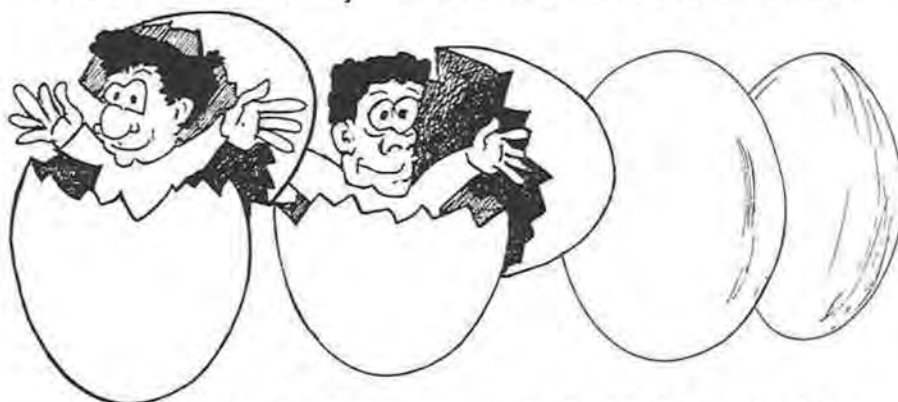
Since the holes in the dial are fairly close fits, it also follows that the founders also made the dials to suit the available or ordered movements.

In post WWII, Italy did produce some very nice castings and this looks like one of them. While the elephant appears to have a nice bronze finish, I could not be certain unless I could take a knife edge file and cut a groove in an innocuous place to determine whether it is cast pot metal or really cast bronze.

The hands appear to match the fit-up types one gets with these fit-up movements. Today these would probably be quartz movements, although striking clock movements were available and still are from Germany, Korea, and France.



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TUES

SAVINGS

FOR THE WATCHMAKER

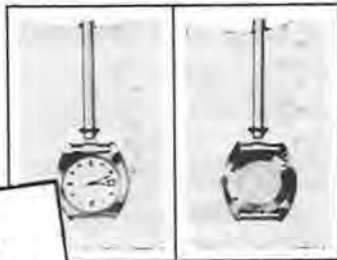


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Bench Tips

Joe Crooks



ARBOR TO REMOVE SPRINGS FROM THE BARREL

This month's tip is from Robert B. Little of Logan, Ohio.

Regarding the bench tip that appeared in the May 1990 issue concerning the removal of Seth Thomas mainsprings from the barrel, I approach the spring winding problem from a different angle. Basically, there would be no problem in winding the spring, slipping a retainer on, removing the assembly and letting it down if the wheel weren't in the way. So here's what I do.

1. Turn the wheel and arbor backwards to unhook from the spring and remove the arbor and wheel.
2. Take a piece of drill rod stock (you can make up a set of 3 or 4 of these in increasing size), square up one end, and form a spring hook on the other end (as Mr. Huckabee shows on one of his tapes). I drill a hole in the stock, insert a piece of 1/8" drill rod stock, hard solder in place, and form the end. In essence, you make a replacement arbor with no wheel so you can slip a sleeve retainer over the spring, after you've wound the spring up using a mainspring winder.

The arbor set would resemble the drawing.



Obviously, these arbors don't have to be close tolerance units and can be made in a few minutes. The square end is found so your winder gets a good bite on it.

The components can be cleaned, rewound, reinserted in the barrel, and the original arbor/gear installed.

Fabricated shaft length is determined by your winder. Make the length so that the spring end aligns well with the spring hook.

Bob Little

This is all I'm going to print about removing clock springs from the barrel. I've already made one friend angry with me for giving out his spring removing tip. I didn't dream the "Great Guru" was so touchy with his tips. Oh, well, I did keep him from bullying his poor mother in his last R/Q article.

He did say some erroneous things about me, and just to set the facts straight, I was NOT cowering in the corner of the baggage claim area when he saw me at that airport. Mike had just put a necktie on me, and I thought I was tied to a post that was there.

Be careful stating these half-truths. It could give a guy a complex . . .

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Old Watches

Charles Cleves



Enameling on Watches

One of the questions I am often asked is: "Who repairs enameling on old pocket watches and repairs cracked enameled dials?" For years I have tried to find someone who did a good job of repairing chipped enameling. I decided it was time to do some more serious checking, and here is what I found out. In all of North and South America, there is only one manufacturer of the glass powder for enameling. The name of the company is Thompson Enamel, 650 Colfax Ave., Bellevue, KY 41073, (606) 291-3800. The biggest coincidence is that this is less than a mile from my house, and I didn't even know about it until last year.

One of the most commonly occurring problems is broken dials. From talking to several people who have been in enameling for many years, I have concluded that the dials cannot be refired to heal a crack. You will have many failures for maybe one success. Many new dark spots or lines can appear in the reheating of enameled surfaces that are more than 10 years old. My advice, based on the many people I have spoken to, is: *don't try it!*

The other problem that occurs quite often is chipped enamel cases. Several watches that I have purchased over the years have small, rose-cut diamonds set in the lid with either blue, green, or red transparent enameling around the stones. The reason there are many of the watches with broken or damaged enamel is because they were never counter enameled. This means they were not enameled on the backside of the piece. The purpose of counter enamel is to reduce stress exerted on the enamel by the metal during the cooling process or after the piece is cool. Many factors have to be considered, including the size of the enameled surface, the thickness of the enamel, and the thickness of the metal. When you combine the stress already present with the many years of use in opening and closing the lids, it is easy to understand why the enameling chips. Remember that when you are working on an enameled watch if the enameling doesn't give, it cracks or chips. I learned a good lesson the hard way. I put an enameled case in my ultrasonic cleaner and forgot about it for a few hours. When I finally remembered it, there was a fairly good size chip that had broken off of the case. Although I had the piece that came off, there was no way to refire it and have it look as it did before it was damaged. Even if you can match the color exactly, there is no way to blend the edges of the old with the new.

These cases can be repaired but you will have to strip out all of the enameling of that particular part that is broken.

If the broken part is black, then I would use Ceramit to repair the damaged part. In case you are not familiar with Ceramit, it is an epoxy-based cement that dries and looks similar to enamel. It can be trimmed with a razor blade, sanded, or polished. It can be purchased from most supply houses. The old enameling can be removed using hydrochloric acid and masking off the gold and other enameled parts with beeswax. It can take 3 to 4 hours to remove enameling this way. You will not harm the engraved surface below the enameling as you would trying to break off the enameling with a hand engraver. There are parts of the enamel that will not break down entirely from the acid so it would be good to scrub the piece with a stiff brush and reapply new acid once every half hour.

Like many other aspects of the watchmaking profession, if you want it done right, then do it yourself. There are two different restoration businesses in Cincinnati. Their estimates to repair single color enameled watches runs between \$400 and \$1000—if they will even do it. I started taking enameling classes two months ago and the one thing I have found is that there is no substitute for experience. Since Thompson Enamel is the only place to buy enamel powders, you can call them to find out if there are any classes near you. There are several books and videos available from them on enameling techniques—for beginners or advanced craftsmen. I have found them to be more interested in helping people than most of the other companies I deal with. They offer free enameling classes on Thursday night, and all of the glass powder that you use is free, along with the use of their kilns, acid, etc. They are very dedicated to reviving the art of enameling. Their mailing address is: P.O. Box 310, Newport, KY 41072. They only sell enamels and enameling supplies. You cannot send them items to be repaired.

Now the answer to my question. Who can repair broken enameled pocket watch cases? You can, but don't start with an expensive watch. Learn on inexpensive pieces of copper and work your way up to the harder jobs. There are many jewelry jobs that can easily be repaired once you learn a few basic principles. You may even decide to remove the old enameling and replace that part with Ceramit rather than risk refiring the whole piece and melting, burning, or warping something else.

In the short time I have been taking classes I have found enameling to be much easier than what I originally thought it would be.

WTEB

BOOK REVIEW

WATCHES—OFFICIAL PRICE GUIDE, 10th Edition by Shugart and Engle. 5-1/8"x8", soft covers, 718 pages, 3100 illustrations. Pub. 1990 by House of Collectibles @ \$16.95.

This book compared to the last edition has many more photos and listings of wristwatches, which alone totals 1850 illustrations together with current prices for each watch identified. There is a separate price when the watch has an 18K, 14K, platinum, gold-filled, silver, or stainless steel case.

There is a new section on Breguet watches and a number of enamel watches, some in color in a special section. Patek Philippe, the magic name in vintage watches, is represented with 100 photos and prices for each wristwatch. Pagination in the new edition is a little different from earlier editions and many errors have been eliminated.

A history of watches, automatic winding, the chronograph and how to read chronograph dials is welcome. The history of the wristwatch could be improved if the authors could refer to that topic in JCK's "Heritage" issue.

A page on the Swiss codes that appear on the balance cocks of wristwatches is welcome. This was mandated a number of years ago by the U.S. Customs to thwart smuggling of watches. Wristwatch listings cover 190 pages, with over 1850 watches pictured, along with the name of the real importer.

Novelty watches are included, some of which are the triangular Masonic pocket watches, the Shell Oil watch by Girard Perregaux, ball watches, blinking eye watches, and a Russian wooden watch by Bronnikoff (somewhat underestimated). There are some pages in color showing enamel watches, ball watches, and some pendant and wristwatches.

The usual comprehensive sections on pocket watches of American and European origin are here, all with prices. Also, there are the introductory chapters on buying and selling hints and guides, various definitions and standards for all types of watches, and a glossary that has had many definitions made more exact.

This book is a best seller and can be recommended for its contents as an identification, price guide, and for general information on antique or vintage watches of all types.

Henry B. Fried

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BULLETIN BOARD

A. NEW REQUESTS

E & M ASSOCIATES

Jim Stanley, Fort Wayne, IN, has an old address for this firm and is seeking a current one.

E & M Associates
109 Bank Street
Waterbury, CT 06702

This is (or was) a firm who repaired LED and LCD modules.

WATCH WHEEL CUTTING & REPIVOTING

This month AWI has had three requests for shops who can (or will) cut watch wheels and also do repivoting work on watch wheels. We have knowledge of two shops which have become unreliable as far as job completions are concerned. If you know of a shop who provides reliable service in this area we would like to add them to our source list.

WATER-HARDENED STEEL

Fred Butler, Tempe, AZ, is seeking a source either in the United States or foreign for small amounts of water-hardened steel. When there were many watch and clock manufacturers in the U.S. water-hardened steel was readily available; this is no longer true.

REMOVING SOFT SOLDER

Michael Fuel, Chicago, IL, has an American kitchen clock (Ingraham) which has been "repaired" by someone who has applied glops of soft solder to several areas of the plate and on one lever. Mr. Fuel would like to know if there is an easy way to remove this solder without damaging the clock's plates.

B. RESPONSES

We have received a number of responses during the month dealing with requests we have previously reported answers for. At times we receive responses to requests that had been published six months before. We always forward these responses to those who made the original request. The information is then filed so we have it on hand to help others when the need arises. The response to this column is gratifying and they have helped many with their problems.

STEAM CLEANER

John Nagle, Myerstown, PA, responds as follows to Edward Moon's request for details about using a steam cleaner.

I've used a steam cleaner in our shop and it has good and bad points like anything else. Ours has a tapered spout in which the steam is blasted out. We also have a foot pedal control which allows us to hold items with both hands.

I know that people swear by them but I feel that the machine's value is somewhat

limited. For watch work it is useful in cleaning cases and bands. We clean our cases in the ultrasonic cleaner, rinse, and then use the steam to blast remaining particles out of the case and band crevices. A friend of mine uses one to blast polishing compounds out of jewelry crevices.

Safety precautions? Keep your body away from the live steam. Hold small items very securely with locking tweezers, etc. The force can be pretty strong. If you are using it on gemstones, be sure you know the characteristics of the stone. Heat and pressure can ruin many stones. Use distilled water and do not let the machine heat without water in it.

My opinion: We got ours secondhand and at a cheap price. While it is handy to have around, I don't think that it is worth buying new unless you are doing volume work. Then you could save time. If you are only cleaning 5-6 rings or a dozen bands a day it might not be worth it. Secondhand price? Get it!

C. ITEMS STILL NEEDED

COLONIAL CLOCK COMPANY FIVE TUBULAR CHIME

Billy E. Young, Dallas, TX, has the colonial clock pictured here which was manufactured by Miller of Germany. It has a serial number 4829 and was patented Jan. 12, 1909. A check of the patent office records developed a "glitch" and we were unable to obtain any patent information on this unit. Mr. Young is seeking the following information:

1. The chime setting sequences.
2. The weights of the chime and strike trains*
3. The chime notes required.

*This could easily be determined using the method suggested in J.E. Coleman's book.





FOLIOT CLOCK KIT

Richard Dreibelbis, Fair Lawn, NJ, is trying to find a source for a Foliot Clock Kit (sometimes called a Columbus Clock). The kits come ready to assemble, requiring little or no work on the part of the assembler. A stone is provided for the driving weight. We have seen these kits offered from time to time in various hobby-type magazines but fail to recall which.

MULLEN'S RUST REMOVER

Arthur Brown, Memphis, TN, is seeking a source for a product known as Mullen's Rust Remover, X3-100. Mr. Brown says it is the best product he has ever used, and he cannot seem to locate a source for it.

JUNGHANS SPARE PARTS

Several of the sources who formerly handled spare parts for Junghans clocks and watches have disappeared. A member in Denver, CO specifically is looking for spare parts for Junghans J30E clocks.

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THIS MONTH'S REQUESTS?**

**DO YOU NEED INFORMATION
ABOUT ONE OF THIS MONTH'S RESPONSES?**

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| ☐ Set AT-150 —101 Men's sizes (8-5/12 doz.) 25.0 mm to 35.0 mm in G-S drawer—\$188. | ☐ Send new supplement with all assortments in rotation, issued since Cat. # 200. |
| ☐ Set AT-125 —(Starter Set) 60 sizes (5 doz.) 26.5 mm to 32.5 mm in G-S drawer—\$116. | ☐ I do not have # 200 Catalog. |

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Bows

Those of us who were “weaned” on pocket watch repairs are probably well versed with the task of fitting bows, and possibly even making a new bow on occasion.

ORDERING BOWS

Even if we are “old timers” on these repairs, it is interesting to note some of the more recent changes in the method of ordering them. For years we have ordered bows by movement sizes, such as 0, 12, 16, etc. It seems most supplies go by sizes; however, these sizes are not movement sizes, but millimeters instead. I found this out the hard way. I received two different orders that were filled with bows that were too small.

We have to let our supplier know if our order is for a certain watch size, or specify millimeters.

In addition to sizes, we must order bows by color and styles. Bows come in white and yellow, and antique white and antique yellow. Since most suppliers are not mindreaders, we need to tell them our color choice. Also, we need to furnish the style (or shape) such as round, oval, railroad, fancy, etc. Figure 1 shows some of these bow styles. Many suppliers can furnish us with a bow chart showing actual sizes so we can select and order them by number. I have one such chart and it gives sizes. I was surprised to learn (as I said before) that the sizes shown were not watch sizes but apparently millimeters.

Figure 1

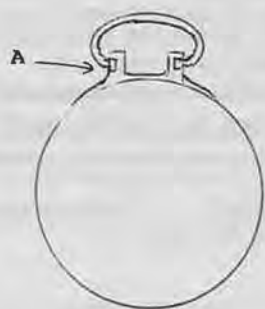
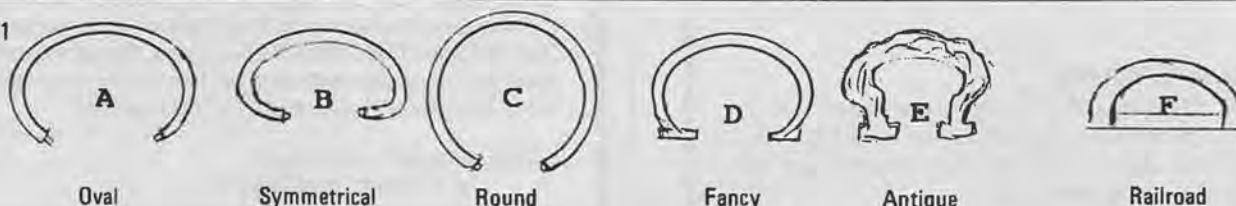


Figure 2

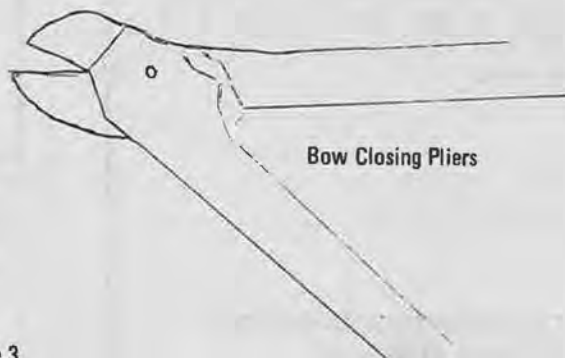


Figure 3



Figure 4

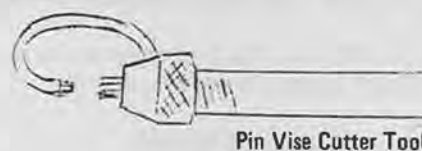


Figure 5

BOW END CUTTING

There is another difference in these newer bows. Some of their ends may need cutting down for a proper fit. A special tool was made for trimming bows called a bow cutter. Even without this tool, we can cut the ends down to a diameter to fit snugly into the holes in the watch pendant (Figure 2A) by using a file. If the pendant holes (in the watch case) are worn too much, we must first fill them in with solder and then redrill.

BOW CLOSERS

Figure 3 shows bow closer pliers. As the name implies, these are used to close bows. By holding the pliers in the center of the bow we can decrease its diameter *before* we fit the bow to the watch. We need to close the bow so that it is just a little too tight to fit into the watch pendant. Now we're ready to use our bow openers.

BOW OPENER PLIERS

Since we have formed the bow too small to fit onto the watch, we must have some method of fitting it. The bow opener pliers (Figure 4) is our answer. We place the jaws of these pliers inside the bow. Then we squeeze the handle of the pliers just enough to fit the bow. Theoretically, the bow should now be tight. If not, we need to again use our bow closer pliers, but this time we'll leave the bow on the watch while we finish our tightening process. This process may be difficult to use on some bows—such as the antique style shown in Figure 1E. Also, railroad bows, like the one shown in Figure 1F, do not require the use of any bow pliers. A screw goes through the bow and through the case pendant. Also, there are other types which are quite obvious that do not require the use of these bow tools.

MAKING A BOW

There are rare occasions when we may choose to make a bow. If it is not available or if we need a gold bow—maybe 14K, for example—then it becomes feasible to make one. If the old bow is just worn a little, it is probably best just to rebuild it. If it is missing, then of course we must make one.

Since we have no sample, we may want to first make a rough sample out of brass. This has several advantages: Our model doesn't need to be so precise that we waste a lot of time. Also, we do not need to worry about a little wasted brass. So, let's cut a piece of small diameter brass rod. Bend it around to form a rough sample bow. Afterwards we need to cut the length to the desired size, so we need to unbend it. After we straighten it out, we can measure it for length. Now we can use our real gold stock, and cut it to this predetermined length. Now we can cut the shoulders on each end while we still have a straight piece of stock. For this we can use our lathe. If it's a fancy bow we are making, we may not be able to chuck it up in the lathe. We can use bow cutting tools or cut this shoulder with a file.

Another tool that works great to cut end shoulders is shown at Figure 5. This pin vise type of cutting tool is actually designed and sold for the purpose of trimming dial feet. It should be used while our material is still straight; however, we can use it before we have completely aligned both ends as shown in Figure 5. Notice that one end will fit into this pin vise cutter if the other end is temporarily bent away.

I hope this article helps in your working with bows. Incidentally, the bow closers and bow openers shown in Figures 3 and 4 are still available, as they are also used in ring repairs.

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Remembering COLA

In Your Service Department

By H.W. Farance

As the years go by we often forget to factor in the "COLA" (cost of living adjustment) that has become an integral part of our economy. Bill Farance of Conneautville, PA offers his method for making this adjustment. If you haven't considered COLA recently, you might want to use this guide to help you catch up.

A YEAR	B PERCENT	C OFFSET VALUE
1979	11.3 =	111.30
1980	13.5 =	126.33
1981	10.4 =	139.47
1982	6.1 =	147.98
1983	3.2 =	152.71
1984	4.3 =	159.28
1985	3.6 =	165.01
1986	1.9 =	168.15
1987	3.6 =	174.20
1988	4.0 =	181.17
1989	4.7 =	189.68

To determine what you must charge now to balance what you were charging then, do the following:

From column A determine the year that you last changed your price. From column C select that number. Subtract that number from the 1989 column C number which is 189.68. Take the result and divide it by the original number you selected. Got that? Now move the decimal point two places to the right and place a percentage sign after this figure. Now add 100% to that amount. Set this aside.

Record the amount that you were charging for the year you last changed your price. Multiply this amount by the

percentage amount that you set aside. This gives you your new price.

It won't buy you anything more than it would have then. Let me give you an example.

Let's say you charged \$12.00 to do a certain job in 1985. What should you be charging now just to offset the rate of inflation? This isn't counting additional costs such as new equipment, education, seminars, conventions, etc. that we all attend or should attend.

1985 = 165.01. Subtract this from 189.68 (the new value).

$$\begin{array}{r} 189.68 \\ - 165.01 \\ \hline 24.67 \end{array}$$

24.67 divided by 165.01 = .149506

Now do this little magical thing. Move the decimal point two places to the right and place a percentage sign at the end. The .149506 becomes 14.95%. To this add 100%. 14.95% is now 114.95%.

The price you were charging in 1985 was \$12.00. Multiply \$12.00 by 114.95% and you get \$13.79—the new price. It can also be expressed as:

$$\begin{array}{r} 1989 = 189.68 \\ 1985 = - 165.01 \\ \hline 24.67 \end{array}$$

$$24.67 \div 165.01 = 14.95\% + 100\% = 114.95\%$$

$$\text{Old Price } \$12.00 \times 114.95\% = \$13.79$$

\$12.00 in 1979 takes \$20.45 for the same now.



KEY TEST FOR QUARTZ WATCHES

The "KEY TEST FOR QUARTZ WATCHES" by Ewell Hartman, CMW is a quick and simple method of locating the problem in a quartz analog movement. The only tool required is a meter.

Material and instructions for learning this test is supplied by the AWI-ELM Trust as part of their educational work. There is no charge to any group wishing to learn this test. There are great benefits to learning this in a group setting. However, for individuals who may not be able to participate in a group, it is available to them also.

For more information call or write to the AWI office for an information sheet and application form.

TIME

THE MID-ATLANTIC TECHNICAL SEMINAR

Recently AWI emphasized its commitment to education by staging a Regional Technical Conclave in Lancaster, PA. The Conclave was co-operatively planned by five Mid-Atlantic affiliate chapters of AWI.

A record 197 people participated in one or more of the twenty scheduled events, which included bench courses, technical discussions, lectures, tours, banquets, and social events. A number of the programs were projected on large screen TV which provided a detailed view of the intricate operation of the various timepieces and a close-up look at the operations performed on them. Twelve lecturers and instructors were involved in the presentations.

The purpose of the Conclave was to determine whether neighboring organizations could work together cooperatively to bring educational opportunities to their members—opportunities that they could not individually offer. The success of this event indicates that such is possible. AWI is already laying plans to present a similar Conclave in the Northwest for the Spring of 1991. Regions interested in such a program in the future are encouraged to secure a commitment from their neighboring associations, and to make that commitment known to AWI Central.

