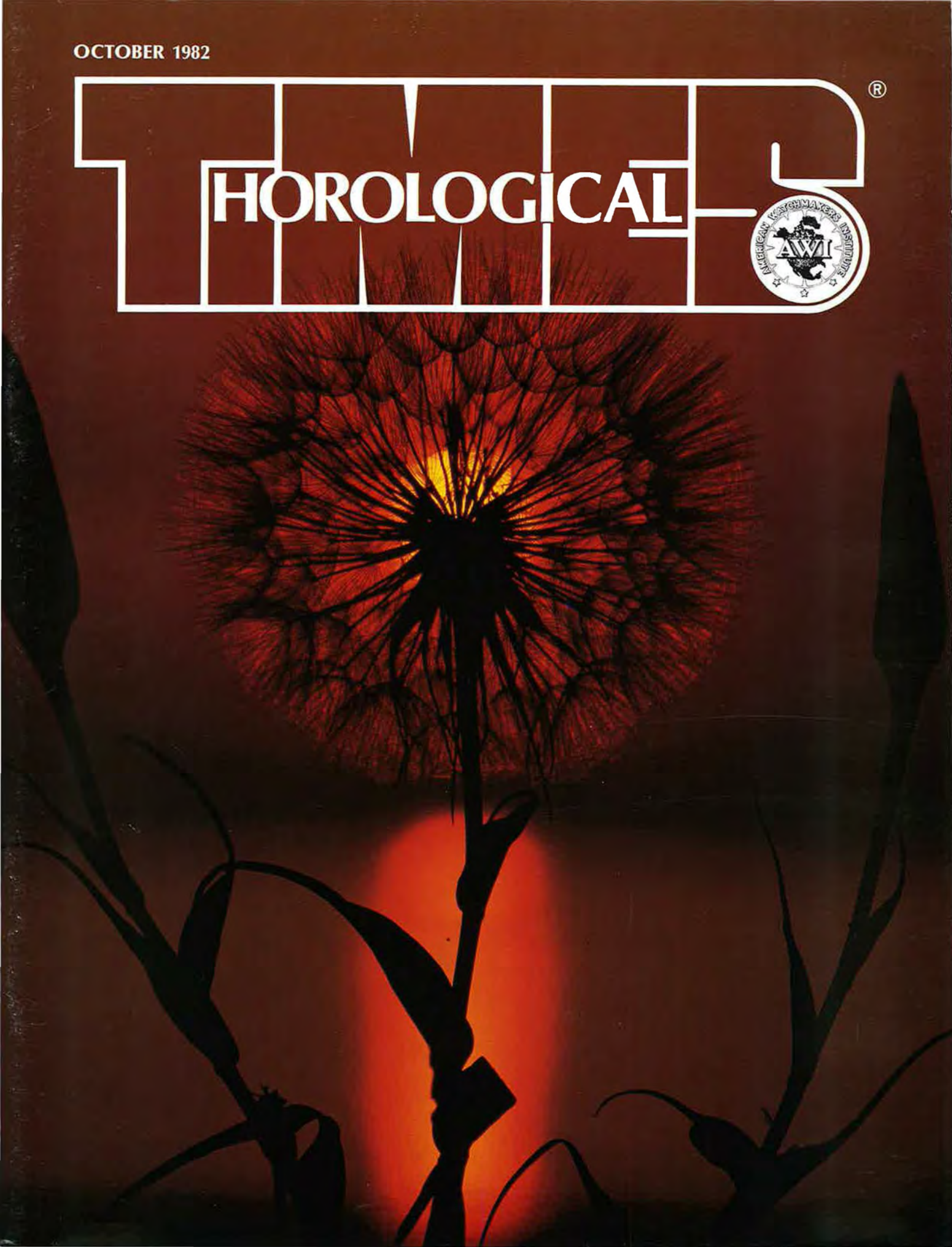
OCTOBER 1982

HOROLOGICAL TIMES®



VOLUME 6, NUMBER 10 OCTOBER 1982

HOROLOGICAL TIMES®

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Find Out How to Repair Analog Coils **8**

More on Arnold's Pivot Finish Restoring **26**

How do You Fit a Stem? **40**

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FELLOWS OF THE AMERICAN WATCHMAKERS INSTITUTE

Editorial

A large majority of the watches coming to the watchmaker's bench for service are mainspring driven, but there are indications this may change rapidly.

In a recent survey by the Economics Study Committee, a group of randomly selected watchmakers were asked to list and describe the work order on the next 25 watches coming across their bench. Of the 799 watches reported on, 74% were mainspring driven, 2% were balance wheel electronic, 7% were tuning fork, 7% were quartz digital, and 10% were quartz analog.

Over 80% of those watches with mainsprings required cleaning or cleaning plus other work. But when cleaning was not part of the work order, only one called for a staff, and only five were mainspring jobs. When battery and mainspring watches were considered together, the bulk of the "only" jobs called for crystals or cells.

An indication of what the future holds for ticking watches may be found in our responding watchmakers' answers to a question we asked: 32 out of 33 watchmakers say that quartz analog watch repair will increase over the next 5 years, and 15 out of 29 say mechanical watch repair (those with mainsprings) will decrease.

The survey tells us that traditional watch repair will be around for a while, but a change is on the way. The answer the survey did not give us and which will affect all bench watchmakers, is just how quickly the change will occur.

The foregoing report was presented at the 1982 annual Board of Directors meeting of the American Watchmakers Institute. The importance of its content warranted that the entire membership be informed.

Editor

On the Front

Mother Nature has the magical ability to flaunt her colors for the enjoyment of all mankind! "Land, Moon, and Sun" is the photographer's title for our cover picture this month. Further description would only hamper the reader's imagination!

Quality Clock Movements

450 Quartz

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President's Message/Marshall Richmond

More Services Of AWI

In the past three months as president of AWI, I have been educated on the operation of the organization. As I stated in the first of these messages, I will try to show each member how to take full advantage of their membership. This month the library is the subject.

The AWI library publishes a list of more than 450 books. They range from books of instruction, historical books on horological subjects, books from the U.S. Navy and U.S. Department of Commerce, publications concerning gemology and metals to just about anything that would be needed to find answers to problems encountered by a watch or clockmaker.

Every year, shortly after the first of January, a membership packet is sent out from AWI Central to all members that have paid their annual dues. This packet usually contains updates on all the latest services available from AWI The library index is one of the items that is included in this packet. The complete instructions for borrowing books are on the front of the library index, and application blanks for the loan of books are also included in the packet. As a member, you can borrow any two books at a time for a maximum of thirty days. Some of the books cannot be circulated due to their irreplaceable value, but upon request, every effort will be made to make information in these books available.

I still feel that of all the bills that I have to pay, my AWI dues are the biggest bargain that I can get today, because of the exceptionally wide variety of services they offer. These services are needed to obtain current information concerning clock and watchmaking. The cost of membership today is actually less than the combined dues of the old Horological Institute of America (HIA) and the United Horological Association of America (UHAofA). It took two good order jobs a year to pay my HIA and UHAofA dues in the 1940's and 1950's before they merged to form the present-day AWI organization. Now I can pay my AWI dues for a year with two good order jobs and have five or ten dollars left.

In addition to the library, AWI offers services that were never possible under HIA and UHAofA. Most watchmakers had to rely on the watch companies and material importers and distributors, but this is no longer possible. However, AWI has established constant contact with all the watch companies and importers, as well as distributors so it is possible in one way or another to furnish most any information that its members need and require.

Although I hold the title, Certified Master Watchmaker, I consider myself a perpetual student of watchmaking, for life is a learning process from the cradle to the grave. By learning every day with the use of books, literature, conversations, and experiments, I have been able to keep up with most of the modern changes or advancements in the horological field. With the use of your AWI membership, you can too! Remember, the only way to success is to **think positive.**

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Our Readers Write

Old Issue Brings Renewed Confidence

I have been reading your articles for a number of years and recently had the opportunity to use one of them as a "how to" guide. I am writing to express my pleasure and to compliment you on the thoroughness and clarity of your efforts.

Until recently, my amateur interests steered clear of three-train movements. I used to refer them to my more experienced hobbyist associates. When someone asked me to work on a Seth Thomas A401-003 movement, I dug back to the June 1980 issue and followed the directions in your article line by line. I was amazed at the amount of detail you included, everything except which post to set the springs against—but you did mention the springs! The results are now ticking on my test stand and I have a new confidence about Westminster movements.

I have indexed all of your articles for the past few years; if you have them available in one volume, or plan to publish them soon, please let me know.

Again, thanks for your clear and concise writing on an extremely complex subject.

