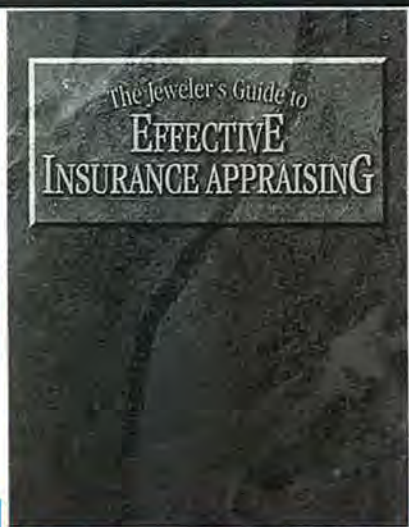


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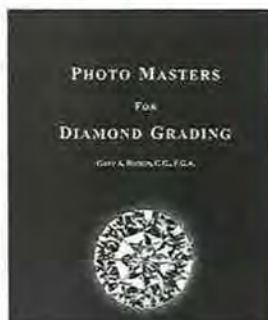
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SEPTEMBER 1996

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ON THE COVER: This month's front cover of the Township Gazebo in Cranford, NJ was taken by Jack Goldstein of Cranford, NJ.

An Official Publication of the
American Watchmakers-Clockmakers Institute.

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HOROLOGICAL TIMES (ISSN 0145-9546) is published
monthly and copyrighted by the American Watchmakers
Institute, 701 Enterprise Drive, Harrison, Ohio 45030.
Subscription price for the public is \$45.00 per year (\$4.50
per copy) in the United States and \$50.00 per year (\$5.50
per copy outside the U.S.). Second-class postage paid at
Cincinnati, Ohio. POSTMASTER: Send address changes
to HOROLOGICAL TIMES, 701 Enterprise Drive,
Harrison, Ohio 45030.

Publication Cost: Producing twelve issues of HORO-
LOGICAL TIMES each year is \$14.63 per member.

PRESIDENT'S MESSAGE

It is with a deep feeling of humility that I say "thank you" to all of you who chose me to lead you throughout the coming year. I know that it takes a lot of guts to elect a simple, quiet country boy to serve you at this time of transition. But you can be sure that I will keep Milt and our new Executive Director very close to hand and very busy keeping me out of trouble. Yes, you probably don't realize how much a president depends on the Executive Director for direction and aid.

Now I face the most difficult task of any leader—the appointment of committees. First, there are many talented people in AWI who are willing to lend their aid to the successful running of the organization by serving on the many committees that are absolutely necessary to our functioning to serve our members. After all, serving our membership is the reason for our existence. The only problem with committee appointing is that there are more people asking to serve on each committee than we can logically accommodate. So it's up to me to shape these committees and trim them down to workable size. Believe me, much study of qualifications and a great amount of prayer time will be required on my part.

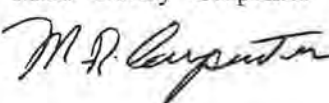
Then there is the job of selecting a new Executive Director. We had over one hundred applications which were pared down to three by our Personnel Committee to find a new Executive Director. Then, the entire board of directors interviewed these three and made their recommendations to the Executive Committee so that they may make their final decision. I would like to take this opportunity to express all our thanks to the Personnel Committee for their difficult task of going over the enormous list of applicants and presenting only three for our consideration. You certainly took one tremendous load off our shoulders.

My next task is to select an Oversight Commission (not a committee, but a Commission). This Commission is to:

1. Monitor and evaluate the performance of the Executive Director.
2. Investigate any complaints, charges, and accusations relating to the administration of AWI policy by members, directors, officers, and employees, and to report to the board through the Executive Committee.

Hey guys, (and gals—Alice said I would have to put that in) we are off to a good start. Now let's all pull together for a great year. If I can be of any help to you, please call or write to me. I sure will call on you if I need your help.

M.R. "Buddy" Carpenter



Because the July issue was mailed so very late due to post office changes not being compatible with our software, there has not been enough time for readers to respond to the "Bulletin Board" column. The column will not appear this month but will return in October.

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QUESTIONS

& ANSWERS

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

QUESTION

I would appreciate any information you could provide about this watch: i.e., manufacture date, place, etc.

I have enclosed all the information I could find, including engravings, rough drawings, stamps, and numbers. Included is a color scan of the watch case. (See Figure 1.) It was impossible to scan the dial without disassembling the front cover. The dial is white and without markings, except the numbers, which are very fine, tall, thin Roman numerals.

Thanks so much for your time and



Figure 1.

all the time and energy you have given to the art and science of horology.

Jim Venable, Wimberley, Texas

Case Description:

- 18k yellow gold - Hunting case
- approximately 36.66 mm in diameter
- front cover hinged at 9:00
- crystal bezel hinged at 12:00
- back cover hinged at 7:00
- dust cover hinged at 7:00

Watch Description:

- 13 ligne - approximately
- white porcelain dial - approximately 29.5 mm
- second bit subdial - approximately 11.4 mm at 6:00
- key wind
- key set
- 13 jewels
- anchor escapement
- independent bridges for center, third, fourth, escape wheels, balance bridge (s....f)
- winged mainspring bridge

ANSWER

From your description and sketches, I can safely assume that your watch was made in LeLocle sometime around 1860-1870. The individual type of bridge for each wheel is typical. Since you didn't include an accurate sketch of the bridge layout, I must assume that the movement was of a Swiss ebauche, probably by Fontainemelon.

The case engine turning is also Swiss but probably with French engine-turning machinery of which there were many.

Henry B. Fried

QUESTION

Recently, a customer brought in a key wind pocket watch that they had purchased at an auction in England. The only information given us was that it came from the Victorian era. On the inside of the case is the word

Continued on page 56.

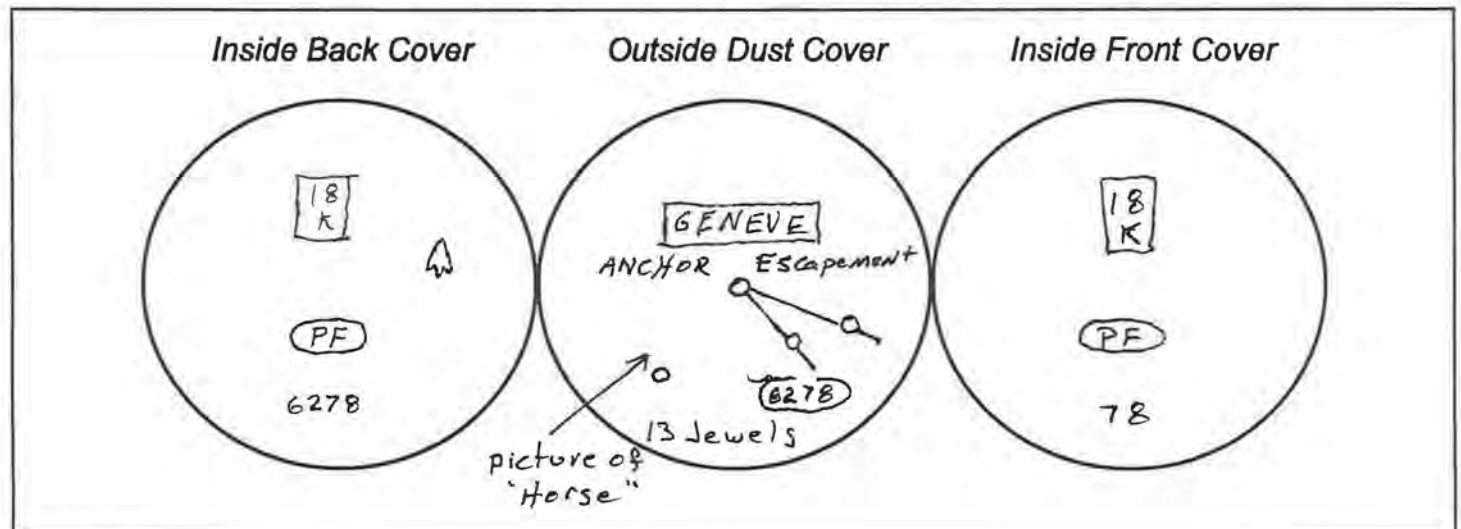
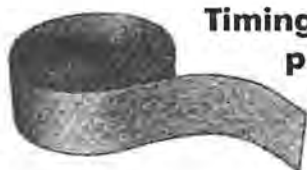


Figure 2.

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	EL872-1/2	2-1/2"	4X	25.35
	EL873-1/2	3-1/2"	3X	24.50
Double Lens	EL880	1-1/2", 2-1/2"	4X, 7X	\$ 31.75
	EL881	2", 3-1/2"	3X, 5X	31.75

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New Synthetic Grease #9501 (for stem & slow moving metal winding parts)	OL9501	7 gram tube	28.30
Regular Mainspring Lube #8200	OL206A	20 ccm	9.70
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All-Purpose Syn. Grease #9415	OL227	2ccm bottle	18.00
Microgliss #D5 Grease	OL-D5	2ccm bottle	20.80
Regular Clock Grease #8300	OL210	20ccm	9.20

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Double Lens	EL807	1/2", 1-1/4"	8X, 18X	\$ 20.90
	EL818	1-1/2", 2-1/2"	4X, 7X	18.75
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ASK

HUCK

By J.M. Huckabee, CMC, FBHI, FAWI

Files

Q. What do you consider to be a good complement of files for the clockmaker?

A. Your question prompted considerable thought, and I'm not certain there is an answer. I estimated that my files may reach a count of 125-150 pieces, and still adding more!

First, take care of your file and it will last a lifetime. Secondly, don't buy a file because it looks good in a catalog.

Let's think in practical, rather than idealistic terms. An assortment of files of various shapes is a necessity. I like those with a self-handle, and a total length of about 6". Possibly this will be a dozen pieces.

These should be in a finer cut; #4 or #5 may be best.

One or two pillar files will be needed. I like these in about 6" length with tang for a wooden handle. My favorites are 1/4" and 3/8" wide in a #5 or #6 cut. These are also called safe-edge files, only having an active surface on the flats.

Add a 6" or 8" mill file, a handsaw file and a rat tail file, all in the 6"-8" range. Finer cuts are most useful.

One or two pivot files will be very handy. These should be in a very fine cut.

This totals less than twenty pieces and will handle most of the common clockmaking needs.

Keep your eye open to sales and promotional flyers and catalogs, and you can have a reasonable assortment at a modest cost.

Screws, Nuts, and Threaded Pieces

Q. Screws and nuts for clock repair are a real problem. Where can I purchase these items? Most assortments just "almost fit" the job at hand.

A. I don't like what I'm about to tell you. That is a major problem in our craft.

Many clocks use fasteners made to preferred English threads, others to preferred metric threads, and others to lesser known sizes. My experience has been a drawer full of taps, dies, and screw plates, and I'm still unable to even identify the thread. Many of the old clocks, English Grandfather type for example, appear to have the screws made with a thread chaser. Some of these movements may have only a very few screws, and though looking similar, will not interchange in position. It behooves us to be very careful with these fasteners because of the consequences of a replacement.

Most newer clocks have metric fasteners which are often found in nut and screw assortments available from a material

supplier. Older American clocks sometimes have threads that will mate with current-day machine screw sizes. However, they are often not in the current preferred sizes. By example, sizes 1, 3, and 5 are not preferred numbers that may be found in American clocks.

My experience is that American machine screw tap and die sets of 1-6 and metric sizes in about 1-4 mm are useful. Screw plates in the same general range will occasionally be useful, but my experience with screw plates has not been very good.

Fasteners really are a problem in our trade. ☛

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ROCK QUARRY

By Fred S. Burckhardt

By the time you read this, the Summer Olympics will be over but not forgotten. I have to admit. I spent quite a few hours in front of the TV watching the Olympians do their stuff.

What always amazes me are the girl gymnasts. Just watching these children go through their routines can really be a humbling experience. The one little girl was only fourteen years old. I have socks older than that. I know if I tried to do any of those routines I would probably break apart. Maybe I was

so fascinated watching her because on my fourteenth birthday, I was just learning how to ride a tricycle.

And how about the weight lifters? Four or five hundred pounds is no big deal. I used to work with a watchmaker whose lunch tray filled with food weighed more than that.

Track is another one of my favorite sports. Watching both the men and women run as fast as they do reminds me of quitting time at a shop where I worked in Philadelphia. In fact, they should make that into an Olympic sport—QUITTING TIME! Talk about separating the tough troops from the faint of heart.

After watching the Olympics, it came to mind that we should have an Olympics. For example, in place of synchronized swimming we could have synchronized watch disassembly. Five watchmakers could be sitting in a row and all would synchronize their motions as they take apart a Font 60 movement. What an exciting event that would be. Clockmakers could have an event where they would compete to see who could repivot a wheel from a French clock movement.

Instead of gymnastics, there could be an event that would entail both speed and dexterity. It would be called "Mainspring Removal." The winner would be the first to remove twelve clock mainsprings from their barrels without breaking any fingers or getting slapped in the face by an errant spring.

The javelin throw would be another good event. There are sev-

eral that come to mind who should excel in this sport, especially those who get great joy from trying to stick it to somebody when they aren't present.

Personally, I would rather not get involved with anything that is too strenuous. Some of us could form an event called "Liar's Decathlon." We would each have ten chances to come up with a lie that would outdo all others. This isn't to say that horologists would ever tell a lie. As for myself, I can look anybody in the eye and say that I've never told a lie. Maybe once in awhile I may tell a non-truth, but that isn't the same thing.

Probably the most difficult contest would be that called the "Humble Event." In this, a group of watchmakers and clockmakers would sit around and tell each other what it is like to be humble. Humility is a trait that escapes many of us so it would be difficult in finding enough participants. As for myself, I must admit that it is difficult to be humble.

Last but not by any means least, are the women. They would all sit around in a circle and the last one to speak would win the gold medal. Now I know some of you will have something to say about that and will call me a male chauvinist pig. I want to say here and now that it isn't true. Many of the people I know are women and I am all for them. I've said it before and I'll say it again, I think every man should own two or three of them!



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A DOUBLE FUSEE ENGLISH BRACKET CLOCK

By David J. Carlson

The beautiful English bracket clock shown in Figure 1 came into the shop for repair. The clock is 19 1/2" tall, 12" wide, and 7" deep. The front and rear doors have attractive glass panels and each is locked with its own separate key. Therein lies part of the story of this handsome clock.

Locked Out

When ready to start servicing the clock, I removed the keys from the pipe cleaner which held them to the handle. The front door unlocked with no problem but I was a little apprehensive when I examined a rather poor solder repair on the rear door key. My concerns were justified when I felt the key self-destruct as I tried to open the rear door lock. Fortunately, I had a similar key which at least worked well enough to open the door and give me access to the lock.

A New Key

On several occasions, it has been necessary to make a key for a special clock. A typical lock is shown schematically in Figure 2. To lock the clock, the key is inserted and rotated counterclockwise. As the key rotates it forces the slide left until the spring is seated in the locked detent position. The rotation is continued until the key can be removed. To unlock the clock, the process is reversed.

The basic steps to make a key are shown in Figure 3. I prefer to work with brass but soft steel should work as well. For maximum wall thickness and strength of the finished key, the diameter of the rod in Step 1 should be as large as possible. The maximum diameter is limited by the keyhole in the escutcheon or the lock, whichever is smaller. For the rear door lock the shaft diameter was determined to be 0.185". A length of 1/4" brass rod was turned down to 0.185" for a length of 2 1/2". (The excess length is used as a handle when fitting the key.) The rod was then slotted 1/16" wide and 1/8" deep to as shown in Figure 3 - Step 1. The width of the slot was set at approximately one-third the diameter which gives strength to the key tab. The depth is determined by the space between the plates of lock. A piece of brass 1/16" x 1/8" x 0.325" was made to fit the slot. The 0.325" dimension is determined by the maximum height of the keyhole. The brass piece is silver soldered into the brass shaft. Silver soldering seemed easier when the brass rod was held vertically in a vise. (To prevent splatter on the vise use a small piece of aluminum foil and pierce the foil with the rod.) After Step 2, the brass rod can be cut off to the 2 1/2" length and mounted in the lathe in preparation for drilling the guide pin hole as shown in Figure 3-Step 3. A size #30 drill (0.128") was used to drill a hole 0.4" deep.

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Figure 1. Double fusee English bracket clock.



Figure 5. Rear view of the clock.

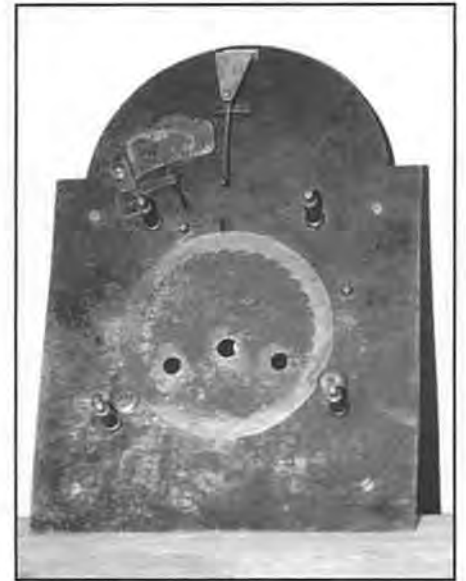


Figure 8. Rear view of the dial.

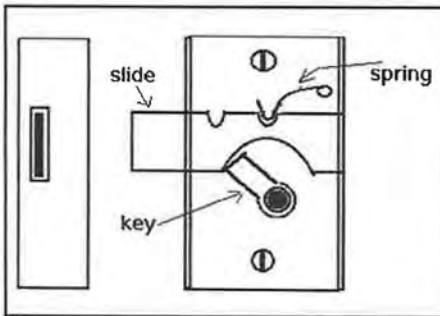


Figure 2. Lock Configuration.

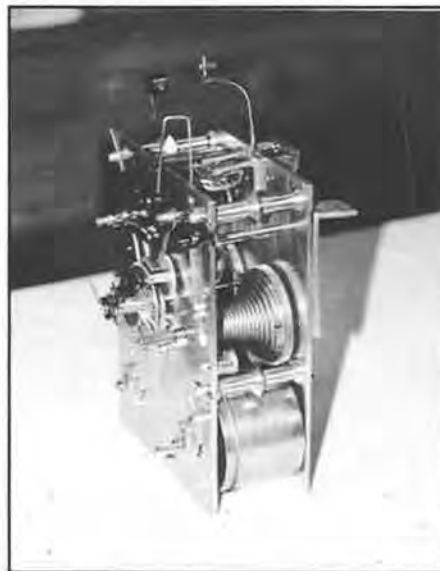


Figure 6. Quarter view of the movement.



Figure 9. Calendar drive gear.

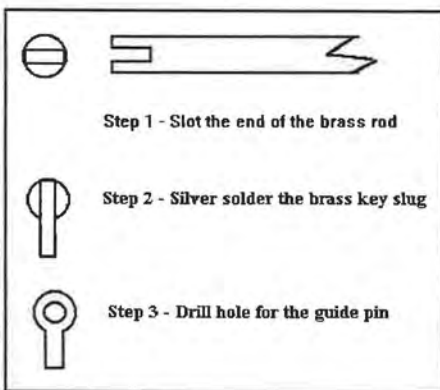


Figure 3. Steps in making a key.



Figure 4. Lock and key.



Figure 7. New cable on the fusee.