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- Y482 $6\frac{3}{4} \times 8$

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\$7⁹⁵

Y480
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- ISA1198/12 $11\frac{1}{2}$

\$8⁹⁵

- ESA927.002 $5\frac{1}{2} \times 6\frac{3}{4}$
2.95mm
- HQ672 $6\frac{3}{4} \times 8$
- ISA369 $6\frac{3}{4} \times 8$
- MIYOTA 2020 $6\frac{3}{4} \times 8$
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SELF-WINDING WATCHES

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THE LeCOULTRE 916

An Automatic Wrist Alarm Calendar
(Part 2)

Referring to Figure 6, first assemble the center wheel (205) and the center wheel cock (126) to the main plate. Oil both pivots with lubricant as indicated in the figure. Then lubricate the post of the center wheel and mount the cannon pinion on it. Back up the center wheel while "snapping" on the cannon pinion. Now test the cannon pinion's clutch action.

The next step is important. *Before you replace the alarm device section, assemble the gear train, escapement, and balance so you can check them.*

The escape wheel and pallet fork have been treated with "STOP OIL," a process which inhibits the migration of oil away from where it has been applied and is needed. Therefore, clean these parts *only* with liquids that have a benzine base or with chlorine solvents so that the "STOP OIL" treatment is not adversely affected.

Before winding the mainspring, you must put in place the driving wheel for the ratchet wheel (1482/1 shown in Figure 6) and its bridge and screw.

The LeCoultre 916 does not have the usual regulator curb pins or attached stud for the hairspring. Instead, the hairspring is in permanent contact with the special balance spring buckle, regardless of the balance's amplitude.

This arrangement eliminates the well-known errors of traditional regulators, such as irregular beat and sticking of the hairspring, as well as isochronal differences. For this reason (as well as others outlined in the section on dismantling procedure), I suggest that you dismantle the balance from the bridge *only when it is absolutely necessary*.

BALANCE/BRIDGE ASSEMBLY

If you found it necessary to separate the balance from the bridge, you can now assemble it correctly by first putting the balance wheel in place, as you would conventional balances without attaching the hairspring to the bridge. (Make certain that the movement's mainspring has been thoroughly let down.) The exterior curve of the hairspring must be the same as that shown in Figure 7.

Figure 6

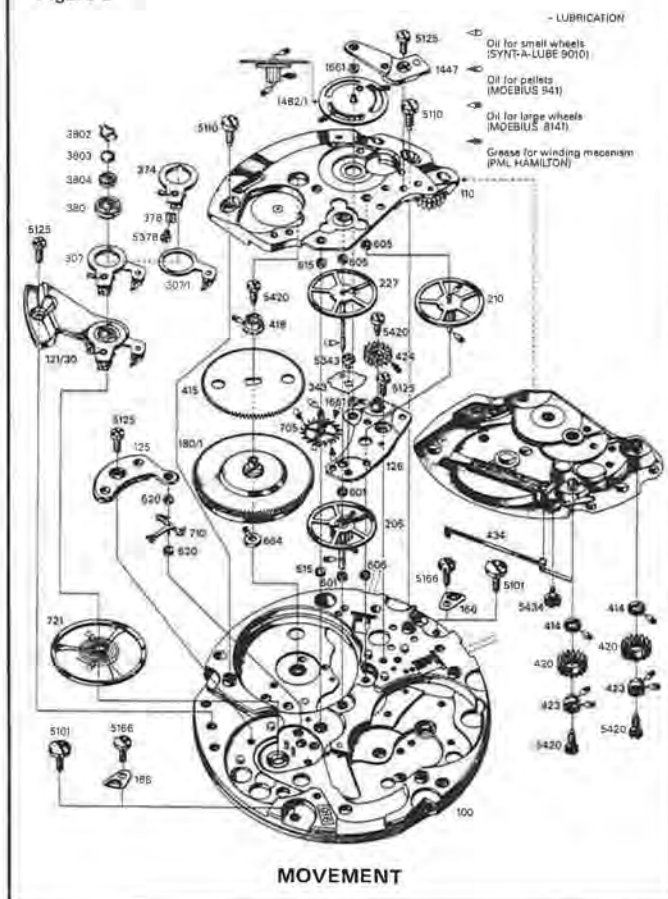


Figure 7

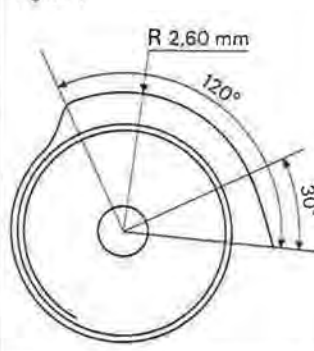


Figure 8

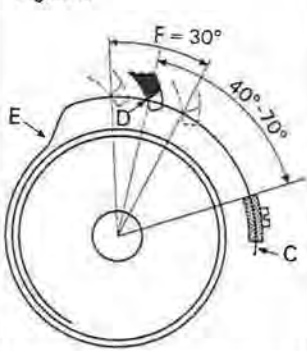
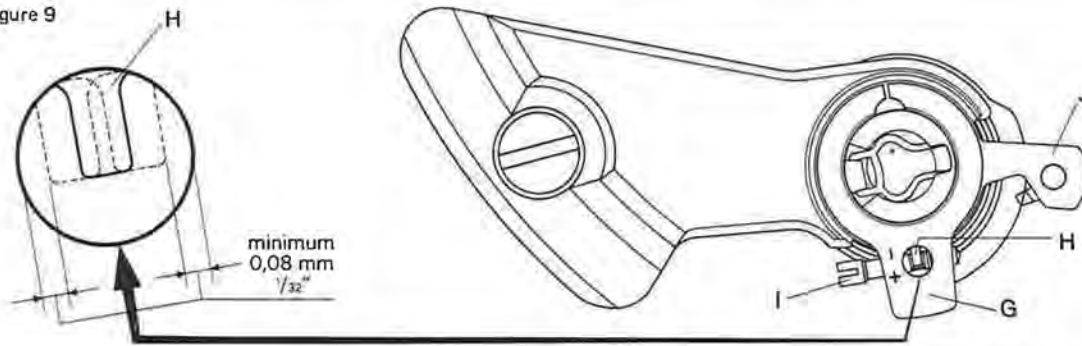


Figure 9



Next turn the balance spring buckle away from the hairspring and loosen the screw of the Spirofin clamp. Attach the balance bridge to the movement. Now turn the balance wheel to bring the impulse pin into the fork slot and insert the hairspring into the Spirofin clamp.

Tighten the clamp screw slightly so that the hairspring can be set parallel to the upper surface of the bridge. Do not tighten the screw too much. This operation is easier when the end of the hairspring extends slightly beyond the clamp as shown at C in Figure 8.

To regulate the balance spring buckle's contact on the hairspring (Figure 8) turn the balance in the direction of the hairspring's spiral development as far as it will go. Hold it in that position while you bring the balance spring

buckle into contact with the hairspring at D. Release the balance.

If you have to center the hairspring, touch it only at E. After each correction, check the contact of the balance spring buckle with the hairspring, as mentioned above. Do this with the complete regulator scale F.

Put the watch in beat by moving the Spirofin G, as shown in Figure 9.

TIMING

Before you make any correction, check to see that the tongue H is not too close to either side of the hole. Otherwise recentre the tongue by means of the regulating screw I.

Preliminary adjustments are made directly by the

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Figure 10

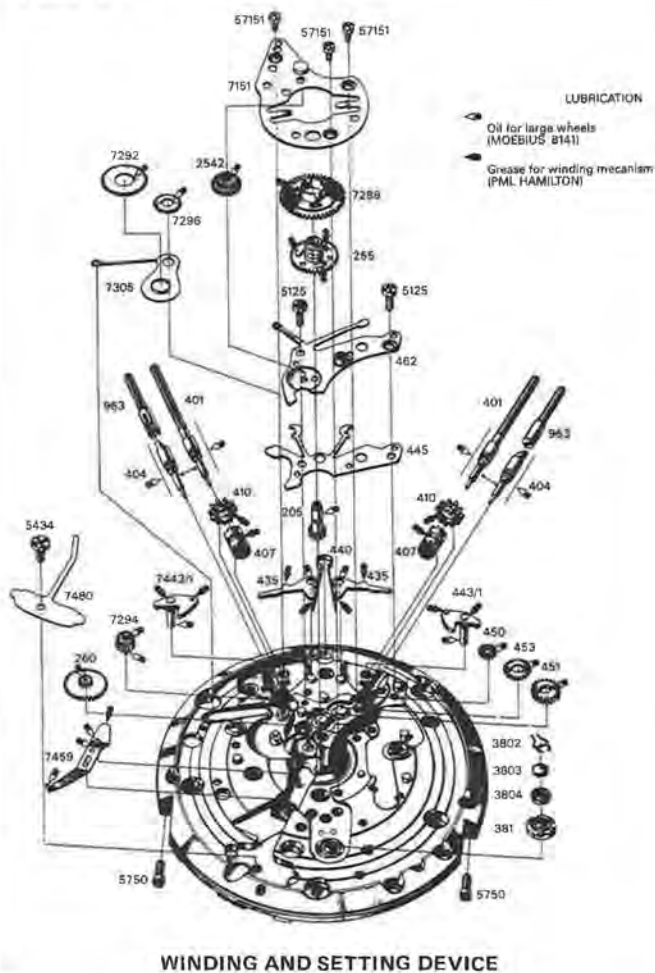


Figure 11

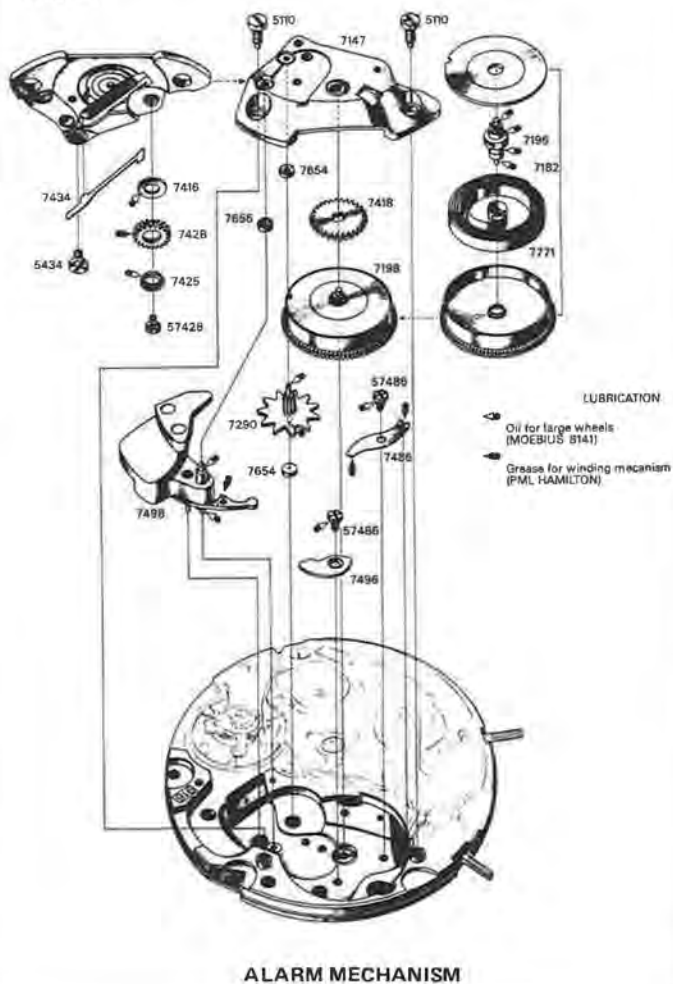
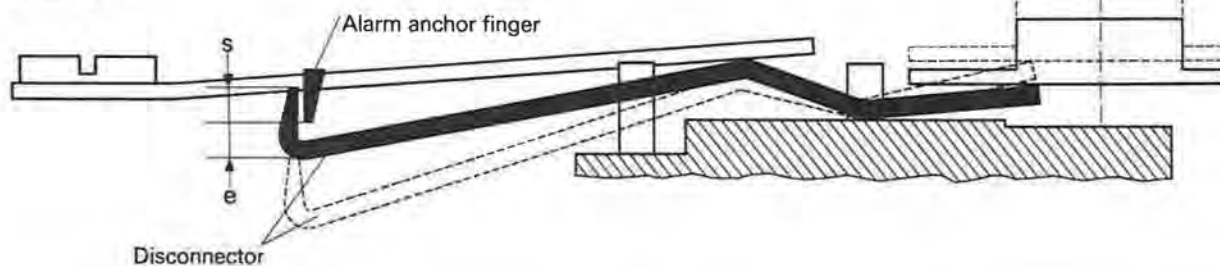


Figure 12



regulator J, until the preliminary timing error is between 0 and +10 seconds per day.

Precise adjustments are made by rotating the regulating screw I using a fine and slender screwdriver. (A quarter turn of this screw corresponds to about 4 seconds a day.)

Make checks on the timing machine before and after each adjustment. When you know the performance of the watch in actual use, you can make this adjustment by introducing the screwdriver perpendicularly into the screw slot. This method eliminates the need to remove the movement from the case.

ALARM MECHANISM

Assemble the winding and setting device as shown in

Figure 10; use lubricants or their equivalents as indicated. Make certain you do not invert the double calendar setting wheel during assembly.

Assemble the alarm mechanism as shown in Figure 11. Pull the alarm winding stem into the setting position and turn this stem until the alarm is released. The nose of the disconnector must release the alarm anchor finger sharply (see s in Figure 12).

In the locking position, the nose of the disconnector must penetrate to at least half the height of the alarm anchor finger (see e in Figure 12). *Never leave the alarm stem in the setting position while you set the hands or the calendar. And never leave the window stem in the hand or calendar setting position while setting the alarm.* Otherwise, the strain

on the double calendar setting wheel (2542, Figure 10) may break its teeth.

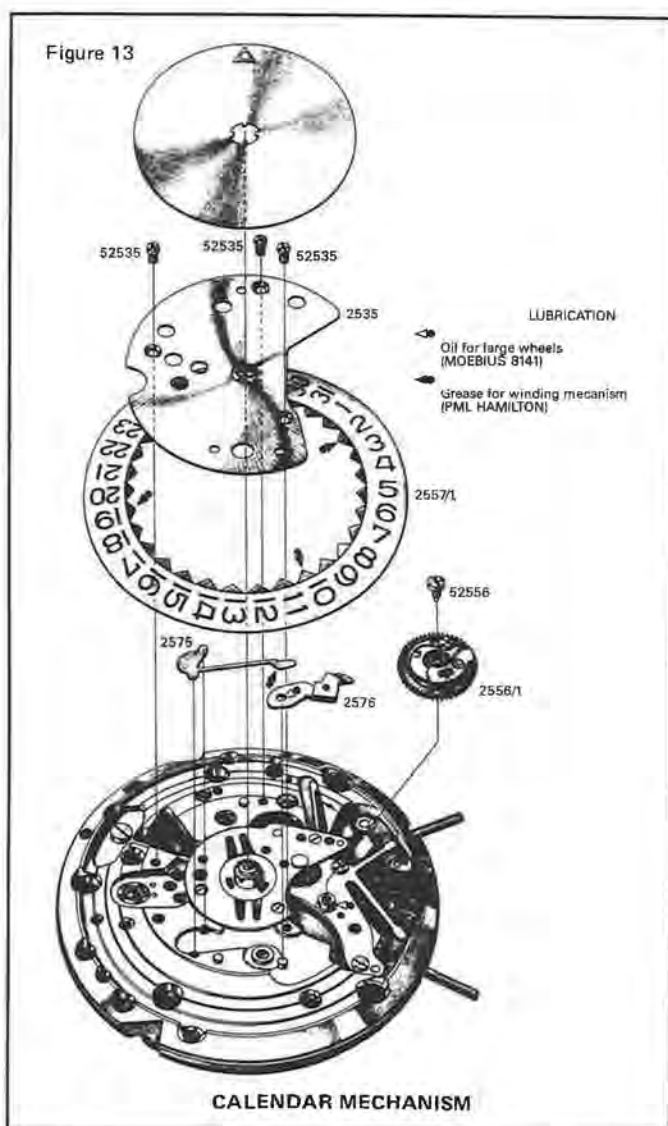
CALENDAR MECHANISM

Assemble the calendar mechanism as shown in Figure 13. Synchronizing the alarm and calendar mechanism is an important operation. You can do it by first letting down the movement's mainspring power. Put the alarm dial disc in place with the four notches in the corresponding slots.

Put the dial in place without tightening the dial screws. Next pull out the movement's winding stem. (Do not leave the alarm stem in the setting position.) Turn the winding stem counterclockwise until the alarm dial disc "catches." Now turn the alarm indicator; set it exactly at 12 o'clock.

Push the movement winding stem inward. Remove the dial and alarm dial disc. Loosen the screw of the date indicator driving wheel (52556).

To make the date indicator jump at midnight, turn the date indicator driving wheel until its center K, the spring hole L, and viewing hole M (all in Figure 14) are in a straight line as shown. When they line up, tighten the securing screw (52556).



QUARTZ WATCH MOVEMENTS



Check this list for your quartz watch movement needs. All of these movements are new, however we recommend checking the batteries and replacing with fresh batteries when needed.

6 3/4 x 8 LIGNE QUARTZ

- Pulsar Y121- 2.99mm thickness- 3 hand style.
146031 \$6.50
 Pulsar Y481- 2.8mm thickness- 3 hand style.
146011 \$6.50
 Pulsar Y482- 2.89mm thickness- 2 hand style.
146015 \$6.50
 ESA 561.001- 2.75mm thickness- 2 hand style.
 Interchanges ESA 561.101, 579.001, PUW 9000, PUW 910.
146021 \$7.95
 ESA 561.101- 2.75mm thickness- 3 hand style.
 Interchanges ESA 561.001, 579.001.
146022 \$7.95
 Orient 4GB- 2.89mm thickness- 3 hand style.
146043 \$6.95

5 1/2 x 6 3/4 LIGNE QUARTZ

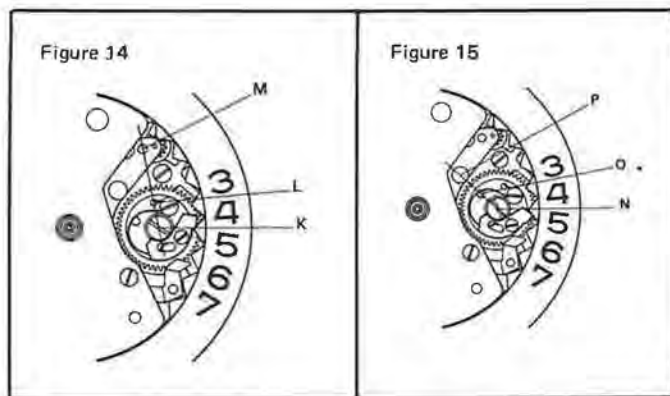
- Pulsar V237- 2.4mm thickness, 2 hand style-
 Interchanges V230.
146018 \$7.95
 Miyota 2Y51- 2.6mm thickness- 3 hand style.
 Interchanges with 2950, Citizen 2Y50 and 2Y51.
146029 \$9.95
 ESA 927.002- 2.95mm thickness- 2 hand style.
 Interchanges with Bul. 2840, 2841, 2845, ESA 924.001, ESA 927.001, Hamil. 768, Ronda 3572.
146024 \$8.50
 ESA 927.102- 2.95mm thickness- 3 hand style.
146042 \$8.50

11 1/2 LIGNE QUARTZ

- ISA 1198/32- 3 hand style with date.
146044 \$8.50
 Y144- 3 hand style with day and date.
149290 \$9.95

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To make the date indicator jump at 1:30 a.m., turn the date indicator driving wheel (2556/1) until its center N, the marking hole O, and the head of the double calendar setting wheel pin P are in a straight line as shown in Figure 15. Now tighten the screw (52556).

SELF-WINDING DEVICE

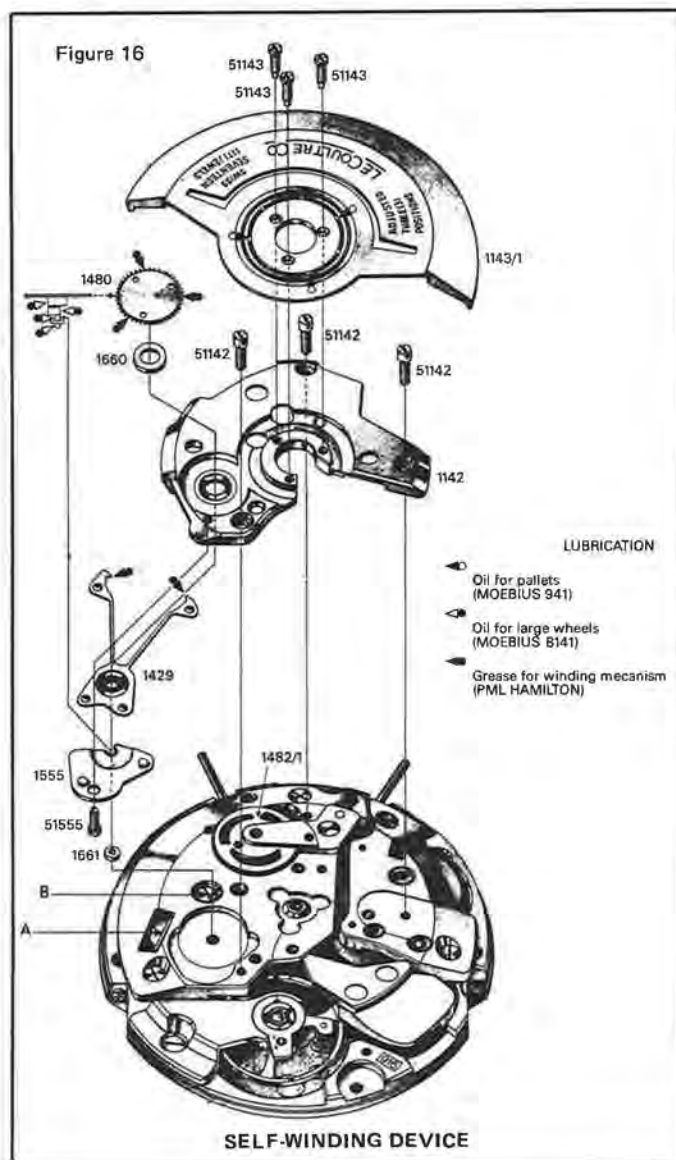
Now you may assemble the self-winding device. First lubricate the ball bearing and race as indicated using a colorless grease. Many breakdowns of ball-bearing rotors stem from dryness in this region.

When you assemble the self-winding mechanism, before you tighten the mechanism bridge, be sure that the noses of the double click (1429, Figure 16) engage properly with the driving gear (1482/1). Check this by turning the wind-up wheel (1480).

To clean the ball-bearing unit, introduce a brass shaft into its center. Soak the oscillating rotor in very clean rectified benzine. Spin the immersed ball bearing rapidly for about 30 to 40 seconds so the liquid will reach into every part of the unit and will remove all foreign matter and old lubricants. Dry the unit very carefully *without heating*, and *immediately* lubricate as indicated above.

FITTING DIAL & HANDS

Depending on the time you want the date indicator to jump, turn the calendar by the movement stem. (Make certain the alarm stem is in the winding or GO position.) Turn the stem until the date indicator driving wheel is in



the position shown in either Figure 14 or 15.

Put the alarm dial disc in place with the index at 12 o'clock. Now put the dial in place and make it ring at 12 o'clock.

Put the hands in place and, before tightening them, check the accuracy of the alarm ringing and the date jump. The date jump must occur between midnight and 12:20 a.m. or between 1:15 and 1:45 a.m. If the date jump is correct, you may push in the hands and secure them. Check the date jump and alarm accuracy again.

TIME

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Technical Problems?
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AWI

MATERIAL SEARCH NETWORK

EDITOR'S NOTE: This column is designed to work in conjunction with the AWI Movement Bank. If you can supply any of the items listed here, please send details to the Material Search Network—do not send the items. Members requesting these items will be advised of their availability and will contact you direct.