Alfred Opengart
Richmond, Virginia

Editor's Note: The article referred to by Mr. Opengart was written by Stephen Conover entitled "The Hermle Chime Movement," and can be found under the feature title "Chime and Strike" in the June, 1980 edition of **Horological Times**.

The cover of the July 1982 issue of *Horological Times* is as magnificent as usual.

John Plewes
Ontario, Canada

In my humble opinion, *Horological Times* is the best magazine published for the working clockmaker. Please keep up the good work. Your efforts are really appreciated!

Wilson L. Suggs
Fort Walton Beach, Florida

Thank you for the very good technical seminars.

William R. Travis
Lodi, California

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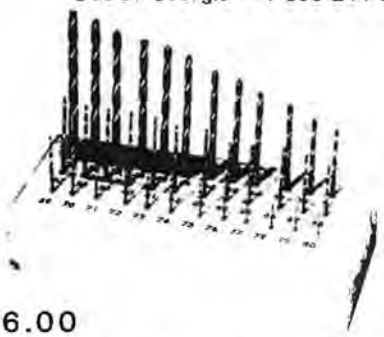

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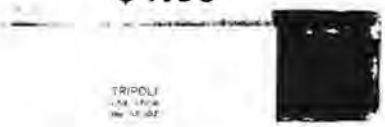

52-501	Tripoli	1 lb.

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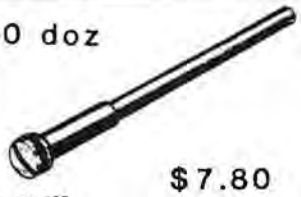

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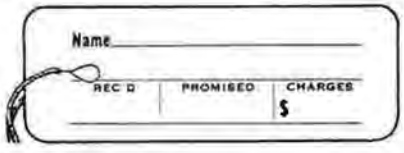
13-315 —Ship. wgt. 1 lb. 15 oz. per box.



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REPAIRING ANALOG COILS ©1982

By
Louis A. Zanoni
and
Gregory L. Zanoni

Due to the compact nature of analog quartz movements, their motor coils can be easily damaged by a screwdriver or a tweezer. The wire windings of the coil are very fragile. The slightest contact with a metal tool will break them. Until recently, it was almost impossible to repair the coils.

The following method can be used to permanently repair watch coils. The techniques and procedures of coil repair are practical and simple.

When it has been confirmed that the coil is open, a microscopic inspection must be made to locate the break. Coil continuity can be tested with a continuity meter. The use of Rodico, or a similar tacky substance to remove dust and lint from a damaged coil, is very helpful in locating a break. Coil resistances are generally between 800 and 3500 ohms. A high-resistance coil is seldom a problem. The wire is either broken or not broken. There are three categories of broken coils. Select from the categories below, the type of damage which has been found, and proceed to the repair technique under that heading.

1. COIL WIRES DETACHED FROM CONTACT PADS.
2. WIRES DAMAGED ON THE SURFACE OF THE COIL
3. NO VISIBLE DAMAGE. (Small breaks are impossible to see.)

1. Coil wires detached from contact pads (See Figure 1A).

When a wire has broken away from the contact pad, it may be possible to solder it back to the pad. (See Figure 1B.) Before this can be accomplished, the insulating coating on the wire must be removed. This can be done by heating the wire with the soldering iron and molten solder until the insulation burns off and the wire appears shiny. If the wire is too short to reach the contact pad, it may be possible to unwind a turn from the top of the coil. If the break is on the inside of the coil, an extension wire should be soldered to the appropriate pad and then soldered to the wire stub. If the soldering iron tip is too large to use on the pad or wire, silver epoxy can be used to rebond the wires. Conductive epoxy is available from Zantech as well as many other watch material distributors.

2. Wire damaged on the surface of the coil (See Figure 2A).

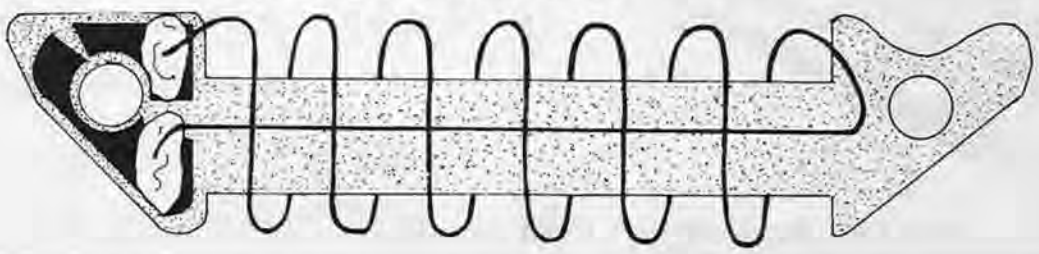
When the coil wires on the surface of the coil are broken or bruised, silver epoxy can be painted over the damaged portion of the coil, causing the ends of the broken wires to short together and thereby completing the continuity of the coil. (See Figure 2B.) It is not necessary to repair the wires individually. Since a motor coil is made up of many thousands of turns, the shorting of a few turns on the surface of the coil will not affect the overall operation of the motor. Before

(Continued on page 42)

WHAT IS A COIL?

A coil is a continuous strand of wire wrapped on top of itself like a spool of thread. When a DC current is passed through a coil, the coil becomes an electromagnet with a north magnetic pole at one end and a south magnetic pole at the other end. When the DC current direction is reversed, the magnetic poles reverse. It is this continuous reversal of the magnetic poles that causes the permanent magnet of the rotor in a quartz watch to turn and drive the gear train.

When a break occurs in the coil winding, no current can flow through it. Therefore, there is no electromagnet to push the rotor around.



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RW-40	391	.64	RW-311	397	.69
RW-42	357	1.10	RW-313	395	.69
RW-44	386	.82	RW-315	371	.63
RW-47	392	.49	RW-320	364	.69
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By Archie B. Perkins, CMW, FNAWCC

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Part II

After the grooves have been ground out of the housing bearing and the lathe spindle with the internal-external grinder (as was shown in the September 1982 issue of *Horological Times*), then the process is started of lapping the bearings in together.

The lapping is done with fine Arkansas stone powder and light oil. The two are mixed together to form a thin paste. Some of this paste is placed between the bearing surfaces of the lathe spindle and the housing bearing that works with it. See View A of Figure 1. After the paste has been applied, the two bearings are pressed together as shown in Figure 2. Then a back and forth twisting motion is started between the two bearings. Occasionally, the two bearing surfaces are separated and brought together at a different point. Then the back and forth lapping motion is started again. This separating and relocation action relocates the oilstone paste, which gives a more uniform lapping action. NOTE: The process of lapping lathe bearings is very similar to the process used to lap the heads of valves into their seats in the cylinder head of the automobile engine.

After the lapping process has been done for a short time, it is a good idea to separate the two bearings and wipe off their surfaces with facial tissue so the surfaces can be inspected. This inspection is necessary in order to determine if the bearing surfaces were ground with matching angles when they were ground with the internal-external grinder. If the bearings have been ground correctly with matching angles, it will be indicated by the effect that the lapping action has had on the surfaces of the two bearings. The lapping action will create a smooth grey finish on the bearing surfaces. This finish should be uniform all over the bearing surfaces. Otherwise, the bearings are not ground with matching angles. If the grey finish on the bearings only shows at certain points, then it must be determined which bearing is at fault and regrind it to match the angle on the other bearing. Then the lapping of the two bearings must be repeated. When the bearings have a smooth grey finish uniformly over their matching surfaces, then the housing bearing should be cleaned and replaced into its housing in the lathe headstock.

To replace the housing bearing into the headstock housing, the following method can be used. If an arbor press is available which has a table that will go between the two housing bearings, allowing the bearing to be centered with the ram of the press, it would be best to use this to press the bearing in. If an arbor press is not available, the method shown in Figure 3 can be used. View A shows a piece of channel iron which is used as a base for the staking block shown at View B. The channel iron and block allows enough height so the opposite bearing to the one being staked can go inside the channel for clearance. This enables the housing of the bearing being staked in to be supported. The punch shown at View C can be a piece of brass or aluminum with a flange which is larger than the end of the bearing. The bearing can be staked in by tapping the punch with a hammer, or this same arrangement can be used on an arbor press. A drill press can also be used to press the bearing in. Make sure the shoulder on the bearing is pressed all the way to the housing and is flat against the housing.

After the housing bearing has been replaced in the headstock, then the headstock spindle is inserted into the housing bearing and the two are relapped together as shown in Figure 4. Some oilstone paste is applied between the two bearing surfaces, and a back and forth twisting motion is used on the spindle as pressure is applied on the spindle toward the housing bearing. If

Figure 1.

Figure 2.