Figure 10. Automata on the dial.

Fitting the Key

If the lock can be taken apart, the fitting process is straightforward. The tip of the key is reduced by filing (the .325" dimension) to obtain the detent action described in connection with Figure 2. If doing it "blind" by cut and try, file carefully until the detent action is accomplished. To finish the key, the length of the shaft is reduced to allow a "handle" which can be as simple as a brass washer. The completed key for this clock is shown in Figure 4. The length of the key is 1.3". The handle on the key was cut off the old key, fitted into a slot and silver soldered.

Overhauling the Clock

With entry into the clock assured, it was time to proceed with the overhaul. Figure 5 is the back view of this fine timepiece with its handsome engraving. Loosening the two screws in the two sidearms allows them to fall and the clock simply slides out the rear of the case. Figure 6 is a quarter view of the clock movement with the time side fusee and crown wheel escapement showing.

The fault that brought the clock in for repair was a complaint of intermittent stopping. Careful examination of the movement revealed that the cable on the time side fusee had started to break. The 0.040" steel cable was made up of seven strands of very spring-like .013" steel wire. Under certain conditions the broken strands of the cable interfered with the third wheel in the time train. The faulty cable was removed and all the parts carefully cleaned. Figure 7 is a view of the fusee spring barrel and the fusee after new cable has been installed. The cable is 1/16" multistrand bronze which at 1/16" will stand a 180-pound pull. The bronze cable is much more compliant and easier to work with. Note in Figure 7 that the fusee is apart with the gear and ratchet shown separately. Takedown is necessary to access the hole in the fusee to tie a "knot" in the cable. In place of tying a knot in the cable which is messy at best, I use a brass bushing soldered on the end. The soldered bushing makes a nice clean assembly.

After assembling the movement, the timing was checked. Proper adjustment for a fusee requires that the spring barrel tension be adjusted so that the rate is the same at full winding and immediately before being completely unwound.

When assembling the clock, care was taken to assure that calendar and the automata work.

The following features are associated with the dial:

Calendar

The date appears in a window immediately below the center of the dial in Figure 1. In Figure 8, a

rear view of the dial, the ring carrying the numbers is visible immediately outside of the winding holes in the dial. The "date ring" is driven through a pin on a gear driven by the hour wheel as shown in Figure 9. Care must be taken to time the gear so that the ring is moved between twelve o'clock and one o'clock.

Automata

A close-up view of the top portion of the dial is shown in Figure 10. The human figure with the net is trying to catch the pheasant as it rises. The levers operating the arm and pheasant are shown in the upper left-hand section of the dial in Figure 8. The levers are driven in turn by a lever which is operated from four pins on the third wheel in the time chain. The "U" shaped driving lever is visible in front of the crown wheel escapement in Figure 6.

It is very satisfying to work on a vintage clock of this quality. I would welcome any comments or other ways of handling the "lock and key" problem. ☛

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PICKLE BARREL

JEWELRY REPAIR, PART 22

MISCELLANEOUS REPAIRS

By Marshall F. Richmond, CMW

Regardless of how the bracelets are constructed, they are all subject to wear. Many of them are subjected to rough usage so the demand for repair creates work for the jewelry repair person. From the appearance of some of these repairs that have crossed my bench, it often appears that these repairs must be very difficult. Some that have had previous repairs have not always been well made. This is often due to the lightweight metal used to keep the cost of the new product down in order to meet competition.

Karat gold bracelets have become quite popular in recent years and are called by different names. Sometimes they are advertised as "tennis bracelets, sports bracelets," or "ladies' fancy bracelets." They are made in 10K and 14K gold usually yellow but sometimes white gold. Other bracelets less expensive are sterling silver, gold filled, and the real inexpensive ones are electroplated on a base metal. Most of these are hinged links and constructed basically on the same hinge principle but each will have its own design. This design makes a difference in how hinge repairs must be made. Many of the solid gold bracelets have diamonds set in some or all of the links. Others have other stones or are gold links with an engraved or embossed pattern. Another type of bracelet has links fastened together with jump rings; when the rings are gold-welded they are equally as strong. Regardless of how the bracelets are constructed, they are all subject to wear. Many of them are subjected to rough usage so the demand for repair creates work for the jewelry repair person. From the appearance of some of these repairs that have crossed my bench, it often appears that these repairs must be very difficult. Some that have had previous repairs have not always been well made. This is often due to the lightweight metal used to keep the cost of the new product down in order to meet competition. Others simply show wear from being constantly worn over a long period of time. The bracelets containing diamonds can be repaired without removing the stones as can the ones using most synthetic stones or genuine rubies or sapphires. Other stones must be removed before applying heat to make gold solder joints.

I am going to list the tools and materials I use in making these repairs: little torch with #3 tip, flex shaft tool for drilling and finishing, drills .8 mm and .5 mm or #67 and #75, locking tweezers, and third hand tool, chain nose pliers, side or end cutting pliers and/or shearing pliers, riveting hammer, aligning broach (small needles will work well if chucked in a small pin vise), needle files, jewelers saw with #6/0 or 8/0 blades, and polishing equipment.

Supplies needed: boric acid and alcohol solution, 14K gold solder (sheet and paste in hypo applicator), pickling solution (Sparex or sulfuric acid diluted using 10% or 20% acid), flux (I use Batterns but Borax and water paste will work), gold wire .5 mm and .8 mm, sheet gold .5 mm thick.

Although I have a rolling mill and can obtain any thickness of gold I need, old wristwatch cases that are 14K gold are usually about .5 mm thick and strips can be cut from them when needed. Also some gold stock 1.5 mm thick such as ring-sizing stock 1.5 x 2 mm will permit cutting out pieces to solder on the broken joints which can then be shaped and drilled.

In repairing these hinges, links, and catches, you will probably discover that ingenuity is the most important skill needed to make these repairs. Rarely have I found two with identical construction. The basic principal on most

of them is the same. However, the designs and details of construction vary greatly. Many of them are similarly hinged as shown in Figure 1 with a gold wire for the hinge pin. Many appear to be made with the hinge pin left a little long. The pin can be cut off and gold soldered on each end of the pin, then filed smooth and polished so it is impossible to see how the hinge is constructed. This is also difficult to repair. Some have the hole in the center piece of the hinge a little larger and the wire is pushed

through with the outer holes, friction-tight. The inner hinge part is free to turn on the pin. These pins can also be riveted on each end if needed. Many times we are called on to shorten one of these bracelets. Again, there is no set way to have a system to cover all of these bracelets; however, to remove one link or more, the start is to remove one of the hinge wires. Some can be drilled out. I start with a #75 or .5 mm twist drill and center punch one end. Then with the flex shaft tool drill to about the center. At

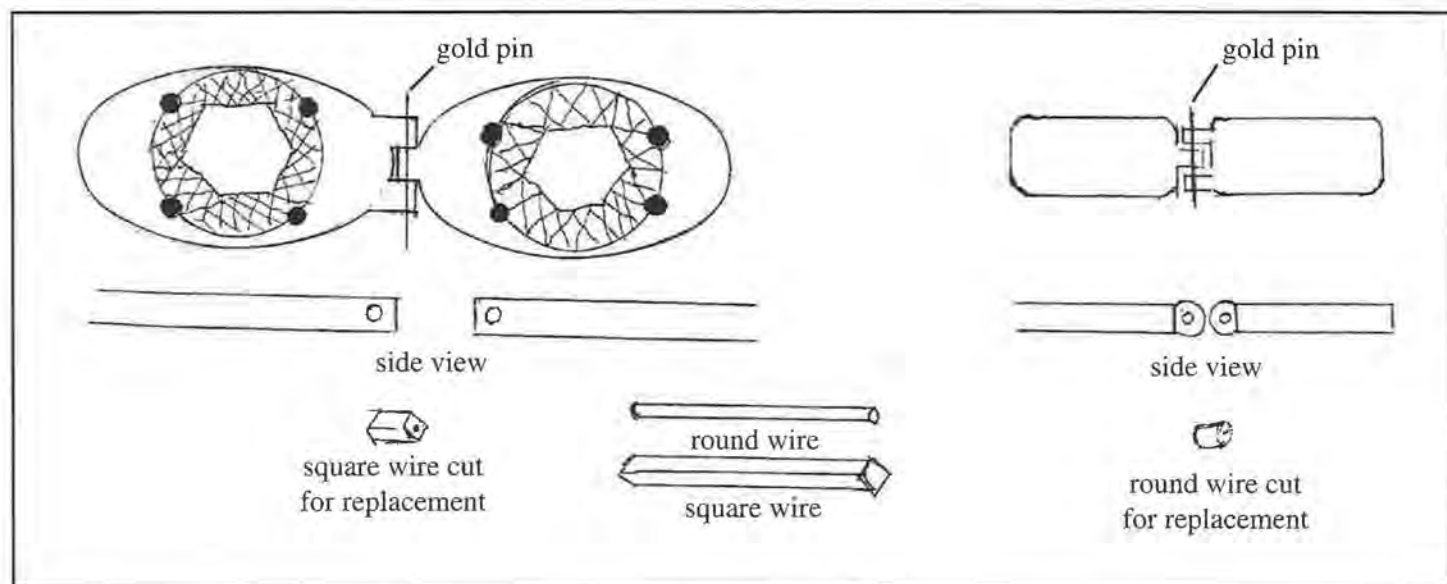


Figure 1.

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Trade-Ins
Taken

this point observe and see if the hole is large enough. If not, use a #67 or .8 mm twist drill and enlarge the hole. If you are centered the hinge pin will be drilled out to the center of the hinge and usually the pin can be bent enough to allow the hinge to be taken apart. If not, repeat by drilling out from the other end which will allow the hinge to separate. If you are removing one link, go to the other end of the link and repeat the process. If both outsides have the holes drilled through, and the stub has been removed from the center, the pieces can then be put back together. It is wise to run the drill through both ends and then when the ends of the bracelet are put together they can be aligned with a small needle in a pin vise. A piece of gold wire the proper size can then be installed. Always leave about a half a millimeter of this wire extended on each end. When gold solder is applied using a very small amount of solder and the heat is applied, the extra end may even melt into the end of the link. Always be careful to keep your heat to the outside so the center piece of the hinge does not get soldered. This would also make the hinge unworkable.

In making repairs on these hinges there are many types of breaks or worn places to be repaired. Although the main basic principle is the same, there are many different shapes of hinges as well as the ends for attaching to the catch. When the center part is worn, a piece of gold wire can be gold soldered into it. The edges can be filed after the wire is cut off and then the hole can be drilled. With the outer parts of the hinge drilled and the center drilled, the hinge can be put together and aligned with the small needle in a pin vise or a broach can also be used. When aligned, the gold pin can be inserted pushing out the aligning pin. When this is done leave one end protruding slightly (possibly 1/2 mm), then cut the other end leaving a like amount protruding. The trick is to gold solder these protruding ends drawing the solder into the hinge ends around the protruding end of the wire without pulling the solder into the center, thus locking the hinge so it will not operate. This can be done using paste solder applied with the hypo needle it comes in. Use the paste sparingly. When applying the heat, keep it as much to the outer edge as possible. Flow the solder on one end at a time. Paste solder sometimes does not want to stay where you want it. It has a tendency to stay with the needle so that if heat is applied to the sparingly placed flux, the solder will be apt to stay where you want it. An anti-flux can be used to keep the solder from flowing to the center of the hinge but this is difficult when working something this small. After the solder is flowed on each end, the excess wire left protruding can be filed off then the hinge polished making it difficult to see where the hinge pin is inserted.

Since there are three sections to the hinge with a pin through the center, another way to make these repairs is by cutting a strip of flat gold about .4 to .5 mm thick which is about the thickness of the back of a salvage 14K gold wristwatch case back. If a rolling mill is available any piece

of gold can be annealed and rolled to this thickness. With a pair of shears, gold this thick can be cut into strips any width needed. If the hinge is 3 mm wide the strips can be cut in 1 mm widths. If it is the center piece to be replaced, first file the end flat and gold solder it preferably to the top of the link having the work positioned bottom up on the heating bench pad. Flux both the end of the link as well as the end of the gold strip. Place the end of the strip to the end of the hinge link and either with a small chip of solder or some paste solder placed where the link and strip meet, and apply enough heat to make a good gold solder joint. Now you have the link with the strip extending outward. Grip it with small round nose pliers so that it can be bent up making a quarter-circle arc at the end of the link. If the gold pin is still in place through the two outer sections of the hinge, the strip can be pushed down through the space between the pin and link; it can then be bent around the pin making a half-circle arc. Cut it off with a jewelers saw using preferably a 6/0 or 8/0 small saw blade, then with pliers, bring it tight against the bottom of the other half of the hinge. Again, using caution, make a gold solder joint which completes the job except for polishing and finishing. The outside ends of the hinge can be replaced by sawing it or filing it off and gold soldering a piece of square wire to the end where it attaches to the link. Cut the wire off and drill it on both sides and then put in the gold hinge pin wire. Finish the job as was previously explained.

For some unknown reason it seems that the most extreme wear on these hinge-type bracelets is the catch, the connecting links (if any) and the links next to the catch. Sometimes the catch is connected directly to the link in the band. When it is worn it must be repaired the same as any link. Such a repair is a delicate and difficult job requiring much ingenuity but it can be done as was previously explained. Possibly, some modifications may be necessary. If a 14K gold jump ring is the connecting link between the catch and band it can easily be replaced with a split ring. When it is connected it can be gold soldered in the split. If the end of the link and/or catch is badly worn or worn through, these slots can be built up using gold solder and wire either flat or round. Then fasten them with the split ring which can be gold soldered. This takes much less effort than when the hinges connect directly. In making these gold solder joints where the flow of the solder must be controlled, it is possible to use an anti-flux where you do not want it to flow and flux where you do want it to flow. This will possibly take away some of the danger of the solder flowing to the working part of the hinge and thus locking it so it will not function. Yellow ochre powder, when mixed with water or alcohol, can be applied with a fine brush as can the prepared anti-fluxes. Apply this to the area you do not want the solder to flow.

Before the electric and quartz watches dominated the watch sales there were many ladies' diamond watches with

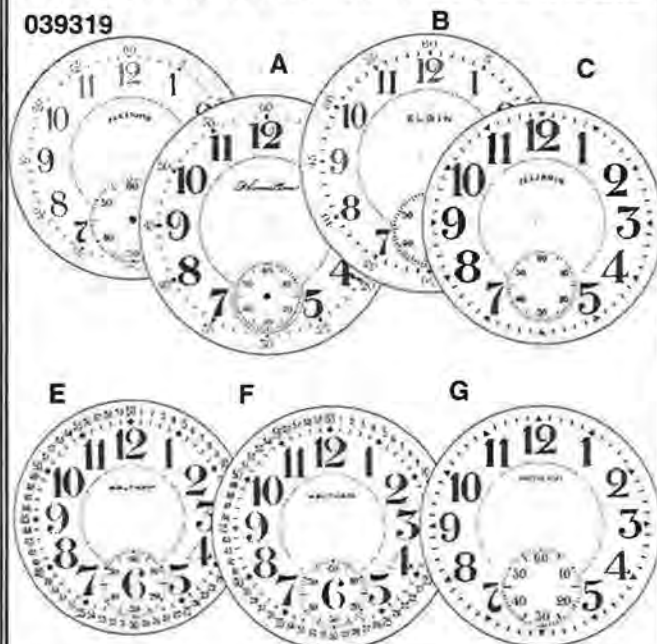
diamond link bands. Most of these bands had small melee diamonds, one in each link. These links were hinged with short pieces of round white gold wire usually .6 mm or smaller in diameter made into a half-circle. They were gold soldered into one end of the link with the arc of the circle going around a bar in the bottom of the next link. Occasionally, for some reason, one side of the link where soldered would break in the solder joint. If the wire was not badly worn or missing, it was a simple repair by bending this very small wire back into position and making a gold solder joint where it was previously soldered. If the link is separated and both half-circle wires need replacing it can be done by taking a piece of the correct diameter wire and bending it double so the ends are even. Then spread them open to the width needed to solder them back in the same spot they were in. This then can be set up by using the third hand tool to make ready for soldering. Before soldering the links containing diamonds the links must be really clean, then they should be dipped in boric acid and alcohol and burnt off, then they are fluxed. Very small chips of gold solder can be applied with the flux brush, or paste solder can be applied with the hypo needle. When all is ready, carefully apply heat until the solder flows. Remove the flame as soon as the solder flows. The wires can now be cut off and bent to hook into the next link. Shape them and again cut off to the correct length and solder. After polishing and cleaning this repair should look like any other link.

The repairs explained in this article are not a suggestion that you attempt making them on customers' valuable bracelets until you have mastered the technique. Even if you are far enough advanced and experienced, these procedures should be practiced on inexpensive or salvage materials to gain the experience necessary to make these repairs before attempting them on expensive items. After over fifty years of experience, I still practice and experiment on salvage materials before attempting to do some of these jobs on customers' valuable jewelry.

The next article will be a continuation on Miscellaneous Jewelry Repairs and possibly repairs on stone settings.

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CHAPTER #102 MAKES A SECOND CONTRIBUTION TO THE FOUCAULT PENDULUM FUND

During the June meeting of the members of NAWCC Chapter #102, composed of AWI members, Paul Wadsworth, the Chapter President, made the second donation in recent months of funds the Chapter has collected for the Foucault Pendulum Fund.

The Foucault Pendulum is the focal point in the Orville R. Hagans Time Display housed in AWI's new headquarters. Early on the Chapter pledged financial support for the installation of the pendulum. The June issue of *Horological Times* featured the presentation of a \$1,900 check by Chapter President, Paul Wadsworth.

The most recent donation check totaled \$1,800 which came from contributions of \$100 by the following members: Eugene Augustin, Clear, AK; Lawrence E. Bernard, San Francisco, CA; Ruth E. Brethorst, Mahomet, IL; Charles Cleves, Bellevue, KY; Wes Door, Kennewick, WA; James W. Dowell, Pana, IL; Paul Fehrenbach, Pittsburgh, PA; Marybess H. Grisham, Dallas, TX; Capital Area Guild No. 6, Austin, TX; Paul Highfill, Santa Maria, CA; Gene Kelton, Canoga Park, CA; Robert M. Leach, Urbana, IL; Nick Lerescu, Highland Lakes, NJ; Archie B. Perkins, Denver, CO; Dr. & Mrs. Wilbur Pritchard, Bethesda, MD; Dr. Robert Ravel, Devon, PA; Milton C. Stevens, North Bend, OH; Mr. & Mrs. Harry Wysong, Austin, TX.

James Broughton, Chairman of the AWI ELM Trust, is shown accepting the check from Paul Wadsworth. Mr. Broughton expressed thanks to all the contributors. He said this is especially timely since we just learned that additional work will need to be done to stabilize the swinging of the 285-pound mass. When the Time Display dome was designed we had not yet planned for the installation of a Foucault Pendulum. That came much later.

Many others have contributed time, talent, and labor to the project. All of these people, as well as all contributors of \$100 or more, will be recognized in the brochure that will be published and furnished to all who visit the display, or who are interested in AWI's unique pendulum. Contributions can be sent to the AWI ELM Trust Foucault Pendulum Fund. Such contributions are tax deductible.



Members of the NAWCC Chapter #102 look on as Chapter President Paul Wadsworth presents the Chapter's second contribution to the Foucault Pendulum Fund to AWI ELM Trust Chairman, James Broughton. The Chapter members met in conjunction with AWI's annual meeting in June.