Please contact the AWI Movement Bank if you can supply any of the following items we are searching for. These items are not sought for donation; you will be compensated for them.

- K-1: Gruen 861 model (1921 vintage)
- K-2: 0 size Paskar (Swiss 1920 vintage)
- K-3: 10½ ligne International (from 1920-1930s)
- K-4: Sessions as shown in photo below (partial movement with ½-hour chime cam)
- I-5: Buren 840 pallet fork (19 ligne) 8-day clock

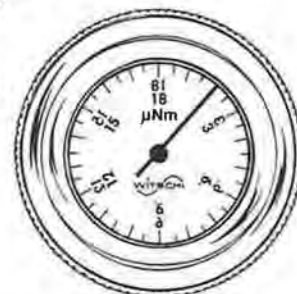


If you can supply any of these items, please contact: AWI Material Search Network, AWI Central, P.O. Box 11011, Cincinnati, OH 45211.

Sessions

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SECONDS	TORQUE NEEDED
1	150-250 uNm
5	35-40 uNm
10	25-35 uNm
12	20-30 uNm
20	12-20 uNm
30	5-12 uNm
60	2.5-6.5 uNm*



These Micro Newton Meter measurements above are the approximate amount of torque needed to move a minute hand from once every second to once every sixty seconds. (*The sixty second reading also applies to the second hand.) This information is essential to see if the motors of your electronic watches have enough power to perform their various functions: hand movement, calendar changes, etc.

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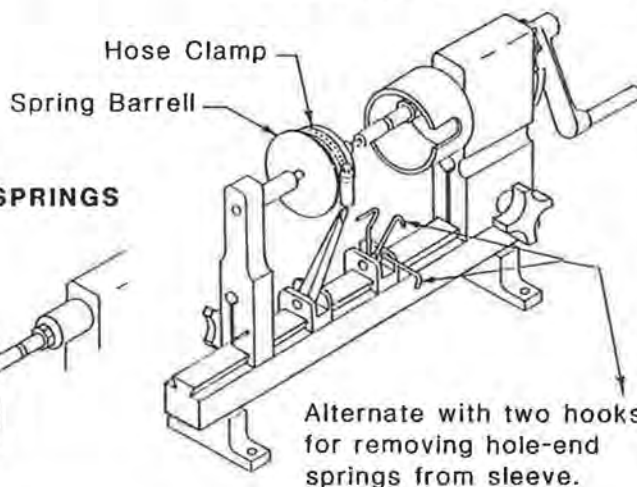
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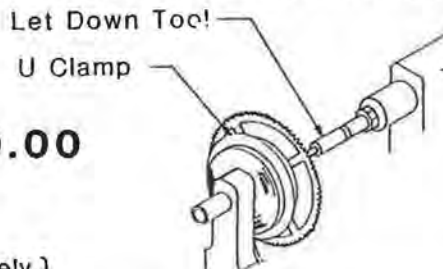
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A BEGINNER'S COURSE IN JEWELRY CRAFTING AND REPAIR

FILING

Filing is one of the most important skills needed to handcraft or repair fine jewelry. Practicing filing develops the dexterity and hand-and-eye coordination that is necessary to repair jewelry to its original shape and condition. There are so many sizes, shapes, and cuts of files available that possibly a complete book could be written describing them and their uses; however, we will only list the basic files that are necessary to start to develop the skills you will need to do basic jewelry work.

The following is a list of the minimum files that will be needed and their approximate costs. The most current price list I have is from a 1986 list; some of these prices may have changed slightly since then.

See Figure 1 for the pillar and half-round file, and Figure 2 for the needle file:

1 - 6"	pillar file (flat)—coarse, one edge smooth	\$ 8.75
1 - 6"	pillar file (flat)—fine, one edge smooth	\$14.65
1 - 6"	half-round ring—coarse	\$15.00
1 - 6"	half-round ring—fine	\$17.50
1 set	12 needle files, #4 medium cut	\$19.50

In addition to these files and the tools listed in last month's lesson, a small bench vise and a ring clamp may be needed for holding the work while practicing filing. The ring clamp can be purchased from any material supplier, and a small bench vise can be found at any local hardware store, usually at a small price. The ring clamp can cost anywhere from \$4.50 to \$7.50.

It is necessary to have the proper sizes and shapes of files to do filing properly. It is also good to know how to hold and stroke the file for the maximum effectiveness and how to clean and care for them to get the best efficiency and longest life from them.

File handles are almost a necessity for comfortably holding the file while working. There is a handle made of wood that screws onto the file tang and cuts its own thread. It can be easily interchanged with other files, but I make it a point to have a file handle for the files that I use frequently, as they are not all that expensive.

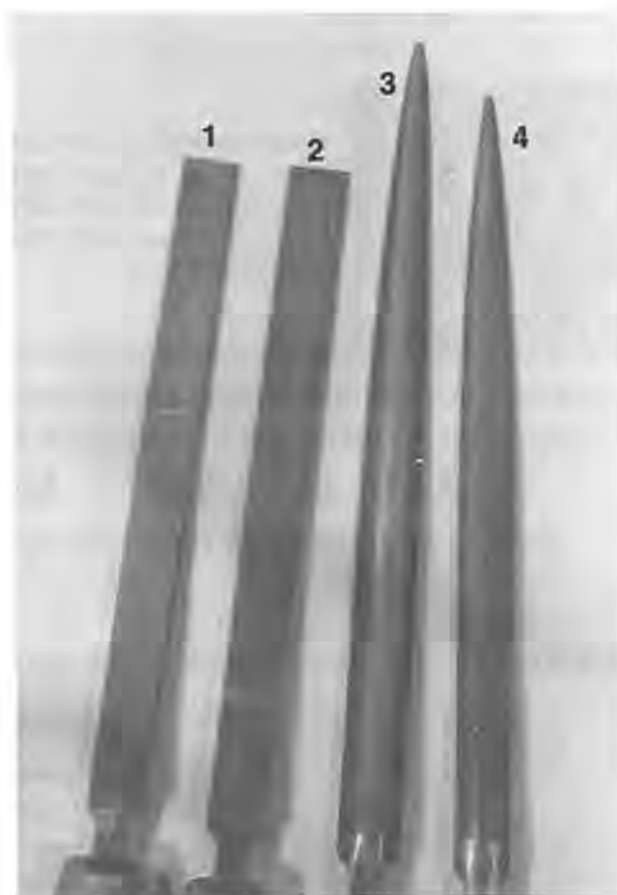


Figure 1.

1—Pillar File, coarse; 2—Pillar File, fine; 3—Half-round File, fine; 4—Half-round File, coarse.

Files should be kept in a reasonably dry place and not allowed to rust. They are very hard steel and can be cleaned using a wire brush, usually with no damage to the file, but they can be dulled by trying to file any material that is harder than the file, such as another file. In filing around stones such as diamond, if the file touches the diamond, it can be dulled. It is wise to learn to hold the work being filed in one hand and the file in the other; this allows for more versatility than when being held by a holding tool or vise, and it saves the time of having to set it up in the vise.



Figure 2. Needle Files.

1, 2, 3—Triangular or Three Square; 4—Square; 5—Half-round; 6—Entering or Warding; 7—Barette; 8—Tapered Round.

There are times, though, when it is more practical to use a vise or holding tool when doing filing that requires the removal of larger quantities of metal. This is when a hand vise, ring clamp, or bench vise can be mighty useful. When larger amounts of metal need to be removed, it is practical to use the jewelers saw and saw away the metal rather than file it away, but don't saw too closely so it can be finished with files.

Before discussing the actual filing it may be wise to discuss the work positions of the body and hands, the type of chair or seat for good posture, and the necessity of a good jewelers bench.

A good jewelers bench should be of a height from 34 to 40 inches. It should have a drawer that pulls out from under the top under the lip of the bench and be low enough to allow freedom in sawing and polishing, yet catching all the sawdust and filings that come off the metal being worked. Although you'll be catching the dust and filings when using inexpensive metals (brass, nickel silver, or steel), it is a good idea to develop a habit of collecting these, for when you start working gold sometimes the filings from a day's work can amount to several dollars in scrap value. Even when working silver, the scrap is well worth saving.

The chair should be adjustable for height with a back that is solid. In order to maintain good posture over a long period of time it is necessary to have a chair that is stable when leaning back—this encourages good posture. The filing block should be located in the center of the bench so you don't have to lean to one side or the other while sawing or filing.

A metal to be used for practice can be brass, as this is probably the easiest and least expensive metal to use that works most like silver and karat gold. Sheet brass is available (Please turn to next page)

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PICKLE BARREL

(Continued from previous page)

from material jobbers in several thicknesses, with 16 gauge (1.290 mm) being the thickest they list. A small piece about 6x6" will more than likely be enough sheet for you to get enough practice before starting to work precious metals. Also, it would be wise to get a piece of round brazing rod $\frac{1}{4}$ " in diameter which comes in 2- or 3-ft. lengths. These materials are the same that were suggested in last month's lesson about sawing.

With the preceding information you should be ready to start practicing filing. To start, I'd suggest that you cut about 6" from the $\frac{1}{2}$ " brass rod, and with the coarse pillar file, file a square on one end about a $\frac{1}{2}$ " from one end. Keep it as large as possible and make it as perfect as possible, but remember: this is just practice, so if you mess up, just cut the $\frac{1}{2}$ " off and start over again.

After getting a square made, rotate the piece of brass rod and the file, and make the square round by filing the corners off. Developing the rotating of the file while stroking with it will be used a lot when working on rings with half-round shanks. It is interesting and good practice to take a half-round ring file and with the rod rotating, file a groove about half the thickness of the rod with the holding hand; then, take a round needle file and file another groove, narrower, next to it. Next to this, a groove can be cut with the cutting edge of the coarse pillar file, which will make a detent groove with square shoulders. Next, take a flat needle file with one cutting edge, and file a more narrow groove next to the one made with the coarse pillar file. The reason that the pillar files have one edge smooth is so that a file cut can be widened without filing deeper and still hold a good and square shoulder. Some needle files also have a smooth edge that can be used the same as the pillar file except to be used in smaller places.

Usually the first jewelry repairs that will be made are in ring sizing, and the files used for this after the ring has been rounded on a ring mandrel will be the half-round ring file and the flat pillar file. The half-round coarse file will be used to shape and smooth the inside of the ring; the half-round fine file is to remove the coarser lines left by the coarse file. The outside of the ring will be shaped with the flat pillar files, using the coarse to remove any heavy metal and the fine for removing the coarse lines left by the coarse files.

These suggestions of exercises that can be used to practice filing are only to get your practice started. Use your own ingenuity in thinking up projects to file, and there will still be several projects in this lesson that will challenge your ability to learn to shape things by filing.

Figure 3 shows a piece of flat brass sheet set up in a small hand or bench vise with some cuts made in the edge with a file. A "V" can be filed in the edge with a triangular file, then with a full round file it can be made into a half-round radius in the edge. The half-round ring file can make many shapes of cuts such as egg shape, oval, or round, due to it being a tapered file.

One of the most used needle files that is in my collection of files is the barette, which is a triangular file with the flat wide surface a cutting edge and the other two edges



Figure 3. Practice Filing. Filing a slot with a round tapered file next to notches from left to right are a rectangular and a "V" cut with a triangular file. Next, the curved groove cut with a half-round inside ring file. The right angle on the right was cut with a large fine cut flat file with edges smooth.

smooth. This allows getting into small grooves and only letting the file cut on one side where you want to remove the metal. This file is used a lot when doing prong work on prong-type stone settings. One of the most important uses that you may have for filing is when making parts to be put in jewelry such as sizes, bezels, shanks, prongs, or heads.

In later lessons you'll be learning to hard solder which is used in most all karat gold assembly and repair, and you will be working on projects such as making brass rings which will require making a shank and a head. The shank should be a piece of rectangular brass about $1\frac{1}{2}$ mm in thickness, 4 mm wide, and 3" long. This is a good project to work on by sawing it out of your practice sheet leaving it a little wide and then filing it to the correct width.

Another project can be to take the $\frac{1}{2}$ " brass rod about 3" long and put it in a vise, then file half the thickness away with the coarse pillar file. This could also be a good sawing exercise because this can be split with the jewelers saw. This is not easy and can be costly in saw blades, but it may be worth it in the dexterity you will develop. If split with the jewelers saw, you have two pieces that are suitable for shanks instead of one and a lot of filings. After sawing the flat surface, if it is rough, you can smooth it by filing with the pillar files. These pieces can be saved and used for practice when learning to hard solder.

One of the important things to remember in filing contrary to sawing is that in filing the cutting is done on the push stroke and no pressure should be brought to bear on the return or pull stroke. In filing heavy pieces when there are large amounts of metal to be removed, it is well then to set the work up in a solid bench vise and with the large pillar or half-round ring files you can use both hands to work the file

with one hand on the handle, and pressure can be brought to bear with fingers of the other hand on the other end of the file which will make the file cut faster.

Sawing and filing can be monotonous and maybe a little boring, but I have tried to suggest projects that might make these a little more interesting. However, as these lessons progress, the work should become more interesting, and when making even the brass practice jewelry fascinating. Even after all the years that I have done jewelry work, it still fascinates me.

Next month's article will cover sources of heat and their application.

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AWI REFERRAL SERVICE

Mobility aptly describes the current population of the United States. People are retiring earlier and moving to new locales, and businesses are moving their employees all over the country.

Many customers who are moving wish to know of a reliable clockmaker or watchmaker to care for their timekeepers. In moving a clock, for example, proper packing is essential to insure safe arrival and proper setup at the new location. Grampa's heirloom pocket watch which many people are using will need periodic servicing. Who can our customers turn to? How about AWI members?

At the most recent Annual Meeting, your AWI Directors decided to establish a Referral Service which you can offer to your customers. The formation of the Service depends entirely on you, the AWI member. Here's how the Service would work:

- 1) Each AWI member who wishes to be included should send their name, home and business address, telephone number, specialty, and certification (if appropriate) to: **AWI Referral Service, P.O. Box 11011, Cincinnati, OH 45211.**
- 2) A file by zip code would be established at AWI Central. Upon inclusion in the file, AWI Central will send you confirmation of your participation in the Service. An appropriate counter card advising your customers of the Service will be provided for your shop or store.
- 3) Upon a request from your customer for a reliable clockmaker or watchmaker, ask for the customer's new zip code. Then you contact AWI Central for a listing of AWI members in the zip code and adjacent zip-coded area.
- 4) Give this listing to your customer and wish him well. It should be explained to the customer that this listing carries no recommendation but rather signifies that the name is that of an AWI member who has access to the latest technical information necessary to perform reliable service work.

Robert Macomber, CMC

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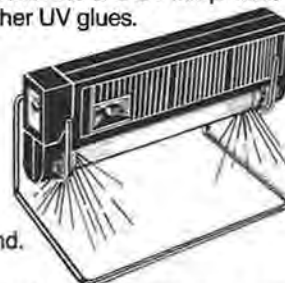
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YALE & TOWNE

TIMELOCKS

PART 2

By

David A. Christianson
CMW, CMBHI



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In the early years of the timelock industry, E. Howard Watch Company was a major supplier of timelock movements for many of the timelock manufacturing companies. A company such as Yale Manufacturing would design a timelock mechanism and then commission time movements for their mechanism from a watch factory such as E. Howard. Figures 1 through 7 show several views of the Yale "L"-type timelock movement built by E. Howard. This movement was such a well-regarded movement that it was used by numerous other timelock manufacturers. As the old saying goes, "Imitation is the sincerest form of flattery;" and it certainly applies here to E. Howard, as Seth Thomas and Hamilton watch factories produced movements very similar to Howard's for use by Yale and the Diebold Safe and Lock Company (Figure 8).

Figure 9 provides a diagram of the Yale "L"-type movement. Disassembly of this movement is quite similar to other timelock movements that we've looked at (and for most small clock movements for that matter), with two exceptions:

RELEASING POWER

As in almost all timelock movements the double ratchet click on the main wheel (mainspring) is not accessible when the movement is assembled. Two methods can be used to release power on this movement:

(1) Remove the dial pointer, dial, and pinion gear. Gripping the mainspring barrel with one hand and the move-

ment at the same time, loosen the barrel lug screws (Figure 6) and place a winding key on the barrel arbor square. Then gently pull the barrel and main wheel away from the movement until the main wheel disengages the second wheel, and then slowly release the mainspring using the winding key as you continue to grip the barrel and movement.

(2) A safer way to release power is simply to block the train, remove the escapement platform, and then slowly allow the blocked train to run down.

RESERVE POWER

After assembling the movement, reserve power for the mainspring (required for all timelock movements). It is done a bit differently on this movement than on the ones we have looked at before.

With the train blocked and the escapement removed, wind the mainspring tightly. Release the train's power $\frac{1}{2}$ turn of the mainspring barrel. Place the dial on with the pointer indicating the maximum of hours on the scale. Release the power until the indication points to zero (or stop) by slowly running down the train, and then replace the escapement.

Let's also look at the procedures for disassembly and assembly of the movement.

DISASSEMBLY

Remove the pointer and the dial. The stop lever always goes on with the flat side down. Hold back the main train and remove the escapement. (Note: Keep the winding



Figure 1. Yale "L"-type timelock movement.



Figure 2. Side view of the Yale "L"-type movement showing 5-wheel train.

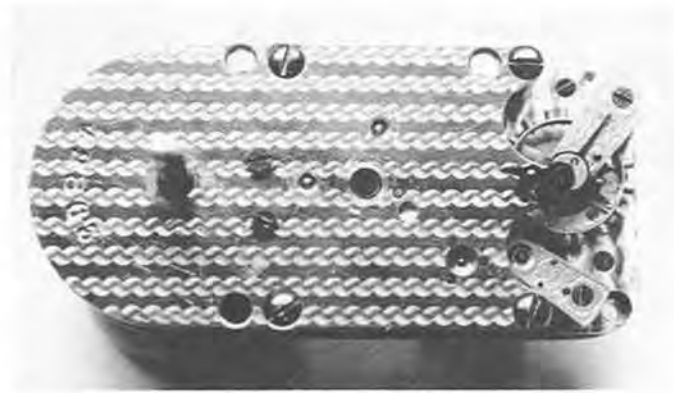


Figure 3. The "L"-type with dial and pinion gear removed.



Figure 4. Lower plate of the "L"-type showing mainspring barrel. Note that the fourth and fifth wheels are jeweled.

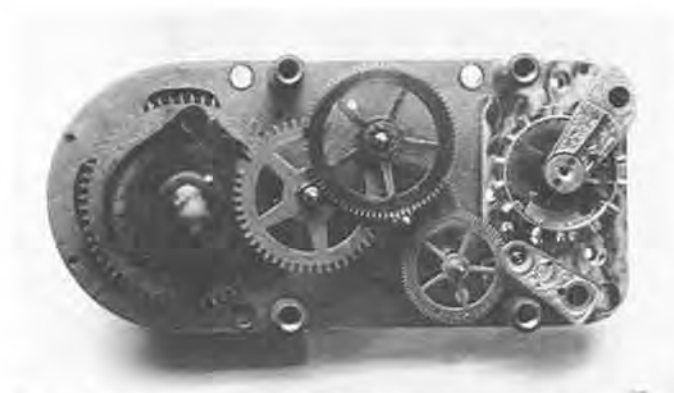


Figure 5. The "L"-type with upper plate removed. Note the fully jeweled escapement and 5-wheel train (not counting the escape wheel). Note also the double ratchet click which is inaccessible in the assembled movement.



Figure 6. The mainspring barrel showing two barrel lug screws. The one on the right is in a locked position and the one on the left is unlocked.

key in so the movement does not get away when running down.) Now remove the top plate (bridge). Study the wheel assembly (main train). Note: This movement has a fifth wheel before the escape wheel. Remove the main train and the ratchet gear assembly. Then remove the mainspring barrel. Disassemble the escapement as you would any platform escapement. Clean the movement completely disassembled, pegging the pivot holes and jewels.



Figure 7. The "L"-type with barrel removed.

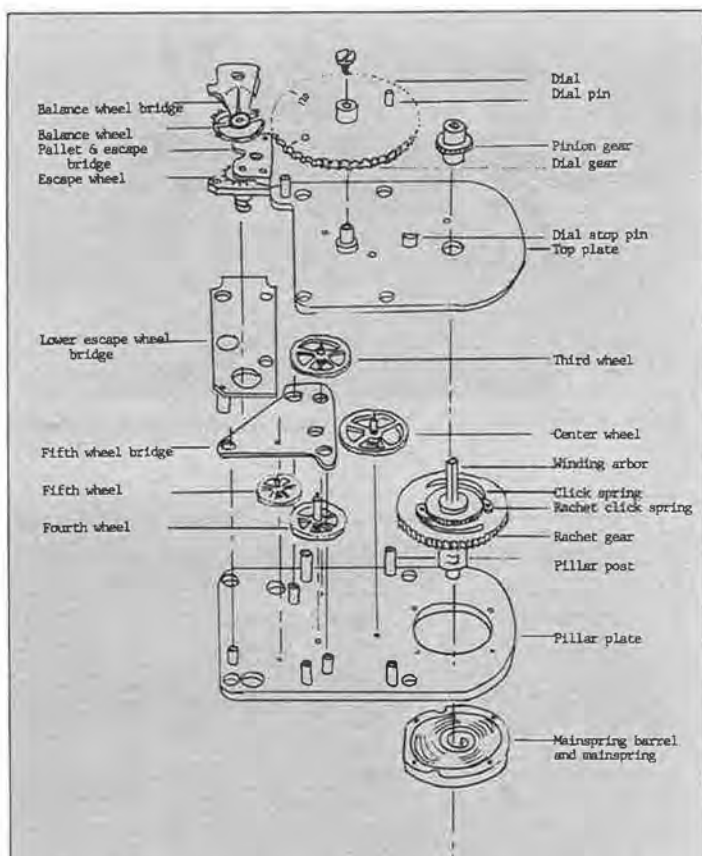


Figure 8. Yale/Seth Thomas timelock movement.

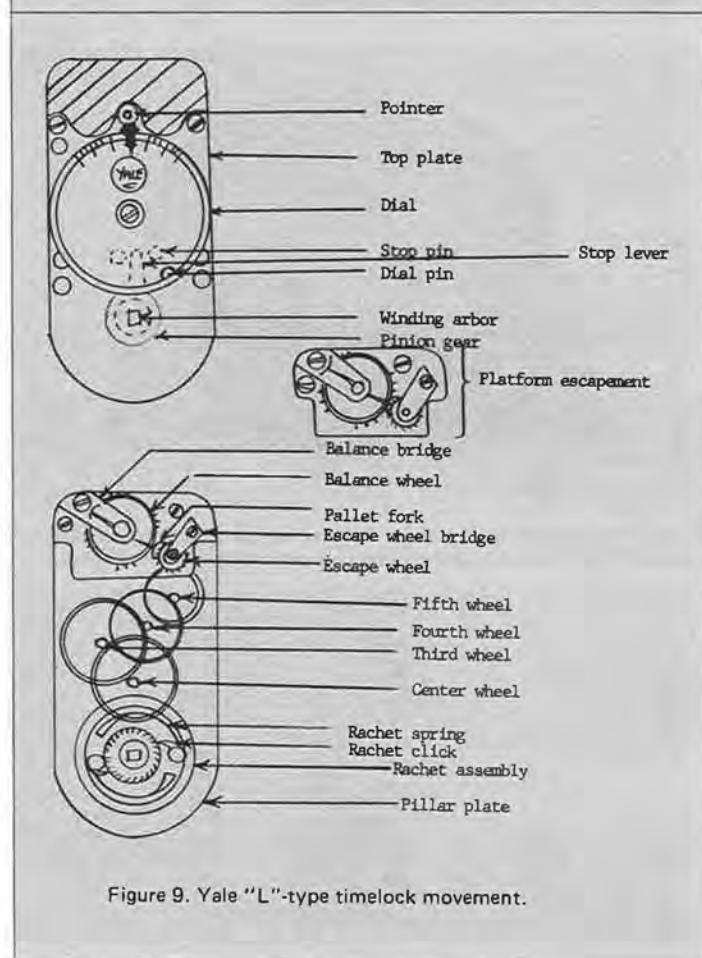


Figure 9. Yale "L"-type timelock movement.