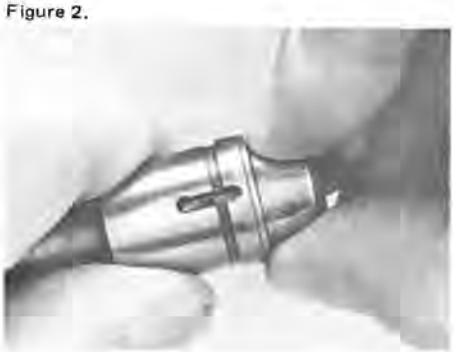
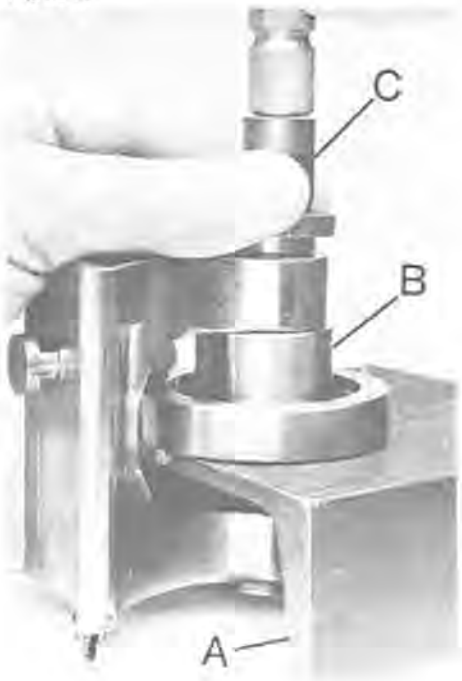


Figure 3.



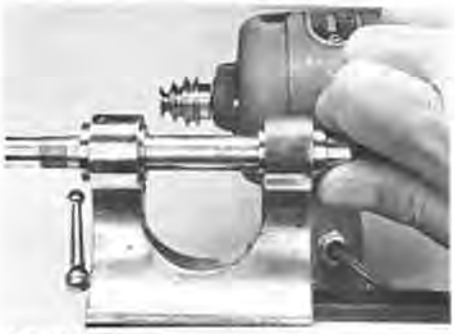


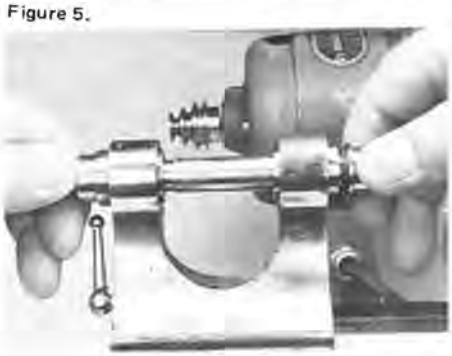
Figure 4.

the back housing bearing and its matching sleeve bearing are to be lapped in, then the sleeve bearing should be placed on the spindle and both the front and back bearings could be lapped at the same time as shown in Figure 5.

When replacing the sleeve bearing on the end of the tailstock spindle, be sure that the key inside the bearing lines up with the keyway on the tailstock spindle. The sleeve bearing should be pushed on far enough to allow a small amount of end shake on the spindle so the oilstone paste can be applied between the bearing surfaces of the bearings. When lapping the back bearings, pressure is applied on the sleeve bearing toward its housing bearing as the sleeve bearing is twisted back and forth. The oilstone paste is applied between the two bearings as was done between the spindle bearing and its housing bearing. After the bearings have been lapped for a few minutes, then the sleeve bearing should be removed from the spindle and the spindle removed. All of the bearing surfaces should be wiped clean with facial tissue so they can be inspected. When the lapping has been completed satisfactorily, all of the bearing surfaces should have a smooth grey finish as shown in Figure 6, Views A and B.

After the bearings have been lapped in, they must be cleaned thoroughly to remove all the lapping compound. Before the headstock is reassembled, be sure to check the condition of the chuck

Figure 5.



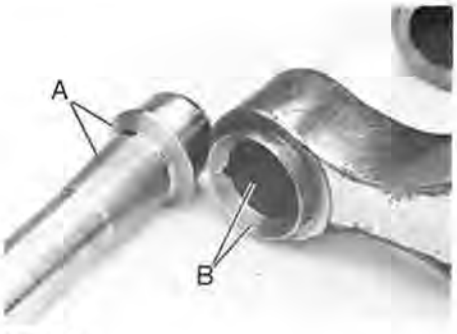


Figure 6.

key in the spindle so it can be replaced if necessary. It was necessary to replace the chuck key in this lathe because the pin had been sheared off in the spindle. The following method can be used to replace a damaged key. First, the damaged key must be removed. This is done by spotting a center in the end of the key with a center punch so it can be drilled out. Figure 7 shows the center being spotted. The spindle is being supported by a steel block which has a vee groove through the center of its top. A piece of thin cardboard shaped to fit the groove is being used between the spindle and the block to prevent the spindle from being damaged when the key is center punched. Sometimes the force used to center punch the key causes it to be driven out of its hole, eliminating the need to drill it out. If the key is removed by drilling, it can be supported in the vee groove of the block while this is being done.

Figure 7.

Figure 8.

After the chuck key has been removed, a new one is made and fitted to the spindle. To make a new chuck key, first select a piece of high carbon steel drill rod. The diameter of the rod should be about two times the diameter of the hole in the spindle where the key fits. Chuck the rod in the lathe and turn down a pivot at its end sufficiently long to reach through the hole in the lathe spindle as shown in Figure 8. The diameter of the pivot should be a size that will fit closely in its hole in the spindle. The diameter can be checked from time to time by trying it in the hole of the spindle as shown in Figure 9.

Another method would be to select a twist drill that would fit the hole closely. Then, measure this drill. This would give the diameter to which the pivot should be turned down. After the pivot has been turned to size, take a sharp pointed, diamond-shaped graver and turn a sharp female center in the end of the pivot. This helps the riveting process when the key is riveted into the spindle. Next, use a cut-off style graver to cut the key from the rod, leaving a thin head on the key as shown in Figure 10. Chuck the key in the lathe by the pivot as shown in Figure 11. Use a graver to thin the head of the key so it is slightly thinner than the depth of the keyway in a lathe chuck. Next, the head of the key is filed down on two opposite sides forming a rectangular-shaped head with a width that is slightly less than the width

Figure 9.

Figure 10.

of the keyway in the lathe chuck. The index pin is used in the holes in the back of the lathe pulley to hold and index the lathe spindle while the filing is being done.

To determine the width for the head of the key, find a twist drill or piece of rod which fits the keyway of the chuck closely without any side shake. Measure the diameter of the drill or rod. Then subtract 0.04mm to 0.06mm from this measurement and this will give the proper width for the head. If the width for the head is subtracted from the diameter of the head, this will determine how much must be filed away to form the width of the key head. Since it is very important to have the head of the key centered, then one-half of the difference between the diameter and the width of the head must be filed away from each side of the diameter of the head of the key. Example: When the head of the key measures 3.00mm and the width of the head is to be 1.70mm, the difference between the two measurements is 1.30mm. Dividing 1.30mm by 2 gives 0.65mm. This means that 0.65mm would be filed from each side of the diameter of the head. If 0.65mm is subtracted from 3.00mm, this leaves 2.35mm.

Figure 11.

Figure 12.

Figure 13.

Now the head of the key is filed on one side as shown in Figure 12 until it measures 2.35mm. Then the spindle of the lathe is indexed 180°, and the other side of the head of the key is filed parallel to the first side so the width of the head of the key measures 1.70mm. After both sides of the key have been filed, it should be tried in the keyway of the chuck as shown in Figure 13 to make sure the fit is correct.

Now proceed to rivet the key into the lathe spindle. First, place the key into its hole from the inside of the lathe spindle. Line up the head of the key so it is in alignment with the spindle. Now insert a lathe chuck into the spindle, making sure the head of the key goes into the keyway of the chuck. The chuck holds the key in place while it is riveted enough to hold it in place. NOTE: The spindle is supported in the vee groove of the metal block as shown in Figure 14 while the riveting is being done. Be sure to use a piece of thin cardboard between the spindle and the block to protect the spindle. A steel hammer can be used to do the riveting, or a round-ended, solid staking tool punch can be used instead of the steel hammer. After the preliminary riveting has been done with the

Figure 14.

Figure 15.

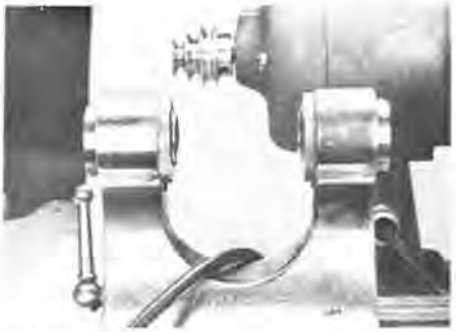


Figure 16.

chuck in the spindle to hold the key in place, then the chuck is removed from the spindle.