CHRONOGRAPH BOOK PRESENTED TO HENRY B. FRIED LIBRARY

During the Henry B. Fried Memorial Tour to Europe which was attended by many AWI members. Gabriele Ribolini and a number of Italian craftsmen and collectors hosted the Fried tourists at a delightful reception.

During the reception Gabriele Ribolini presented a copy of the bi-lingual book *Il Cronografo*, which he and Claudio Ghidoni authored. The book is an exceptionally fine expose of chronograph watches. Shown in the center of the photo are Jack Kurdzionak and Harry Blaire, both AWI members, as they accepted the book for the Henry B. Fried Library.



Italian watch collectors presenting a book to Jack Kurdzionak for AWI's library.

MEMORIAL CONTRIBUTIONS

There can be no more fitting way to perpetuate the memory of a loved one, than by making a memorial contribution in that persons name to the AWI ELM Charitable Trust's Scholarship Fund.

Such scholarships provide tuition assistance for those who need assistance. Your contribution will help to insure the continued vitality of our craft

All memorial fund contributions are tax deductible.

MEMBERS TOUR AWI CENTRAL DURING THE ANNUAL MEETING

Friday, June 28, was an extremely busy day for all who attended the annual meetings. The chapters met during the day, a special roast/toast reception was held almost immediately after the meeting in recognition of Milt

Stevens' thirty years of service as Executive Secretary of AWI. After the reception the members boarded a bus which took them to the new AWI headquarters building in Harrison, Ohio.

Here are some scenes from the museum. ELM Trustees and their wives had spent several days, prior to the meeting, preparing and refurbishing the displays.



Figure 1. The excitement around the case on the right is centered on the first-prize winning tourbillon clock which Gerhard Hutter (back to the wall) brought with him from the NAWCC convention the week previous. Such excellence in craftsmanship is nothing new to Mr. Hutter as he has won first-place awards in previous competitions.



Figure 2. With the Foucault Pendulum swinging in the foreground, the guests examine and discuss the piece on display.



Figure 3. Note the bow tie in the foreground which is standing on the registration desk at the museum entrance. This is the same bow tie that Ben Matz wore to twenty consecutive AWI meetings prior to its retirement to the museum.

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MUSIC BOX CLOCKS

TWELVE-TUNE MUSIC BOX WITH SIX BELLS, PART 14

By Leo A. Jaroslaw

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Inspect pins around the circumference of the cylinder in bands of three or four of the scribed lines. Go around at least twice on each band to make sure you didn't miss any bent pins. Start and end at the start/stop gap in the pins. The pins do not have to be absolutely straight (side to side). The main purpose is to prevent the pin from interfering with adjacent comb teeth. There is some tolerance allowable, so eyeballing is close enough.

Introduction

In Part 13 we covered the cylinder assembly as a whole. In this part we will work on the cylinder and pins.

19. INSPECTION AND CORRECTION OF THE CYLINDER AND PINS. (See Figure 14.1.)

19.1. Set up cylinder on a stand which will allow easy rotation, while providing safe clearance for the pins.

NOTE: See Figure 14.1 for the jig I built for this operation. It can also be used later when cleaning and polishing the cylinder. All pin straightening and corrosion removal should be accomplished prior to cylinder cleaning to minimize handling of the cylinder afterwards.

19.2. Removal of corrosion.

Upon inspection the cylinder had about twenty badly corroded spots, with many minor ones. The bad spots in some cases were quite green rather than brown. When cleaned, these green spots left a pitted area which had to be left as is. I believe at some time past some liquid was accidentally splattered onto the cylinder. (See Figure 14.2.)

Some of the authors I have read on the subject recommend brass wire brushes for removal of corrosion. I've tried these as well as a fiberglass brush. The fiberglass brush proved most effective. There are several on the market. I used the scratch brush pencil (LaRose #061197).

19.3. Pin straightening.

19.3.1. Mount the cylinder on a stand such as described in 14.1 above.

19.3.2. Inspect the pins for position, rake and bend.

NOTE: On the Twelve-Tune, with bells cylinder the number of pins would be in the several thousands. On some cylinders all the pins are raked. In raking the pins are bent in the direction of the rotation at the time of manufacture. Theoretically the release of the tooth after lift by the pin is smoother, and the tendency to bend the pin by the pressure on the tooth is reduced. Practically, however, it makes little difference. The pins on the cylinder we are discussing are radial, not raked.

Use a loupe or binocular magnifier (preferably 4" focus) when inspecting or working on the pins. I used the 4" focus binocular magnifier.

19.3.3. First determine if the teeth are raked.

19.3.3.1. If the pins are raked, look for any incorrect rake. These pins will be obvious, and are to be reset later when

straightening bent pins.

19.3.4. On all cylinders (both raked and radial pins) inspect for bent pins.

NOTE: *On some cylinders—some pins lean a little sideways, with a majority of the pins which do not, straight ahead leaning fairly uniformly. Only those pins leaning in an opposite direction or more than the others will require resetting. (See Figure 14.3.)*

Inspect pins around the circumference of the cylinder in bands of three or four of the scribed lines. Go around at least twice on each band to make sure you didn't miss any bent pins. Start and end at the start/stop gap in the pins.

I found it best to look straight down on top of the cylinder, then move my eyes towards the quarter ahead. In that way you can see the pins from several directions/positions as you rotate the cylinder.

19.3.4.1. Mark all bent pins on the adjacent cylinder surface with a felt marker. The ink will come off when cleaning the cylinder.

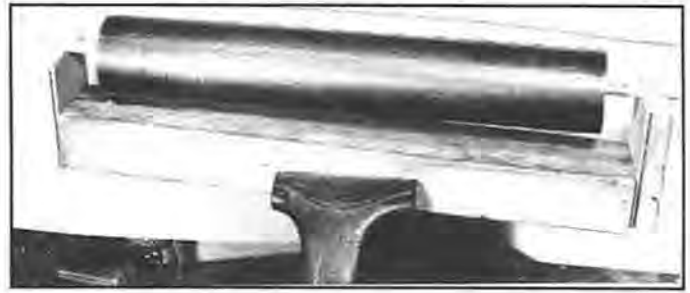


Figure 14.1. Cylinder mounted in jig.



Figure 14.2. Corrosion on cylinder.

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Figure 14.3. Bent pins.



Figure 14.4. Pin straightening tool.

19.4. STRAIGHTEN BENT PINS.

NOTE: *There are several tools that can be used to straighten bent pins.*

1) A jewelers/watchmakers screwdriver. This is used by pressing the blade tip to the bottom of the pin and lifting the driver against the pin in the direction to correct the condition.

2) A hypodermic needle which fits over the pin. You will need a wire which fits inside the needle for two purposes. One, when cutting the needle to a working length, the wire inside will prevent the collapse of the needle. The other, in case a pin breaks off and lodges inside the needle. The wire is used to eject the broken pin.

3) A special tool designed for this purpose. It is similar to a pin vise with an adjustable chuck. The chuck however is turned down to almost a point to allow access to close adjacent pins. (See Figure 14.4.) This tool is available from the supplier I will list with the bibliography at the end of the series.

There is a probability of pins breaking when being straightened. This is most probable when the pins are severely bent; even flattened against the cylinder. (See Figure 14.3.) Some writers say a possibility of 20% breakage. If badly bent, the pin should be lifted slowly in stages.

The pins do not have to be absolutely straight (side to side). The main purpose is to prevent the pin from interfering with adjacent comb teeth. There is some tolerance allowable, so eyeballing is close enough.

On the cylinder we are discussing, I straightened seventy-nine pins and broke only two. Both of these were completely bent down to the cylinder.

This completes Part 14. In Part 15 we will be cleaning and polishing the cylinder.

MOVEMENT BANK DONATIONS

The AWI ELM Charitable Trust provides assistance with hard-to-find replacement parts for vintage watches. When a member needs a replacement part and is not able to locate one through their normal sources, the Movement Bank/Material Search Network often is able to help.

The need is first faxed to the participants in the Material Search process to see if they can supply a new part. If no source is found we then search through the vintage movements that have been donated to the Movement Bank for a usable spare part. A nominal fee of \$5 for each part requested is charged to cover the costs involved. The fee is waived if a vintage watch movement is donated for each part requested. The movement should be substantially complete.

YOUR CONTRIBUTIONS OF MOVEMENTS TO THE MOVEMENT BANK WILL INSURE CONTINUATION OF THIS SERVICE FOR PRESENT AND FUTURE CRAFTSMEN. DONATIONS ARE TAX DEDUCTIBLE.

THE 1996 BATTERY CONTEST

This year's Battery Contest enjoyed outstanding support from the chapters and from individual contributors. During the annual meeting all of the batteries collected during the year were weighed and the winners in the chapter competition were as follows:

	<u>Category 1</u>	<u>Category 2</u>	<u>Category 3</u>
1st Place	Ohio	North Carolina	Arizona
2nd Place	Pennsylvania	New Jersey	West Virginia
3rd Place	Florida	Virginia	Maine

Grand Champion—North Carolina with 256 1/2 pounds

A total of 842 1/2 pounds of salvageable batteries were donated.



The Trustees immediately presented William R. Pleiman, West Harrison, Indiana, with the Trust's Battery Reclamation Scholarship. Shown in the photo is William Pleiman (right) as James Broughton (left), Chairman of the ELM Trust, makes the presentation. M.R. Carpenter (center), AWI President, looks on.

Fred Burckhardt, Chairman of the Trust's Battery Collection Competition, thanked everyone for their cooperation during the year. He pointed with pride to the fact that the total amount received for the batteries (\$3,700) was applied to this year's scholarship.

Everyone who contributed batteries should also be proud of their role in helping to insure that our trade has an adequate number of fully trained craftsmen to carry on the tradition of this profession. Burckhardt appealed to everyone to continue their support of the Battery Collection Program during the coming year.

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Tools from A to Z

THE NOVICE WATCHMAKER

A BRIEF HISTORY OF WATCH CLEANING, PART I

By David A. Christianson, CMW, FBHI

The world of watch servicing has changed. The mechanical watches coming in for service now are not so relatively new, anymore. Complicated watches do not lend themselves to ultrasonic cleaning for reasons we'll see later. Neither do the old and very old movements.

We'll begin our look at watch cleaning methods by looking first at the beginning of the seventeenth century. A newly emerging class of craftsman were designing and producing portable timepieces to become known as the watch. The work was so highly skilled and so labor intensive that only royalty could afford to pay the craftsman's labor; after all a watch could take well over a year to produce since there were no mechanized tools to help the watchmaker create his unique pieces.

Animal oils and greases were the means used to lubricate these marvelous machines that recorded the lapse of time. As time wore on and the lubricants thickened and became rancid, the watch would stop running. A new trade would eventually evolve from this need to service these and future timepieces. But for the time, cleaning what the master had made was relegated to his more advanced apprentices. Wiping with a chamois cloth then dry brushing the plates and wheels was the cleaning method of choice. The pivot holes would be thoroughly pegged with thin, sharpened pencils of wood. As the fully disassembled watch components were brushed, the brush itself was frequently cleaned by passing the brush over a cake of finely ground chalk or whiting (French-produced chalk was said to be the best); or over a "burnt bone" (literally a boiled bone that was burnt in low embers for a couple of hours). Some observant repairers even noticed that leaving a bit of the chalk on the brush while cleaning the gilded movement plates would improve the brightness of the gilding.

This method of dry cleaning became the traditional method of cleaning watch movements, being used almost exclusively for two hundred years.

The beginnings of the eighteenth century brought a method of improving the efficiency of hand manufacturing. The resulting movements became known as "ebauches" or "rough movements" or "movements in the gray." The movements were made by groups of specialist manufacturers: escapement-makers, frame-makers, wheel-makers, spring-makers, and so on. They were then sent to the watchmaker or finisher who polished them, engraved them, gilded them, timed them and made all of the final adjustments to them. This method not only benefited the big name makers, like Tompion (who started it) and Breguet, but it benefited the local watchmaker and a slowly emerging group of consumers in the tradesman and craftsman classes of society.

The big name makers, with their large shops of watchmakers, could relegate the finishing of these ebauches to their shop personnel and never touch one of these "gray movements." This practice freed the master's time for research and development of improved escapements, complications, and motive powers.

The local, independent watchmaker could purchase these ebauches, finish them to his own standards and supply his own growing class of tradesmen and professional consumers.

Of course this growing class of upper income consumers benefited by being able to afford portable timepieces that were until recently the sole province of the very, very wealthy.

By the beginning of the nineteenth century, the industrial revolution, advances in machine tools, interchangeability, an expanding pool of consumers with a disposable income and a growing consumer demand all combined to set the stage for individual

watch factories to produce and market fully finished watch movements. Even into the late nineteenth century some ebauche manufacturers were still producing ebauches for the finishing watchmakers, but by this time the movements were so well finished during manufacture that they required little or no additional work by the finishers who bought them.

By the beginning of the nineteenth century, hundreds of thousands of watches were in the hands of the public. People, by now, depended on their individual watches to schedule their daily routines in business and leisure. Local watchmakers had ceased finishing ebauches and instead concentrated on servicing the watches already in use. Because of the large numbers in use and the demands on the watchmakers' time, more efficient means of cleaning watch movements evolved. Dry brushing was out except by a relatively small number of traditionalists.

Evolution in Cleaning Methods

Solvent cleaning (using soft soap and water with an alcohol rinse) had always been used during the making of watch movements from the earliest days, but watch repairers now started using this wet cleaning method for after-market service, too.

Some repairmen followed the soft soap and water wash with a benzene wash followed by drying in warm sawdust; and then followed by dry brushing in the traditional manner. If the lubricants were stiff and thick, a solvent such as carbon tetrachloride (followed by an alcohol rinse) was brushed on before the benzene wash.

Some repairmen skipped the soap and water wash and started with the carbon tetrachloride or the benzene wash. The conscientious repairmen fully disassembled each movement, scrubbed each part, pegged each pivot hole and each pinion leaf. Some would string the various components on wires and dip the parts in solution jars, scrubbing only the pieces that needed it.

A ten-second dip in a cyanide solution (followed by a soft water rinse and boxwood sawdust drying) was used to remove verdigris from the brass components and brighten the gilded plates. Unfortunately, it was not unusual to find a local watchmaker slumped over his bench, the victim of a careless whiff of this deadly product. The cyanide dip persisted into the mid-twentieth century but was eventually replaced by adding a bit of ammonia to the washing solution.

By the early twentieth century, factory-produced cleaning solutions replaced the soap and water wash. The individual components were strung on wires or placed in compartmentalized wire mesh baskets and soaked in a solution-filled jar for a few minutes. If the plates and wheels were badly tarnished, they were brushed individually with the cleaning solution and a soft brush.

The mesh basket was then placed in a benzene jar, shaken lightly to rinse off the cleaning solution, and then shaken in another jar of clean benzene for the final rinse. The parts were blotted dry, or blown dry with a bench blower, or shaken in a box of fine boxwood sawdust, depending on the size and delicacy of the watch part and the method preferred by the repairman.

As you can see, by the mid-1950s, cleaning methods hadn't

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changed too much. In fact, other than the change from mixing his own soap and water solution, to buying his own pre-mix, little had changed. Other than the traditional dry brushing method which persisted as a final cleaning procedure even with solvent cleaning, this wet-method of after-market cleaning didn't change much for two hundred years. In the early days the solvents were brushed on by hand (being stored in covered dishes on the watchmaker's bench). Later the watch components were gathered in mesh baskets and agitated by hand in larger jars filled with solvents and rinses.

The formulas for the hand-made soap and water solutions varied, some contained naphtha, others oleic acid, some "Spic & Span," others green soap, or laundry soap. But most now contained ammonia as a brightening agent. No matter the concoction, they all did a good job of degreasing the movement: as long as the movement was fully disassembled; the holes, pivots, pinions and wheels pegged; and as long as the various parts were well rinsed in two or three separate jars of warm, distilled water, followed by a benzene or alcohol rinse to remove all vestiges of soap scum and water.

Even the motorized cleaning machine that first appeared near the turn of the twentieth century used the same soap and water solutions (whether hand concocted or factory formulated); it simply took the drudgery out of dipping and swishing by hand. The machine did it for you; followed by a benzene or alcohol rinse and sawdust drying.

Heated drying chambers were added to the machines with the advent of specially formulated rinses that would safely evaporate in the heated chambers. Benzene was then out as a final rinse in the heating chambers; it was much too volatile. Alcohol, likewise, was out; it was much too flammable.

By the late 1940s most production watchmakers were using factory formulated cleaning solutions and rinses in motorized cleaning machines. The machines, themselves, evolved to include automatic advancement from jar to jar, with timed spin-offs between jars.

In the 1960s ultrasonic transducers were added to the existing machines to allow a more thorough penetration of solutions into the crevices of the movements. Special cleaning and rinse solutions were formulated that would penetrate the cracks and crevices even more thoroughly with the aid of the ultrasonic cavitation.

There were more watches in use and more watches being serviced than at any time in history: they all were mechanical, they all needed servicing on a frequent basis, and in most cases it was much cheaper to service the watch than to replace it. All these factors put quite a burden on the individual watch repairman, even though there were more practicing watchmakers than at any time in history.

Ultrasonics

With the advent of ultrasonic cleaning the watchmaker could get a handle on the volume of watches coming into his shop for cleaning. With ultrasonics, the watchmaker didn't have to disassemble the movements or so said the manufacturers of both the

machines and the solutions. With the advent of the "one-step" and "two-step" lubricants that were added to the rinse solutions, the watchmaker didn't even have to lubricate the movements—so said the manufacturers of the lubricants. Watch repairmen by the thousands took to this new and innovative approach to cleaning: no disassembly, automatic cleaning and lubricating, all done by machine.

It was a miracle cure for the numerous cleaning jobs that were clogging the system. Like adding a new eager apprentice to each shop, the new cleaning procedure took the drudgery out of watch work and freed up the watchmaker to tackle the more complex and serious jobs.

But like all panaceas, the new method had its drawbacks, although the pluses far outweighed the minuses. Watchmakers soon learned that partial disassembly was necessary to get good cleaning results. The barrel bridge and barrel were removed and the barrel opened up. Some removed the balance and hairspring assembly and cleaned it separately in hairspring cleaner and dried it in fine boxwood sawdust. Others left the balance assembly in the movement, pulling the balance bridge and assembly out before the final rinse lube. And others let the balance assembly go on through the complete cycle, including the final rinse lube; and then pulled the balance and its hairspring out to clean in hairspring cleaner.

The manufacturers of both the solutions and the machines claimed that the system would clean the balance hole and cap jewels while assembled in the movement. All one had to do was add oil to the jewels by removing the balance bridge and feeding oil in through the hole jewels.

The system worked with these modifications. It still was a panacea for the overworked repairman. For thirty years the watchmaker has used this ultrasonic cleaning system to his advantage. But where there is advantage, there is the potential for abuse. And abuse the system, many did. It was so easy to run chronographs and other complicated pieces through the system and final rinse lube. After cleaning the hairspring and adding oil to the balance jewels, the watches ran well. Never mind that one couldn't remove the mainspring barrels without disassembly of much of the complications in these watches; many just left them in the movements, intact.