REASSEMBLY

Replace the mainspring barrel and the ratchet wheel assembly, and oil the disks with heavy clock oil or mainspring grease. Assemble the main train of wheels and replace the top plate. Oil the jewel holes and metal pivot holes with light clock oil. Oil the winding arbor pivot holes with heavy clock oil. Replace the stop lever and winding pinion gear and put on reserve power as shown above. Be sure the dial stop pin is on the correct side of the trip lever. Replace the dial and pointer. Oil the escapement assembly with watch oil and replace the escapement.

As I mentioned in Part 1 of this monologue on Yale timelocks, several other Yale & Towne timelocks used adaptations of the Yale "L"-type movement. The Yale "M"-type looks like the "L" but has a 4-wheel train rather than the "L's" 5-wheel train. The Yale "Midget" is simply a much smaller version of the "L" (still with 5-wheel train). All of these movements, including the pie-shaped "Y"-type, appear to be circa very early 1900s. It should be noted that all the Yale movements follow the same assembly and disassembly procedures.



Figure 10. The Yale Triple-Movement, Type "C," from a catalogue illustration. Note model 1874 American Waltham watch movements.

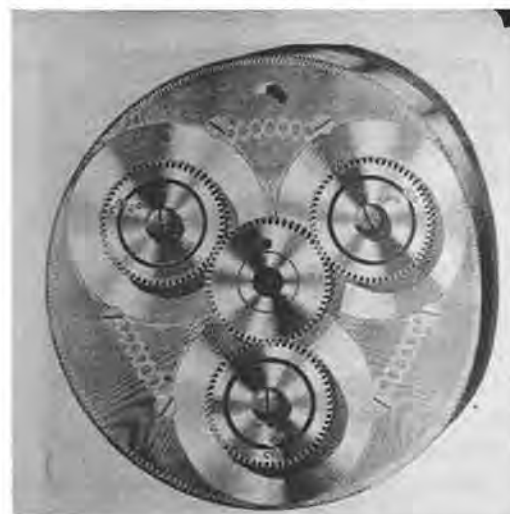


Figure 11. Rear view of the Yale triple movement Type "C" timelock cylinder. Note center winding arbor and pinion that engages winding arbor gears for the three included watch movements.

One more interesting Yale timelock is the Yale Triple-Movement Type "C", shown in Figures 10 and 11. This timelock is controlled by three modified but regular production American Waltham watch movements, all of which are wound by a common arbor. Instead of a dial revolving to indicate lapsed time and to unlock the bolt mechanism, the whole timelock cylinder or case revolves around a common center arbor. The hours of running time are indicated on the perimeter of the cylinder. The movements are in the front of the cylinder and the winding wheels are at the rear. Up and down indicators, accompanied by stop-works, are visible at the front. The stop-works stop the movements at the running down point and the up-down indicators show the condition of wind on each movement's mainspring.

This lock can be used with complete safety if two of the three movements are functioning properly. As with all timelock movements, when the opening time (or zero hours) is reached the mainsprings are not fully run down. They still have a large amount of reserved power to aid in unlocking the timelock; of course a movement that does not run down at the same rate as the others in a timelock indicates a malfunction of that movement. In the early days of timelocks, no nationwide service network had been devised. So the manufacturers, upon notice of a defect, would immediately send out a replacement timelock (complete) to exchange for the defective one.

STATEMENT OF ACCOUNT.	
Kendallville, Ind., Oct 6 th 1876	
M. First National Bank	
To LOUIS BECKMAN,	
Watches, Clocks, Jewelry,	
SILVER & PLATED WARE, Etc.	
Cr. Dr.	
June 29 To Clock Rep.	1 50
July 18 " Cleaning Safe Locks	75
" 26 " " "	50
	2 75
Received Payment	
L. Beckman	
Charge 1.50 clock repairing to Perimeter of	
" 1.25 cleaning 50% & 25% of	
By the above of 2.75	
	

Figure 12. Early statement of account (October 6, 1876) showing local cleaning of safe locks for the First National Bank of Kendallville, IN.

Oftentimes, if a competent watchmaker were to be practicing in the area, the bank would simply call upon his repair services which would be much quicker than an exchange of timelock mechanisms. This fact is evidenced by receipts found in my own shop and shown in Figures 12 and 13. Back in 1876, Mr. Beckman, watchmaker and proprietor of his own jewelry store (and now mine), cleaned the bank's two sets of timelocks for \$1.25. In 1883 he cleaned the safe's "double chronometers and locks." Incidentally, this 1884 statement also shows that he changed the lock's combination and cleaned its "inside boltwork."

For a detailed treatment of the very old (and probably rare) Yale "C"-type timelock, as well as several of the other very old and rare timelocks of the late 1800s and early 1900s, see "Horological Treasure Guardians" by James Gibbs, *The Bulletin of the National Association of Watch and Clock Collectors*, Volume XI, pages 758 to 762.

STATEMENT OF ACCOUNT.	
Kendallville, Ind., Oct 25 th 1884	
M. First National Bank	
To LOUIS BECKMAN, Dr.	
DEALER IN	
WATCHES, CLOCKS AND JEWELRY.	
1883	
Oct 29 To Cleaning double	
chronometers & locks	2 50
Nov 15 To Cleaning other Lock &	
changing comb.	1 50
1884	
Jan 16 Cleaning inside boltwork	50
	4 50
Received Payment	
L. Beckman	

Figure 13. 1884 statement of account showing the cleaning of "double chronometers and locks" along with the cleaning of "inside boltwork" for the First National Bank of Kendallville.

TUES

...if you're not doing it...
...You Should Be...
 using your AWI casemark!



BALANCE SPRINGS

(HAIRSPRINGS)

While this series of articles deals with the American pocket watch, and we are currently interested in the function and theory of the hairspring, let's look at its history and development for a minute or two.

Early watches, or more correctly clock-watches, were scaled-down clocks, early microminiaturization really. These early clock-watches, being portable timepieces, were

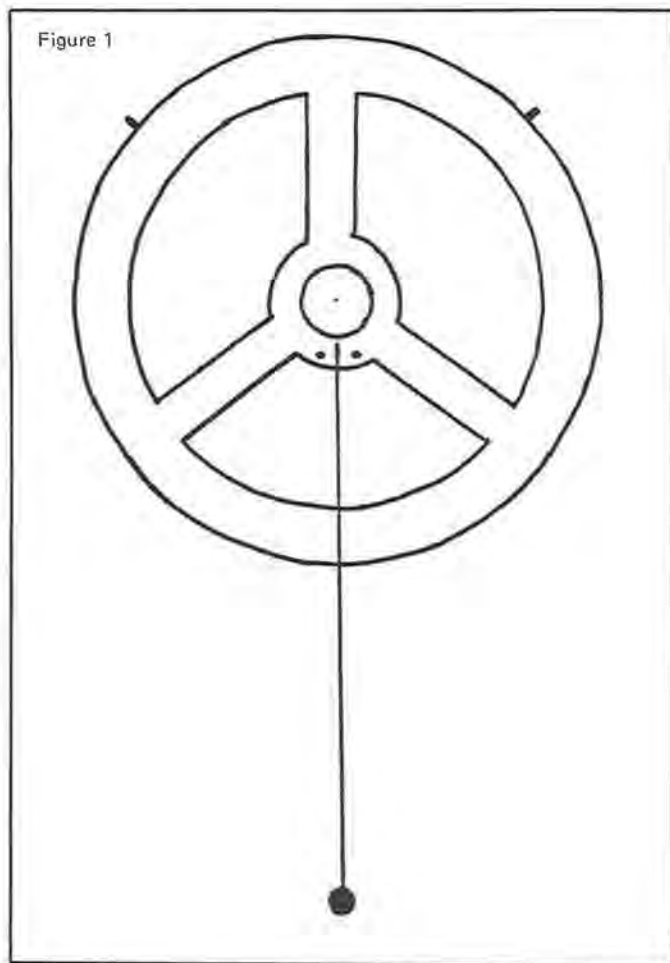
subject to motion disturbances and vibrations of various kinds. In fact, the first types of portable timepieces were time-controlled by a foliot balance, verge, and crown wheel. There was no balance spring to control the motion of the balance. This being the case, accuracy was in the range of 1 to 2 hours a day, at best. Maybe that wasn't so bad since they used only one hand, the hour hand. An interesting aspect of these early, state-of-the-art timepieces was that many of them also incorporated strike work, alarm mechanisms, calendar, and moonphase among other things.

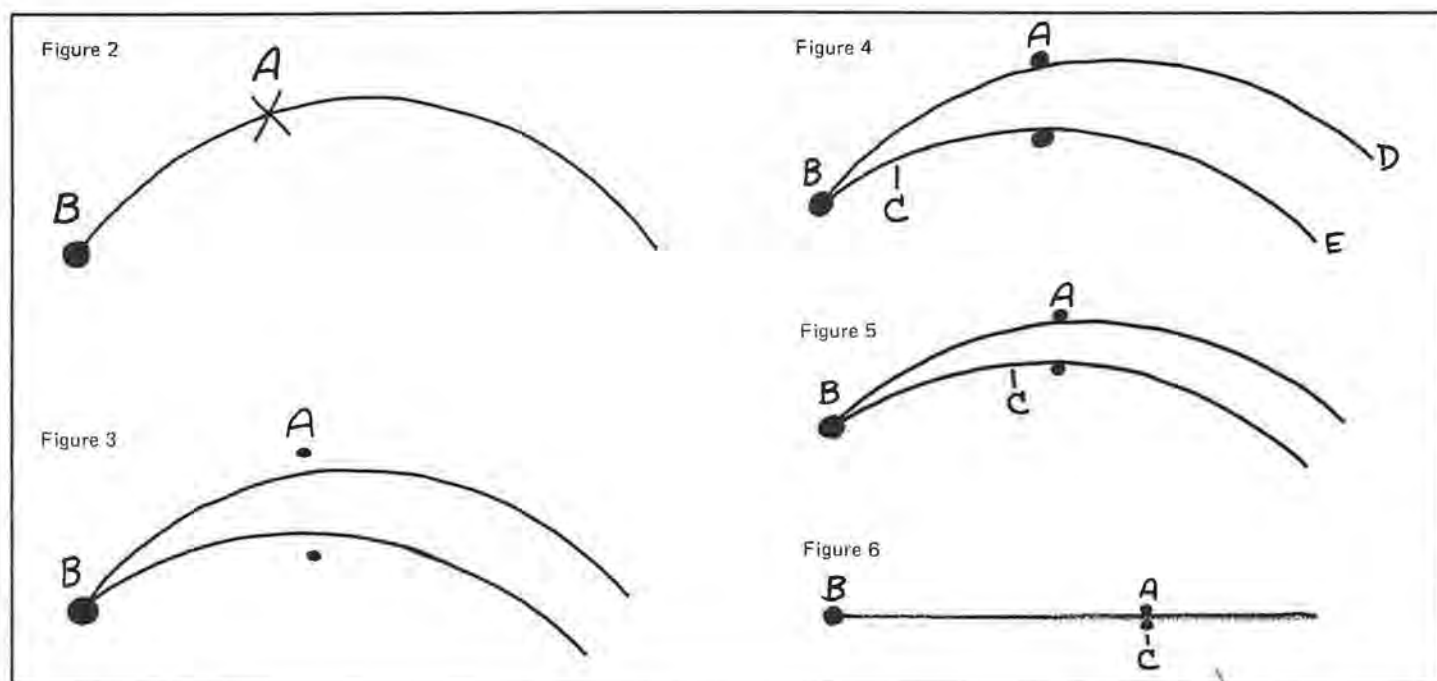
Can you imagine the stares of envy as passersby gawked at you and your "gee whiz" clock-watch hung around your neck? Status . . . you know . . . show off your bucks! Let people know you have arrived, so to speak. Then someone asks, "What moonphase is it?" You answer smugly, "Why, a quarter after full of course." Hey, these guys were on the cutting edge of technology.

Then it happened, sometime before 1600 and maybe as early as 1580, someone fixed a straight hog bristle to the escapement to curb the motion of the balance. This was not a balance spring but the rudimentary beginning of a form of control. About the year 1659, Dr. Robert Hooke experimented with metal springs to replace the hog bristle (Figure 1). Then came the fateful years 1674-75, John Hautefeuille and Christiaan Huygens, quite independently of each other, discovered the spiral metal spring as a controller of the balance. So, we can think of Bobby, Johnny, and Chris as being the giants and fathers of the modern concepts of balance control. The early balance springs were heavy and had few coils, as few as two or three. When it was realized how effective these spiral springs were, they became more delicate and contained many more spirals. These guys really had something.

As these timepieces improved in time rates and were continually being made smaller, someone got the jump on the competition and added a minute hand. There's always someone around ready to build a better mousetrap, so to speak. He cornered the market for a while, but, as with any high-tech product, there was some consumer resistance.

Figure 1





From time to time there were protests and grumblings about adding another hand to the clock-watch in an effort to confuse the already high-tech burdened owner. But still . . . there was status to consider. Like, "Hey Leo, see the latest? I just picked this dude up. Two hands! Don't ask me why two hands, but it sure looks macho! I see yours is the old-fashioned one-hand job, huh?!" The old put-down. I'll bet Leo, the silk merchant, hotfooted right down to Elmo's Gun, Lock and Clock Shoppe to pick one up. From time to time, along with the operating instructions (much of which he did not read or understand), back he came to Elmo's Gun, Lock and Clock Shoppe to have Elmo's clock/watchmaker set his timepiece. If we have to set digital watches for our customers, it's only fair that Elmo got our customers' ancestors under similar situations.

Christiaan Huygens, the Dutch mathematician, is a man to stand in awe of. His credentials include improving the telescope and discovering Saturn's rings. He formulated the wave theory and developed Galileo's mathematical theory of the pendulum clock which he patented in 1657. He also discovered the value of the spiral balance spring for the now miniaturized clock called the watch.

A side note of some interest is that after Galileo noted the action of the swinging pendulum and its apparent time rate values, he tried to get a clockmaker to incorporate this device into an experimental clock. The clockmaker told Galileo he was a nutty screwball and to get lost. Oh well, such is life.

Now that you've had a lesson on profound horology, let's get on with it.

We'll start by presenting a common problem. Let's say that we have cleaned and carefully overhauled a pocket watch. On bench timing we discover that it gains time when fully wound and yet loses time when it's run down, say, after 20-25 hours run time. What is happening? For starters let's look at the theory of balance spring vibration. We will assume this is an 18,000 beats per hour spring. It's under-

stood that at a given point on that spiral balance spring it will cause the balance complete to oscillate at 18,000 beats per hour (Figure 2). Point A is that position where, if that spring is firmly gripped, the balance would oscillate at 18,000 BPH. Point B is that point where the balance spring is secured to the stud and held in place by the balance cock. In actual practice, point A is a pair of regulator pins. If the regulator pins are spaced as in Figure 3 where the balance spring does not touch the regulator pins at point A, then the actual point of vibration is located at point B. That being so, the watch will run slow.

Now, if the balance spring in Figure 4 touches the regulator pin D in one direction and touches the other regulator pin E in the other direction, the point of vibration will be at D and E. When the spring no longer touches the regulator pins, the point of vibration drifts back toward the stud B, but the swift sideways motion of that balance spring will make the central vibration point somewhere around C. As the regulator pins close, as shown in Figures 5 and 6, the vibration point drifts closer to the regulator pins where we want it. What we want in a better high-grade watch is that the regulator pins on a flat balance spring should be approximately twice the thickness of the balance spring apart.

Back to our time problem of time loss and gain in the same winding. If those regulators are spread apart or open, the watch gains time fully wound when the balance motion is such as to allow the balance spring to touch the regulator pins. But as the watch runs down, the short arc of the balance will not permit the balance spring to touch the regulator pins and will move the point of vibration back toward the stud. This causes the watch to run slow. For instance, Figure 3 is running slower than Figure 5.

On a Breguet or overcoil balance spring the regulator pins must be closed to the point of just allowing the balance spring to be free but with no side play. A flat spring will
(Please turn to page 40)

MILITARY TIME

Marvin E. Whitney, CMW, CMC, FAWI



TIMER OR STOPWATCH

Elgin, 16 Size, 7 and 15 Jewels, Type "B,"
Long (Cat. #736) and Short (Cat. #1765A) Pendant,
Grades 469, 582, and 586

There were two types of 1/5-second Elgin timers issued to all branches of the service. The primary difference between the two types was the length of the pendant and shape of the crown—one had a longer pendant than the other (Figures 1, 2, and 3). All parts were interchangeable with the exception of the stem and crown. The stem and crown assembly was retained in the neck of the pendant with a small screw.

Both the short and long pendant cases were of the hinged snap back and snap bezel type with a hinged snap dust cover. Later, a two-piece, short pendant case was designed with a waterproof stem and crown and screw back, which was removed and/or secured with a large dodecagon spanner type wrench, as shown in Figure 4. The cases were made of Elgin nickel and fitted with an unbreakable crystal.

Although the Ordnance cases were stamped "ORD. Dept., USA, OR-serial number," the vast majority of the Bureau of Ship's cases were void of any marking. However, some of the 15-jewel movements were encased in chrome-plated cases and were engraved with the usual Bureau of Ship's contract and identification information.

The dials were either of white porcelain or metal. The metal dials had either a beige or dull black finish. The main or second's orbit on the porcelain and metal dials were graduated 5 to 60 seconds in 1/5-second graduations with large Arabic numerals, 5 through 55 used to indicate each five-second graduation. Since the minute register subsidiary dial was located at the top of the dial, the 0/60 graduation was a line mark. The minute register dial was graduated from 0 to 30 minutes in one-minute graduations, with numerals showing each three-minute graduation. Many of the porcelain dials' numerals were coated with a luminous material, with 11/64-inch luminous line marks radiating out from the numerals towards the center dial hole. The second and minute register hands were of blued steel. The sweep second hand on the luminous dial movement was tipped with the same material.

The second's dial of those finished in dull black was also graduated from 5 to 60 seconds in 1/5-second graduations; however, the Arabic numerals, indicating each five-minute interval, numbered 5 through 60. This was possible because the minute register subsidiary dial or orbit was located



Figure 1. 1/5-second Elgin timer with long pendant.



Figure 2. 1/5-second Elgin with short pendant.

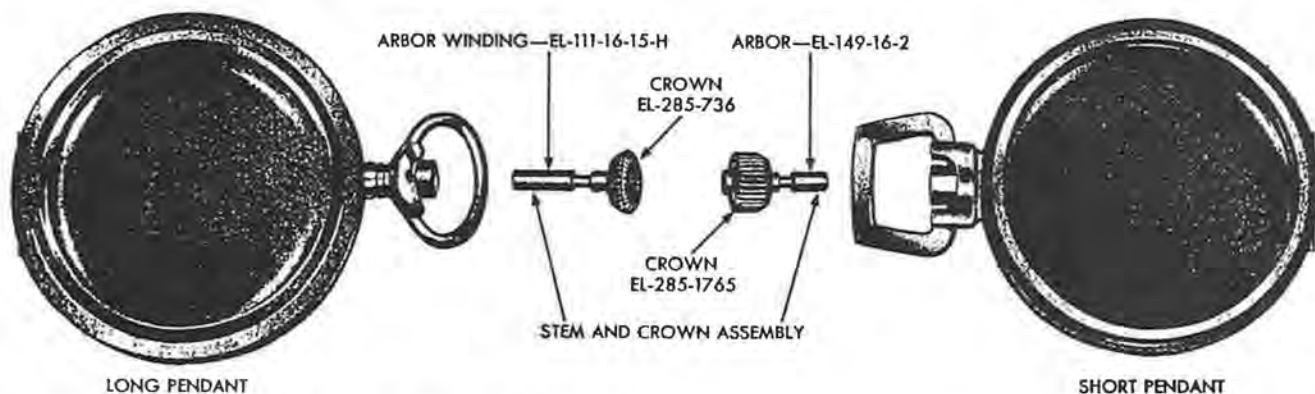


Figure 3 (above). Elgin stopwatches—showing long and short pendants.

Figure 4 (right): Elgin dodecagon spanner wrench, 7¼ x 2½ inches, with 1¾-inch opening for opening and closing Elgin's 16-size waterproof timer.

in the center of the dial (Figure 5). The minute register orbit was graduated from 0 to 60 minutes in short, one-minute line graduations with a luminous dot indicating each five-minute graduation. The numerals were painted with a luminous material, as was the tip of the white sweep second hand and the minute register hand.

The white and beige dials were stamped "Elgin Timer" above the 30-second numeral, while on the black dial timers, only the name "Elgin" appeared, just below the 60-second numeral.



Ask Huck

CLOCKMAKING BITS

By J.M. Huckabee
CMC, FBHI

About...

PIVOTS

Q. Many old American clocks have scratches or rings around their pivots. Is it necessary to polish these each time the clock is repaired?

A. Let's discuss pivot ringing first. The pivot holes will also have rings in conjugate form to those on the pivot. These rings key the pivot into a fixed position in terms of end play. We now have an arbor with no endshake. When ringing occurs on both pivots of the same arbor, any dimensional change between the plates brings a lock-up bind and the clock stops. This usually occurs in the lower energy end of the train, near the escapement.

Dimensional changes in plate spacing can be caused by temperature changes, degree of mainspring wind, and frequently by stress in the movement mounting.

I test for ringing with a fingernail; it's easier to feel than to see. Correcting ringing removes a large power robber from the job, a condition that frequently causes latent stopping and erratic rate. This problem also occurs in disguise and gets called poor lubrication methods, weak mainspring,

and sticky and bad mainspring lubricant. Pivot ringing is probably the king of all intermittent stopping problems.

In my shop I consider it proper to correct pivot ringing. Correction should also involve passing a smooth brooch through the pivot hole. Be aware that correcting ringing may require a plate bushing.

Q. How much can I reduce the size of a pivot before it becomes necessary to replace the arbor or fit up a new pivot?

A. This is a question that I have never seen treated by a textbook or heard taught. It's obvious that a point comes when the cut-down pivot no longer has sufficient strength for its job.

My shop rule is based on personal judgment, and experience has proven it to be satisfactory. The rule is this: When a pivot is reduced to about 50 percent of its original size, I consider it to be too small. I judge the size on its cross-sectional area, not on pivot diameter. A 50 percent cross-sectional area occurs at just over 70 percent of the original diameter. By example, an old American clock has a pivot diameter around 0.065 inch. When the repolished pivot drops to around 0.045 or 0.050 inch, I replace the arbor or the pivot.

A searching question is how to know the original diameter. That can be judged from other less-worn pivots, holes that have never been bushed, and past experience.

If you have a subject that you would like J.M. Huckabee to address in a future article, send it to: "Ask Huck," c/o Horological Times, 3700 Harrison Ave., Cincinnati, Ohio 45211.



Figure 5. Elgin timer with center 60-minute register dial.

Later, due to a corrosion problem, the steel parts and screws on most Elgin timers were given a black oxide finish (Figures 6 and 7).

In the above, the sweep second hand was started from zero by depressing the crown, stopped by depressing the crown a second time, and returned to zero by a third depression of the crown.

Even though the hands could be stopped, the movement, per se, continued to run. The time train mechanism was connected to the chronograph or flyback mechanism through the use of a connecting pinion (Figures 8 and 8a). One end of the pinion was mated to the fourth, while the opposite end with very fine teeth was mated to the sweep second wheel. Since the balance wheel made 18,000 vibrations or beats per hour—or 5 beats per second—the sweep second hand advanced in tiny jumps every fifth of a second; hence, a 1/5-second timer.