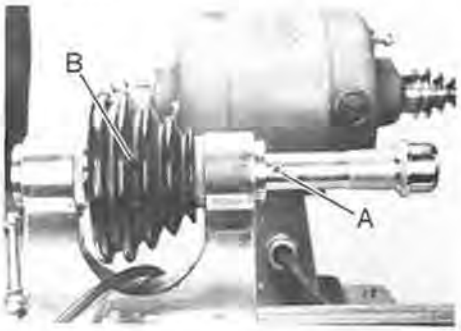
The final riveting is done by using a steel rod inside the spindle to support the head of the key. The rod should be of a diameter that fits closely in the hole through the lathe spindle. Then use a file to file a flat side one inch long at the end of the rod. This flat side is used to support the head of the key. Therefore, the rod must be filed to a depth that allows the rod to go into the lathe spindle, with the flat side supporting the key. The rod is held in the bench vise, while the final riveting is being done as shown in Figure 15. After the riveting has been done, the head of the rivet is filed down flush with the surface of the spindle so it will not interfere with the spindle working in its housing bearing.

To reassemble the lathe headstock, the following procedure is needed:

First, replace the two inside dust shields and replace the belt between the two housing bearings. See Figure 16.

Second, place the pulley between the housing bearings and start the headstock spindle through the front housing bearing and into the pulley. See Figure 17. Place some oil on the spindle bearings. Be sure to line up the set screw hole A with the set screw hole B in the pulley. Press the spindle into the pulley until hole A in the spindle lines up with the set screw hole B in the pulley.

Figure 17.



(Continued on page 44)

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Chime and Strike

By Steven G. Conover

Waterbury "Double-Deck" Chime Movement *

Waterbury Clock Company manufactured the chime movement we will look at this month. It appears rather ordinary from a quick glance at the front or back plate, but the side view in Figure 3 shows us something unusual. Waterbury converted a striking movement to chime by adding a third movement plate. The chime movement is added onto the back of the strike movement, and the two share the common middle plate.

This series has featured two other chime "conversions" based on a modified time and strike movement with an added chime mechanism. Seth Thomas' Sonora Chime, covered in the April 1980 installment, has a separate chime movement in the clock case along with a No. 89 striking movement. Levers connect the two movements. The No. 89 actuates the chime movement each quarter hour, and each hour the chime mechanism starts the strike. When Sessions tackled the same problem, they added a chime mechanism to the side and rear of a modified striking movement. The result, featured in the April 1982 issue, is a two-train chime movement even more difficult to repair than either the Seth Thomas or this month's Waterbury. It seems that the Sessions is such a hybrid, that you just have to start from scratch with it.

Our Waterbury movement is not as complicated as it seems at first. Even though there are two movements in one, they can be worked on separately. The time and strike portion is assembled first and can even be wound up before any of the chime parts are added. A 1923 Waterbury catalog shows the line of clocks called "Mansion," with the No. 35 double-deck chime movement. This is probably an "improved" version of ours. The No. 35 in the catalog has rack and snail strike, a solid back plate, and a "reduced wind feature" which is a gearing-down of the effort required to wind the heavy chime mainspring. Our movement is similar in overall appearance, but it has a count wheel strike, a back plate with open areas, and a straight-through winding arbor without special gearing.

A brief summary of the movement's operation is our starting point. A star cam on the center arbor has four arms instead of the one or two found in striking clocks. The cam does not start up the count wheel strike train but rather the chime train. As the hour chime ends, the chime train puts the strike mechanism into operation. This may sound simple enough, but one good look at this Waterbury creation is enough to convince you otherwise. There seem to be many gears and levers in the movement, which is unlike others you have worked on! Resist the urge to put it aside. We can tackle it step by step.

Let's continue by giving the movement a quick going-over. The *front* half of it certainly looks familiar to us. It is a basic time and strike movement with a count wheel. You may already have experience adjusting and repairing this kind of clock. The striking movement has, of course, been modified for its special purpose in a chime clock, but once it has started striking the hour, it works like any other striker of this type.

Figure 1. Front view of the Waterbury chime movement.

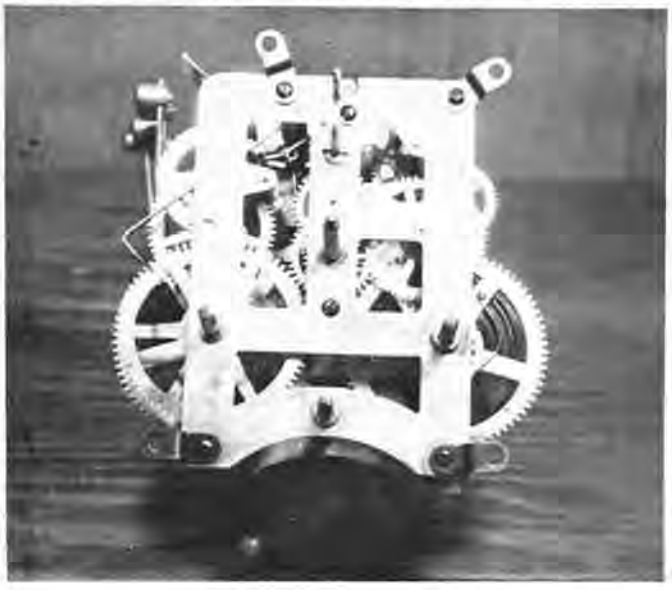
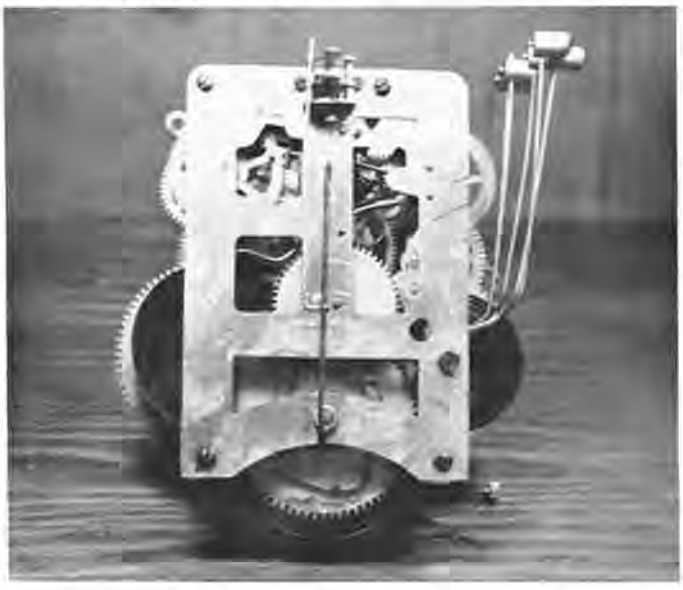
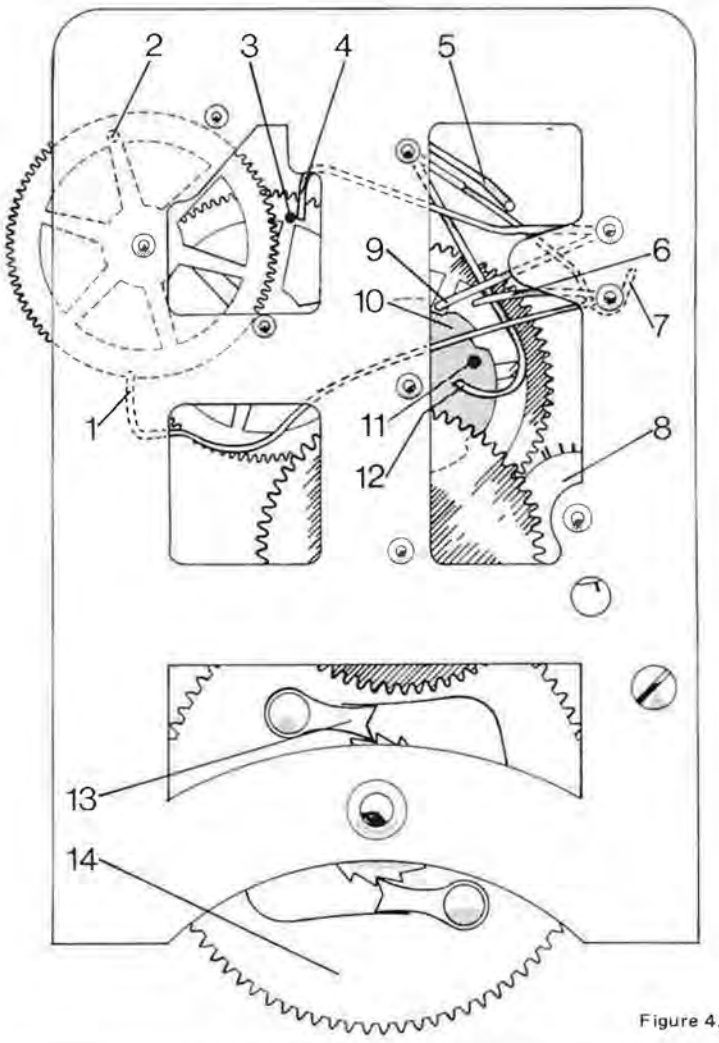


Figure 2. Rear view of the movement.