The very old watches, with their dried up oils and green-colored plates came through the system well, it seemed. They looked brand new, never mind that they didn't time out well to the various positions. Even poisoning the balance didn't help with poise error. But so what, they were old and of sentimental value, it didn't matter that they didn't keep consistent time. With regular watches, too, it was easy to leave the mainspring barrel intact during cleaning. It was too easy not to bother adding oil to the balance jewels: let the machine lubricate them for you. And how about the just plain filthy watches encountered in the rural and industrial sectors ... just run them through, too, without disassembly ... they come out looking good. Never mind that they, too, don't seem to time out so well; they still seemed to run fairly well for a while (after all, they're abused by their owners, right?).

This is where we are today. The miracle of the 1960s, the

ultrasonic watch cleaning system, is no longer the panacea. It had its time and place. When the mechanical wristwatch was at its height, when everyone had at least one and they were relatively new (within ten to twenty years) and people were accustomed to having them serviced every few years, the ultrasonic method was a savior.

With the advent of the inexpensive quartz watch movement, most of the mechanical watches of the 1940s, 1950s, and 1960s were relegated to the junk drawer or "saved" for the grandkids. When these inexpensive quartz movements need servicing, most people either replace their watch or have the movement replaced; it's easier and in most cases less expensive than having the movement serviced. The better watches with their quartz movements protected in a case with back gaskets and crown gaskets, tend to last several years before needing service. By this time many replace their watches with new ones because the cases of base metal look quite shabby, or they have them serviced.

The world of watch servicing has changed. The mechanical watches coming in for service now are not so relatively new, anymore. Complicated watches do not lend themselves to ultrasonic cleaning for reasons we'll see later. Neither do the old and very old movements. In many cases the quartz movements are not very compatible with the ultrasonic method of cleaning. The average watchmaker finds a number of the ancient fusee movements coming across his bench, as well as a number of the very old Swiss and English lever movements. The old American pocket movements have become a mainstay, as well as the older complicated movements, including chronographs, chronometers and repeaters of various types.

With a new mix of movements: some new, some old, and some very old, different ways of handling each type of movement are necessary. The ultrasonic cleaning method of the recent past is not entirely sufficient for the variety of watches coming across our benches today.

This concludes our brief look at the evolution of watch cleaning methods. Next time we'll look at contemporary methods of cleaning. We'll see that (in many cases) the old methods are new again; yet we'll see that some variations on the ultrasonic method are useful, too. And we'll see if we can learn why certain methods of cleaning should be used with certain types and ages of watch movements to get the best results.

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Woody Retires

After teaching Watch, Clock and Jewelry Repair at St. Paul Technical College for the past thirty years, Woody Woodward has retired. Woody's plans are to do some traveling, set up a small repair shop in his home, and to write a book.

Joe Takes Over

Joe Juare has been hired as the new Watch, Clock, and Jewelry instructor. Joe is a 1988 graduate of Woody's and he is a graduate of the six-month Refresher Watch Repair Course, given by WOSTEP in Neufchatel, Switzerland.

He is married to Janelle and they

have two children, Andrew who is 3 1/2 years old and Olivia who is 1 1/2 years old. They own and operate a retail business in Stillwater, Minnesota.

Joe has just completed his first year as the new Watch, Clock, and Jewelry Repair instructor and he has already made some basic changes that will give more people the opportunity to attend classes.

Starting with the Summer of 1996, classes will be open year round. This will allow students to set a schedule and stay with it until they have reached their goal. No long interruptions in education over the summer.

Starting in September of 1996, Joe will be adding an Evening Course in Watch Repair, one night a week. This will help those who have other obligations during the day, but still want

to learn Watch Repairing. This evening course will help those who would like to make a career change, but still need the money from the day-time job.

Joe has also organized the curriculum so that a person can come in for one, two, three, or four quarters, depending on their goals which could be anything from learning how to change batteries in quartz watches, to truing a hairspring in an antique pocket watch or regulating the tuning fork in a Bulova Accutron.

If you have any questions or if you want to know more about attending one of the classes, you can contact Joe on the school's classroom phone at (612) 221-1408, or you can reach Joe on his pager at (612) 580-5064, or at Joe's workshop at (612) 430-9470. ☺



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EDUCATION

UPDATE

By James E. Lubic

As you are well aware, the Academy of Watchmaking began its first 45-week session July 15, 1996. There are six well-qualified full-time students attending. By the time you read this they will have completed all their skill-building projects (sawing, filing, and lathe) and finally will be getting into the watch movement.

On July 24, 1996, President Buddy Carpenter and Chairman of the ELM Trust, Jim Broughton, presented each student with their scholarship. The Hattori USA Scholarship was awarded to Phillip J. Stoller of Bloomington, Illinois; the J.M. Huckabee Scholarship was awarded to William O. Overturf of Akron, Ohio; William R. Pleiman of West Harrison, Indiana was awarded the ELM Trust Battery Reclamation Scholarship; and Chris Gurule of Albuquerque, New Mexico,

received the ELM Trust Memorial Scholarship. Nestor Hincapie of New York City, and Chip Lim of Castro Valley, California received 50% scholarships and a student loan sponsored by the ELM Trust.

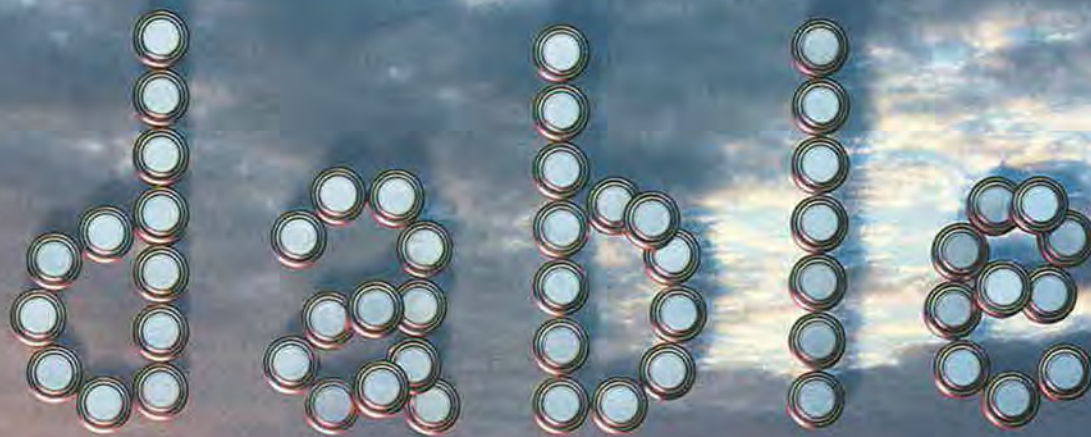
Registrations for upcoming Bench Courses are progressing on schedule with the exception of Mechanical Watch Repair, October 4-6 in Cleveland, Ohio. Only one member has registered so far for that particular course. There are openings in all the other courses except of course the ones that are indicated as being full on the schedule located on the back cover. The same is true with all the Project Extend Courses as well.

Remember all AWI courses are taught by true professionals in the trade. Where else can you get that type of training for \$50 per day? The contacts you make with other craftsmen is worth the price of

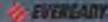
admission. So take a weekend off from the everyday grind and learn a new skill or get updated on an old one. 



Left to Right. ELM Trust chairman, Jim Broughton; William Overturf; Jim Lubic, Instructor; Phillip Stoller; President, Buddy Carpenter; William Pleiman; Chris Gurule; and Nestor Hincapie.



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A COMPLETE SERIES OF BENCH PRACTICES

USES OF STAKING SET STUMPS, PART 1

By Henry B. Fried,
CMW, CMC, FAWI, FBHI, ★FNAWCC
© 1996 (All rights reserved by the author)

***Generally, in the modern staking set,
the punches go through different
tempering processes. Not all punches
are of uniform hardness.***

***To use the punches unnecessarily as
stumps when a stump is handy, invites
the shattering of the punch because it
was too brittle, or spoiling it because it
was, of necessity, made softer for
the sake of toughness.***

A little used part of one of the watchmaker's most versatile tools, the staking set, are the stumps supplied with each set. Of various sizes and shapes, these stumps are each designed for a specific use.

Many watchmakers often have jobs calling for an increase of the endshake in a barrel, the staking of rollers or staffs for old three-arm balances, hole closing, and other odd jobs. To perform these tasks they resort to the use of makeshift tools or methods, not realizing that in their own staking sets are stumps that were made specifically for the job they intend to perform.

Staking sets have always been supplied with many stumps of various sizes and shapes, each one to serve a specific purpose. However, they are included in these sets with the premise that the buyer has a full knowledge of their use. Possibly for this reason no manual of instructions is included. It is intended here to describe the various stumps and their use.

Generally, in the modern staking set, the punches go through different tempering processes. Not all punches are of uniform hardness. For instance, a cross-hole punch, used in conjunction with a roller remover and in other staff work, is annealed after hardening to a much greater extent than a round-faced solid punch. Mouth-tapered punches also are not as hard as riveting punches or the flat-faced punches. These facts must then be considered. Because stumps must often act as miniature anvils and take a great deal of abuse, they are left much harder after the necessary tempering process is completed.

To use the punches unnecessarily as stumps when a stump is handy, invites the shattering of the punch because it was too brittle, or spoiling it because it was, of necessity, made softer for the sake of toughness.

Stumps should not be abused so that their surfaces become badly nicked, dented, scratched, or rusted. The work resting on a stump will directly reflect the condition of its surface. Scratches and dents on the stumps mar the finish of objects that rest upon them. Rusted or damaged flat stumps may be refinished with a screwhead polishing tool.

When using fiat-faced stumps, it is advisable to use one with the largest diameter the work will permit. In this way, the work rests on a large, flat surface, giving it stability and easier manipulation.

In Figure 1, is shown a high-grade clutch lever resting upon a flat-faced solid stump in preparation for taking out a bend. With a stump of this diameter, it is possible to rest the piece on the flat, raised table without the possibility of it falling off or shifting while the lever is being pressed. Where possible in the use of flat-table stumps, the largest size available should be utilized.

In Figure 2 is shown a stump used to stake on single rollers and the lower part of two-piece rollers. Staking sets come equipped with these stumps graduated in hole size, outside diameter, and also in width and depth of the slot which accommodates the jewel.

In selecting a stump for this operation, the staff's roller post must fit into the center hole of the stump with ample room around it. The stump must also have its slot wide enough and sufficiently deep to accommodate the roller jewel. The slot must also be cut close to the center hole in the stump, so that the roller jewel will

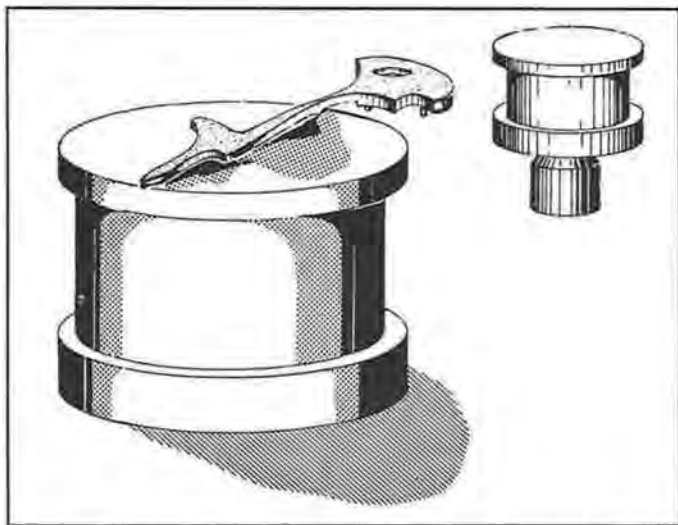


Figure 1. Large flat-faced solid stump can be used as an anvil for straightening bent pieces such as the clutch lever shown.

have clearance from the rear as well as from its sides and depth. Otherwise this jewel might crack or break when the roller is pressed downward.

To use this stump, the roller table or disc is placed upon the staff with the tweezers, pushing it down far enough so that it will not fall off when the balance is turned over. The stump is placed in the staking die, centered and then locked in place. The staff and roller are then placed over and on the stump. A flat-faced

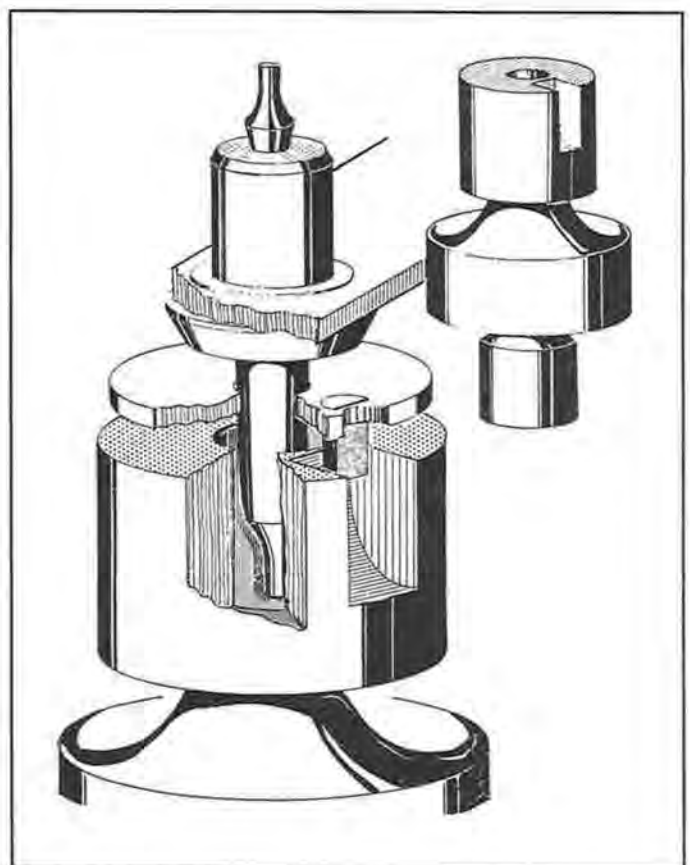


Figure 2. This stump is used to stake on single rollers and lower part of two-piece rollers.

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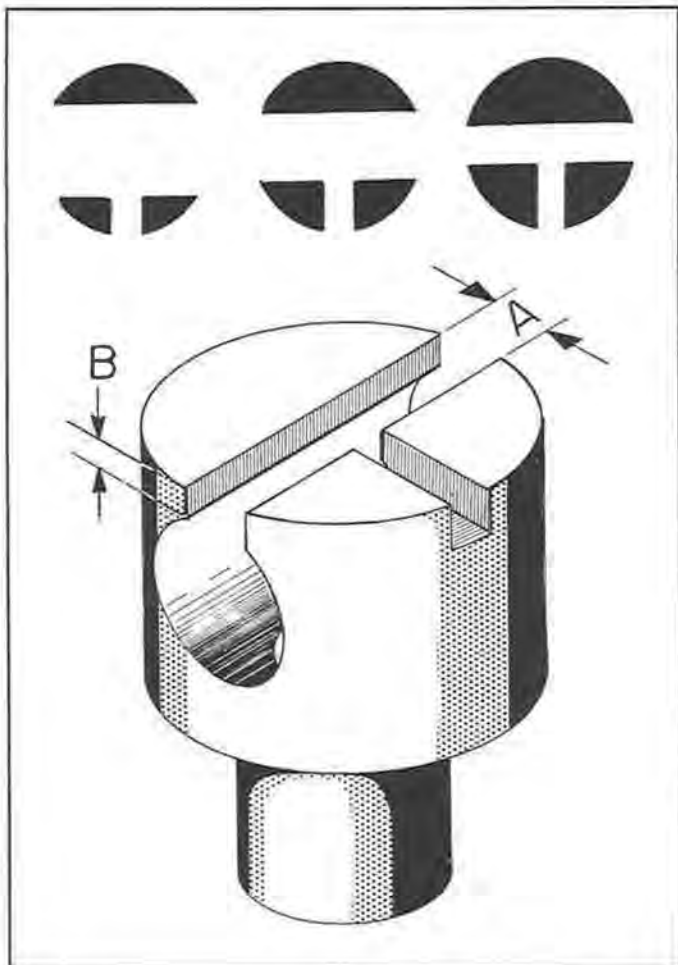


Figure 3. A type of stump still included in staking sets for use in removing rollers.

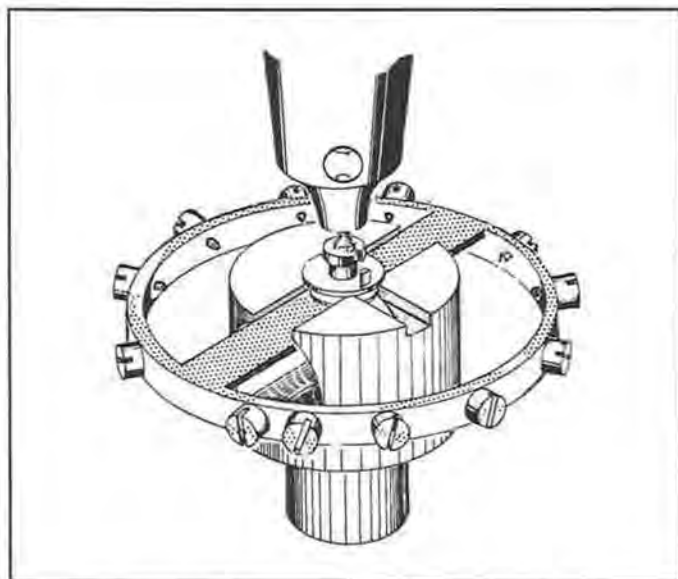


Figure 4. Use of roller-removing stump. Balance arm is below slot while as much of the roller as possible rests on stump.

hollow punch is then fitted over the hairspring shoulder of the staff and as the hammer taps the punch lightly, the balance is pushed down onto the roller so that when the job is done, the roller rests snug against the balance staff hub.

Some watchmakers prefer not to use the roller stump for this operation, but rather a flat-faced hollow stump to rest the balance on it so that the hairspring shoulder of the staff is in the hole of this hollow stump. Or by inverting the staff, and with a punch, bearing the same characteristics as the stump in Figure 2, the roller is pushed downwards.

In Figure 3, is shown a type of stump that is still included in staking sets and is used to remove rollers. While roller removers are sold as separate items and tools, staking set manufacturers still include them in order to give versatility to their product.

These roller-removing stumps are not adjustable for rollers of many sizes. That is, they cannot be made wider or narrower. To remove the roller, the balance must be manipulated so that it is edged between the jaws of the stump, and the roller rests on the stump as shown in Figure 4. Here, the roller's edges rest upon the stump, while the balance arms or spokes are below the lips of the stump. To fit the balance to the stump, it is tilted so that the balance arm, which is often wider than slot "A" (Figure 3), may be edged in under the slot and thus permit as much of the roller to rest on the stump as possible. If the roller is supported merely at its extreme edges, it may crack or bend, and furthermore, it may be difficult to remove. This is due to the slight bending of the roller disc, causing the warped hole to pinch the sides of the roller post.