All Elgin timers utilized the instantaneous type of minute register. When the sweep second hand passed the 0/60 second graduation, the indicator or minute register hand jumped suddenly one division on the minute register subsidiary dial.

The Elgin timer, Grade 469, first made its appearance in 1919, the first serial number being 22,027,001; the last, 42,992,000 (1945). During this span of 26 years, there were 51 production runs totalling 196,000 pieces.

Elgin's Grade 582, 16 size model contained 15 jewels and was used in their 1/5- and 1/30-second timer. Both were encased in the same type of cases as described above. The 1/30-second timer, used by the Air Force and the Navy's Bureau of Aeronautics, was known as Watch, Navigation (Ground Speed), Type A-8.



Figure 6. Elgin timer showing steel parts without black oxide finish. Movement number 40974757, 16 size, 15 jewels.



Figure 7. Elgin timer showing steel parts with black oxide finish to prevent corrosion. Movement number 41816068, 16 size, 15 jewels.

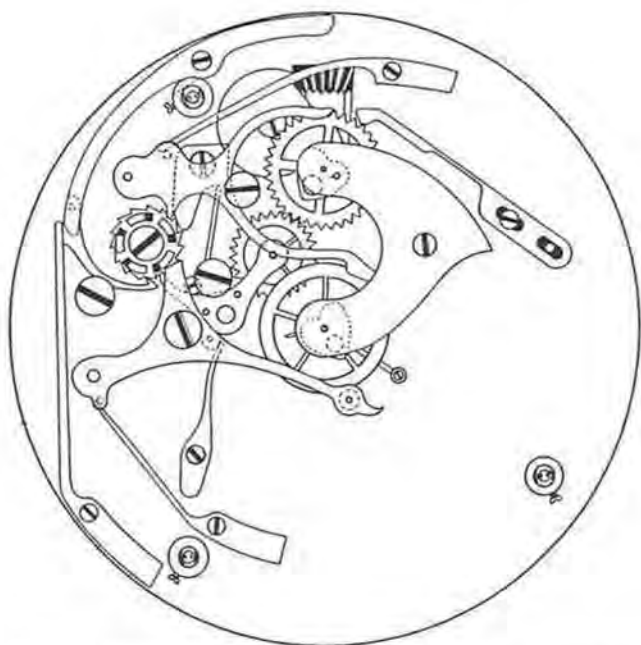
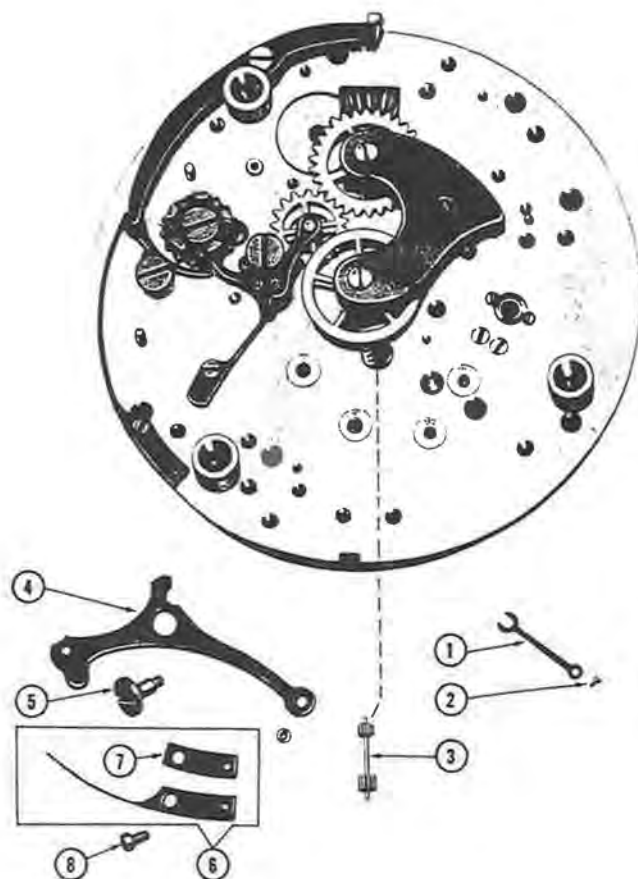


Figure 8. Elgin stopwatch, type B, showing relative position of parts.

Figure 8a (right): 4—connecting lever assembly; 6—connecting lever spring; 3—connecting pinion; and 1—seconds wheel friction spring, (Elgin timer type A).



It was fitted with a dull black-finished metal dial with white numerals, markings, and hands. The outer second's orbit was graduated in 1/10-second graduations, with large Arabic numerals 1 through 9 used to indicate each one-second graduation. Since the minute register subsidiary dial was located at the top of the dial, the 0/10 graduation was a line mark. The minute register dial was graduated in 10-seconds line marking with small minute numerals 1 to 5 on the inside of the dial and 6 to 10 on the outside, with the numeral 10 at the top. Thus, the minute register dial registered up to 5 minutes on one complete revolution of the minute register hand or 10, if the beginning of the second revolution was noted (Figure 9). The minute register was of the instantaneous type; each time the sweep second hand passed the 10-second mark, the minute register hand jumped one line mark. The operation of starting, stopping, and returning the sweep second hand to zero was done by successive depressions of the crown.

Other than the dial configuration, the only other significant difference between it and 1/5-second models was the size of the balance wheel. The balance was very small, measuring 7.35 mm in diameter with eight small balance screws and was under the control of a very stiff Elgium alloy hairspring, as shown in Figures 10 and 10a. The balance moved so fast that it appears as a blur. The movement was of the continuous type since the train and balance continued to operate even though the hands had been stopped and/or returned to zero.

The first Grade 582 movement was produced in 1941, beginning with serial number 39,861,001 and ending with 43,291,000 in 1946. During those five years, there were 38 production runs totalling 366,200 timers.

Elgin made another 1/5-second timer, Grade 586, 16 size, 15 jewels, Model 1787A, with a dial configuration not



Figure 9. Elgin type A-8 1/30-second navigation (ground speed) timer. One revolution of the minute register hand, located under numeral "10" at 12 o'clock, equals 5 minutes. Movement No. 41819863, 16 size, 15 jewels.

too often seen. The metal dial was white with black numerals 1 to 9, graduations and hands. The minute register orbit was graduated from 0 to 30 minutes in one-minute graduations, with numerals showing each five-minute mark. The sweep second hand showed hundredths of a minute, making one (1) revolution in one (1) minute (Figure 10). Elgin made two production runs, totalling 2,000 pieces. The first serial number was 43,289,000, the last was 43,292,000 (1945-46).

The timing specifications for all Type A-8 watches were as follows:

1. Whenever the temperature existing at the time of test is not specified definitely, it is understood that the test is to be made at room temperature of approximately plus 20°C (plus 68°F).
2. The watch shall be tested for action of the start, stop, and flyback operations by successive depressions of the crown.
3. The watch shall be given a 10-minute test run in comparison with an accurate time source in a horizontal position, dial up. The variation from the latter shall not exceed two-tenths (0.2) of a second.
4. The watch shall be tested to determine the index position error of the sweep second hand. Start the hand and permit it to operate for four (4) seconds before stopping. Upon operation of the flyback mechanism it shall return to the exact index (0) position. Repeat this test and allow the hand to operate for six (6) seconds. The hand must then return to the exact index (0) position upon operation of the flyback mechanism.

TIMES

NOVICE WATCHMAKER

(Continued from page 35)

expand and contract its entire mass, while the Breguet spring does not. Breguet springs are used in high-grade pocket and wristwatches, as the Breguet spring can be controlled more closely in its vibrations.

There's one more thing I want to say before I end this article. Blue balance springs are subject to rusting, and they do. A rusted balance spring will no longer vibrate properly. Rust changes the spring mass and elastic qualities. Rust can be removed from the spring by soaking it in kerosene for a few hours or by boiling the spring in oil. These treatments will loosen the rust and, depending on the severity of rust, might make the spring useable . . . not correct, but useable. Remember, once damaged by rust the spring has lost its time rate dependability.

We've gotten into some pretty heavy stuff here. Novice, I recommend you go over this article as many times as it takes to sink in. The next time we meet will be for some more heavy horology—vibrating the balance spring. I know, everyone calls these hairsprings. Hair of what? Cow, hog, mouse, or antelope? Call it what it is—a balance spring.



Figure 10. Elgin type A, 1/30-second timer, with very small balance wheel. A segment of the rim (light arc) is visible just to the right of the upper balance cock cup jewel. Movement No. 4181-9863, 16 size, 15 jewels.

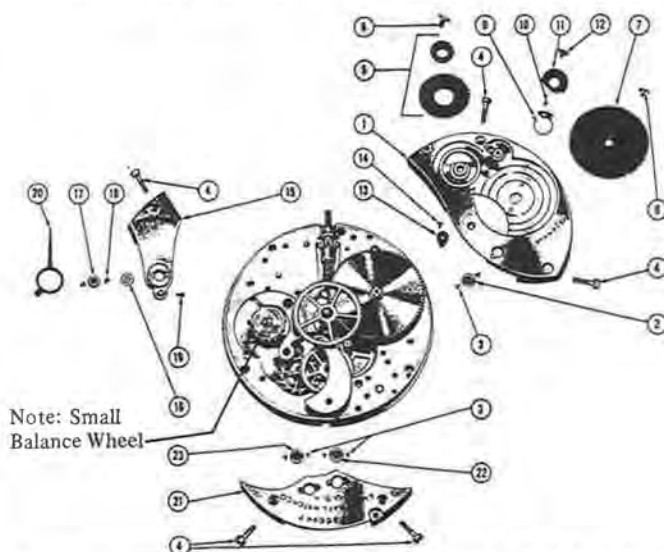


Figure 10a. Barrel bridge, main wheel, ratchet wheel, click, balance cock, train, and train bridge, Elgin 1/30-second, type A-8 timer.

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Watch & Clock Information, Please—W.H. Samelius
Chicago School of Watchmaking
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Personal experience.

TIMES

We Salute These New Members!

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PART LV MAKING CANNON PINIONS

When doing antique watch restoration, it is quite common to find a watch with a missing cannon pinion, or even a cannon pinion that is damaged beyond use. Since a replacement cannon pinion is not always available, the watch restorer must be prepared to make one when it becomes necessary.

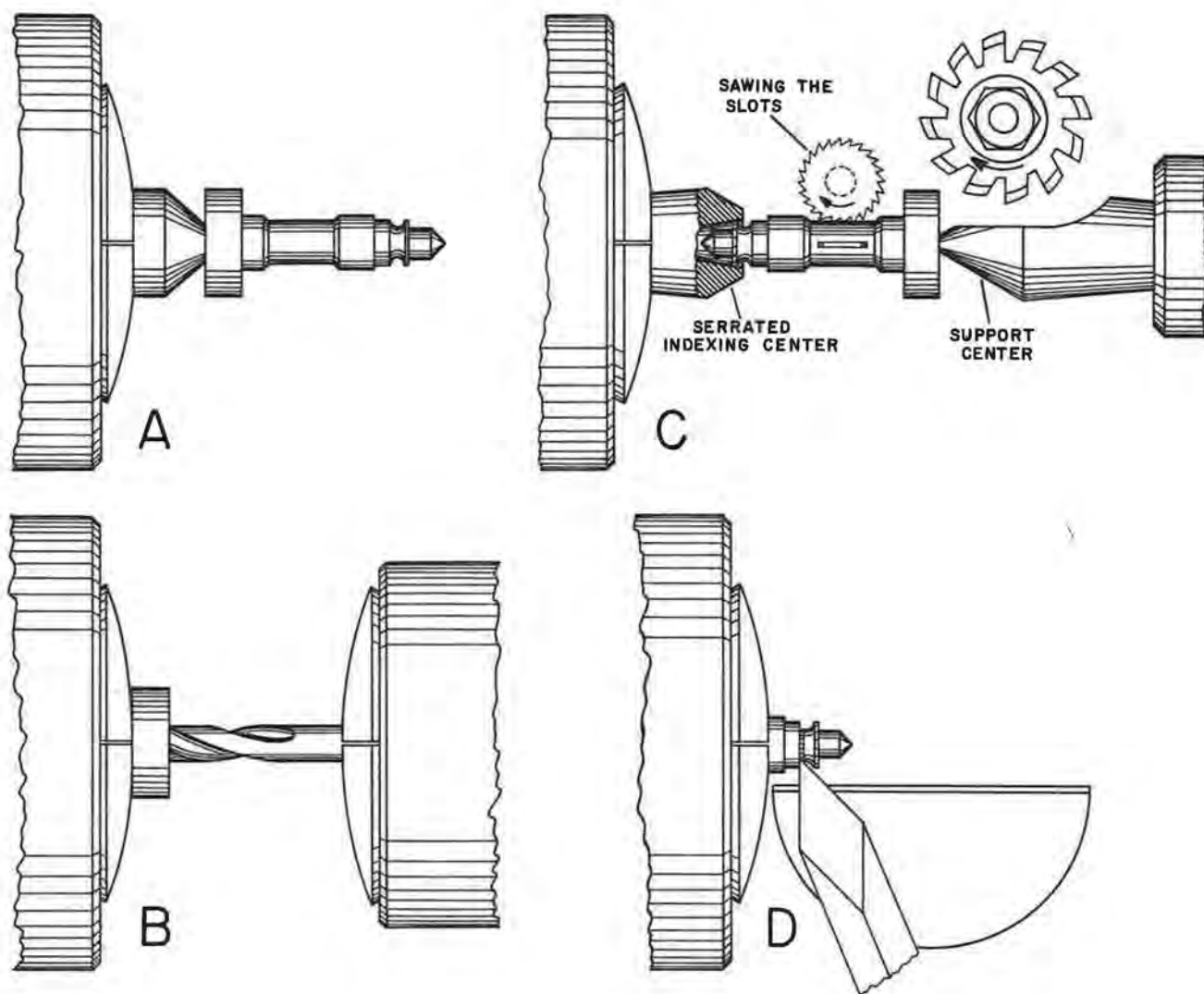
Figure 1 shows how a solid end cannon pinion can be made. This method was used by the Elgin Watch Company when making this type of cannon pinion. The blank was first made on automatic machinery. The blank was formed similar to that which is shown in View A, Figure 1. Some extra material was left at the end of the blank as shown so it could be held in an indexing center for cutting the teeth and the slots in the body of the blank. The extra material was shaped with a thin ridge that the indexing center bites into for a secure hold on the cannon pinion for indexing when cutting the teeth and slots.

After the blank is formed, it is chucked as shown in View B, Figure 1 while the hole is drilled to the proper depth. Then the blank is chucked as shown in View C, Figure 1 while the teeth are cut and the slots cut in the body of the blank. There are usually four slots equally spaced on the body of the cannon pinion. The slots are cut with a small circle saw made onto an arbor (one piece). After the teeth and slots are cut, the cannon pinion is chucked as shown in View D, Figure 1 while the excess material is removed from the end of the cannon pinion. Next, the cannon pinion is hardened and tempered and then finished. NOTE: When the cannon pinion is being hardened, it can be held on a steel wire which has been tapered to fit the hole in the end of the cannon pinion. The cannon

pinion is first warmed and then dipped in boric acid powder to obtain an even coating. Then, the cannon pinion is heated to a uniform medium cherry red and then quenched end first in cold tap water. Next, the cannon pinion is checked with a fine escapement file for hardness. When it has been sufficiently hardened, then the body of the cannon pinion is cleaned with fine emery paper and tempered on a pan of sand to the first blue. After this, the leaves and the other bearing surfaces are polished. When Elgin made cannon pinions, the teeth and slots were cut on automatic machinery. They were also hardened and tempered in large numbers and finished on automatic machines. The watchmaker would do these operations individually.

Figure 2 shows how an open end cannon pinion can be made. When this method is used, the cannon pinion is almost completely made while it is still on the rod from which it is made. First, the shape of the cannon pinion body is turned as shown in View A, Figure 2. Of course, this shape would vary from job to job. The diameters should be left slightly oversized for finishing after the cannon pinion has been heat-treated. Next, the hole is drilled in the end of the blank as shown in View B, Figure 2. First, a good sharp center is spotted with a graver, then the hole is drilled. It is a good idea to drill the hole about two-thirds of the way through the length of the blank and later drill a hole from the other end of the blank to meet the first hole. This is to increase the accuracy of the hole. Sometimes when a long hole is drilled from only one side, the drill will travel during the drilling process causing the hole to be off-center on the other end of the material.

Figure 1



After the hole is drilled in the top end of the cannon pinion, then the slots are sawed as shown in View C, Figure 2. The saw for this purpose usually needs to be made up special. The teeth are cut on the edge of the saw with a fine ratchet wheel cutter. The saw is hardened and tempered to a very pale straw color. An index plate is used on the spindle of the lathe for indexing when cutting the slots and the teeth on the blank. In many cases, the index plate on the lathe pulley and its index pin can be used instead of the regular index plate.

After the slots have been sawed, then the thickness of material for the pinion leaves is formed by removing material from the rod back of where the leaves will be cut. This is shown in View D, Figure 2. Next, the leaves are cut. Then the pinion is removed from the rod. Now, the cannon pinion is chucked by its body, a center is spotted in the bottom end of the cannon pinion, and a hole is drilled to meet the hole drilled in the top end of the cannon pinion. Then the cannon pinion is hardened, tempered, and finished.

Figure 2

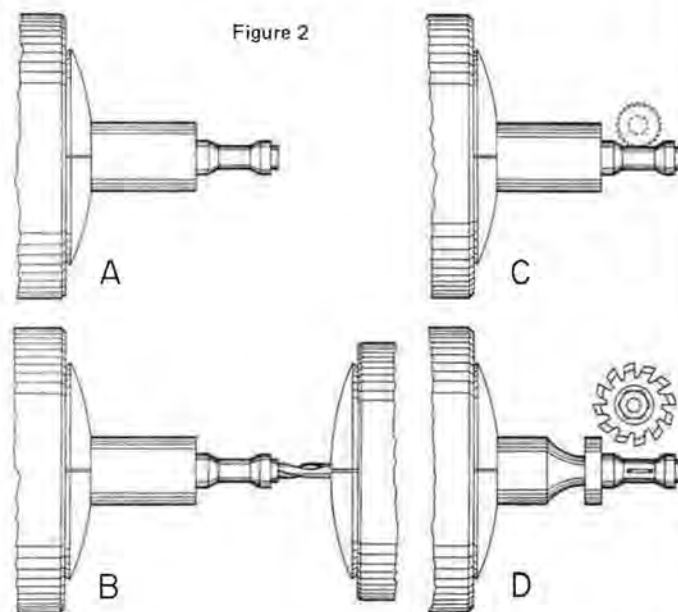


Figure 3 shows an Elgin cannon pinion and how the tongue is made in the body of the cannon pinion during the process of making the cannon pinion. View A shows the completed cannon pinion. The tongue is formed after the hole has been drilled in the end of the blank past the point where the tongue is made. NOTE: The widths of the slots in the illustrations have been made much wider than they should be so they will show up well after the drawings have been reduced for printing. The width of the slots is .10 to .15 mm. To form the tongue, first two slots are sawed across the body of the blank as shown in View B, Figure 3. Then, a special milling cutter is used to cut a slot lengthwise of the cannon pinion body at the end of the two cross slots as shown in View C, Figure 3 to finish forming the tongue of the cannon pinion. The length of the two cross slots should be such that they extend almost one-half the distance around the body of the cannon pinion. The length of the slot to form the end of the tongue should be long enough to free the end of the tongue so it can be moved in to adjust the tension of the cannon pinion on the center staff. NOTE: Although Figure 3 shows that the slot at the end of the two cross slots is to the right of the two cross slots, some Elgin cannon pinions have been made with this vertical slot to the left of the two cross slots. It should not make any difference on which side the vertical slot is cut except for ease of manufacturing. It is very important though where the tongue is located on the body of the cannon pinion in relation to the groove on the center staff. The distance from the bottom of the cannon pinion to the center of the tongue should be equal to the distance from the shoulder on the center staff where the cannon pinion seats to the center of the groove around the center staff. After the tongue has been formed, then one would proceed to cut the teeth, harden and temper the cannon pinion, and then finish the cannon pinion as previously explained.

Figure 4 shows a Waltham cannon pinion and how the tongue is formed. View A shows a completed cannon pinion. After the body of the blank has been turned to shape and the hole drilled in the end of the blank, then the tongue is formed. A hollow end milling cutter is used to form the tongue. A side view of the end mill is shown at "a," View B, Figure 4. An end view is shown at "b" in View B. This hollow end cutter would need to be made up special for the job. The thickness of the wall of this cutter should be between .10 and .15 mm. The end milling cutter is held in the milling attachment. The spindle of the milling attachment is set in an exact vertical position. The slide rest screws are used to set the cutter in the proper position for milling the tongue. The end of the cutter should be positioned so only half of its diameter overlaps the body of the cannon pinion where the tongue is formed. The cannon pinion blank is held in position with the index pin in a hole in the index plate on the pulley. As the milling cutter is turning, the handle on the screw of the milling attachment is turned to lower the milling cutter into the wall of the cannon pinion blank. First, a semi-circular slot will be cut in the wall of the cannon pinion blank. Then as the cutter is lowered further, two straight slots leading from the semi-circle will be cut. There is a limit as to the length of slots that the milling cutter will cut. If it is desired to make the straight part of the slots longer, this can be done with a small saw as shown in View C, Figure 4. The tongue should extend about

Figure 3

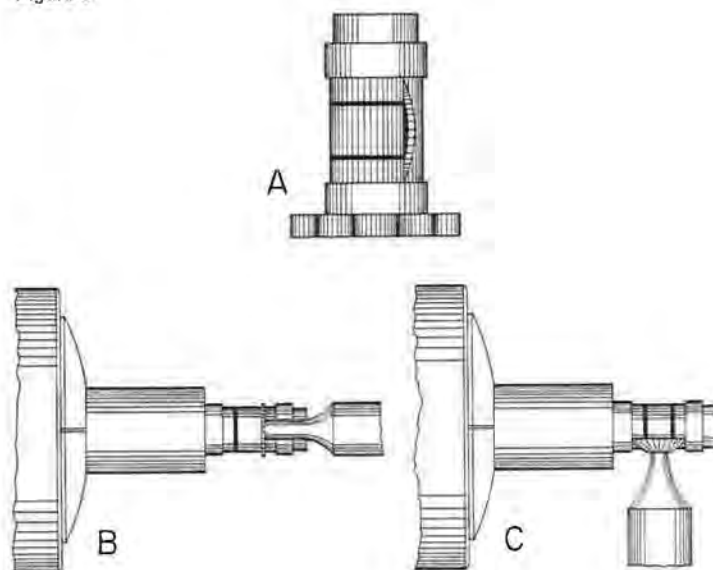
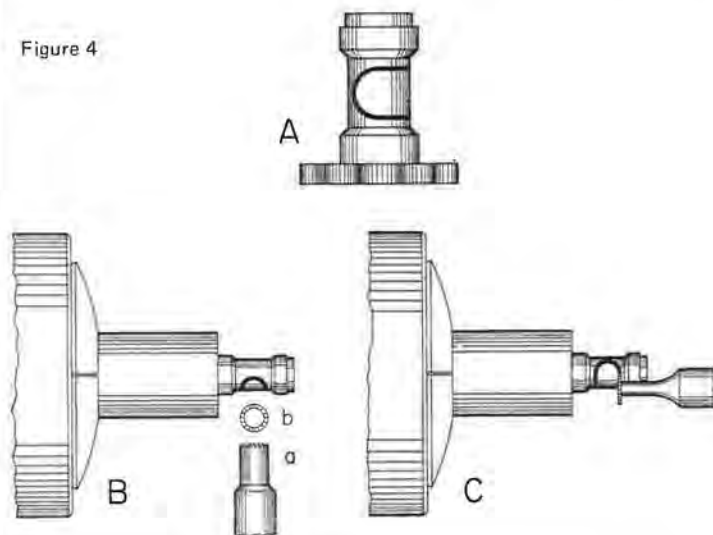


Figure 4



one-third of the distance around the body of the cannon pinion. After the tongue has been formed, then the cannon pinion blank is prepared for cutting the teeth and the teeth are cut. Then the cannon pinion is removed from the rod, chucked, and counter-drilled from the lower end. Next, the cannon pinion is hardened, tempered, and finished.