1. Chime warning lever
2. Chime warning pin
3. Chime lock pin
4. Chime locking lever
5. Rear strike unlocking lever
6. Chime unlocking lever
7. Strike warning lever
8. Pin barrel
9. Chime drop lever
10. Locking plate
11. Strike lift pin
12. Strike lift lever
13. Chime click
14. Chime main wheel

Figure 4. Chime train viewed from the back of the movement.

The *back* half of the movement is exclusively for the chime. The chime operates on a count wheel principle also, but I am more used to calling this a locking plate in a chime mechanism. Figure 3 emphasizes the two sections of the movement in a side view. The front half, for time and strike, is on the right of the photo. The chime portion is to the left.

Before thinking about disassembly and overhaul, follow the operation of the chime and strike mechanisms. Throughout the discussion which follows, locate the parts on Figures 4 and 5. The star cam (16) is on the center arbor of the clock. For each quarter hour, the cam raises the chime lift lever (17). It connects with an arbor in the chime portion of the movement. On this arbor is also the chime unlocking lever (6), which raises the chime drop lever (9) from the slot in the locking plate (10). This action raises the chime locking lever (4), allowing the chime lock pin (3) to escape. The chime train moves to the warning position as the chime warning pin (2) revolves with its wheel toward the chime warning lever (1). There it is held until the exact quarter hour. At that moment, the arm of the star cam releases the chime lift lever, and the warning lever drops. The warning pin is released, and the gear train begins to run. The chime drop lever rides on the locking plate, and keeps the chime lock pin raised up out of the way so it will not hit the chime locking lever. The chime train runs until the drop lever finds the next slot

(Continued on page 21)

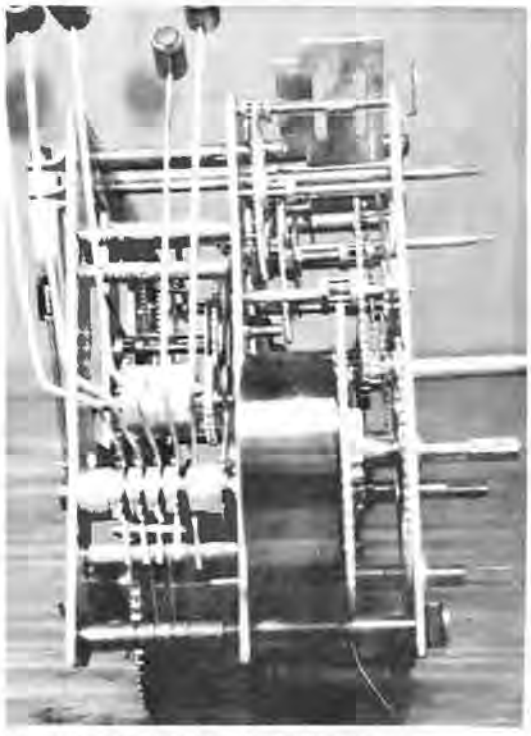


Figure 3. Side view from the strike side.

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(Continued from page 19)

in the locking plate, Then the chime locking lever stops the chime lock pin and the entire gear train.

We have seen from other clocks in this series that it is the spacing of the four slots in the locking plate which establishes the duration of chiming for each of the four quarter hours. The shortest "segment" of the locking plate is for the first quarter, and the longest is for the hour. The chime melody is Westminster. The Pin barrel (8), which lifts the hammers, is driven directly off the locking plate gear. Figure 3 shows the pin barrel behind the hammers.

As we consider the locking plate, it seems appropriate to mention here that the Waterbury movement does not have an automatic chime correction feature. There is no mechanism for it. The locking plate has no "hump" or high spot as is found in some clocks. There is no chime correction cam either, which would have a slot synchronized for the third quarter locking position. And the four arms of the star cam are of equal length, producing the same lifting action at each quarter. The chime train just counts one quarter after another. If the chime train runs down or someone turns the hands, the minute hand may not point in agreement with the notes we hear. We may get the first quarter chime at the half hour, for example. The only solution is to move the minute hand counterclockwise so that it agrees with the notes played.

The count wheel strike train does not have an automatic correction feature, nor would we expect it to have one. The movement has a trip wire hanging down, to enable the clock owner to advance the hour hand. The trip wire is common in striking movements in which the minute hand should not be turned back. In the Waterbury movement, the trip wire is required for a different reason. It is the only way to get directly at the strike train. The strike is, as we have seen started by the chime train at the hour.

As the movement nears the end of the hour chime, the strike train moves to the warning position. The key to this action is the strike lift pin (11) on the locking plate. The pin raises the strike lift lever (12). This motion also raises the strike warning lever (7), attached to the same arbor as the lift lever. The warning lever holds the strike lock pin (21) during the warning, but it also has another function to perform at the same time. The warning lever pushes up the strike unlocking lever (5). There are two of these strike unlocking levers. The one toward the rear of the movement is contacted by the strike warning lever as I have explained. The lever near the front of the movement (not shown on the drawings) has the trip wire hanging from it, and it is this lever which actually raises the count lever (26) up out of the slot in the count wheel. To review, the flow is from the strike lift pin to strike lift lever, to rear strike unlocking lever, to front strike unlocking lever, to count lever. The "standard" count wheel strike takes over at this point. We cannot cover it here, because our space is best devoted to the chime portion of the movement.

(Continued on page 24)

Questions and Answers/ Henry B. Fried

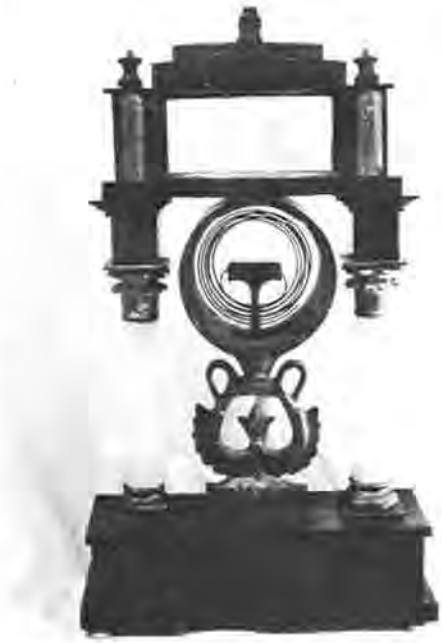
Henry B. Fried, CMW, CMC, FAWI, FBHI

Viennese or Czechoslavakian?

Q I have enclosed pictures of a case and movement of a clock I have recently purchased. The movement is spring driven, yet is set up similar to three weight Vienna regulators I have worked on. The case is primarily wood with marble or similar material used for the columns and reclining figure. The signature in the lower photo, is found on the back of the dial and the inside back plate. I am presently attempting to restore the clock and would like to learn as much about it as possible. Could you answer a few questions or lead me to literature that might help me find some of the answers.

I have not been able to decipher the maker's signature. Any help in indentifying the name or information on the gentleman (or woman) would be appreciated. I have guessed that the clock is Austrian, from the early 1800's. Is this a good guess? The clock has two holes on the sides just above the columns. The holes are drilled at an angle, so that a piece set into them would stand at a 45° angle. Could these perhaps be original and used to support flags or tapestry? Obviously any information you have to offer regarding the clock will be awaited anxiously.

Steven J. DeYoung
Holland, Michigan



A *I have examined the photographs of your clock and I think that you have done a good job of estimating its age and place of origin.*

This is either Viennese or possibly, on an outside chance, Czechoslavakian (Prague) which isn't too far from Vienna. It is a bit too massive in the movement for the Viennese type, and that's what prompts me to make the Prague connection. However, at that time, there was a great interchange of artisans between the two cultural centers. The pillars are most likely alabaster and possibly white marble, which from looking at the photos, cannot be ascertained. However, usually alabaster was used at that time in such clocks.