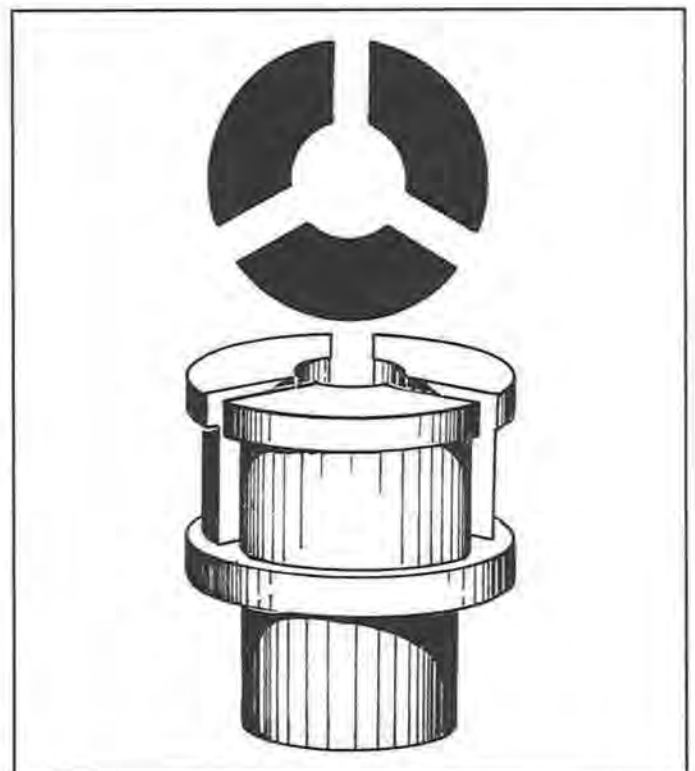


Figure 5. Least known of all the staking set stumps are these tri-slotted ones used for removing rollers from old three-armed balances.

To make use of these stumps, the slot "A" (Figure 3), must either be wider than the balance arm, or the thickness of the lips "B" must be thinner than the height of the balance hub of the staff. Figure 4 shows how the balance must rest on the jaws of the roller stump before the roller can successfully be removed. In the upper section of Figure 3, is shown a silhouette of a set of three roller-removing stumps. Notice that they vary not in diameter but rather in the distance between the jaws. This variation provides for the differences in both roller diameters and balance arm widths. The cross slot is to provide for clearance of the roller jewel, should it project slightly below the roller disc.

Probably the least used of all stumps in the staking set are those pictured in Figure 5. These tri-slotted hollow flat-faced stumps often puzzle users, especially the younger watchmakers. They are employed when rollers must be removed from old, three-armed balances. Sometimes, these stumps have six radial slots in an attempt by the makers to give them a wider range of employment. This makes it possible to use them with both two or three arm balances and sometimes with six-spoked chronograph wheels with special discs on their arbors or pinions. Figure 6 shows an old three-armed balance with a roller resting on such a stump in preparation for the removal of its roller.

The round-faced solid stump shown in Figure 7 is used to close holes in brass and steel plates or objects. These may be used as a base or stump in conjunction with a punch of similar curvature and radius when the hole to be closed does not act as a bearing, or where endshake is of no concern. Such a case may be the brass cam of a clock or a thick clock wheel that must be driven friction-tight onto an arbor or post. It is also used when a pallet fork must be stretched.

Here the fork is rested on the central portion of the stump and a peening punch is brought over the fork and is lightly tapped. This method has less tendency to bend the fork while it is being stretched, as might be the case when it is rested on a flat-faced solid stump.

In hole-closing operations, generally, the purpose of the stump is to serve as a base or anvil upon which the work is rested while the punch does the job. The use of the proper stump, however,

will go a long way to insure a successful job. To close a hole in a bushing or plate, the plate is rested on a flat-faced solid stump whose diameter most nearly fits into the countersink in the bottom of the plate. When such a stump is unavailable, a wide diameter flat-faced solid punch (inverted) may be used. If the bushing has an oil sink, a round punch, slightly smaller in radius than the oil sink is used. This is recommended because its smaller size permits its surface to reach down against the hole and yet contact as much of the area in the "sink" as possible. When the punch is tapped with the hammer, the hole will close more through the depth of the hole rather than merely pinch in the topside alone. This operation is shown in Figure 8.

"Uses of Staking Set Stumps" will be continued next month. ☛

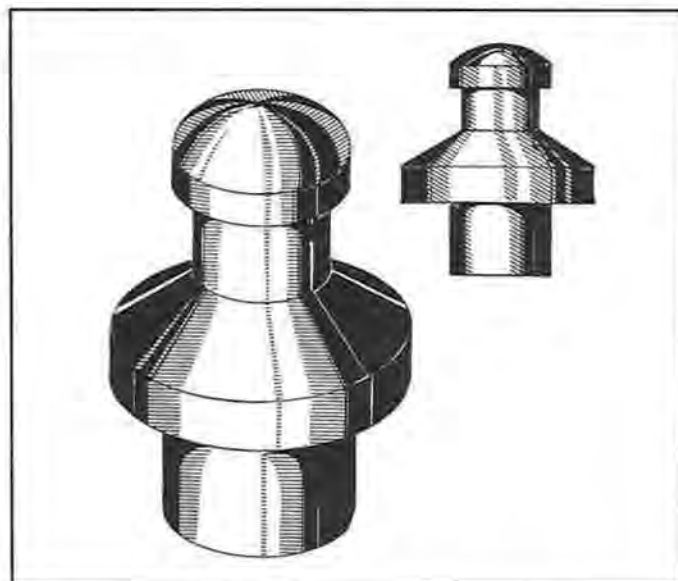


Figure 7. Round-faced solid stump is used to close a hole in a brass or steel plate or object such as a thick clock wheel that is driven friction-tight on an arbor or post.

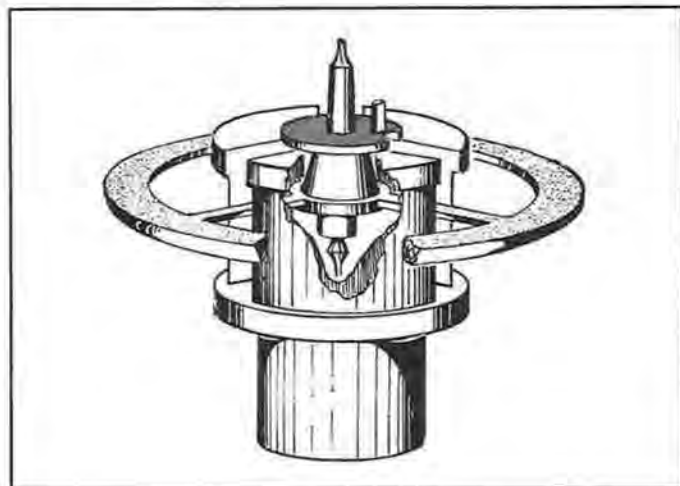


Figure 6. Three-armed balance resting upon tri-slotted stump in preparation for removing roller.

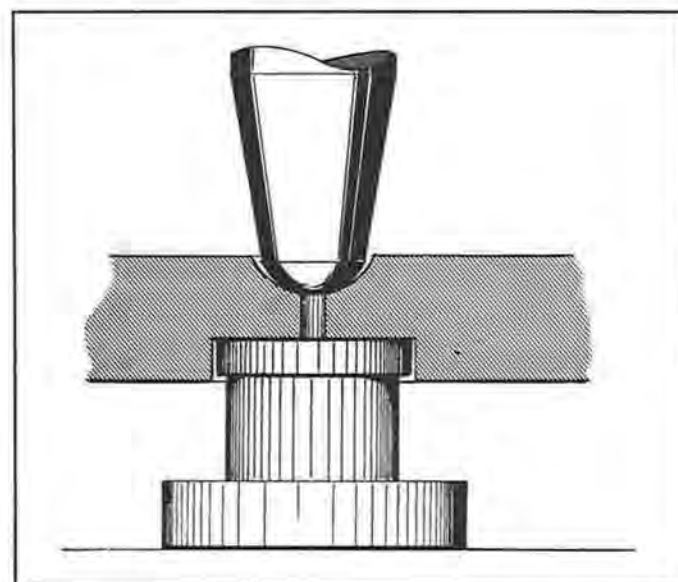


Figure 8. A round punch used in conjunction with a flat-faced solid stump can be used to close a hole in an oil-sink as shown.

A PRACTICAL COURSE IN CLOCK REPAIR

UNIT 2

LATHE CUTTING TOOLS

By John P. Kenyon, CMC

In order to remove metal efficiently and effectively with a lathe, a cutting tool is used. Lathe cutting tools are single-point tools, distinctly shaped for specific types of turning. A typical machinist's tool room lathe and some miniature lathes are equipped with compound slide rests and tool post attachments to hold the cutting tool, called a "tool bit." These accessories are available for watchmaker's lathes, and are necessary for some specialized work, but most clockmakers use a hand-held version of the tool bit, called a graver.

Gravers are available in a variety of sizes and shapes from horological suppliers. Sizes are designated by number, 1 to 12, increasing in size as the number gets larger. Most lathe work in clock repair can be accomplished with size 6 (3/32") or 7 (1/8").

Carbide (tungsten-carbide) and tool steel gravers are generally used in the horological trade. Carbide gravers are well suited for high-speed cutting of hard metals, and will stay sharp indefinitely, if used correctly. You can make a set of tool steel gravers in your shop. They must be sharpened more frequently than carbide, but if used and maintained properly they will work fine.

A cutting tool is ground to a precise shape so that the cutting edge will penetrate the work and remove metal efficiently. The clockmaker needs to be familiar with the various shapes in order to select the proper tool for the job. In addition, he should be capable of making a functional tool with the required cutting edge.

A set of ten or so gravers for routine work can be purchased from suppliers, but those required for some specialized work will have to be made in the shop.

A graver can be made from round high-carbon steel drill rod. A length (about 3") is filed to a square section for about 1". The end is "roughed out" and then ground to final shape on a conventional emery grinding wheel. The design of the end conforms with the service expected of it. A tang is

filed on the other end for a handle. The graver is then cleaned with a solvent, and the cutting end is hardened and tempered to a pale straw color.

Grinding causes microscopic burrs to form on the cutting edges. This saw-tooth edge is excellent for cutting tempered steel and is also satisfactory for a "rough cut" on brass. If a smooth bright finish is desired, the edge should be removed by stoning the graver on an Arkansas stone with a few drops of light oil, and then honing the flat sides. For a smoother finish on brass, a graver can be polished with a piece of smooth leather that has been glued to a flat board and "charged" with a polishing compound.

Some of the most common types of gravers are discussed below.

Square Graver

A square graver (Figure 1a) can be made as illustrated, by shaping the end to an angle of 45°, and then sharpening the sides and face on a flat hard Arkansas stone with oil. This graver is used for regular turning, and for cutting straight shoulders on pivots and arbors.

Lozenge Graver

A lozenge or diamond-shaped graver (Figure 1b) is made in the same manner as a square one, but sharpened to an angle of 30°. This sharp angle provides a long thin point for undercutting pivots and shoulders and for making a center for pivot work.

Shouldering Graver

A shouldering graver (Figure 1c) is made in the same manner as a square one, with the end ground and sharpened to an angle of 45°. The point is then ground off at a right angle to the left cutting edge, as shown in the illustration. It is used for cutting square shoulders.

Round-Nosed Graver

A round-nosed graver (Figure 1d) is made in the same manner as a square one, with the end ground and sharpened to an angle of 45°. The point is

When sharpening a graver, be careful not to let the cutting edge overheat, or the temper will be lost. It should never get hot enough to require water for cooling.

then rounded off as shown in the drawing. It is used for cutting round bottom grooves, curved shoulders, and coned pivots.

Cutting-Off Graver

A cutting-off graver (Figure 1e) is made in the same manner as a square one, with the end ground and sharpened to an angle of 45° . The chisel-like edge is made wide and then relieved as it is tapered back. This tool is used for cutting square grooves, slots, square shoulders, or for cutting off a section of a rod.

Knife-Edged Graver

The knife-edged graver (Figure 1f) is made in the same manner as a square one, with the end ground and sharpened to an angle of 45° and then shaped on an emery wheel to resemble a knife blade, as shown in the illustration. It is used for cutting very narrow and shallow grooves.

Cupping Graver

The cupping graver (Figure 1g) is made square in section and shaped on an emery wheel. The cutting edge is ground to a quarter of a circle and relieved as illustrated. After polishing, it will make a bright finishing cut on brass and is used for cutting jewel settings and specialized work.

Traditional turning is done with the edge of the square graver. The point should be used only to cut and touch up corners because it is very fragile and easily broken.

Tool steel gravers can be sharpened on a hard Arkansas wheel attached to a collet in a lathe (Figure 2). When sharpening a graver, be careful not to let the cutting edge overheat, or the temper will be lost. It should never get hot enough to require water for cooling. Withdraw the graver from the wheel frequently to check for the correct angle and a uniform cutting edge. When you examine the graver, be sure to reposition it at the same angle to the wheel.

To sharpen a graver on bench stone, hold it between the thumb and

index finger with the flat surface against the stone and move it in a steady lateral motion, as illustrated in Figure 3. Silicone carbide or Arkansas sharpening stones and oil are used for tool steel gravers.

Carbide cutting tools are intensely hard and must be sharpened on fine grit diamond wheels.

To test a graver for sharpness, lightly hold the edge or point to the thumbnail and push it in the direction

of the point. If it catches (will not slide), the graver is sharp.

Always sharpen the needed gravers before starting a job. It will avoid lost time for stopping to sharpen them.

Use necessary safety precautions when shaping or sharpening a cutting tool on a grinding wheel. If you apply excess pressure, there is danger that the cutting tool could be propelled by the wheel, and could injure you and/or damage the tool. ☛

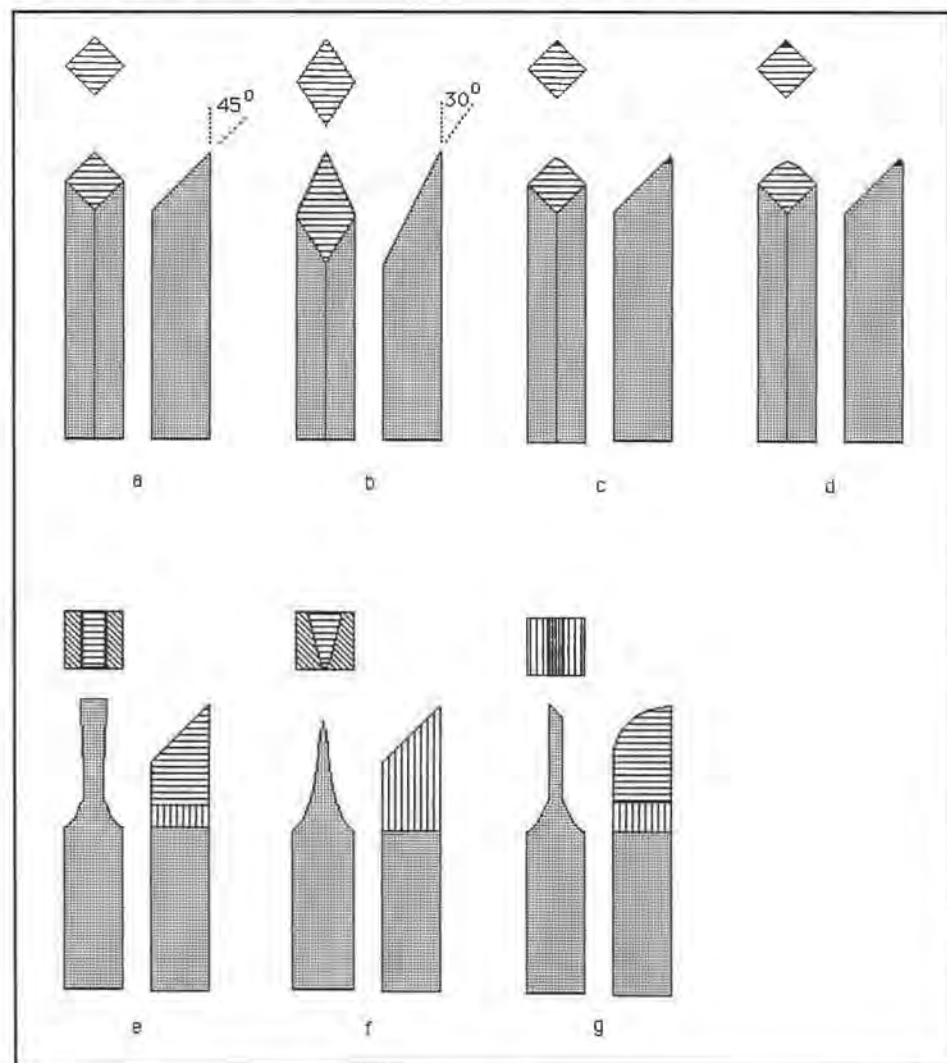


Figure 1. Gravers.

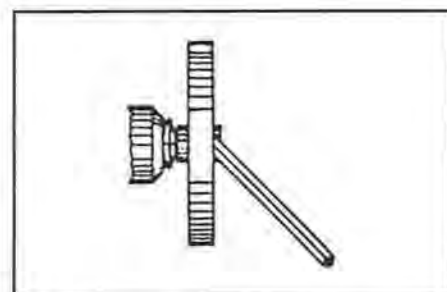


Figure 2. Sharpening a graver.

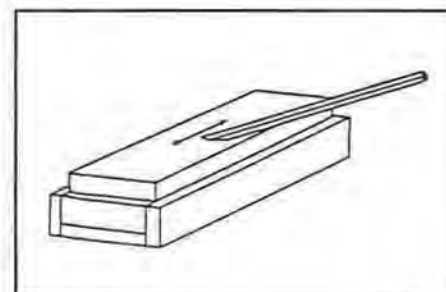


Figure 3. Stoning a graver.

TECHNICALLY WATCHES

ANTIQUe WATCH RESTORATION, PART CXXIX

STYLES OF WATCH REGULATORS

By Archie B. Perkins, CMW, FNAWCC, FBHI

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About 1810, Abraham Louis Breguet made watches which had a regulator that employed a bi-metallic curb that compensated for the changes in temperature on the timekeeping of the watch.

Since the invention of the hairspring for watches, the regulator has gone through more changes than most other parts of the watch. There is hardly an end to the different styles and types of regulators. Although there is some similarity in designs, there is also a difference between the designs.

The Barrow Style Regulator

One of the oldest styles of watch regulators is shown in Figure 1. This style of regulator was first used in watches which were regulated by a straight hog's bristle. This regulator was said to be invented by Nathaniel Barrow about 1670. The Barrow regulator was used on spiral hairsprings by leaving the outside end of the hairspring straight. The micrometer screw of the regulator has a square on one end that is turned with a key to move the curb block back or forth on the straight part of the hairspring. The outside end of the hairspring is pinned in a hole going through the main support block for the micrometer screw.

The Tompion Style Regulator

Figure 2 shows the style of regulator used by Thomas Tompion on his watches. This was about 1670 after the spiral hairspring started to be used in watches. The Tompion watch used a verge escapement. View A, Figure 2 shows the regulator and hairspring assembled to the upper plate of the watch.