Figure 5 shows six other styles of cannon pinions which are used by different manufacturers. The cannon pinion shown in View A is used by Waltham on one of its clock models. Note that the tongue is only a semi-circle. This leaves the tongue very short with little spring action which is not desirable. The tongue should have been slotted further around the body of the cannon pinion.

View B, Figure 5 shows a style of cannon pinion used by Illinois and Waltham. This style of cannon pinion has a rib running lengthwise of the body of the cannon pinion. The rib is formed by using a milling cutter that is shaped similar to the cutter used by Elgin to cut the vertical slot in its cannon pin-

Figure 5

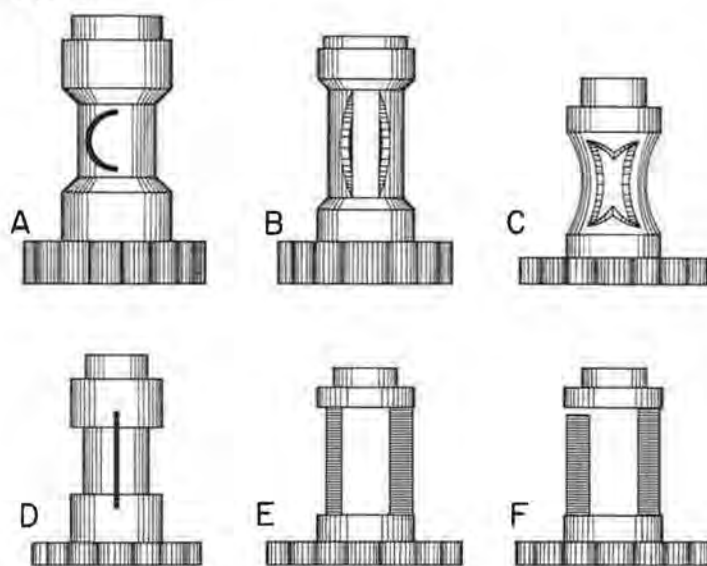
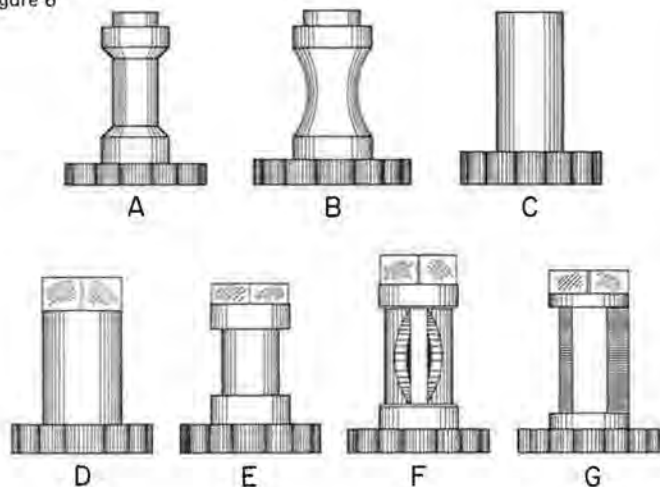


Figure 6



ion. A special double cutter could also be made up to cut both slots at the same time. To tighten this style of cannon pinion, it is supported on a tapered brass pin while the rib is pressed in at the proper place to match the height of the groove around the center staff.

View C, Figure 5 shows a very unusually designed cannon pinion which has been milled out at three equally spaced positions forming three ribs. The milling cutter used to mill out the spaces in this cannon pinion is similar to the one used to mill the vertical slot in the Elgin cannon pinion. The cutter is used in two positions for each slot to form the three ribs. To tighten this style of cannon pinion, it is supported by a brass tapered pin and each of the three ribs is squeezed in equally at the proper position to match the groove in the center staff.

View D, Figure 5 shows a cannon pinion used by Hamilton. This cannon pinion has two slots sawed lengthwise of the cannon pinion body. The slots are opposite each other

forming two sides that can be squeezed in to tighten it on the center staff.

View E, Figure 5 shows the style of cannon pinion used by Hampden. Opposite sides of the cannon pinion body have been milled away leaving two ribs. One of the ribs has been thinned down from its outside surface. It is this thinned-down rib that is manipulated when tightening the cannon pinion on the center staff.

View F, Figure 5 shows a cannon pinion used by Elgin. This cannon pinion has material milled from opposite sides of the body but when the milling is done, the milling cutter is not centered over the body of the cannon pinion. As a result, one of the ribs is more narrow than the other. The more narrow rib is sawed through at its end so it can be sprung inward when tightening it on the center staff.

Figure 6 shows other styles of cannon pinions. View A shows a style of cannon pinion used by several watch companies. In fact, this style is possibly the most common style. This cannon pinion does not have any milled slots on its body. When tightening this cannon pinion, it is supported on a brass taper pin while a dimple is made on its tube section at the proper height to match the groove around the center staff.

View B, Figure 6 shows a cannon pinion used by Waltham. This cannon pinion also has a plain body and is tightened in the same manner as the one shown in View A.

View C, Figure 6 shows a style of cannon pinion which is used on watches that have a hollow center pinion. This cannon pinion fits on the end of a pin which goes through the hollow center pinion. The pin has a head on the opposite end and the friction is created between the pin and the inside of the hole in the center pinion and not on the cannon pinion. The cannon pinion fits friction tight on the pin and does not slip on the pin. When the watch is set, the pin slides inside the hole in the center pinion. The tension is increased by swaging the pin to spread its diameter.

View D, Figure 6 shows a plain cannon pinion for a key-set watch. The end of this cannon pinion has a square which the minute hand fits onto. This cannon pinion has a very thick wall and is impossible to close unless a spot is ground on one side of its body to make the wall thin enough so it can be closed to tighten it on the center staff.

View E, Figure 6 shows another cannon pinion for a key-set watch. Note that the body of this cannon pinion has been turned down in its center to thin down the wall so it can be more easily closed to increase its tension on the center staff.

View F, Figure 6 shows a cannon pinion for a key-set watch. This particular cannon pinion is possibly for an Illinois or Waltham watch since they made this style of cannon pinion for pendant-set watches. The body is milled out to form a rib the same as the cannon pinion that is shown in View B, Figure 5.

View G, Figure 6 shows a cannon pinion for a key-set watch. This cannon pinion appears to be for a Hampden watch, since the style of body is the same as the one that is shown in View E, Figure 5, which is for a Hampden pendant-set watch.

"Antique Watch Restoration" will continue next month.

CHAINMAKER

by

John Plewes

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Whilst it is obviously preferable to buy rather than to make up replacement chains for the old 30-hour longcase clocks, the exact chain is not always available. This is due to the difficulty of duplicating each of the wide variety of chains which were used by the original makers. (For a practical analysis of the problems involved, see the June 1990 issue of *Horological Times* - "Huygens System.") It is for the above reason, and also because a certain old clock would otherwise probably never run again, that I came to design and build the manual chainmaker of Figure 1.

As it takes several hours to make up the 11 feet or so of chain which is required for such a clock, the machine is not an ideal long-term solution to the problem. It will, however, turn out uniform, well-shaped links and so create a custom-made chain for a cherished old-timer.

The chainmaker is made of cold-rolled mild steel, tool steel, and a little brass. Apart from several hours spent in visualizing the concept in detail, it took about 12 hours to build. The proportions of Figure 1 are fairly accurate, so scaling is possible; as chain links differ considerably, exact dimensions are not applicable. Given the general idea in some detail, anyone building such a device will no doubt wish to incorporate his own modifications.

The circular base shown in Figure 1 (a) is not critical; a square base is also acceptable. The stop bar is retained at each end by a no. 8 screw and spacer and by two stop pins. The stop pins have sleeves over them, the position of the stop bar being determined by the wall thickness of the sleeves. Adjustable screws running in blocks make a good alternative. The exact position of the stop bar, the throat width (T), the diameter and positions of the forming pins, and the length of the retaining slots are all determined by the dimensions of the desired chain link. It is essential to know the number of links per foot and/or the exact link measurements before attempting to make any of the above critical parts.

A few links from different chains are very useful when matching a chain to a spiked pulley, and some initial experimenting is necessary before deciding upon a given

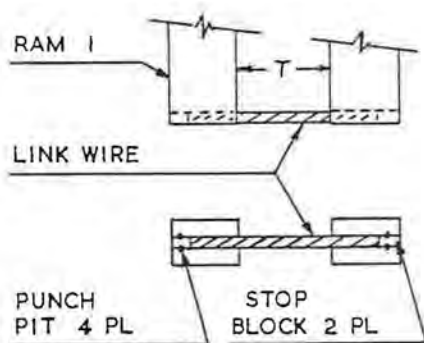
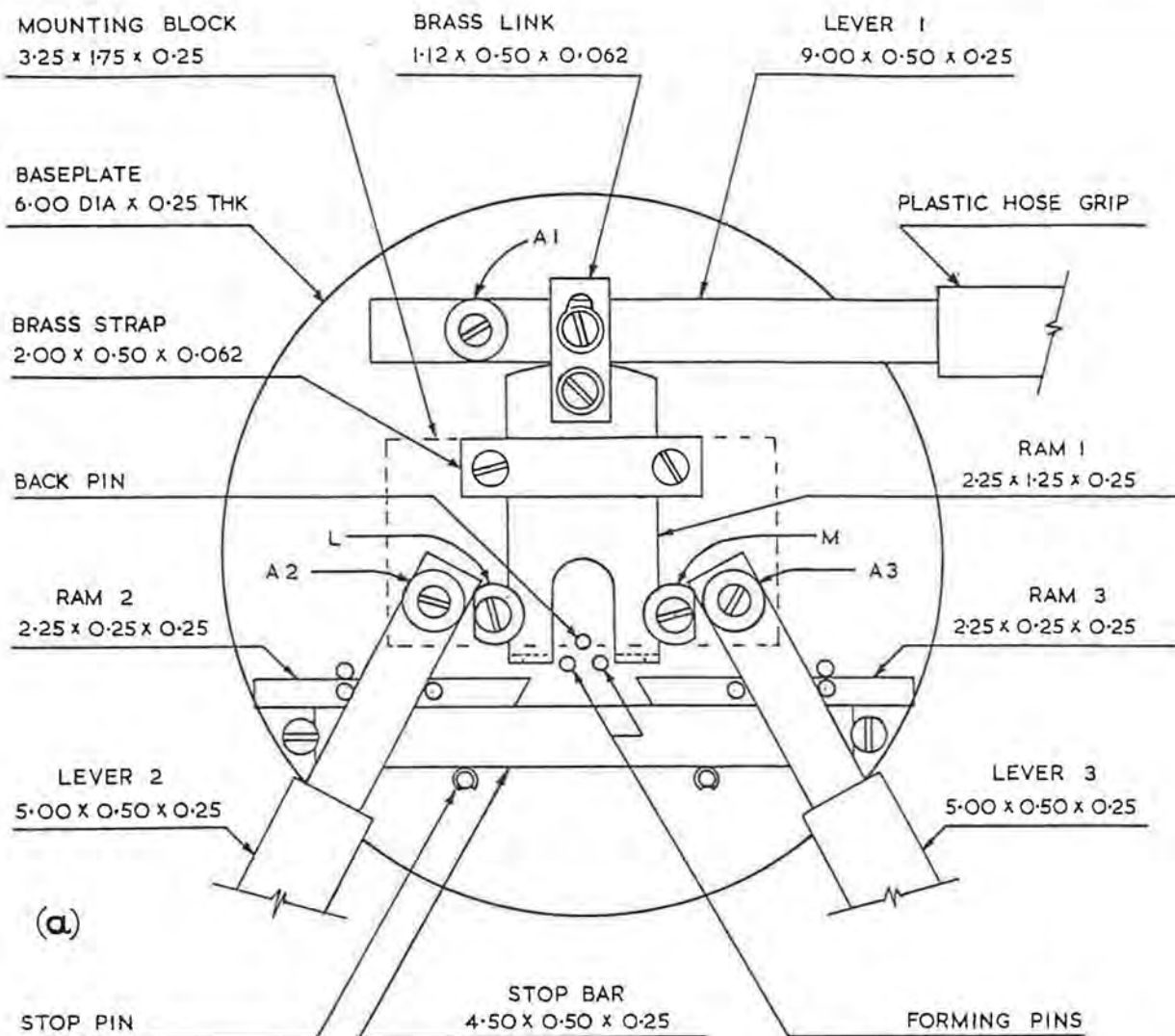
link. This involves varying the spacing of the forming pins on a piece of scrap steel until the correct measurements are found, see Figure 1 (c). Dimension t determines dimension T , the width of the throat; T in Figure 1 (b) will be a few thousandths of an inch greater than t to allow clearance during forming.

The links are made from mild steel wire, typically 0.063" in diameter. It is available in hardware stores in coils of 50 feet or more, and is plated with cadmium or is given a similar finish. The wire is straightened by holding one end in the vise and pulling two closely held pieces of wood along it using a firm grip. If a choice is offered, take the stiffer wire for preference. The common 0.063" diameter wire can be used to make links for most of the required chains.

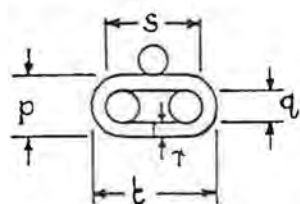
The straightened wire is then cut to exactly the right length to form the desired link. In the case mentioned earlier, the requirement was for 36 links per foot, and the length of wire to form one link worked out at $31/32$ ". I must stress that in circumstances such as these, $15/16$ or 1 " is not near enough—it must be $31/32$ ". If the length is too long, the link will be difficult to close and may jam the rams. If the link is too short, a gap will result.

Figure 1 (c) shows a correctly formed link. Dimension p is the outside width of the link and is determined by the distance between the sides of the pulley minus a working clearance. Dimension q is the diameter of the forming pin and is determined by the thickness of the pulley spikes plus a working clearance. The wire thickness r cannot therefore exceed $1/2 (p-q)$. Dimension S is the inside length of the link and it is determined by the spike spacing on the pulley which also dictates the number of links per foot. The distance between the centers of the forming pins is therefore $s-q$. The back pin is located on the vertical center line and is spaced away from the two forming pins by a distance of r plus a few thousandths of an inch of clearance, for the link wire must be inserted into this gap. If the back pin were not present, the link wire would bow during forming, whereas the sides of the link should be almost straight. The position of the

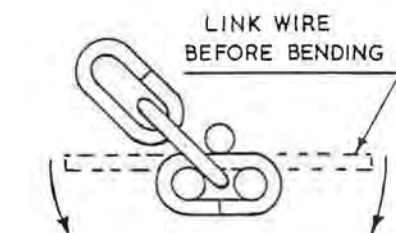
Figure 1



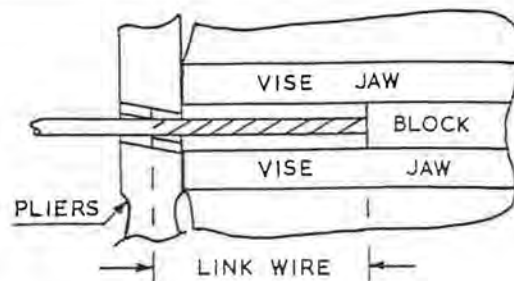
(b) RAM 1 DETAIL



(c) LINK DETAIL



(e) CHAIN DETAIL



(d) CUTTING LINK WIRES

back pin is therefore fairly critical.

When the length of the link has been decided, it becomes necessary to find a reasonably easy way of cutting off about 400 lengths of wire to a tolerance of $\pm 0.005''$. Figure 1 (d) shows a very simple way of doing this. Clamp a block of steel about $1/2''$ thick in the vise and lay a pair of heavy pliers alongside the end of the jaws as shown. With the pliers open, set the wire into the cutting notches in the side of the joint so that the end of the wire butts against the block. Making sure that the wire is parallel to the vise jaws, cut off a length and measure it with a micrometer. Adjust the block and repeat the process until the correct length is obtained. The ends will be reasonably square cut.

As long as parallelism is maintained, this method is accurate enough for the intended use. Push a piece of cardboard through the vise so that it extends as a channel beneath the pliers and set up a small box under the end of it. This simple arrangement will allow the cut link wires to drop or to be occasionally pushed into the box ready for use in the chainmaker.

Figure 1 (b) shows the detail of ram no. 1 with a link wire in position. It is as well not to set the two stop blocks into the slot until a test run has proved out the length selected for the link wire.

Clamp the chainmaker in the vise by means of the mounting block which is screwed to the underside of the baseplate. Push lever no. 1 away in the general direction of 12 o'clock and move levers 2 and 3 apart until they stop against the heads of the no. 8 screws which form end stops for the stop bar. The three levers swivel on arbors at A1, A2, and A3. Lever 1 rests on the baseplate, nos. 2 and 3 have $1/4'' \times 1/4''$ brass collets under them at A2 and A3. The levers move rams 2 and 3 by means of a pair of pins, *P*, which are set into the top of each ram. As the levers are in use continuously for several hours, it is as well to push a short length of plastic garden hose over the end of each one to avoid sore fingers. Old drill stubs are used throughout for pins.

Load one of the link wires into the slot of ram 1 and center it. It will lie between the two forming pins and the back pin, as shown in Figure 1 (e). This first link wire is a little difficult to load, but all the others are much easier as the last link formed is used to grip each succeeding link wire.

Apply a light pressure to lever 1 so that the link pin is held against the forming pins and center the link wire in the slots of ram 1. The ends of the link wire should now be centered about the forming pins also. Apply more pressure to lever 1, pulling it towards the 3 o'clock position. The ends of the link wire will then leave the slots and curve round the forming pins. If this proves difficult, the throat of ram 1 will likely be too narrow. Note that the upper hole in the brass link is oval so that lever 1 can press directly upon the rounded top of ram 1. The brass link therefore is only used to retract ram 1.

The link wire is now bent into an inverted U and the ends of ram 1 are resting against the ends of rams 2 and 3.

Ram 1 must slide like a lathe slide does, firmly but not too freely. A little tension is applied by means of the brass strap and the two overhanging washers and collars which are mounted on the no. 8 screws on either side of the

throat end, at *L* and *M* in Figure 1 (a).

Leaving ram 1 in this position, bring levers 2 and 3 together simultaneously and evenly. This will cause rams 2 and 3 to push the ends of the link wire further round the forming pins until the ends of the link wire butt together, thus making it into a closed link.

Retract all the levers and pry the link off the forming pins using a small screwdriver. After a little use, the pins will become very slightly tapered, and the links will come off easily assisted by those already made. Fit a link wire through the link just made and set it up in the slot of ram 1 as shown in Figure 1 (e). It is easy to retain control over each successive link wire by holding the link between the thumb and finger so that the link wire presses against the fingernails.

Repeat the above procedure and the chain will begin to grow out of the machine in the direction of 11 o'clock. Keep the chain on the bench at all times. When 15 inches or so is available, check the links for flaws and then check for twists by letting the chain hang. If the link wires were cut consistently and the links properly closed, the quality will be good. A slightly open link can be closed up in the pliers by pressing across its width; it is not as effective to apply pressure from end to end unless the gap is wide.

Count the links per foot and try the chain on the spiked pulley. It should fit snugly and show no tendency to ride up when it is pulled round. If the results indicate that a slightly shorter link is desirable, it is feasible to make, say, a 36-link per foot chain into one having 37 links per foot.

The method of doing this is to shorten the link wires by $0.010''$ and to make the chain as before. Each link is then closed up in the pliers in the end-to-end mode. With a little experimenting it is possible to make two slightly but significantly different chains without major surgery on the chainmaker.

When the correct link wire length has been ascertained, press the two small stop blocks into the slot of ram 1 and lightly swage a little metal over them with a center punch if necessary. The link wires will then be centered automatically, Figure 1 (b).

Pull the finished chain through fine emery cloth to smooth it down and to get rid of any loose scale or powdering of the finish. The resulting chain should hang straight and be of an even, pleasingly burnished appearance.

When fitting the chain to the clock, take care not to close the chain up with a twist in it. Twists almost always develop during normal running and winding, but they should not be introduced initially. It is best to open and close a chain link by twisting it lengthwise rather than levering one end outwards.

Improvements to the chainmaker might possibly include case hardening the rams and mounting the back pin and forming pins on an interchangeable plug. This, in conjunction with no. 1 rams having slightly different throat sizes, would enable the creation of a wider variety of links. An automatic machine would, of course, be even more interesting to design!

J.M. HUCKABEE'S "Random Clock Talks"

The series of 37 "Random Clock Talks" videotapes listed below are available for loan to AWI members from the AWI Audio Visual Library. The tapes vary in viewing time from 1.25 to 2.00 hours and are available in the VHS format. A service charge of \$5.00 each is to accompany requests to borrow a tape; only one tape is loaned at a time. The service charge covers AWI's production and shipping costs. Tapes should be returned to AWI within 7 days after receipt, insured for \$30.00. Please order tape by number along with your name, address, and \$5.00 service charge. Send to: AWI Audio Visual Library, 3700 Harrison Ave., Cincinnati, OH 45211.

TAPE 1: Approximately 2 hours

SUBJECT MATTER: A brief view and discussion of a variety of clocks and tools used in the Huckabee shop.

TAPE 2: Approximately 2 hours

SUBJECT MATTER: Demonstration and discussion on using various tools and lathes to make and fit a clock bushing.

TAPE 3: Approximately 2 hours

SUBJECT MATTER: Discussion and demonstration on lathe operation using the Boley watchmakers lathe and the C&E Marshall watchmakers lathe.

TAPE 4: Approximately 1.50 hours

SUBJECT MATTER: An analysis and work with the Urgos 21/42 8-day trapezoid time only clock.

TAPE 5: Approximately 2 hours

SUBJECT MATTER: A demonstration and discussion about drilling the arbor using Huck's "turning in a box" method and making a pivot.

TAPE 6: Approximately 1.75 hours

SUBJECT MATTER: A demonstration of wheel cutting using clear plastic and a Mosley watchmakers lathe. Huckabee cuts four gears such as those required in the AWI certification examination.

TAPE 7: Approximately 1.75 hours

SUBJECT MATTER: The Birge & Mallory Striker Clock—a complete study and analysis of the Birge & Mallory Striker and the clock with its strap plates and roller pinions, circa 1841.

TAPE 8: Approximately 2 hours

SUBJECT MATTER: Making a great wheel and mounting the great wheel on its arbor.

TAPE 9: Approximately 1.75 hours

SUBJECT MATTER: Making and fitting a replacement pinion for a clock wheel.

TAPE 10: Approximately 1.50 hours

SUBJECT MATTER: Correcting problems caused by an elongated pivot hole by bushing with a solid bushing and the use of a "preacher" to relocate center distance.

TAPE 11: Approximately 2 hours

SUBJECT MATTER: Huckabee discusses the IBM #37 Master Clock Movement and IBM 90 Series Clock Movement.

TAPE 12: Approximately 2 hours

SUBJECT MATTER: Using a custom-made attachment to make wheels and index plates on the Unimat lathe. The custom-made attachments can be made from drawing available from AWI upon request (cost to cover printing and postage is \$2.00).

TAPE 13: Approximately 2 hours

SUBJECT MATTER: Cutting clock wheels—a demonstration of cutting the wheels used in the AWI CMC examination.