I do not think the maker's name is the one you saw on the back of the dial. It could be a repairer or possibly the dial plate maker who sometimes put their names on these parts. I cannot advance any ideas regarding the obliquely drilled holes.

This type of clock is also known as an "Empire" clock, after Napoleon's victories in that region.

Q I have the opportunity to buy several Morez clocks in Spain. Since I haven't found reference to these in U.S. trade publications, I would appreciate your opinions/recommendations regarding rarity/novelty, value to collectors, reference material available, and any information you can provide.

J. de las Fuentes
APO, New York

A *I think it would be a good idea to purchase the Morbier, or what you called them, Morez clocks. These are always interesting. I have one and have owned a few in my time.*

The older ones are those with the verge escapement or with the crown-type escape wheel horizontal with the pallets on top; these are worth more. Those with calendar are also more valuable, and those with interesting pressed brasswork atop the clock are equally so. The pendulums which are floral and still have the original paint are desirable.

Years ago, I got my first one for thirty-five dollars. Today, these bring over six hundred or more dollars. The vertical striking arrangement is very nice, and their peculiar repeating mechanism makes them quite interesting.

The case work is rather plain or provincial, but sometimes one shows up that is attractive. If you can buy various types, do so, as these will surely appreciate. Even though these are now being reproduced in the Morez section by Jaz and others, it is still a good idea to collect them. There are two books on these clocks which can be had from the AWI library or bought from Adams Brown Company of Epping, New Hampshire 08033. Ask for their catalog of books.

Q A colleague has placed in my hands a dial from an old English fusee gallery clock that was once used in public buildings. (This was stated by him.) This dial is of a cast iron type with a ceramiclike paint on the front surface.

The lettering and numerals are all hand drawn and the posts on the back were heat soldered, which created more damage. The fact that the "GR V" is so prominent brought up the question to my colleague "why not restore it as authentically as possible?"

My question to you, sir, is; does this ring a bell in your memory or can you refer me to someone, possibly the London Museum, who might know the complete name and address of the

(Continued on page 39)

Borel

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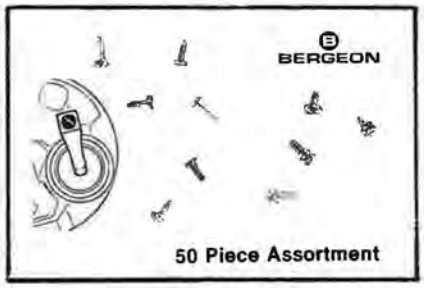

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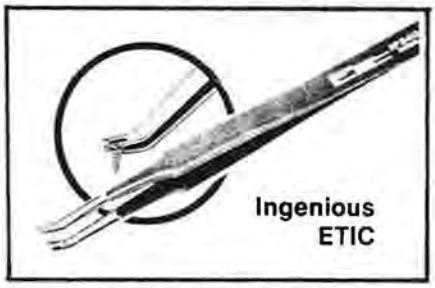

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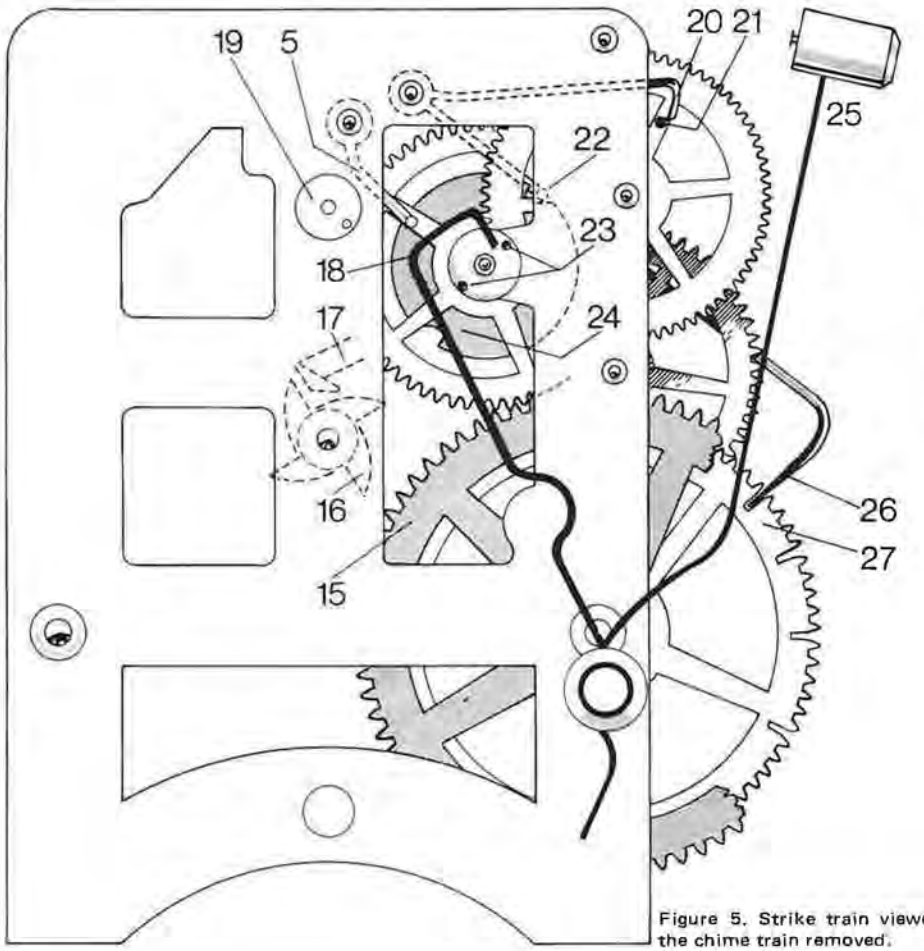

15. Strike main wheel
16. Star cam
17. Chime lift lever
18. Strike hammer tail
19. Chime silencer arbor
20. Strike locking lever
21. Strike lock pin
22. Strike drop lever
23. Strike hammer lifting pins
24. Strike cam
25. Strike hammer
26. Count lever
27. Count wheel

Figure 5. Strike train viewed from the back of the movement, with the chime train removed.

CHIME AND STRIKE

(Continued from page 21)

After having studied the basic operation of the Waterbury chime movement, we are ready for the disassembly and overhaul. There are certain problems even with the disassembly. For one thing, regular mainspring clamps do not seem to fit on any of the three springs. All we really have to worry about at first, however, is the chime spring. The time and strike springs can remain wound until we have removed the entire chime portion of the movement. Another problem is the strength of the chime mainspring. Take some strong wire and wrap it around the spring, fastening it securely. A single wrap may not be enough. Make sure the spring is actually let down all the way before you remove the back plate. On

(Continued on page 35)

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- Pendulum length: up to 42½" from center shaft to tip of pendulum
- Self-starting and service-free

Restoring Pivot Finish

Part II

By David G. Arnold, CMC, CMBHI

This month we are continuing the discussion of restoring pivot finish. There are abrasive means of polishing soft pivots. I prefer to obtain a pivot with additional wear resistance, but sometimes I polish the burnished surface slightly. A thick paste of diamantine and oil on boxwood works well. Likewise a commercial chrome polish "Simichrome," when not allowed to become dry on the boxwood, does a reasonable job. Don't polish too much after burnishing or you will cut through your hardened skin on the pivot. Keep the pivot in a blob of polish on the boxwood and move the boxwood quickly back and forth and slightly from side to side as well, to prevent developing ridges on the pivot. Run the lathe at top speed. Clean the revolving work after a few strokes with a clean piece of pith, and check your work. Be sure the polish extends all the way into the shoulder and that the shoulder is polished as well. As the boxwood becomes deformed and loaded with steel and polish, scrape it flat and clean again with your bench knife. (See Figure 10.) Recharge with abrasive and start fresh.

Hard pivots, being harder than the steel in the file, require abrasive means of truing the pivot. I have read writers who advocated leaning on the file and forcing it to cut the steel. My experience is that it is very easy to ruin a $4.00 pivot file by trying to use it on steel that is too hard. I can't afford that, just to polish a pivot.

The ideal tool for the job is a pivot polisher. (See Figure 11.) I use diamond compound well rolled into a copper or iron lap. It costs a little more initially, but, in my opinion, the speed of cutting justifies the expense. One carat each of 12 micron, 6 micron, and 0-1 micron diamond powder only costs about $15.00 – if you can find a source for the raw powder. Even made up in syringes with oil from a lapidary supplier, the cost would be about $50.00 for enough diamond to polish pivots for many years. *Absolute cleanliness is essential when handling abrasives.* Any cross contamination from hands or tools or bench top must be avoided at all costs. If any coarser material gets into the finer material, all your work will be futile, and the laps will have to be retrued and recharged with uncontaminated abrasive.