The regulator consists of a toothed rack which has an arm with a slot for the outside coil of the hairspring to work in for regulation purposes. The rack with its arm is moved by the use of a pinion meshing into the teeth of the rack. The pinion has an arbor with a square to allow it to be turned with a key to shift the rack. The bottom side of the pinion has a pivot that works in a hole in the upper watch plate. The rack and pinion are covered with a plate to hold

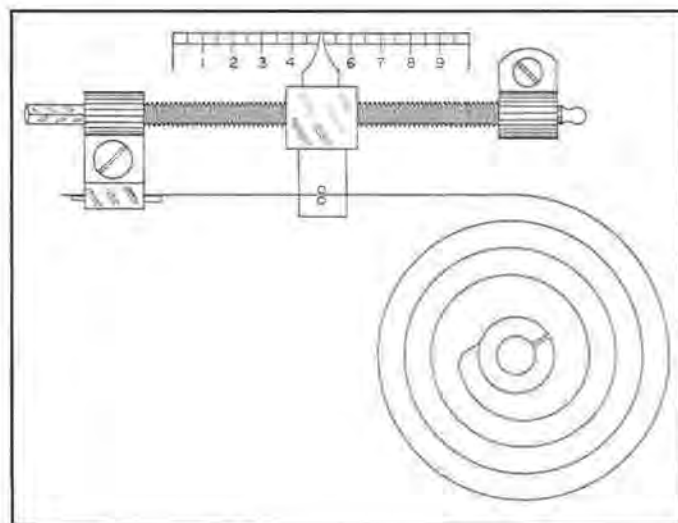


Figure 1.

them into position on the upper plate. The rack has a circular ridge on its top side that works in a matching groove on the under side of the cover plate. The end of the circular groove in the cover plate is shown at point "a," View A, Figure 2. This ridge holds the rack in position with the pinion and guides the rack when it is moved by the pinion. An indicator disc is mounted on the square of the pinion arbor to be used to indicate how much the arbor is turned when the watch is being regulated. The disc turns with the arbor. A reference mark is made on the cover plate at the edge of the disc to indicate how much the disc has been turned in relation to the reference mark.

View B, Figure 2 shows the regulator components without the cover plate. This view shows the regulator disc, the pinion, and the rack. The circular ridge on the rack is shown at "a." Note: The teeth on the rack and pinion needed to be fitted very closely and precisely on the Tompion style of regulator; otherwise, it would be difficult to move the regulator a precise amount due to the play between the teeth of the two gears.

The French Verge Watch Regulator

The French verge watch used a regulator that was very similar to the Tompion regulator. The main differences were that the French fastened the regulator

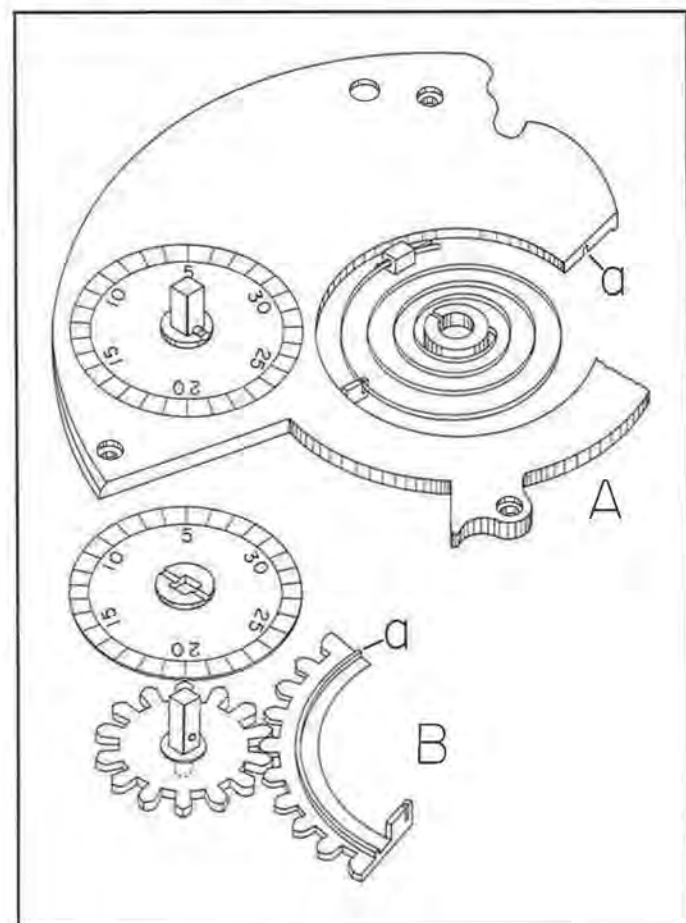


Figure 2.

disc to the upper plate with two screws and they placed an indicator hand on the square of the pinion arbor to indicate how much the regulator was moved. The rack is held in place on the upper plate by a circular cover. The teeth on the rack and pinion are "V" shaped which helps to eliminate the play between the teeth. This allows a more precise movement of the regulator.

The Improved Verge Watch Regulator

Figure 3 shows an improved verge watch regulator. This regulator is situated underneath the balance wheel on the upper watch plate centered around the staff of the balance wheel. The rack and pinion have been eliminated. View A shows the regulator mounted under its cover plate. The regulator is circular with one arm which holds the regulator pins and another arm that serves as a pointer to indicate on a scale engraved on the upper plate how much the regulator is moved.

View B, Figure 3 shows the bottom side of the regulator and its cover plate. The regulator fits friction-tight against a seat turned in the cover plate. The regulator rim is cut to allow the proper friction on the regulator.

The next improvement to regulators was to place the regulator on the balance cock centered around

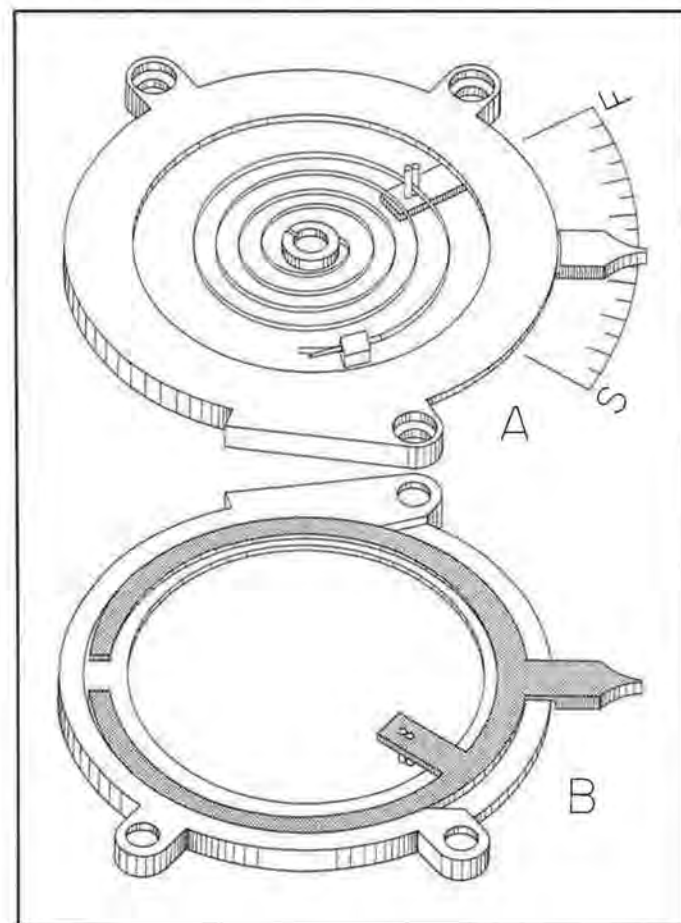


Figure 3.

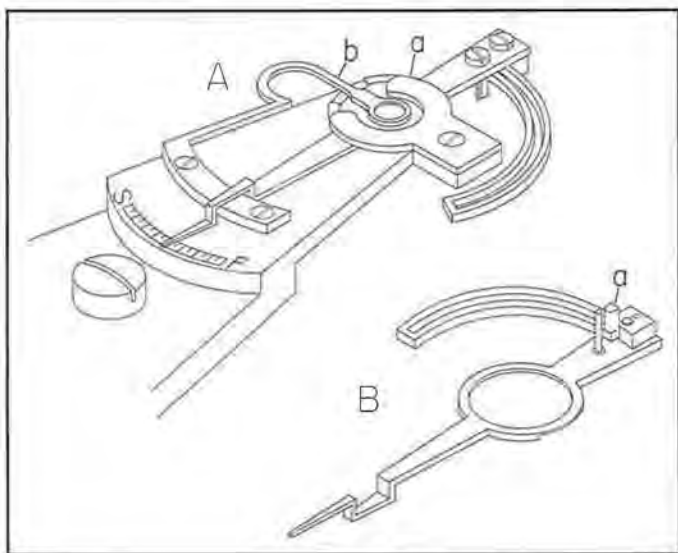


Figure 4.

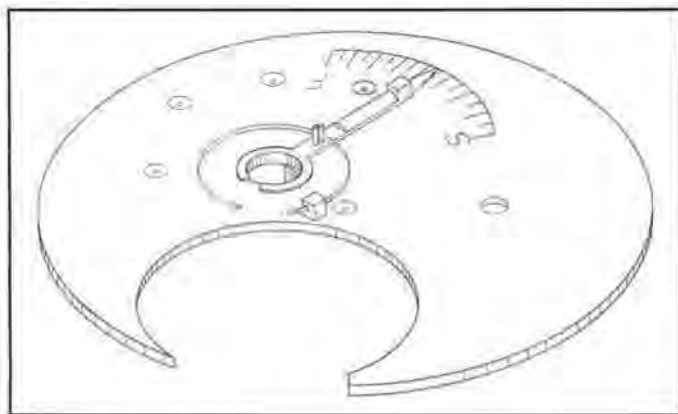


Figure 5.

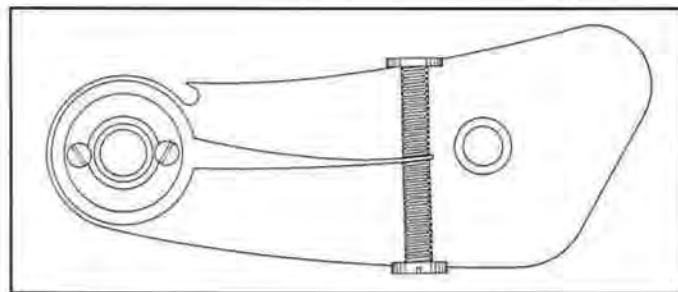


Figure 6.

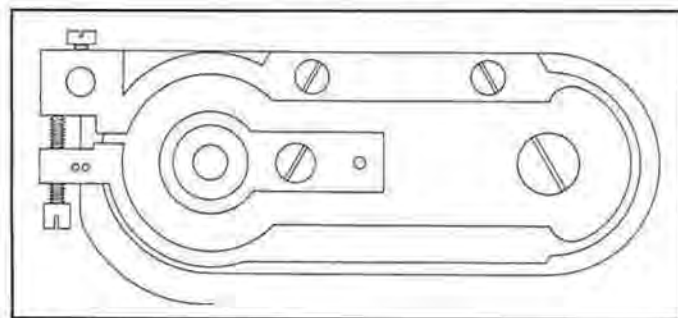


Figure 7.

the balance hole and cap jewels and to place the hair-spring above the balance wheel.

The "Compensating Curb" Regulator

About 1810, Abraham Louis Breguet made watches which had a regulator that employed a bi-metallic curb that compensated for the changes in temperature on the timekeeping of the watch. This style of regulator is shown in Figure 4. View A shows the regulator mounted on the balance cock. The regulator is held down on the balance cock with the cover plate shown at "a." This cover plate also holds the hairspring stud into position on its slot in the arm on the balance cock. Shown at "b" is the spring arm that holds the cap jewel in position over the hole jewel. This is to add a shock proofing to the jewel assemblies. This device was called a "parachute" by Breguet.

The compensating curb device is held to the regulator by one steel screw and a steady pin. Another screw made of brass containing the regulator pin is screwed into the regulator.

View B, Figure 4 shows a bottom view of the regulator. The compensating curb device is similar to a circular tuning fork and is made of steel and brass fused together similar to a bi-metallic compensated balance wheel. The compensated curb has the steel on the outside and the brass on the inside which is just the opposite to the bi-metallic balance wheel. The reason for this difference is that the space between the curb and regulator pin needs to close slightly during heat conditions to make the watch faster when the elasticity of the hairspring causes the watch to be slower. In order for the curb space to close, the tine which holds the curb "a" must move away from the tine that is mounted on the regulator. For this to happen, the brass is placed on the inside of the steel on the tines. The brass expands and contracts more than the steel which spreads and closes the tines during hot and cold conditions.

Early American Regulator

Figure 5 shows a regulator that was used in some of the later English and early American watches. This regulator fits flat on the upper plate of the watch which is underneath the balance wheel. The hub of the regulator frictions inside a hole in the plate where the staff of the balance wheel goes through. The hub of the regulator is split to give the regulator tension in the hole in the plate. The hole in the plate is beveled toward the underside of the plate. The hub on the regulator is also beveled so when the regulator is snapped into the hole it will be tight in the hole with adequate friction when it is turned. This type of arrangement requires the hairspring to be underneath the balance wheel.

Early Modern Type Regulators

Figure 6 shows a regulator which uses a micrometer screw to move the tail of the regulator. The screw is contained in a hole that goes through the balance cock near the top of the balance cock. The hole is open at the top of the cock to expose the thread on the screw so the tail of the regulator will go into the thread. The tail on the regulator is made narrow to fit the thread and it is bent at an angle to match the pitch of the thread. The regulator tail is also bent downward to hold tension on the tail in the thread. A cross slot is used in the head of the screw for the screwdriver. The screw has a washer on the other end for holding the screw in place in the hole. This style of regulator was used by some European makers.

The Fasoldt Regulator

Figure 7 shows a regulator made by Charles Fasoldt about 1860. This regulator is mounted on top of the balance cock with two screws and employs a micrometer screw to shift the regulator pins on the outside coil of the hairspring. The outside end of the hairspring is pinned in the stud in the stationary side of the regulator and goes between the regulator pins on the moveable side of the regulator. The regulator sweep is slightly curved but almost straight.

The Potter Regulator

Figure 8 shows a regulator used by Albert H. Potter around 1885. This is a two piece regulator which is capable of allowing very minute adjustments to the active length of the hairspring. The design of this regulator allows for a vernier or multiplying effect on its movement. The regulator scale is engraved on the barrel bridge which allows for a long regulating lever.

The Howard Watch with Mershon's Patent Regulator

Figure 9 shows the Mershon regulator used on a Howard watch about 1860. This regulator has a multiplying effect similar to the Potter regulator. There is also another advantage to this regulator. It has a two-adjustment capability since it has a toothed rack on the regulator arm. For major adjustments, the pin on the short adjusting lever arm can be placed between any two teeth in the rack. Then for finer adjustments, the adjusting lever is moved on the regulation scale. This gives a vernier effect. The regulation scale is engraved on the train bridge.

The Fredonia Watch Company Regulator

Figure 10 shows a regulator used on an 18 size Fredonia watch about 1883. A worm with worm gear is used to move the regulator. A pin on the worm

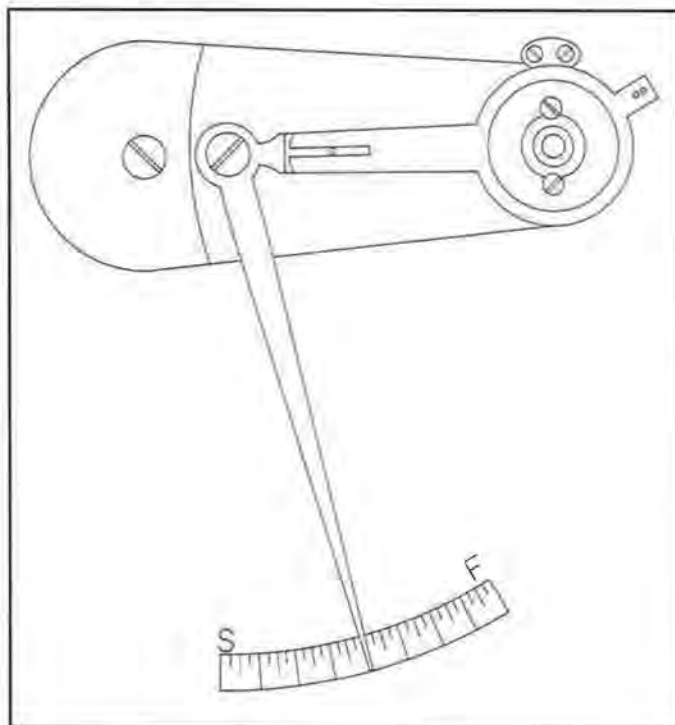


Figure 8.

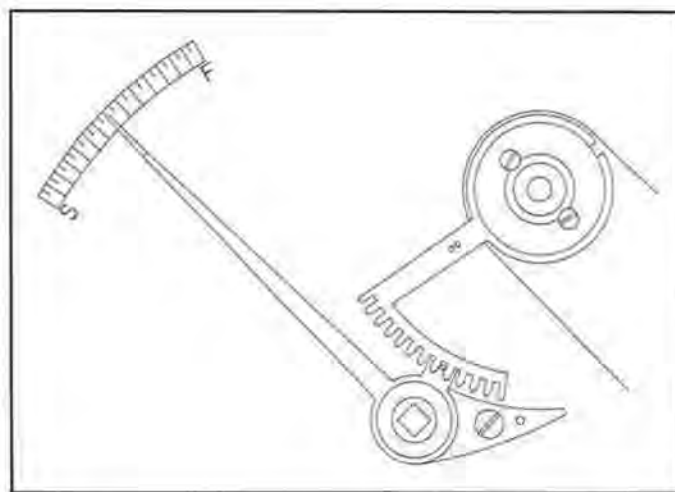


Figure 9.

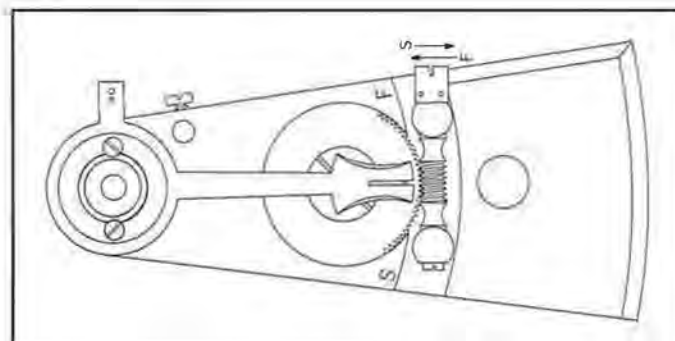


Figure 10.

gear fits into a slot in the center of the end of the regulator tail. As the worm is turned clockwise, the watch is made faster. When the worm is turned counterclockwise, the watch is made slower. This arrangement allows for a very close adjustment.

The Illinois Regulator

Figure 11 shows the 18 size Illinois regulator. The regulator is moved with a special arrangement. This includes a steel wheel blank that has been placed in a sink in the watch plate so the blank is flush with the top of the plate. The blank has three arms which can be seen in the illustration. The inside of the rim of the blank is rounded. The regulator scale is fastened to the plate over the wheel blank with two screws. A slotted stud is fastened to the rim of the wheel at an arm of the wheel. This stud can be turned back and forth. The regulator tail fits into the slot of the stud. See View "a." A steel roller fastened to screw "b" works against the inside of the wheel rim to move the wheel in its sink when screw "b" is turned in either direction. The steel roller has a rounded groove turned around its edge which the inside of the wheel rim works against. When the screw is turned clockwise, the watch is made faster and when the screw is turned counterclockwise, the watch is made slower.