TAPE 14: Approximately 2 hours

SUBJECT MATTER: Using an inexpensive quartz analog clock movement, Huckabee disassembles the movement and provides an in-depth explanation of each component and their function in the operation of the timepiece.

TAPE 15: Approximately 2 hours

SUBJECT MATTER: Huckabee presents an in-depth discussion on the design of cutting tool bits, both hand-held and those held in the tool post rest. Also a discussion of steel—its composition and characteristics.

TAPE 16: Approximately 1.50 hours

SUBJECT MATTER: Huckabee presents an in-depth discussion about hairsprings. He also demonstrates how to vibrate a clock hairspring.

TAPE 17: Approximately 1.75 hours

SUBJECT MATTER: Huckabee goes through the process of making a knurled nut, one like those used as hand nuts in Early American kitchen clocks. He demonstrates a simple way to knurl the nut.

TAPE 18: Approximately 1.75 hours

SUBJECT MATTER: Huckabee demonstrates the process of inserting a tooth into a clock wheel to replace a broken or damaged tooth.

TAPE 19: Approximately 2 hours

SUBJECT MATTER: Pivot work in the American antique Sessions, count wheel, and clock movement.

TAPE 20: Approximately 2 hours

SUBJECT MATTER: Continuation of work with the Sessions clock used in Tape 19. Complete restoration work on the movement and treating a worn great wheel.

TAPE 21: Approximately 2 hours

SUBJECT MATTER: Making an American clock verge. Huckabee demonstrates how to select and work raw materials into a verge for an Ingraham miniature kitchen clock—time only.

TAPE 22: Approximately 2 hours

SUBJECT MATTER: Completion of making a verge for an Ingraham kitchen clock from Tape 21. Also random tips and cutting a 32-tooth recoil escape wheel for an Ansonia kitchen clock.

TAPE 23: Approximately 2 hours

SUBJECT MATTER: Pivot and bushing problems and their repair.

TAPE 24: Approximately 2 hours

Not available at this time.

TAPE 25: Approximately 2 hours

SUBJECT MATTER: Clock mainspring and barrel work.

TAPE 26: Approximately 2 hours

SUBJECT MATTER: Clock mainspring ends and barrel teeth. Huckabee demonstrates how to replace teeth in the barrel of an Urgos 8-day modern clock. Huckabee also fashions a new hole end for the mainspring.

TAPE 27: Approximately 2 hours

SUBJECT MATTER: Understanding the antique American clock time train and repairs to it and using the Unimat lathe to polish pivots.

TAPES 28 & 29

Not available at this time.

TAPES 30-34: Approximately 2 hours each

SUBJECT MATTER: A series of five tapes designed as a teaching exercise which encompasses every facet of lathe work encountered in the clock shop. Produced in conjunction with a series of drawings which are provided by AWI when you borrow the first tape in the series. Upon completion of the work you have a set of excellent useable lathe accessories for use in your shop.

TAPES 35 & 36: Approximately 2 hours each

SUBJECT MATTER: Two tapes which demonstrate the use of the lathe accessories produced in the Series 30-34. This encompasses all facets of pivot work encountered in the clock shop.

TAPE 37: Approximately 2 hours

SUBJECT MATTER: A companion tape to the Huckabee book "How to Build a Regulator Clock." All components and details for their construction are discussed in detail. It is recommended that the viewer have the book at hand when viewing this tape.

**A DETAILED DESCRIPTION
OF EACH TAPE IS AVAILABLE
FROM AWI CENTRAL.**

THE 1990 AWI HOROLOGICAL TOUR

Henry B. Fried
Tour Guide



On April 16, 1990, the AWI tour group left for the sixteenth annual tour, which was mainly a visit to the Watch, Clock and Jewelry Trade Fair in Basel, Switzerland. There we were greeted by Dr. Roland Schild, head of the Swiss group of exhibitors, Henry Schaeren, president of the exhibitors committee, and many old friends in our industry. Dr. Michel Mamie, head of the Fair, greeted us and spent some time with our group. A very fine luncheon was provided.

The Basel Watch, Clock and Jewelry Trade Fair was by far the best and most interesting one in our many years of visiting this large trade show. Over 2000 exhibitors of watches, clocks, and jewelry were represented. Each exhibitor's booth had at least a million dollars of exhibitions with 50,000 trade visitors from the world over. For the watchmaker and clockmaker particularly, the general atmosphere and theme was very refreshing. It appeared that the emphasis was on mechanical timepieces, whether they be watches or clocks. The abundance of very high-priced items revealed a trend—particularly

by the Swiss—that there existed a strong market for mechanical watches and clocks of very high quality and artistic appeal.



One of the clocks exhibited at the Basel Fair—a three-wheel mystery clock mounted on a block of rock crystal. It will run for three months before it needs rewinding. It features a high-precision device whose mechanism is hidden in the base. Transmission to the movement is invisible. It has a gold, diamond, and gemstone decor. (Techniques Horlogeres Appliquees SA, Sainte-Croix.)



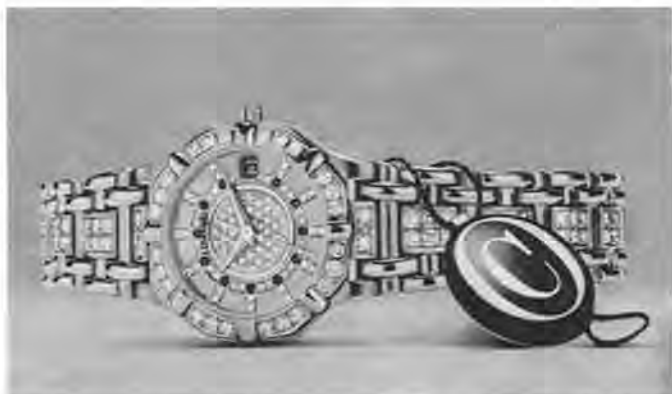
Reception at the Basel Watch, Clock & Jewelry Fair. Left to right: Dr. Roland Schild (Director, Swiss Exhibitors), T. Fried, H. Fried, H. Creed, Leona Creed; James Robinson and Bill Bruce in back.



Basel luncheon reception. Shown left to right are Harry Creed (CA), Tina Fried (NY), A. Benz (Berne), Henry Fried (NY), James Robinson (NE), Dolores Nowaczynk (WA), Jim Gibson (NY), Peggy Blair (NJ), Bill Bruce (KS), Jean Augustin (AK), Harry Blair (NJ), and Leona Creed (CA).



At Basel Fair, left to right: T. Fried, H. Fried, Secretary to Fair President Laura K., A. Benz (Berne, Comor), Mike Roman (President, JA), Mrs. Roman, Mrs. Mamie, Mr. Michel Mamie (Director of Basel Watch, Clock & Jewelry Fair).



One of the new timepieces exhibited at the Basel Fair. This is Concord's "Saratoga" watch, decorated with sapphires and diamonds; 18K gold, sapphire glass, water resistant.

When the quartz revolution devastated the Swiss for a while, despair enveloped them. They found their fine ebauche and brand-name industries eclipsed by the Japanese and the enterprising Hong Kong manufacturers who exploited the quartz watch market. As a result, the Swiss domination and the dollar value of their exports fell behind others.

Now, realizing that doing what they do best—produce high-quality watches beyond the current skills of competing makers—they could more than survive. As a result, Switzerland today surpasses Japan and Hong Kong in the dollar value of their exports of horological items. Their exhibits at the Basel fair showed many extra fine watches with main-spring-powered movements, lavishly constructed and artistically executed, with the very fine-honed traditional Swiss skills.

Self-winding chronographs from numerous makers were strongly in evidence. The many famous Swiss name brands were seen in high-end metals, diamonds, colored stones, cases and bracelets, colored dials, and bold designs.

Furthermore, skeletonized mechanical watches were abundantly in evidence, many with minute repeating additions, some even more complicated with perpetual calendars, moon phases, and other complications. There were watches with retrograde dials on sectored dial divisions, and even one wristwatch with a minute repeating movement and its dial showing two automatons apparently striking bells. Others displayed astronomical indications as well, with dials and outer case rims displaying various major time zones around the globe.

The quartz area certainly wasn't neglected, many with the latest quartz technology. Harry Blair, one of our regular tour members, became enamored with an advanced new self-generating energy system that charges the latest technological capacitor that will store a charge for ten days. Although these were in short supply at the fair (just making their debut), his charming manner of persuasion had him wearing one as we left the booth of Jean d'Eve. There were watches with 24-hour dials with articulated outer steel case rims which could be shifted to various time zones, dials with many colors, compositions, and colored metal cases. We were privileged to learn of the new wristwatch by International-Schaff-



The first "Grande Complication" designed to be worn on the wrist by the Schaffhausen-based IWC (International Watch Co.). After almost seven years and 50,000 hours of painstakingly hard work, a team of designers and watchmakers from around the world have created this timepiece. The fully automatic "Grande Complication" shows the time in hours, minutes, and seconds. Its chronograph is equipped with a cumulative timing facility, and stops time up to 12 hours. Its perpetual calendar, likewise mechanical and fully automatic, displays the date, the day of the week, the month, the year, the decade, the century, and even allows for leap years in the process, requiring no adjustment from the wearer. Its lunar phase display is extremely precise, and diverges from the actual course of the moon by only one day in 122 years. The minute repeater, activated by the slide on the side of the case, has a dual-gong mechanism that gives audible tones to mark off the hours, quarter hours, and minutes. The case is fashioned from a block of solid platinum.



Two mechanical designs from Epos (Bienne, Switzerland). At left: very delicately open-worked Peseux skeleton movement. At right: self-winding watch with regulator-type time display, i.e. with the hours and minutes shown on separate, off-centered dials and center seconds hand. Its meticulously finished movement can be seen through the case's transparent back.

hausen: their new opus, a wristwatch with the "Grande Complication." All exhibitors were very optimistic that there were many in the general public who will be able to appreciate well-made, artistically designed, and distinctly original timepieces.

Clocks were also in abundance. Skeletonized mechanical clocks of unusual design and visible mechanical and eye-catching actions were seen everywhere, as were the regular, commercial quartz items. Even the Morbier—French reproductions—were seen in all sizes, from miniature to the ornate, large, decorated pendulums, some even with automation at the bottom of their flared-out pendulum bobs, duplicating the rarer originals. Ornate, tall-cased clocks in traditional designs and well-executed cases were seen as products of neighboring Germany's clock industry.

Another very interesting development observed with great satisfaction were the exhibits of a new group of artisans, the "Academie Horlogere des Createurs Independants." This is a group of individual makers of handmade, one-of-a-kind clocks and watches who created this organization of master horologists and obtained the rare space at the fair to display their "tour de force" creations, which attracted many fair attendees. In fact, when the group later visited the Beyer horological museum in Zurich, we saw the mechanical siblings of some of the more unusual clocks from the shops of these artisans. Some of the artisans and masters were on hand to show our group their watches, and they even removed some of the timepieces from their showcases to better explain their systems. George Daniels, Fellow of AWI, and who may be credited as the inspiration for this group, was on hand as well, and felt equally enthusiastic. They had watches and clocks with unusual escapements, some containing the tourbillons mounted in unusual parts of their creations.



"Samara," Jean d'Eve's quartz-piloted yet battery-free watch, is powered by the wearer's wrist movements. Its microgenerator (with a diameter of only 1 mm) has proved very efficient, providing the watch with more than ten days' off-the-wrist reserve power. Called "Micro-Generator," the system is protected by more than 20 patents.

One clockmaker—Christiaan van der Klaauw of Joure, Holland—had a group of four-sided dialed clocks with an armillary sphere atop each clock which enclosed an orrery displaying the correct movements of the observable planets (Mercury, Venus, Earth, Mars, Jupiter, and Saturn) revolving around a center-mounted Sun. This section was executed in pure silver, coated with 24 karat gold. The four dials showed the time, day, date, and month. At its left side was displayed the southern-starred sky in blue. At the right side was the northern blue sky with its gold-starred moveable view, different for each day and season. At the rear was another astronomical service with astrolabe, on each a lower diallette indicating the day, the number of the week, and the number of the year.

The tour was not all Basel. Our group also visited the start of the famous, legendary Rhine river which begins at the falls at Schaffhausen. Clock shops were visited in Lucerne as were places of entertainment and good Swiss fare. Other countries visited were Yugoslavia and Morocco. Dubrovnik was enjoyed with its warmth and beautiful harbor and sea-shore. Other cities in Yugoslavia visited were historic Sarajevo, Zagreb, Mostar, and its many, many goldsmith and jewelry shops. Belgrade was our last stop in this old-world country.

Our last stop was in Morocco with exciting tours of Casablanca, Marrakech, Fez, Rabat, and numerous wayside stops for shopping and viewing centuries-old Roman ruins. The exotic casbahs, narrow, crowded streets (or should we call them passageways?) lined with shops of all types, selling a great variety of spices, fruits (delicious), nuts, figs, unusual candies, brasswork made on the spot, leatherwork, and an ill-smelling, slippery tannery hundreds of years old (so old, in fact, we thought the hides stored in there were just as old). Surprisingly, the countryside was in many places lush and filled with growths of unusual plants. Our accommodations were the finest, and nighttime entertainment was picturesque, as though time hadn't changed much in this unusual country.

Our group consisted only of eleven members, due to the very short promotional period available. However, it was an excellent tour.

In all probability the 1991 tour will again visit Switzerland, its Basel trade fair, and Swiss watch factories. Hopefully, too, we'll visit Rolex and Patek Philippe, horo-



Snake charmer at Marrakech, Morocco.



Left: Henry Fried with clockmaker Christiaan van der Klaauw, a member of the Academie Horlogere des Createurs Independants. Above is one of Mr. van der Klaauw's creations—an international table clock with astrolabe. The 24K gilded case, designed on the "Golden Section" with a height of 38 centimeters, is a perfect balance in lining, attaining a wonderful outside magnificence. The 8-day movement has a platform escapement while an independent movement operates the astrolabe, the planetarium, and the star maps. The front of the clock has dials for the time, day of week, and month of year. The left side shows the stars of the southern hemisphere, and the right side the northern hemisphere, and contains the winding of the movement for the star maps, astrolabe, and planetarium. The astrolabe is at the rear showing sunrise, the moon indicator, and the dragon. On top is the planetarium supported by three atlases in silver.

logical museums, and visits to France, Germany, Holland, or Belgium with their horological attractions. Would-be tour members should contact AWI headquarters.

Henry B. Fried



Above and at right: Two scenes inside the Beyer Time Museum, Zurich, Switzerland.

TIME

Affiliate Chapter Column

Paul D. Wadsworth



CONVENTION IDEAS

I have just returned from the Mid-Atlantic Technical Conclave and have only the best to report. Everyone was pleased with everything. The programs were overfilled from the start. This must tell us that the topics are in demand. I have heard many great comments about the courses from some of our members. They want to know how to sign up for next year's programs now. The idea seems to be taking hold according to some of the affiliate chapter reports that have come in already from other areas. They are already planning for the same type of get-together in 1991.

Other news seems to be slow. As you could see last month I was sick for about a week and without any input from you, the column just didn't get done. By the time that you get this the annual meeting will be over. But for now I am looking forward to seeing many of you in Cincinnati again. One couple already has said they are looking forward to eating on the Riverboat.

Our state watchmakers organization convention committee has just had a meeting to plan some of the final ideas for the convention. One of the long-time problems that I believe we have resolved is what to do with watchmakers from another area that attend but don't belong to our organization. Do we charge them as a non-member for the registration fees? Do we allow them in at the regular member

rate and make some of the regular members choose not to pay their dues next year? We have set up a new rule which states "any watchmaker from another state that is a member of another watchmaker organization that is affiliated with AWI or an AWI member will be admitted at the member rate". This seems to cover all the situations that we have run into in the past. Also, if the watchmaker is from our state, even though they are a member of AWI, they should also belong to our organization, and this covers that situation.

One of the other things that our organization has been doing is to have an auction after the Saturday night banquet. This will be easier to keep track of through the use of a computer program that we have. The program issues a number to each person as they register for the convention. This number is used for all items in the auction. If the person brings an item to be sold, the item number starts out with the person's number (23) then we add an item number (1) to make (23-1). When the item is sold it gets the buyer's number added (23-1-19). This should keep the record keeping quite simple. Also, everyone that is registered will get a card with their number printed on one side and the auction rules on the other. I will let you know how this works out after our convention in October.

W.D.W.

ASSOCIATION NEWS

ARIZONA

The Arizona Clockmakers & Watchmakers Guild held their last dinner meeting of the fiscal year on April 17, 1990 in Phoenix.

The following officers were elected for the 1990-1991 year: Tom White, president; Jim Phillips, vice president; Sal DiStefano, secretary; Bernie Guhin, treasurer; and Jim Pickard and Bob Richard, directors.

The program was "Legal Aspects of the Problem of Unredeemed Repair Jobs" by Jim Phillips. Jim is a registered patent attorney as well as an horologist. He presented a procedure which conforms to the Arizona statutes. Included were sample letters which could be used in following delinquent customers as well as sample notices of public sale to satisfy artisan's liens.

CALIFORNIA

The San Diego Horological Society held a dinner meeting and technical seminar on April 24, 1990 in San Diego, CA. The seminar was presented by Seiko. Members were informed about the new Seiko "I.Q." (intelligent quartz) watches.



Pictured, left to right, seated: Mr. Uchida, factory representative; Scott Chou, Sr. General Manager and Technical Support; and Carl Goldberg, President of the San Diego Horological Society. Standing: Gary Yale, Gateway Time Sales Manager; and Tom Vetlesen, Seiko Sales Representative.

NEW YORK

Harold Perlman, President of the American Perfit Crystal Corp., presented a program on crystal replacement for the Horological Society of New York on May 7, 1990.

UPCOMING EVENTS

*Watchmakers Association of Ohio
44th Annual Convention
July 27-29, 1990*

Parke University Hotel – Columbus, OH

*Nebraska & South Dakota Jewelers Association
85th Annual Convention
August 17-19, 1990*

Kearney Ramada Inn – Kearney, NE

*Central Illinois Watchmaker's Association
Annual Convention
October 19-21, 1990
The Sheraton – Normal, IL*

*Florida State Watchmakers Association
Annual Convention
October 26-28, 1990
Holiday Inn Airport – Tampa, FL*

With the use of a video cassette, he demonstrated how flat mineral crystals could be replaced. The step-by-step procedure began with the making of a mold from the opening of the bezel; then how the crystal stock was roughed out; and finally how the roughed-out crystal, together with the mold, was ground to direct dimension on a Kronoglass grinding machine.

At the end of the video, Mr. Perlman made some explanatory comments and distributed among the audience sample crystals with their matching molds.

A question and answer period concluded a very interesting evening.

TIME



GEORGE H. AJEMIAN RETIRES

After a 42-year affiliation with the Joseph Bulova School, George H. Ajemian retired from his post as instructor at the school in December of 1989.

During his youth, George spent his summers in Boston with his uncle, a watchmaker. He learned how to fix clocks as well as how to identify the various parts of a watch. George's uncle wanted him to become a watchmaker but George had his heart set on aviation mechanics.

During World War II, George joined the Marine Corps and was wounded. When he was discharged, he was unable to pursue aviation mechanics, so he came to the Joseph Bulova School as a student in watchmaking. George recalled Max Schwartz, his instructor, as a very helpful individual who provided him with various employment leads. These leads enabled him to work at various jewelry shops before he became a full-time watch instructor at the Bulova School in January of 1954. During his teaching years, George also taught at the Taus School of Watchmaking in the evenings from 1956 through 1958. He was certified as a Master Watchmaker. George has been married for 45 years and has a son and a daughter, as well as two grandchildren.

While George has officially retired, he still has his bench at the Bulova School and comes in daily to help out.

TIME

A TOOL FOR YOUR IDENTIFICATION MARK

Robert L. Macomber, CMC

Recently the Identification Mark Committee found a tool which makes casemarking a cinch! It's called TRACE MARK™.

Trace Mark is a precision tool, micro-engraved in hard steel, with your identifying mark. It lasts indefinitely yet makes a permanent mark in seconds on almost any smooth, firm surface. Because it is so small it can be used where nothing else can go, and its mark is virtually invisible to the naked eye. Applied with a simple pressure and roll-on motion, it makes a micro-impression imprint only .010" high. The imprint is either not seen at all or appears as a minor scratch. It can be used on silver, aluminum, copper, pewter, brass, bronze, steel (including stainless), ivory, gold, lead, or plastic. It cannot be used on glass, ceramics, hard steel, knife blades, or hard chrome. In short, it is an answer to AWI Identification Marking.

Figure 1 shows the tool. Figure 2 shows the enlarged micro-stamp tip of the tool, and Figure 3 shows an enlarged impression on a copper penny.

The manufacturer—Microstamp Corporation—has indicated that they will give a 30% discount to AWI members. Below is their order form. If you wish to order a Trace Mark, mention that you are an AWI member. Please note that AWI cannot officially endorse a product, but that this recommendation comes from your Identification Mark Committee.

I have been using my Trace Mark, micro-engraved with my AWI Identification Mark, for the last month. It's easy and quick to use. The Trace Mark can be followed by your Job Number to facilitate later identification. While your Job Number will be larger and therefore legible, a thief would pass over the Job Number but probably not notice the micro-stamp mark.



Figure 1. The Trace Mark tool (3 3/4" high).



Figure 2. Enlarged micro-stamp tip shows how "roll on" design allows each letter to get full, clean impression.



Figure 3. An impression on a penny.

MICROSTAMP CORPORATION 2770 E. WALNUT STREET, PASADENA, CA 91107		NAME _____ ADDRESS _____ CITY _____ STATE _____ ZIP _____ U.S.\$ _____											
YES / I would like to order a TRACE MARK™ bearing the data printed clearly below. 11 OR LESS SPCS \$98.00 MIN + \$5.00 EACH EXTRA		Shipping & Handling 4.50 CA add Sales Tax _____ Total \$ _____											
ONE CHARACTER PER SQUARE INCLUDING PUNCTUATION/SPACES/ETC. EXAMPLE: California Drivers License would read:													
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25px; height: 25px;">C</td> <td style="width: 25px; height: 25px;">A</td> <td style="width: 25px; height: 25px;">B</td> <td style="width: 25px; height: 25px;">I</td> <td style="width: 25px; height: 25px;">9</td> <td style="width: 25px; height: 25px;">0</td> <td style="width: 25px; height: 25px;">9</td> <td style="width: 25px; height: 25px;">0</td> <td style="width: 25px; height: 25px;">6</td> <td style="width: 25px; height: 25px;">8</td> </tr> </table>		C	A	B	I	9	0	9	0	6	8	.25 mm or .30 mm High .010 In. .012 In.	
C	A	B	I	9	0	9	0	6	8				
My Instrument will come with a protective cap for the Micro-engraved tip, a 5X-10X Magnifier, a Proof impression, suggestions on How to Use, Applications, Care and Cleaning, all in a convenient pouch for safekeeping.													
THIS PRODUCT IS GUARANTEED FOR ACCURACY OF CUT AND WORKMANSHIP		We ship UPS surface where possible in the continental U.S. Foreign orders please double shipping/handling charge.											
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"PEAU DE MER" NATURAL LEATHER FROM THE SEA FROM McKZ COMPANY

For the first time, an exclusive new Canadian technology and tanning process makes possible the introduction of leather from the sea as an ecologically unique, high-end, quality alternative to exotic animal leather.

Luxurious new Canadian Peau de Mer leather is the beautiful, ecologically acceptable end product of a breakthrough discovery that recycles fish skin from non-endangered North Atlantic cod, wolf fish, and catfish, a natural food by-product, and transforms it into a high-quality fashion option.