To this end I mix only small amounts of diamond with oil in 1 in. x 1 in. plastic parts boxes. They are kept closed except when removing abrasive, and when the last is used, I throw away the box. This way I avoid carrying over any contamination to the next batch. Likewise I store my laps in 1 in. x 2 in. plastic parts boxes labeled on the tops and sides in magic marker to prevent any accidental confusion.

Figure 1. Scraping a boxwood lap true.

Figure 2. Setup for grinding and polishing hard pivots.

Figure 3. Badly rusted and pitted arbor before grinding with abrasive wheel previous to lapping.

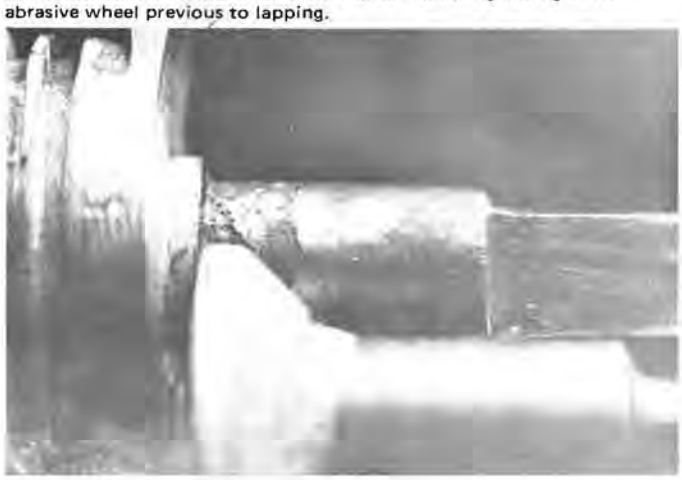

Figure 4. Appearance after grinding.

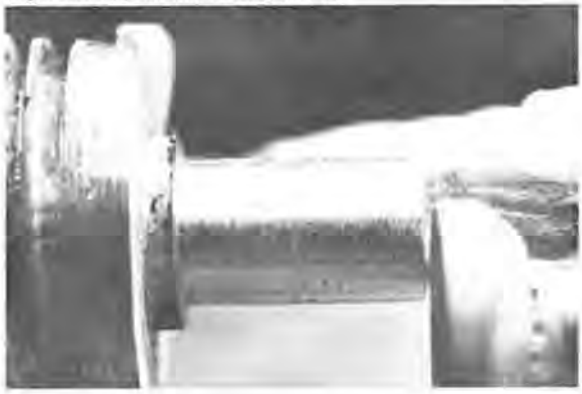

Figure 5. Appearance after 12 micron diamond.

Figure 6. After 0-1 micron diamond. Certainly a far superior bearing surface to that in Figure 3.

Charge the lap by rolling in the diamond particles with a hardened steel roller while rotating the lap slowly. Apply some considerable pressure and be sure to toll the diamond into the entire surface of the lap. Clean any excess off the surface of the lap, and thoroughly clean the roller before using it for any other grade of abrasive. Keep the lap and pivot thoroughly flooded in oil while using the polisher to prevent tearing either the pivot or the lap.

With the lap set at center height and the lathe and lap revolving against each other in opposite directions at high speed, a few seconds work with each lap is usually sufficient to true-up and polish the pivot. Keep the lap moving lengthwise on the pivot to prevent forming ridges. Be sure the corners on the laps are square, or you will not obtain a polish into the shoulder. Absolute cleanliness is again essential between laps to obtain top quality work. (See Figures 12, 13, 14, and 15.)

Lacking a pivot polisher, abrasive stones can be used. To keep the shoulder square, use a triangular stone. As with

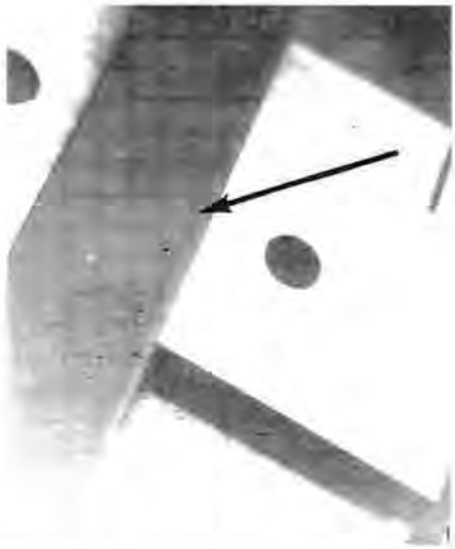

Figure 7. The corner on this triangular stone has been ground to allow work into the shoulder of the pivot.

burnishers, the corners on the stones are seldom true as received. A little work on a diamond wheel will relieve the corner and still allow a broad flat area to work against the pivot. (See Figure 6.) By using progressively finer stones (India, Arkansas, Jasper), you can nearly polish the pivot. Follow up with diamantine or 0-1 micron diamond on a cross filed mild steel or iron lap. Use the lap as usual, but do not allow the abrasive to dry out completely during use, or the finish will be spoiled.

Alternately, a paste of oilstone powder and oil on a mild steel or iron lap can be used to grind out the flaws in the pivot. This has the advantage of avoiding the transferring of irregularities in the stone to the pivot and, as the lap should be cross filed to clean and true it up between uses, also provides a fresh, flat working surface for each use.

Occasionally, a hard pivot will be so badly scored as to require the use of a carbide graver to roughly true it up before any of the above methods are used. A steady rest will be found to be a great advantage in supporting antique arbors with the pivot running true.

Any method of polishing pivots relies on the pivot spinning true. Any eccentricities in centering the pivot will show up as an off center, polished side on the pivot.

Hopefully, that is enough. With patience, practice, and persistence, you will find yourself able to polish pivots and truely restore the pivot surfaces to factory-new condition.

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THE PICKLE BARREL

By Marshall F. Richmond, CMW

Polishing, Buffing, and Burnishing

Part II

Polishing and burnishing often produce the same results, only there is a different principle involved. In some cases the application is similar or the same.

Polishing is generally referred to as the use of an abrasive to remove dullness in order to produce a bright, shiny finish. When polishing a very rough surface, a coarse abrasive is used, leaving a satinlike finish. To make it even brighter, a finer abrasive is used. This will remove all the coarser abrasive marks until a fine enough abrasive (such as rouge) can be used, which will produce an almost mirrorlike finish.

Burnishing is done by rubbing a harder metal or substance over a softer substance to produce a mirrorlike finish. The burnishing does not remove any of the metal or substance being polished, but simply moves the high spots into the low by exerting pressure. This process can not be seen with the naked eye, only the result of a smooth finish is visible. One example of burnishing and polishing that can be used is when polishing pivots. There are many ways, but I use a jasper slip for burnishing. This will not reduce the size of the pivot, but will only make it smooth. I also use a sapphire slip, which will reduce the size of the pivot, as well as leave it with a very bright finish. These are both applied in the same manner. However, the jasper burnishes while the sapphire polishes.

Another good example of polishing and burnishing is the tripoli wheel on the polishing motor, whether it is soft cotton or hard felt. When charged with tripoli and heavy buffing has been done, the wheel becomes shiny and the same color as the metal being buffed. If no more tripoli is added, the wheel will burnish the item instead of polishing it. Although the wheel will continue to produce a bright finish, it does not actually remove any metal.

Burnishing is usually thought of as a hand operation using a burnishing tool. By handrubbing the tool over metal, the surface becomes smooth, such as burnishing down the bezel on a bezel set stone ring. However, that is only one small use for burnishing. I have referred to using the hand-burnishing tool to remove rough places in rings where the metal is porous. Sometimes it works, sometimes it doesn't. A very good use for burnishing is riveting the tube rivets on emblems that are put on drilled stone rings. A bright pointed center punch in a hand vise should be put in the center of the rivet when the emblem is resting on a sturdy wood base. Twisting it back and forth while applying pressure will result in a tight rivet with little chance of breaking the stone. Actually, anytime two pieces are rubbed together without an abrasive, the process is burnishing, and when the two pieces are rubbed together with an abrasive present, the process is polishing or grinding.

Tumbling is another form of producing a fine finish. A tumbler is a drum in a horizontal position that rotates slowly (20 to 50 RPM). It can be loaded with jewelry and steel shot for burnishing, or with abrasives used for polishing. Abrasives are available in different grits from extra coarse for prefinishing rough castings, to fine grits for a semifinal finish. A detergent is available to lubricate the steel shot while burnishing. Tumbling can polish into hollows and crevices that are next to impossible to get polished in any other way. Findings manufacturers use the tumbling process for finishing almost all findings. In spring-rings, I have found a steel shot obstructing the catch, so I feel this is proof of the manufacturers' use of tumble burnishing. One watchmaker that I know uses the tumbling process altogether for polishing his watch cases in his watch repair shop. Since he operates a production watch repair shop, this is a paying method for him because in man-hours, he has only one or two minutes per case involved in the total watch repair cost.