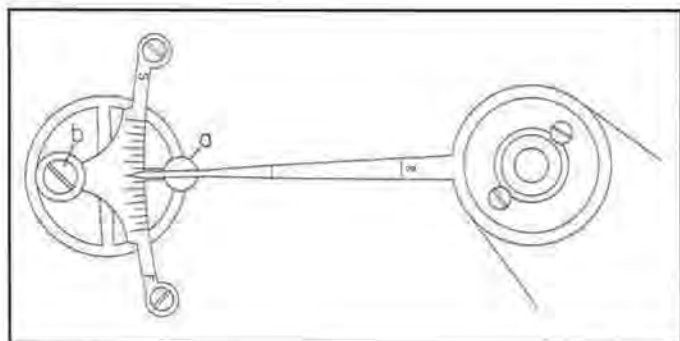


Figure 11.

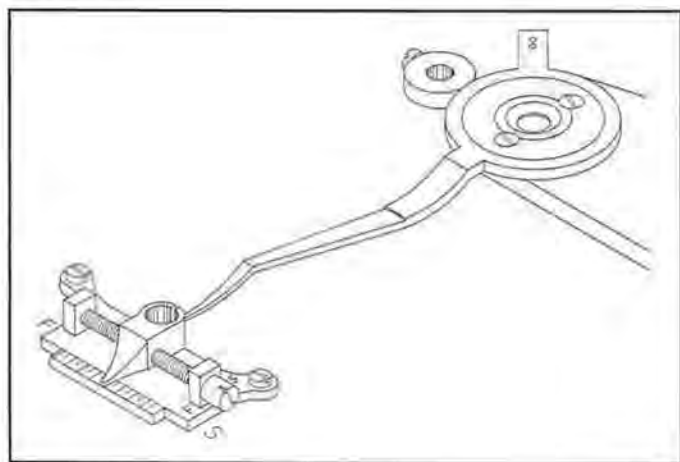


Figure 12.

Hampden Regulator

Figure 12 shows an 18 size Hampden regulator. This arrangement employs a micrometer screw. The base of the arrangement is fastened to the upper plate with two screws. The micrometer screw is supported at both ends by two posts that are riveted to the base. The index is stamped on the base plate. The index pointer has a hole in its back end. A slot is sawed in the back end of the pointer block for the tail of the regulator to fit into. When the micrometer screw is turned clockwise, the watch runs slower. Turning the screw counterclockwise makes the watch run faster.

"Antique Watch Restoration" will continue next month. 

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HUCKABEE RECEIVES AWI FELLOW AWARD

J.M. Huckabee received the highest award bestowed by AWI, that of "Fellow AWI," on June 29, 1996. Huckabee's wife, Gladys, was on hand to congratulate her husband for achieving this high honor. The Huckabees make their home in Austin, Texas.

In making the presentation, Awards Chairman, Glenn Gardner, noted the contribution J.M. Huckabee has made, not only to AWI, but to the industry in general.

Huckabee has spent more than a half-century in the trade. He started as a watchmaker in the United States Army during WW II. Later he worked in the Time Equipment Division of IBM. He is a Certified Master Clockmaker and a Fellow of the British Horological Institute. At retirement from IBM in 1986, Huckabee was an Advisory Scientist in the Discipline of Magnets, IBM.

Recently Huckabee put his knowledge and skill to good use; he built the magnetic device that impules the Foucault Pendulum in the Orville R. Hagans Time Display at AWI headquarters. He is well known for his "Ask Huck" and "As The Clockmaker Turns" series which appear regularly

in *Horological Times*. It was Huck who conceived the idea of the correspondence course in clock repair offered by AWI. Huckabee made the "In The Clock Shop" series of video tapes which have been viewed by hundreds of AWI members.

Huckabee says he spent a lifetime learning his skills as a craftsman and is now trying to pass those skills on to as many interested craftsmen as he can. To this end, he donates the royalties from his writings to the J.M. Huckabee Scholarship Fund. This includes income from his two books that AWI has published: *How to Build a Regulator Clock*, and *The Top 300 Trade Secrets of a Master Clockmaker*.

Huck has written several tutorials for individual study by the clockmaker and has prepared numerous teaching aids for AWI's classroom use. He authored an excellent series of how-to articles in the former *AH&J* magazine when Orville Hagans was its publisher. During his acceptance speech Huckabee challenged everyone to always give their best effort to serve the public and their craft.

Huckabee has earned the respect and admiration of those with whom he has come in contact.



SEIKO SCHOLARSHIP AWARDED TO PHILLIP J. STOLLER

The first of three consecutive full scholarships to be awarded by the Seiko Watch Company was won by Phillip J. Stoller of Bloomington, Illinois. In support of AWI's Academy of Watchmaking, the Seiko Watch Company is making available three full scholarships.

The first scholarship was awarded this year as the Academy began its first full-time training program on July 15, 1996. The other two will be awarded in succeeding years. Mr. Tom Rossiter, Director of Service for COSERV in Mahwah, NJ, recently made the check for \$7,000 available to the Academy.

Phillip Stoller is twenty-three years old and already has shown a high aptitude and ability for our craft. He apprenticed as a clockmaker last September. His mentor recognized Phillip's abilities early on and encouraged him to seek a formal education in watchmaking. Jim Lubic, the Academy Director, observed that encouragement will turn out to be good advice since Phillip scored the highest of twenty-two applicants on the entrance exam.



On the second day of class, AWI President M.R. Carpenter presented the Seiko Scholarship to Phillip J. Stoller of Bloomington, Illinois. James Lubic, Education Director, (center) and Milt Stevens, Executive Secretary, (right) look on.

FROM THE WORKSHOP

"From the Workshop" is a recent addition in Horological Times. Readers are invited to send in one or more of their favorite methods of solving a problem in the workshop.

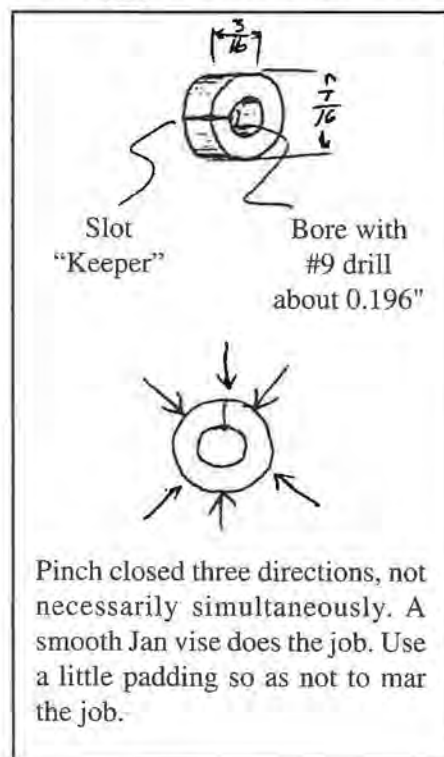
AWI has not tested any of the methods published. They are published for the reader's information and experimentation.

Send your suggestions to: "From the Workshop," Horological Times, 701 Enterprise Drive, Harrison, Ohio 45030.

Alfred Groer, Boothwyn, PA, recalls reading in Joe Crooks' "Bench Tips" column the tip regarding the Hermle chain wheels that bind. I have run across this problem many times myself. I use a somewhat different approach.

I make what I call "keepers." I go down to my beloved big Logan engine lathe and chuck up a 7/16 bar of good tough brass in a collet chuck and bore a deep hole with a #9 twist drill and part off several 3/16" lengths. I make a bunch of them while I'm at it to be "cost efficient." I take these and slot them after which I spring them closed. These will crisply press onto the arbors and hold the chainwheel and spider spring with more than enough security. These can be readily removed and reused easily when the clock is serviced in the future. I have another idea as to why the bind occurs. I believe the nickel plating used on these arbors sheds and makes a mess of things.

The factory, forgetting to lubricate one now and then, aggravates this condition. I have encountered this at least twice in new Hermle clocks. There was no trace of lubricant and much crumbled nickel flake. I have found the condition in several older clocks of this make and always the nickel seems to be a contributing factor. I carry at least one of these "keepers" in my "road kit" should I encounter this problem in a new clock setup or service in the customer's home. I do of course clean up the arbors and chainwheel bores prior to assembly. I use 90-weight multipurpose gear oil to lubricate the assembly. This is available at any vehicle repair shop or any automotive supply establishment and is



reasonably priced, so reasonable I cannot recall, possibly a couple of dollars for a squeeze bottle of the stuff which lasts a long time. The chains wind so nicely after this treatment.

Max Levine, Snoqualmie, WA, has provided a number of work methods which we will be using frequently in this new column. We invite you to send yours to us as well. Here is Max's suggestion for calculating the gear train of a clock.

Application: all watch and clock wheels and pinions where the number of teeth needs to be determined for beat count calculations, for information for cutting new gears, or checking new parts against damaged ones which must be replaced. The method is most useful, but not limited, to gears with high-tooth count.

Materials/tools required: felt-tip pens or grease pencils, solvents for cleaning off the ink or pencil marks such as alcohol, naphtha, or lacquer thinner, and paper towels and/or cotton swabs.

To count the teeth on a wheel (or large pinion) use a black or colored marking pen or grease pencil in the following manner:

1. Mark the side of a tooth to make it the "Zero" tooth to begin and end the count.
2. Starting with the first tooth on one side of the "Zero" tooth, count off (either consistently

clockwise or counterclockwise) ten teeth and mark the side of the tenth tooth. Continue in the same direction, counting and marking every tenth tooth until you count ten teeth or less including the "Zero" tooth. Note the number of teeth if less than ten.

3. The number of teeth in the wheel (or pinion) will be the number of spaces times ten plus the odd number (if any) less than ten. For instance, if you count four (4) spaces of ten and one space of eight (8) teeth including the "Zero" tooth then: $N = \text{number of teeth} = (4 \times 10) + 8 = 48 \text{ teeth}$. If the number of spaces was nine and the odd space was six then: $N = (9 \times 10) + 6 = 96 \text{ teeth}$.

The advantage of this method is that if you are interrupted or lose count, you don't have to start over—just go back to the last marked tooth and count ten more teeth (or in the case of the last space, the odd number of teeth). Re-checking is easy and fast by using a caliper or divider as the spaces of ten are equal. Actually you can space off the ten teeth only once and using a divider save some time and a lot of counting. Count the first ten, step off the remaining tens and count the odd number of teeth remaining.

The marks can readily be removed using a suitable solvent and paper towels or cotton swab sticks when the job is finished.

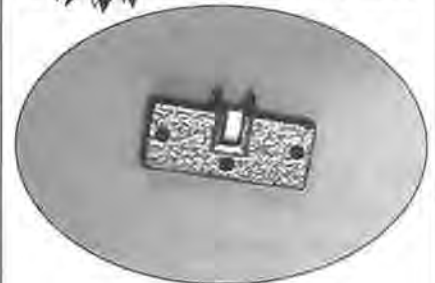
Robert M. Hay, Sun City, AZ, comments on a method explained in the May column. Several others have had the same idea, and it happens to be my method of choice when I was actively repairing watches for a living. It deals with the assembly at the old full-plate pocket watches. Ray also has a bonus suggestion to pass on. He writes:

The May issue of *Horological Times* had a tip from Mr. Max Levine regarding juggling wheels and pallet forks into place on the old full-plated pocket watches. Another way to perform this tricky operation is to lay the bare train bridge inside up on the bench, stand the wheels and pallet fork in position on the bridge, carefully lower the main plate down over the center wheel and seconds bit of the fourth wheel, and with luck the main plate may drop on down in position. If not, carefully pick up the assembly like a sandwich, look between the plate and bridge and nudge the out-of-line wheel or wheels into place while exerting slight clamping pressure with your hand.

While on the subject of these old turnips, a great way to loosen a screw type case back, or front, that seems welded on is first lay a strip of wide masking tape over the balky back or front, then take the rubber suction cup to it. It is best not to have the tape extend over the crack between the offending side and the case frame. Also when done always remove the tape immediately as masking tape becomes nearly impossible to remove if left in place on anything for more than several hours. 🐷

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AFFILIATE CHAPTER COLUMN

By Jack Kurdzionak

Your Annual Meeting

My thanks go to all who attended our annual meeting last June. Their efforts will help direct our organization for the coming year. This meeting is the best opportunity for a member's viewpoint to be heard by your officers and directors. The delegate's meeting is your direct connection to your organization. There is just no substitute for attendance. My thanks go to the affiliate chapters for their confidence to elect me as chairman for the coming year. Please do not hesitate to contact me in the coming year if you think I can assist your chapter activities in any way.

Affiliate chapter delegates arrived at the Commonwealth Hilton Hotel in the greater Cincinnati area during the afternoon of Thursday, June 27, and were warmly greeted by AWI's staff at the reception desk. There were no formal activities on this afternoon as this was time to register at the hotel desk, freshen up, and meet old friends one had not seen for a year or more. The third annual Thursday evening get together featured our Executive Secretary, Milt Stevens, who spoke about affiliate chapter concerns such as liability insurance, tax exempt status, and chapter incorporation pros and cons. Before Milt spoke, the delegates were able to share about an hour together to socialize and meet each other informally. Your chairman hosted the balance of the evening with some informal discussion of issues facing the chapters and the horological profession. The meeting concluded at about 10:30 that evening.

When the affiliate chapter annual

meeting was called to order at 9:00 on Friday morning, there were twenty chapters represented. After the invocation and the Pledge of Allegiance, the delegates were welcomed by President Joe Cerullo and heard a few words from Fred Burckhardt about the annual watch cell contest. The chairman appointed the parliamentarian and appointed the members of the nominating and awards committees. After the introduction of delegates, alternates, and members in attendance, we heard a presentation by Mark Butterworth, a clockmaker and owner of a clock movement supply company, about the future of clockmaking in this country. He is a third-generation horologist who paused his horological career to teach high-school physics for twenty years. Mark's well thought out keynote speech outlined the history of clockmaking in the United States. He explained how clockmaking is now occupying a place of importance in the horological profession after many years of being thought of as the industry's stepchild. He was able to present some statistics regarding current clock sales in our country and compared these figures to how few people are actually repairing clocks for consumers. He left us with the impression that any horologist who chooses to repair clocks and can do it well will have a good future in the profession. We appreciated Mark's input and we thank him for taking the time from his own business to speak to us.

The remaining time for the morning was given over to chapter reports given by the delegates or alternates. We then recessed for lunch and when

we reconvened we considered a number of proposals from the delegates. Of the five proposals accepted by the delegates, four of them met with the approval of the directors at their meeting on Saturday afternoon. The accepted proposals included the following:

1. Affiliate chapter travel allowance to be increased to a maximum of \$400 from the present \$200 and not to exceed the actual cost to the delegate.
2. AWI to request, at its discretion, a current membership list from all affiliate chapters when they request any services or speakers. (This measure will insure that chapters requesting services actually meet minimum AWI standards for membership.)
3. To make referral booklets available to all AWI members. (AWI members can refer customers to listed AWI members in other geographic areas.)
4. To make minutes of AWI directors' meetings along with each director's recorded vote available to all affiliate chapters.

The delegates then elected Jack Kurdzionak as chairman, and John Sokol as vice chairman for the coming year. They were installed and the meeting was adjourned until next year.

The evening was highlighted with a retirement party given for Milt Stevens. Many speakers paid tribute to the contributions Milt has made to AWI over the past thirty years. Milt was presented with a plaque from

AWI. After the party, a bus brought the delegates and members to the new headquarters in Harrison, Ohio, for a tour of the building which included the library, museum, educational facilities, and business offices—then back to the hotel for a well-deserved rest.

Saturday was taken up with the annual meeting of the directors of AWI, which included reports from all of the committees and an explanation of the annual budget. Proposals from the chapter delegates were considered and the meeting was recessed until Sunday morning. Saturday evening was given over to the president's reception and the annual buffet dinner at which time awards were presented and new directors and officers were installed. The highlight of the evening was an inspiring impromptu speech by Jim Huckabee after he was made a Fellow of AWI.

NAWCC Chapter 102 held its annual meeting on Saturday afternoon. Paul Wadsworth was elected president and Jack Kurdzionak was elected secretary-treasurer for the coming year. This chapter has applied for AWI affiliate chapter status and has been actively assisting with the funding for the installation of the Foucault Pendulum at AWI headquarters.

The director's meeting resumed on Sunday to consider several motions and elect new officers for the coming year. The meeting adjourned at noon time and the delegates said their good-byes and returned to their homes again.

AFFILIATE CHAPTERS MEET JUNE 28, 1996

Chapter delegates from across the United States converged on the Commonwealth Hilton Hotel, Greater Cincinnati International Airport for their annual chapter meeting on June 28, 1996. The meeting was chaired by Chapter Chairman/Director, Jack Kurdzionak. A complete report of that meeting appears in the "Affiliate Chapter" column elsewhere in this issue.

Photo #1 shows the delegates during their meeting. Note the chapter banners on the wall; they include banners from AWI chapters in Canada, New Zealand, and Australia, as well as the banners of chapters from the various states.

Photo #2 shows the two chapter officers who were chosen by their fellow delegates. Director Henry Frystak (left) a long-time advocate of the Affiliate Chapter program has just sworn in Jack Kurdzionak (center) for his second term as Chapter Chairman/Director and John Sokol (right) as Vice Chairman.



Photo 1.



Photo 2.

Additional Scenes from the Annual Meeting:



Photo 3. Honored guests, J.M. Huckabee and his wife, Gladys, sign in at the registration desk just inside the time display entrance.



Photo 4. Newly installed as President, M.R. "Buddy" Carpenter discussed his plans for the coming year.



Photo 5. From his favorite spot in the video control/editing room Robert Bishop demonstrates the equipment that has produced three new tapes: The Affiliate Chapter Story, Servicing the 214 Accutron, and Introduction to Clock Repair. All three are now available from the video library.

INDUSTRY NEWS

Vibrograf U.S.A. Corp. Introduces the Profi Check

Mr. Joseph Presti, President of Vibrograf U.S.A. Corp., announced the introduction of the Profi Check Quartz Watch Analyzer. This Swiss-engineered inexpensive tool allows the salesperson or watchmaker to make a quick diagnosis of a watch's problem. The Profi Check can restart jammed watches, check batteries, set time, and improve lubrication.

Special introductory price of \$295 is good through December of 1996. For further information contact: Mr. Joseph D. Presti, President, Vibrograf U.S.A. Corp., 504 Cherry Lane, Floral Park, New York 11001-1696. Phone: (516) 437-8700. Fax: (516) 437-8708.



Figure 1.

Wittnauer Goes Fishing for Family Fun with Sports America in Nationwide Promotion

Wittnauer got a jump on the fishing season recently when the brand teamed up with Sports America in a nationwide promotion providing family fun in the form of indoor trout pond fishing for hundreds of thousands of consumers who attend sport/boat and travel shows.

Consumers cast their lines in crystal clear water stocked with hundreds of Rainbow trout, many of them tagged in different colors representing thousands of dollars in prizes. Lucky anglers who caught a yellow-tagged trout received a beautiful Wittnauer Longlife watch, the most sought after prize at the event. Greg Dubrule, a nationally known figure in sport fishing, said "Wittnauer created quite a stir. Everyone on the sidelines was straining to catch a glimpse of those bright yellow tags!"

The Longlife watch is powered by an envi-

ronment-friendly lithium iodine solid state battery which lasts for twenty years, has a split-second quartz movement and is water-resistant up to 100 feet.