The McKZ Company's Peau de Mer comes in a variety of textures, finishes, and markings. Finishes range from butter-soft suede to sleek, elegant glazed looks, to weathered, sand-washed effects not always possible with exotic animal leather. Different Atlantic species have varying characteristic markings: cod looks like lizard; wolf fish resembles leopard; and catfish feels and looks like ultra-fine, ultra-soft pig skin. The McKZ Company plans to start marketing other Atlantic species, including mahi-mahi, shark, and grouper within the next six months. The naturally water-resistant leather can be created in any color, and is available in sizes from small to extra large, and priced from \$7.65 to \$15.30 per skin.

According to Tim Gorie, President of the McKZ Co. of Cleveland, OH, who is marketing the innovative Peau de Mer to the U.S., "At last we have eliminated all the obstacles which have kept the high-end, quality-oriented market away from leather from the sea as a viable alternative. Peau de Mer will appeal to those looking for more than immediate novelty. We feel the exceptionally fine quality and strength of this material makes it a new classic."

Peau de Mer is attractive, strong, durable, and color-fast. It will be used in accessories such as

belts, buckles, buttons, shoes, jewelry, and a full range of small leather goods. It can also be skived ultra-thin for multiple fashion applications and trims. It cuts well and sews easily.

The patented Peau de Mer process and technology originated in Australia after 10 years of extensive research, and was further improved and refined especially for Atlantic cod, catfish, and wolf fish. Only 5% of Atlantic species processed are suitable to undergo the new tanning method.

According to Tim Gorie, "Of special personal satisfaction is the fact that the leather is made from a by-product which would have gone to waste. Fishermen catch only those fish needed to fill orders for food. The fishery . . . is very conscious about fishing methods and quantities of fish harvested. We plan to donate a portion of the sales of Peau de Mer to Canadian and American environmental organizations."

For more information, contact: **The McKZ Co., 1701 East 12th St., Suite 3G West, Cleveland, OH 44114; (216) 348-1333.**



Peau de Mer Watch Straps

L&R SEEKING ITS OLDEST ULTRASONIC MACHINE IN THE JEWELRY TRADE

The L&R Manufacturing Company, a leading manufacturer of ultrasonic cleaning systems and solutions for the jewelry trade, is looking for the oldest L&R machine still in use.

The manufacturer is celebrating its 60th year in business, and is renowned for building machines that are engineered to

endure continuous, trouble-free use. To that end, L&R wants to find the single oldest system in use that can be identified by the serial number. Anyone who is presently using an L&R ultrasonic cleaning machine can simply submit the serial number on the machine and then become eligible to win a 20" color TV and receive an award from the manufacturer.

Submit your serial number, name, and address (including phone number) to: **L&R Manufacturing Co., Oldest Machine Promotion, 577 Elm St., Kearny, NJ 07032.**

JANE DI SANTO NAMED DIRECTOR OF MARKETING OPERATIONS FOR BULOVA

Jane Di Santo has been named Director of Marketing Operations for Bulova Corporation, as announced by Robert E. Ryan, VP/Marketing. Ms. Di Santo, who has a prior background in International Trade, joined Bulova in 1985 and was made Requirements Planning Manager the following year.

She was subsequently promoted to Manager of Product Development and Business Planning, where she was instrumental in the successful launch of the Ultime 14K gold jewelry line.

In her new position, Ms. Di Santo will direct the planning, marketing, and implementation of Bulova, Caravelle, and Ultime watches and 14K gold jewelry. She holds a B.S. in Marketing from the New York Institute of Technology, where she is completing an MBA program in marketing.

THE MAGICAL WORLD OF MECHANICAL DOLLS & AUTOMATA

Jay Foreman, Founder and President of House of Clocks, Los Angeles, was a featured speaker at a Conference of Doll Collectors held under the auspices of Region 2 South of the United Federation of Doll Clubs. The May 2-6



Conference was held at the Red Lion Inn in Ontario, CA and attracted 750 collectors from the US and Canada.

Jay, an avid antique doll collector for many years, has combined his advocacy of doll collecting with his vocation of horology and thus is one of the few persons in the United States that specializes in the repair and restoration of mechanical dolls and automata. The majority of these mechanical wonders were created in France during the latter half of the 19th century. Most of their creators began their professional lives as clockmakers or watchmakers. Jay's introduction to automata occurred in 1967 during a business trip to Neuchâtel, Switzerland. That was the year that he first saw the famous androids created by the gifted horologist Pierre Jaquet-Droz.

Mr. Foreman's program featured a video tape that he created and narrated. By means of two 12-ft. screens, the audience was transported to the "magical world of mechanical dolls and automata." From whistling birds to whistling dolls, the audience had an opportunity to see just what makes them "tick." The video included various repair sequences along with the completed doll performing its designated movements . . . whether playing a piano, drinking a cup of water, or smoking a cigarette. There were 34 examples of automata on display from Mr. Foreman's collection.

For additional information contact: **Jay Foreman, House of Clocks, 404 West 7th St., Los Angeles, CA 90014; (213) 626-7893.**

New Products and Literature

VIBROGRAF'S NEW TIMOQUARTZ™ 4500 MODULAR QUARTZ WATCH RATE TIMER

The Vibrograf USA Corporation has introduced the next generation of modular quartz watch and clock timer machines.

Mr. Joseph Presti, President of Vibrograf USA Corp., stated that the new Timoquartz 4500 Quartz Watch Rate Timer can test all frequencies, providing digital rate measurements in seconds per day, and seconds per month on its two large digital displays when testing any analog or digital quartz clock and watch. "In fact," Mr. Presti continued, "the Timoquartz is also an analyzer, providing some diagnostic information on quartz watches and clocks. Faults in the electronic circuit of the watch can be detected within seconds, even with sealed quartz watches. It will test all the latest watch calibers, and on analog quartz watches it displays motor impulses."

The machine has a three-sensor microphone which picks up all acoustic, inductive, and capacitive signals, and is color coded to the machine. The Timoquartz features adjustable cycle time to suit today's and future quartz watch designs. Watches of all types can be measured quickly and accurately. However, Timoquartz provides only rate readings on mechanical watches.

Mr. Presti also stated that the compact and elegant design of these new modular units makes their use in the showroom dramatic as well as practical. They were designed to be combined with the previously introduced Timoprint 4500 mechanical watch and rate recorder which provides rate clearly in digital and on linear graph screen readout.

"Vibrograf will actually bolt the two units together as shown, creating a complete timing system in one package, and as an incentive for purchasing the combination package we're offering special introductory pricing," said Presti.

The compact Timoquartz 4500 measures only 9"W x 5"H x 8"D, and weighs 6 pounds. It operates on 110 volts, 40-60 Hz, with microprocessor-controlled signal processing, and comes in a sturdy metal cabinet with handsome blue-gray finish.

For more information contact: **Joseph Presti, President, Vibrograf USA Corp., 504 Cherry Ln., Floral Park, NY 11001-1696; phone (516) 437-8700; fax (516) 437-8708.**

BULOVA'S CLASSIC ROMAN WITH A TWIST

Bulova introduces a quartz watch with classic styling and innovative design. A white enamel dial provides the background for gilt Roman numerals which mark the odd-numbered one through eleven positions. An inner circle of corresponding numbers mark the even two through twelve positions. A small calendar is located at six.

The rounded goldtone case is accented with a dark brown textured leather strap. The watch is water resistant to 100 feet and features a scratch-resistant Dura-Crystal. The model illustrated is 92B87, and has a suggested retail price of \$145.00.

Contact: **Bulova Corp., One Bulova Ave., Woodside, NY 11377; (718) 204-3300.**

Bulova's Classic Roman Watch



Vibrograf's Timoquartz 4500 Quartz Watch Rate Timer shown mounted on Timoprint 4500 Mechanical Watch and Rate Recorder.

KASSOY INTRODUCES SIMULATED TV CAMERA

TV protection without the price—provides the ultimate in realism. This device has the same deterrent power as a live surveillance system at a fraction of the cost. It has a long-life, glowing red pilot light. No maintenance is necessary. The "camera" comes with one full year guarantee. The model pictured is S2000, and retails at \$89.95.

For more information contact: **Kassoy, 16 Midland Ave., Hicksville, NY 11801; or call toll free: (800) 4-KASSOY; in NY State (516) 942-0560.**



Simulated TV Camera from Kassoy

SEIKO INTRODUCES NEW SING-ALONG MICKEY MOUSE ALARM

A delightful new Sing-Along Alarm featuring Mickey Mouse is among Seiko Time's newest intro-

ductions. Mickey Mouse, the first Disney character, remains by far the most popular. The new Sing-Along Alarm goes beyond the conventional boundaries of clocks and adopts the Mickey Mouse design with the latest advances in technology to generate music.

This whimsical musical clock sports a deco-styled case with a colorful Mickey pictured on the dial. Its alarm charmingly plays seven well-known Disney melodies, such as "It's a Small World," "Heigh Ho," and "Zip-A-Dee-Doo-Dah." Truly a clock to be loved by all—whether six or sixty.

The Mickey Sing-Along Alarm is available through the Seiko Time nationwide sales force. It is also available in wood-tone finish with cream-colored dial, playing such popular tunes as "New York, New York," "Stand By Me," and "Here Comes the Sun."

Seiko



BATT-TRONIC'S NEW "BEDAZZLE" WITH FREE CAP-TIONS

Batt-Tronic Corporation has developed a new method of marketing BeDazzle Jewelry Cleaner. Each case of 4 oz. jars includes 36 free labels that the retailer may use to customize the jars. The easy-to-use, self-adhesive labels called "Cap-Tions" offer a variety of individual salutations (Happy Birthday, Happy Anniversary, I Love You, and Happy Holidays).

"Retailers may customize any jar for that special occasion and give it as a gift to the customer," said Harry Hillson, President of Batt-Tronic. "This, we feel, gives a more personal and professional touch to the sale," Hillson continued.

BeDazzle Jewelry Cleaner is also available in an 8 oz. size. The 8 oz. size may be personalized with the store's name and address. For further information call Batt-Tronic Corporation toll free: **Nationwide (800) 431-2828; NY State (800) 942-1944.**



Batt-Tronic's "BeDazzle" Jewelry Cleaner

MINI EXTRACTOR FROM NEDERMAN

The Nederman Mini Extractor removes dangerous airborne contaminants at the source. The compact, bench-mounted design is engineered to remove soldering and chemical fumes, while providing an aesthetically pleasing addition to a lab, soldering station, or room. The unit can also be mounted on a wall or ceiling with an optional bracket. The addition of an optional charcoal

filter will allow the Mini Extractor to remove odors as well. Other options include a 20W halogen lamp and hood. The unit can be installed to an individual fan or manifolded with a central system.

The arm and optional hood are constructed of polypropylene, which has a temperature resistance of 250 degrees F at a continuous use level. The arm has three joints and a base swivel. Air velocity within the Mini Extractor is 1575 FPM at a recommended air volume of 60 CFM.

For information, contact: **Nederman, Inc., 6100 Hix Road, Westland, MI 48185; (313) 729-3344.**



Nederman Mini Extractor

RAYMOND WEIL'S NABUCCO COLLECTION

Basel 1990 was the launch venue for Raymond Weil's new Nabucco collection, evocative of the grandeur of Antiquity, Babylon, its hanging gardens, and Verdi's celebrated opera. Three sizes, two distinctive shapes—round and square—set off by wave-patterned, multilink gold-plated bracelets



Raymond Weil "Nabucco" Watch.

featuring a hidden clasp. These come with top quality, extra-thin (Flatline 1) quartz movements. The cases are water resistant to 30 m, fitted with a sapphire crystal, and offer a choice of 17 different dials.

For more information contact: **Raymond Weil, 587 Fifth Ave., New York, NY 10017; (212) 355-3350.**

MECHANICAL WATCH FROM BREITLING

This timepiece comprises a self-winding movement with a power-reserve indicator on the dial in the form of a disc with variously colored zones. The wearer can thus gauge the exact amount of reserve power produced by his wrist movements. Steel case, water resistant to 200 m, with rotating bezel. Contact: **Breitling, 25 Van Zant, Norwalk, CT 06855; (203) 853-9593; (800) 243-5146.**



Pocket watches are making a vigorous comeback. This upmarket design from Aero Watch SA sports a hunter case (with pushpiece-operated lid) in 925 sterling silver featuring an 18K gold applied crest for engraving a coat of arms or initials. Fitted with a high-quality, 16½-ligne movement. Contact: **Aero Watch SA, Chaussee De La Boine 20, CH-2001, Neuchatel, Switzerland; 038-251-136.**

Classified Ads

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Ads are payable in advance \$.60 per word, \$.70 per word in **bold type**. Classified display ads are \$25.00 per column inch, 2 1/4" wide. 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. June issue closed for copy on May 1st).

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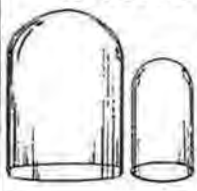
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WTIF

Dates to Remember

JULY 1990

13-15—Advanced Clock Repair Bench Course (AWI); John Kenyon, instructor; Rochester, NY.*

14-15—Repair of the Atmos Clock Bench Course (AWI); Gerald Jaeger, instructor; Reno, NV.* (COURSE IS FULL)

14-15—Cuckoo Clock Repair Bench Course (AWI); James Williams, instructor; Chicago, IL.*

15—Useful Techniques: Mechanical Watch Repair Bench Course (AWI); James Adams, instructor; Baltimore, MD.*

21-25—Jewelers of America's 1990 Fall International Jewelry Show; Javits Convention Center; New York, NY. Information: Jewelers of America, Rockefeller Center, 1271 Avenue of the Americas, New York, NY 10020; (212) 489-0023.

27-29—Watchmakers Association of Ohio 44th Annual Convention; Parke University Hotel; Columbus, OH.

29-30—Chicago Jewelry Show; Expocenter, Chicago, IL. Information: Marcia Bunchman (217) 522-2409.

AUGUST 1990

4-6—Heart of America Jewelry Show; Doubletree Hotel; Overland Park, KS. For more information contact Sharon Blair (913) 661-0084.

10-12—Advanced Clock Repair Bench Course (AWI); John Kenyon, instructor; Boston, MA.*

12—Retrofitting, Casing & Coil Repair Bench Course (AWI); James Broughton, instructor; Portland, ME.*

12—AWI Northeast Regional Seminar; Toronto, Canada.*

12—Useful Techniques: Mechanical Watch Repair Bench Course (AWI); James Adams, instructor; Kansas City, MO.*

12—Introduction to Quartz Watch Repair Bench Course (AWI); Buddy Carpenter, instructor; Denver, CO.*

15—Retrofitting, Casing & Coil Repair Bench Course (AWI); James Broughton, instructor; Springfield, MA.*

17-19—Nebraska & South Dakota Jewelers Association 85th Annual Convention; Kearney Ramada Inn, Kearney, NE.

18-19—Repair of the Atmos Clock Bench Course (AWI); Gerald Jaeger, instructor; Indianapolis, IN.* (COURSE IS FULL)

19—Retrofitting, Casing & Coil Repair Bench Course (AWI); James Broughton, instructor; Rochester, NY.*

25-26—Cuckoo Clock Repair Bench Course (AWI); James Williams, instructor; Pittsburgh, PA.*

25-26—Advanced Quartz Watch Repair Bench Course (AWI); Robert Bishop, instructor; Perrysburg, OH.*

SEPTEMBER 1990

7-9—Advanced Clock Repair Bench Course (AWI); John Kenyon, instructor; Detroit, MI.*

8-9—Cuckoo Clock Repair Bench Course (AWI); James Williams, instructor; Trenton, NJ.*

13-16—Intermountain Retail Jewelers 29th Annual Convention; Resort Center Lodge and Inn; Park City, UT. For information: (503) 889-2566.

14—Retrofitting, Casing & Coil Repair Bench Course (AWI); James Broughton, instructor; Fargo, ND.*

15-16—Introduction to the Watchmaker's Lathe Bench Course (AWI); Jim Lubic, instructor; Phoenix, AZ.* (COURSE IS FULL)

15-16—400-Day Clock Repair Bench Course (AWI); John Nagle, instructor; Cincinnati, OH.*

15-16—Repair of the Atmos Clock Bench Course (AWI); Gerald Jaeger, instructor; Bay Area, CA.*

16—Useful Techniques: Mechanical Watch Repair Bench Course (AWI); James Adams, instructor; Seattle, WA.*

16—Introduction to Quartz Watch Repair Bench Course (AWI); Buddy Carpenter, instructor; Baltimore, MD.*

16—AWI South Central Regional Seminar; Dallas, TX.*

19-20—Repair of the Atmos Clock Bench Course (AWI); Gerald Jaeger, instructor; Fresno, CA.*

22-23—Repair of the Atmos Clock Bench Course (AWI); Gerald Jaeger, instructor; Santa Ana, CA.*

22-23—Advanced Quartz Watch Repair Bench Course (AWI); Robert Bishop, instructor; Baltimore, MD.*

26-27—Repair of the Atmos Clock Bench Course (AWI); Gerald Jaeger, instructor; Bay Area, CA.*

30—The National Timekeepers Festival, presented by The Columbus Watch Co.; Veterans Memorial Convention Center; 300 W. Broad St., Columbus, OH.

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9 a.m. to 5 p.m. Admission \$5.00.
For information: Columbus Watch Co.,
3280 Riverside Dr., Suite 18, Columbus,
OH 43221; (614) 459-7469.

OCTOBER 1990

12-14—Advanced Clock Repair Bench Course (AWI); John Kenyon, instructor; Winston-Salem, NC.*

13-14—Cuckoo Clock Repair Bench Course (AWI); James Williams, instructor; Salt Lake City, UT.*

13-14—Repair of the Atmos Clock Bench Course (AWI); Gerald Jaeger, instructor; Boston, MA.*

14—Useful Techniques: Mechanical Watch Repair Bench Course (AWI); James Adams, instructor; Scranton, PA.*

***For more information on AWI Bench Courses and Regional Seminars contact AWI Central, P.O. Box 11011, 3700 Harrison Avenue, Cincinnati, OH 45211; (513) 661-3838.**

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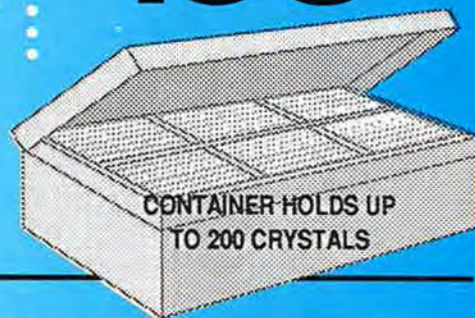
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Introduction to Clock Repair
Instructor: Roland Iverson, CMC

Advanced Clock Repair
Instructor: John Kenyon, CMC

Repair of the Atmos Clock
Instructor: Gerald Jaeger, CMW, CEWS, FAWI

Useful Techniques: Mechanical Watch Repair
Instructor: James Adams, CMW, FBHI

Introduction to the Watchmaker's Lathe
Instructor: Jim Lubic

Cuckoo Clock Repair
Instructor: James Williams

400-Day Clock Repair
Instructor: John A. Nagle

To register for these courses, please send along with your request a registration fee of \$25.00 per instruction day (for AWI members) to: AWI Central, P.O. Box 11011, 3700 Harrison Ave., Cincinnati, OH 45211. For more information: (513) 661-3838 or Fax (513) 661-3131. PLEASE NOTE: Registrations are limited, and will be selected by earliest postmarks.

NOTE: COURSES MARKED WITH AN ASTERISK (*) ARE FULL.

JULY 1990

- 13-15—Advanced Clock Repair—Rochester, NY
- 14-15—Cuckoo Clock Repair—Chicago, IL
- *14-15—Repair of the Atmos Clock—Reno, NV
- 15—Useful Techniques: Mechanical Watch Repair—Baltimore, MD

AUGUST 1990

- 10-12—Advanced Clock Repair—Boston, MA
- 12—Retrofitting, Casing & Coil Repair—Portland, ME
- 12—Useful Techniques: Mechanical Watch Repair—Kansas City, MO
- 12—Introduction to Quartz Watch Repair—Denver, CO
- 12—AWI Northeast Regional Seminar—Toronto, Canada
- 15—Retrofitting, Casing & Coil Repair—Springfield, MA
- *18-19—Repair of the Atmos Clock—Indianapolis, IN
- 19—Retrofitting, Casing & Coil Repair—Rochester, NY
- 25-26—Cuckoo Clock Repair—Pittsburgh, PA
- 25-26—Advanced Quartz Watch Repair—Perrysburg, OH

SEPTEMBER 1990

- 7-9—Advanced Clock Repair—Detroit, MI
- 8-9—Cuckoo Clock Repair—Trenton, NJ
- 14—Retrofitting, Casing & Coil Repair—Fargo, ND
- *15-16—Introduction to the Watchmaker's Lathe—Phoenix, AZ
- 15-16—400-Day Clock Repair—Cincinnati, OH
- 15-16—Repair of the Atmos Clock—Bay Area, CA
- 16—Useful Techniques: Mechanical Watch Repair—Seattle, WA
- 16—Introduction to Quartz Watch Repair—Baltimore, MD
- 16—AWI South Central Regional Seminar—Dallas, TX
- 19-20—Repair of the Atmos Clock—Fresno, CA
- 22-23—Repair of the Atmos Clock—Santa Ana, CA
- 22-23—Advanced Quartz Watch Repair—Baltimore, MD
- 26-27—Repair of the Atmos Clock—Bay Area, CA

OCTOBER 1990

- 12-14—Advanced Clock Repair—Winston-Salem, NC
- 13-14—Cuckoo Clock Repair—Salt Lake City, UT
- 13-14—Repair of the Atmos Clock—Boston, MA
- 14—Useful Techniques: Mechanical Watch Repair—Scranton, PA
- 14—Introduction to Quartz Watch Repair—Portland, OR
- 21—Retrofitting, Casing & Coil Repair—Pittsburgh, PA
- 21—AWI North Central Regional Seminar—Denver, CO
- 21-22—400-Day Clock Repair—Baltimore, MD

NOVEMBER 1990

- 2-4—Advanced Clock Repair—Bay Area, CA
- 3-4—Cuckoo Clock Repair—Charlotte, NC
- 3-4—Repair of the Atmos Clock—Nashville, TN
- 10-11—400-Day Clock Repair—Ft. Myers, FL
- 11—Retrofitting, Casing & Coil Repair—Oklahoma City, OK
- 11—Introduction to Quartz Watch Repair—Toledo, OH
- 11—Useful Techniques: Mechanical Watch Repair—Columbia, SC

JANUARY 1991

- 11-13—Advanced Clock Repair—Houston, TX
- 12-13—Cuckoo Clock Repair—San Diego, CA
- 12-13—400-Day Clock Repair—Tucson, AZ
- 13—Useful Techniques: Mechanical Watch Repair—Los Angeles, CA
- 13—Introduction to Quartz Watch Repair—Miami, FL
- 19-20—Repair of the Atmos Clock—Baton Rouge, LA

FEBRUARY 1991

- 9-10—Repair of the Atmos Clock—Albuquerque, NM
- 13-14—Repair of the Atmos Clock—Phoenix, AZ
- 16-17—Cuckoo Clock Repair—Austin, TX
- 16-17—Repair of the Atmos Clock—San Diego, CA
- 17—Useful Techniques: Mechanical Watch Repair—Pensacola, FL
- 17—Introduction to Quartz Watch Repair—Bay Area, CA
- 22-24—Advanced Clock Repair—Phoenix, AZ
- 23-24—400-Day Clock Repair—Los Angeles, CA

MARCH 1991

- 9-10—Repair of the Atmos Clock—Cincinnati, OH
- 15-17—Advanced Clock Repair—Alexandria, VA
- 16-17—Cuckoo Clock Repair—Oklahoma City, OK
- 16-17—400-Day Clock Repair—Mobile, AL
- 17—Useful Techniques: Mechanical Watch Repair—Phoenix, AZ
- 17—Introduction to Quartz Watch Repair—Nashville, TN