The special attraction took place in Chicago, Indianapolis, Detroit, Cleveland, Pittsburgh, and many other locations, and included lectures about trout, fishing techniques, and the importance of the "Catch and Release" method.

The Wittnauer prize was promoted on public announcements, in displays, and in broadcast and print publicity. "The attraction appealed to us because it was highly promoted and involved motivation and participation. Activist consumers are a prime target for the Longlife," said Frank Salzano, Director of Marketing for the brand.

Swiss-born Albert Wittnauer founded his company in 1880. Today, watches from Wittnauer International may be found at fine jewelry and department stores throughout the United States, Canada, Mexico, and other

countries. The Wittnauer Buckle-to-Buckle™ warranty is unprecedented for covering every part of its watches for one full year plus an additional guarantee on the movement for three years.

Three Pilot Programs Help Jewelers of America Determine New Strategy Initiatives

To better serve its members' needs, Jewelers of America has begun three pilot projects in the areas of education, truth-in-pricing, and the organizational development of JA affiliates.

"Pilot programs are a way of helping jewelers refine and develop their ideas at a grassroots level, and then testing new programs in one part of the country first to find out if they really suit jewelers' needs," says Matthew Runci, JA's Executive Director. "If they are successful, they can later be rolled out across the country."

JA and the California Jewelers Association have become partners in the development of a

new local business education network in Southern California. In the jewelry industry, the way stores operate has changed significantly over the last few years. Longer hours with a smaller staff have changed the way educational programs need to be delivered. It has become more difficult for owners, managers, sales associates, and bench jewelers to get away from the store to attend educational programs. Ways must be found to bring education into the store.

"CJA and JA want to help the local jeweler capitalize on two of their competitive advantages: their status as a professional jeweler and the ongoing trust relationship with the customer," says Runci.

This program will develop a "business education resource center." The center will include operational support services for jewelers and also professional and managerial learning opportunities. Resources will include business schools, consultants, video and audio tapes, and condensed articles on timely topics.

The focus in the early phases will be on developing jewelers' skills in merchandising products, managing finances and cash flow, and understanding the dynamics of employees. It will provide basic business operations support in areas like

insurance, regulatory compliance and taxes. The program will also offer problem-solving sessions on various topics and talks by successful retailers.

In the area of truth-in-pricing (TIP), seven leaders of JA State Affiliates met in New York to exchange ideas about TIP strategies and tactics. The participants were: Richard White (AL), Bruce Higgins (AR), Kari Anderson (IL), Barbara Sardzinski (MA), Eric Phillips (MN), Stuart Palestrant (OH), and Jayne Booth (TN).

Members presented their recent TIP efforts and created new strategies for the future. The main point of the session was to explore different ways of effectively approaching this pressing issue.

The strategies discussed included working with state legislatures, Attorney Generals, local Better Business Bureaus, and local yellow pages and newspapers.

JA's partner in the organizational development pilot is the MD/DE/DC (Tri-State) Jewelers Association. At a retreat held by the Tri-State Board of Directors, priorities were selected for implementation by the end of 1996. The priorities include creating new job descriptions for the Board, developing an annual event which will provide a forum for jewelers to meet and talk with other

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jewelers, and organizing a venue where jewelers can sell old merchandise. Also under discussion is creating a presence on the Internet where stores can access general industry information, and have a membership bulletin board as well.

"We are excited that the pilots are underway," said Runci. "We are confident they will help us determine our new strategic initiatives."

For further information contact JA's Communications Department at 1185 Avenue of the Americas, 30th floor, New York, NY 10036. Phone: (212) 768-8777.

First Book on Movado Debuts this Year

The History of Movado will be published this year in three international editions. It was announced at Basel '96, the foremost watch, clock and jewelry show. Movado traces its roots to 1881, when founder Achille Ditesheim opened his shop in the Jura Mountains. This lavishly illustrated book, certain to delight collectors, presents the evolution of Movado, while also weaving a portrait of the watch industry and more than a century of technological advancement and tradition.

From eight employees, Achille Ditesheim created a company with such technical prowess and creativity that it has had a lasting influence

on the development of timepieces. Over the years, Movado earned a reputation for pioneering the art of wrist-watches, high-precision movements, and watches with complications, as well as water-resistant watches. The book details Movado's consistent pursuit of technological progress, and the many unique watches that were introduced as a result of the firm's achievements. Through 250 color illustrations, the book captures the most compelling designs introduced by Movado, many of which have become coveted collectors' items commanding high prices at worldwide auctions. Over the years Movado watches have attracted international luminaries; it was said that Albert Einstein was presented with an Ermeto, which was also a favored gift for heads of state.

Among those timepieces featured in the book are: a 1925 "Ermeto" purse watch with beautiful enameling and luminous Arabic numerals and hands; a stainless steel wristwatch with waterproof case, calendar and moon phase, circa 1950; and an elegant fourteen karat gold "Polyplan" wristwatch shaped to conform to the curve of the wrist, circa 1920. Also illustrated in the book are the Movado watches in the limited edition series designed by such international artists as

Andy Warhol, James Rosenquist, and Max Bill.

The company was named "Movado" in 1905, a word meaning "always in motion" in the then newly-created, universal language of Esperanto. Living up to its origins, Movado has remained a company on the move. Through the pages of this tome, Movado takes its place in the history of the great Swiss art of watchmaking. Much as the reader will appreciate the attention given to the technological advancements made by Movado, and evidenced by the nearly 100 patents the firm received, one will also marvel at the unbridled ingenuity in design, and the contemporary pulse of this remarkable watch institution. From the early development of wrist-watches, to the incomparable international success of the Museum Watch to today's introduction of the sleek Vizio collection, Movado has energized the industry with its quest for innovation. The book has been written by international watch historian, collector, and author Fritz von Osterhausen, with a foreword by the founder's great-grandson Bernard Ditesheim.

The History of Movado will be published in English, German, and French editions. Pfeiffer-Belli, a noted watch collector

and author, served as consultant for the book. Callwey will publish the German edition, and Schiffer Publishing, Ltd. will distribute the English-language version of *The History of Movado*.

For more information contact: Denise Hofmann, Movado Watch Company SA, Bettlachstrasse 8, CH-2540 Grenchen, Switzerland. Phone: 065/52 53 01. Fax: 032/22 36 97.

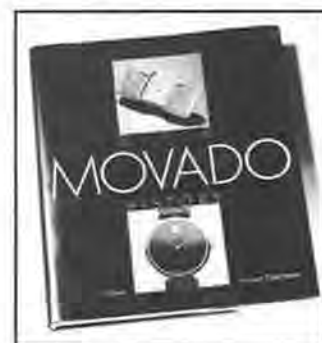


Figure 2.

Manufacturers Anticipate and Meet Client Needs with Advantage Series Customer Information

Armor Systems is proud to announce the release of the new Armor Advantage Customer Information module. With this new module, manufacturers can maintain and instantly access all vital client information to increase their customer base, and their business productivity and profitability.

Customer Information was specifically engineered to help manufacturers track their most valuable resource—their customers. Manufacturers can

develop and maintain current customer files to the detail level they specify. This system will also help manufacturers identify and track prospective clients to increase their customer base. For more rapid access to any necessary information, Customer Information provides a look-up feature based on the customer's Accounts Receivable company number.

Manufacturers can manipulate stored data for mailings by using up to eighteen user-defined fields of information. Customer Information's ability to track publicity events, distributor information and the company's promotional schedule provides manu-

facturers with up-to-date data on what products and information their customers received, and when. When interacting with Advantage's Point of Sale module, even cash sales data is recorded.

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BOOK

REVIEW

By John C. Losch

How to Make a Skeleton Wall Clock is comprised of twelve chapters which originally appeared in serial form in the *Home Shop Machinist* from November, 1993-October, 1995. There are 85 pages of text, and 280 photos and drawings. The format is 8 1/2 x 11" sheets in a spiral binder making the book convenient to use in the workshop. It is available for \$35 from W.R. Smith, Gateway Clocks, 7936 Camberley Drive, Powell, Tennessee 37849. Phone: (423) 947-9671. All prices are postpaid within the United States and Canada. Overseas buyers add an additional \$5. No credit cards, but personal checks are acceptable.

I have just finished reading Bill Smith's latest book, *How to Make a Skeleton Wall Clock*. As a lifelong clockmaker and machinist I am tempted to sometimes think I have seen it all, even if I know better. This book reminded me there are still things to learn, and I learned much from reading it. I can say without reservation that this is a "must read" book for every neophyte clockmaker, as well as for the more experienced who may be working without all the tools they would like to include in their workshops.

Bill writes with the same objective used by Donald DeCarle when he wrote *Practical Clock Repairing* forty-five years ago. Each author showed step-by-step procedure for making a clock movement, and in the process has shown the reader the steps re-

quired to accomplish competent fabrication of replacement parts needed in the repair shop. This means that by making either of these clocks the serious practitioner will have the satisfaction of making a clock from "scratch." Equally important, he will have expanded and improved his repair skills.

There are differences between Smith and DeCarle. DeCarle's instructions are about as traditional as it is practical to be in the twentieth century, and Bill's book takes full advantage of the affordable technology available as the century closes. Bill's book includes wheel cutting in detail. DeCarle, writing in an era when specialty shops were still common, simply advised his reader to "send out to the wheel cutter."

Bill Smith's style of presentation accomplishes two valuable things. It removes the sometimes threatening mystery of machine tools, and the text emphasizes craftsmanship throughout. For the reader attentive to the easy-to-read instructions, fear of machinery is quickly replaced by respect. Description of processes emphasizes the goals of the procedure rather than allowing the reader to go through meaningless motions. Bill gives his reader an understanding of the capabilities and limitations of tools, and real understanding of why a procedure is necessary.

Sources are recommended for both the materials and the cutters

needed to make the train wheels. There is a section on making fly cutters for both the winding ratchet and the escape wheel. Cutters are expensive, and to minimize costs this clock is designed to use lantern pinions. Added to the economy of this design is the advantage to the reader of learning a technique for making lantern pinions. This subject is inadequately treated in most clock books, although an abundance of very collectible American clocks were made with them.

If I have one constant criticism of many technical instructional books, it is that they are written with the assumption that everything goes along exactly as described. There are no warnings to the reader which will prevent trouble before it begins. Not so in this book. Here is an example I found just by flipping the book open: "One thing some hobbyists are not accustomed to is the need for polishing their cutting tools. If the cutting surfaces of the lathe bit and the graver are polished on a hard Arkansas stone after sharpening, they will cut a polished surface and much work with the emery paper can be avoided."

Those who follow Bill Smith's writings will notice a certain amount of repetition from one book or article to another. Bad economics, perhaps, but a gift to the reader. Each book stands independent of the others, and any workman operating from this, or another of Bill's books, does not

have to have a copy of something else in hand to complete a project. This, like many of Bill's other books, is a complete manual covering every aspect of the subject project.

For those who do not know it, Bill Smith usually does every part of his books himself. He writes, draws, photographs, prepares the master page mats, makes the off-set press plates, prints, collates the copies, and distributes his books himself. He once described to me all the procedures involved from conception to completion of a book, and it is a Herculean task. Apologetically, Bill told me that for this book he was short of time so he had the negatives and the printing done outside. Either way, the result is instruction for a clock project offering great reward to anyone who successfully embarks on this project.

In order that there is no confusion, I offer the standard disclaimer. I have no financial involvement with Gateway Books, or Bill Smith, and this review is unsolicited by Bill Smith. I just want to call attention to a project, about which I am very enthusiastic, for the "hands on" clock crowd. 



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Continued from page 4.

"CUIVRE" and the serial number 330131. There is also the imprint of a pheasant and the number 0800 above the serial number. We are unable to identify this watch and would appreciate any information you can provide.

Ed Tan, Oklahoma City, Oklahoma

ANSWER

I have examined your adequate photocopy of the watch and I am familiar with it. (See Figure 2, page 4.) The watch was made for the very low market potential, pricewise. The case "Cuivre" means copper or brass. The mark on your balance bridge is not

familiar and my checking on trademarks did not reveal anything further. The movement is ordinary although the dials on such watches were quite attractive. Your photocopy of the movement is not clear enough to note the type of escapement but I can only surmise that it was either pin lever or cylinder. Although the watch appears a little earlier than the advent of the Roskopf pin lever it may be an early model. I hope that your customer didn't pay too much for the watch, although it is an interesting item of that 1850-1860 period. The end result on such items is that if you like it, then enjoy it.

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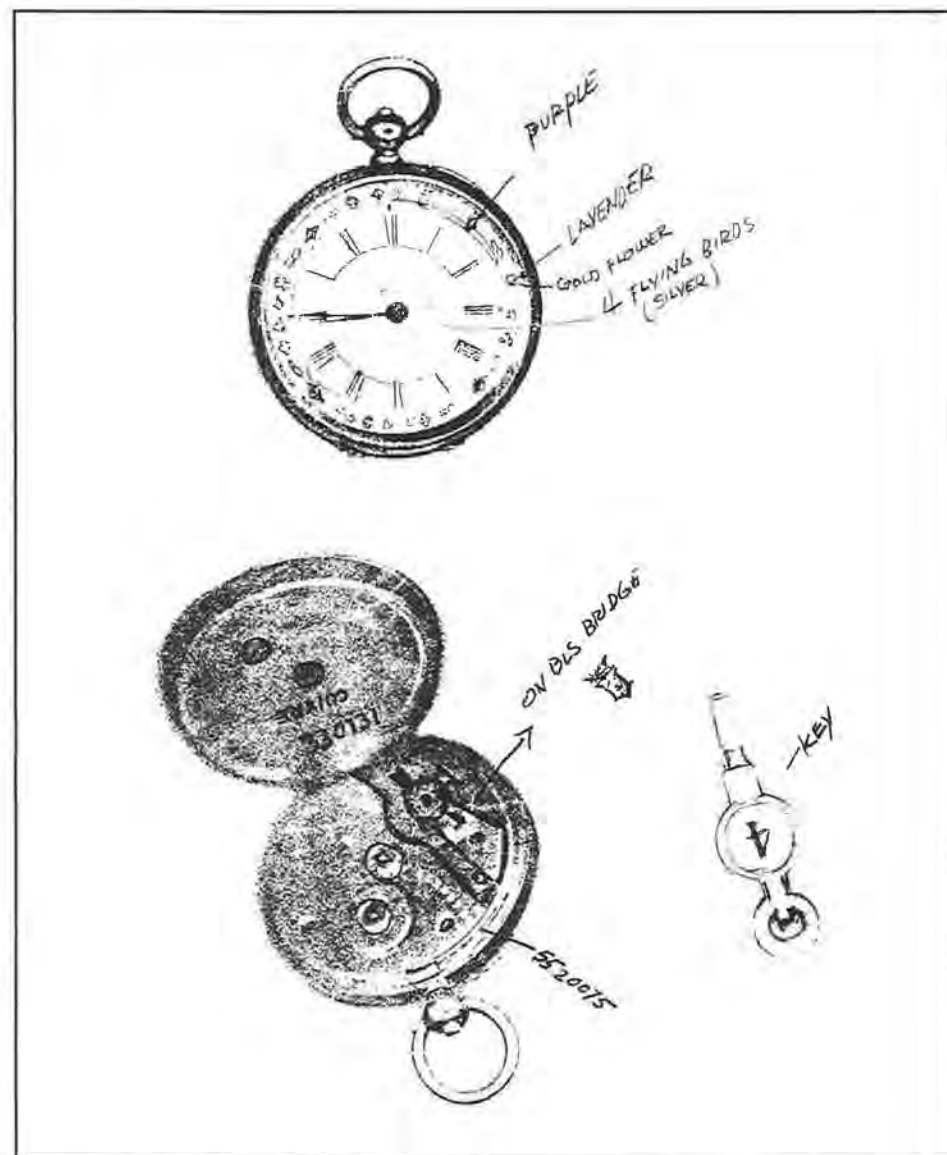


Figure 3.

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1996 Bench Courses

To register for these courses, please send your Bench Course registration and fee to: **AWI Central, 701 Enterprise Drive, Harrison, OH 45030**. PLEASE NOTE: Registrations are limited and will be selected by the earliest postmarks. You may register by fax if you wish; if so, please include your Visa or Mastercard number, card expiration date, signature, and phone number. Registrations cannot be taken by phone. All registration fee checks and charges are processed immediately upon receipt. **FAX (513) 367-1414 • PHONE (513) 367-9800** * Indicates Bench Courses held in conjunction with a convention.

DATE	CLASS INSTRUCTOR	LOCATION FEE	DATE	CLASS INSTRUCTOR	LOCATION FEE
SEPTEMBER 1996			OCTOBER 1996		
7-8	Hairspring Vibrating Joe Cerullo	Greensboro, NC \$100.00	4-6	Mechanical Watch Repair James Lubic	Cleveland, OH \$150.00
13-16	Lathe Course (Phase II) Roy Hovey	Arlington, TX \$280.00	5-6	Mechanical Chronographs Mark Meist	Seattle, WA \$100.00
14-15	Mechanical Chronographs Mark Meist	Newark, NJ \$100.00	12-13	Striking Clocks Buddy Carpenter	San Diego, CA \$100.00
14-15	Striking Clocks Buddy Carpenter	Oakland, CA \$100.00	25-28	Lathe Course (Phase III) Roy Hovey	Arlington, TX \$280.00
20-22	Advanced Clock Repair Roy Hovey	Austin, TX \$150.00	NOVEMBER 1996		
			9-10	Citizen Quartz Watch Repair Joe Cerullo	Milwaukee, WI \$100.00

1996 Project Extend Classes

AWI's continuing Education Program offers one-week and two-week classes in various phases of watch & clock repair techniques. Work alongside recognized leaders in the field of horology. See how they handle the everyday situations we all encounter. All Project Extend classes are held in AWI's training rooms in Harrison, Ohio. Call or write for information and details for the classes that interest you! **AWI Central, 701 Enterprise Dr., Harrison, OH 45030; Phone (513) 367-9800, Fax (513) 367-1414**

PROJECT EXTEND WATCH CLASSES

DATE	CLASS INSTRUCTOR	FEE
SEPTEMBER 1996		
9-13	Watch Cases, Bands & Crystals David Christianson	\$250.00
16-20	Basic Jewelry & Watch Case Repair Marshall F. Richmond	\$250.00
21-22	Watch Case Finishing Dennis Warner	\$100.00
23-27	Introduction to the Watch Movement James Lubic	\$250.00
OCTOBER 1996		
7-11	Time Train, Dial Train & Friction Jeweling James Lubic	\$250.00
21-25	Drawing the Lever Escapement James Lubic	\$250.00
28-Nov. 1	Adjusting & Repairing the Lever Escapement James Lubic	\$250.00
NOVEMBER 1996		
18-22	Balance Assembly - Staffing, Truing & Poising James Lubic	\$250.00

PROJECT EXTEND CLOCK CLASSES

DATE	CLASS INSTRUCTOR	FEE
SEPTEMBER 1996		
23-28	Antique Clock Restoration David Christianson	\$250.00
30-Oct. 4	Prep for CMC Examination David Christianson	\$250.00
OCTOBER 1996		
7-11	Introduction to Clocks Jim LaChapelle	\$250.00
14-18	Organize Your Work Habits for Success Robert Ockenden	\$250.00
21-25	Advanced Cuckoo Clock Repair Jim Williams	\$250.00