Sandblasting is another form of rough finishing jewelry. It is primarily used in preparing rough castings or corroded jewelry for the work to be done, or as a prefinishing step before polishing. Small sandblasters are available from the material jobber. If enough work of this kind goes through your shop, it would quickly pay for itself in man-hours saved.

Burnishing is a subject that all watchmakers and jewelry repairmen should understand thoroughly. The better it is understood, the easier it is to apply. It would hardly be believable if I told you that a quarter of an inch bump on a piece of metal could be burnished out with a hand tool, but if it were on a flat piece of metal, it could be put through a rolling mill and flattened into the metal. This is about the same process as burnishing. Because of the properties of various metals, they are quite workable. Karat gold, silver, platinum, and the metals most used in jewelry are all workable metals. They can be bent, stretched, and shrunk, all with a given understanding of the metal being used and its limitations. Of course, when working metal, it becomes harder as it is manipulated through burnishing, bending, hammering, or rolling. Annealing it periodically is necessary to make it easier to shape and to keep it from becoming brittle and breaking.

Beading tools used for forming and polishing beads on stone settings are burnishing tools. If the beading tool has a mirror finish in the cup, a bead will be bright when it is formed and need no polishing to finish it. Prong pushers used for bending prongs and tightening them over stones are also burnishing tools. The bright finish on the prong pusher will burnish the prong while bending and tightening it since it

must be rubbed over the prong with pressure. For bending the metal of a bezel over a stone, usually a burnishing tool is used. It can be either a curved or a straight burnisher. Often when the metal is too heavy to be bent over with a burnishing tool, it is peened over using a matting tool (flat bottom punch) and tapped with a brass hammer. Then after it is bent over the stone, it can be tightened and burnished bright with the burnishing tool.

In using the drawplate to reduce wire or form tubing, the metal is pulled through the drawplate with heavy tongs. If the tapered holes in the drawplate are polished mirror bright, the outside of the metal after being drawn through the drawplate will be bright and shiny. The beading block that is used to form the concave in the ends of beading tools is a series of half balls in the block sitting in a tapered depression. Both the bead and depression are polished bright so when forming or touching up the beading tool ends, it is done by hand and exerting pressure while turning the tool in half rotations, back and forth. This not only shapes the end, but burnishes it bright at the same time. This bright finish may be transferred to the stone settings while forming or tightening beads.

Although the current highly inflated economy in which we live has converted many fine watchmakers to parts changers, there is still a need to know all we can about burnishing and polishing, if only for polishing the watch cases on the watches we repair. Some of us still repair all or a large percentage of the damaged or worn watch cases that are brought into our shops, and many of these case repairs can be made with a burnishing tool.

For some reason, many ladies' watch cases with bezels and snap backs become loose. I have found that most of them can be tightened by removing the movement, snapping the bezel over the back (if it snaps), and with a curved burnishing tool, tighten the case back to its original shape. Sometimes in order to get it to snap, the ends of the bezel need to be bent slightly inward with a pair of flat nose pliers. Pocket watches with screw or snap backs may become loose. Sometimes they can be tightened merely by burnishing around the edges. Other times this can be corrected by using a crystal press so the edge can be drawn in enough to make the threads hold on screw cases, or make the back snap on snap cases.

Dents can be removed usually with a burnishing tool, without leaving the marks that tapping them out will leave. Even scratches can be smoothed out with a curved burnishing tool, so that little polishing is required to completely remove it. This can be important especially in gold-filled cases. If the scratch is through the layer of gold, it would require polishing away much of the gold around the scratch, leaving a very undesirable base metal showing. The burnishing actually fills the scratch with the surrounding metal.

One application for burnishing that I have found quite useful over many years is tightening the lids on mainspring barrels, usually on pocket watches. I reassemble the barrel, snap on the lid, and if it does not snap tight, I burnish all around the edge with the curved burnishing tool, being careful not to damage the teeth. Then I put it on a bench block with the lid up and burnish the flat part of the edge. This usually eliminates any chance of the barrel lid coming off while the watch is in service.

While in watchmaking school receiving instructions on clock repairing, we were told that if one of the teeth in an escape wheel was slightly short it could be "stretched" by milking it with tweezers. Since these teeth are long on an old verge escapement, this is possible because what is really occurring is the tooth is stretched by burnishing it with the tweezers. It works successfully, but care must be taken to make sure that when the point is finished, it is the same distance from the teeth on each side.

Although engraving is not considered as polishing or burnishing, it can be an important part of finishing watch and jewelry repair jobs. We usually think of engraving as letter engraving, but hand letter engraving is a trade of its own. To be a good letter engraver requires natural artistic ability, but to do jewelry repair and crafting it is good to know how to use hand gravers. Although gravers remove metal, the highly polished belly of the graver leaves a bright, mirror finish. This is useful in touching up finished jewelry repairs after polishing. In diamond or stone setting, engraving is necessary to finish bead set rings or jewelry. One school that teaches diamond setting, as well as hand engraving, highly recommends that anyone entering the school for diamond setting should first take the course in hand engraving. Florentine finishes are done with a lined hand graver; however, there are rotary burs that can be used in the flex shaft tool that will produce what is called a Florentine finish, but it will not compare to a hand-cut Florentine finish. Bright cutting with hand gravers can produce borders, patterns, or duplications of patterns where the repair has been made in an engraved section. I am sure most of you have observed small circular swirls inside watch cases covering the complete inner panel. This is done with a rubber abrasive wheel in the flex shaft tool or in a small drill press. It is easy to apply, and often is used for coverup scratches or flaws on a smooth surface.

One of the most difficult ring sizing jobs is a two-tone, white and yellow band ring. In addition to having to contend with two colors of gold, to do a perfect job also requires matching the engraving when a piece is added to make it larger. Hand engraving can be done to match almost any pattern, but it is time consuming. Most customers would rather have a blank space where the ring was enlarged, rather than pay the price of having the engraving matched. Matching engraving requires quite an amount of time and a high degree of skill, so the cost will be very high.

Still another type of finishing that I have not mentioned is the finishing of hard enamel. Hard enamel in different colors is just powdered, colored glass that is mixed with enough water to form a thick paste. It is placed in the depressions in the article to be hard enameled. Then the article is placed in an enameling oven and heated to a temperature that will melt the glass until it flows, but not hot enough to melt the metal. What was just explained about enameling is only enough to give an understanding of the material. Since glass is flintlike and will chip easily, it should not be filed, but there will be excess above the metal surface that must be removed. Start with an oilstone or extra fine grit emery paper on a stick and remove the excess almost down to the metal. Then use finer grits, such as hard Arkansas oilstone or 4/0 emery on buff sticks, and make the enamel flush with the metal. Now the article can be polished on the polishing motor using cotton buff wheels, charged first with white tripoli and then rouge. This should produce a fine finish on both the enamel and the metal.

Finishing repairs or handcrafted jewelry is as important as the repair itself. Hopefully this article will help give you a better understanding of polishing, burnishing, and finishing articles of jewelry, as well as watch cases and attachments. The next article will be a discussion on altering stones to fit settings, or how to alter settings to fit stones.

USE THE AWI BATTERY SYSTEM

Battery replacement has caused much concern among jewelers and watchmakers in recent years, prompting more questions than any other topic. In the August 1982 *Horological Times,* Ewell Hartman explained the new AWI Battery Number System, which was developed by his committee. Because of this committee's work, most of the uncertainty of installing the proper battery in a timepiece has been eliminated.

The AWI system assigns a two-digit number to all batteries having like properties. The character of the battery is identified by an alphabetical letter, which precedes the two-digit number. Thus, "S" identifies silver batteries; "M" identifies mercury batteries; "L" identifies lithium batteries; "A" identifies alkaline batteries; and "R" identifies rechargeable batteries. Numbers ending in odd digits are high-drain batteries while numbers ending in even digits are low-drain batteries. The system's charts provide the dimensions of the battery and voltage.

A convenient kit is now available to AWI members to adapt present systems (or nonsystems) to AWI numbers. The kit contains a convenient 8" x 7½" booklet listing data on all the watch batteries known to be in use today. Three sheets of gummed labels are included, which are imprinted with the AWI numbers assigned to each type battery. The labels can be attached to the compartment storing the various batteries assigned to that number. The kits are available from AWI Central, P.O. Box 11011, Cincinnati, Ohio 45211. The cost is $2.00, which covers our cost of printing and mailing.

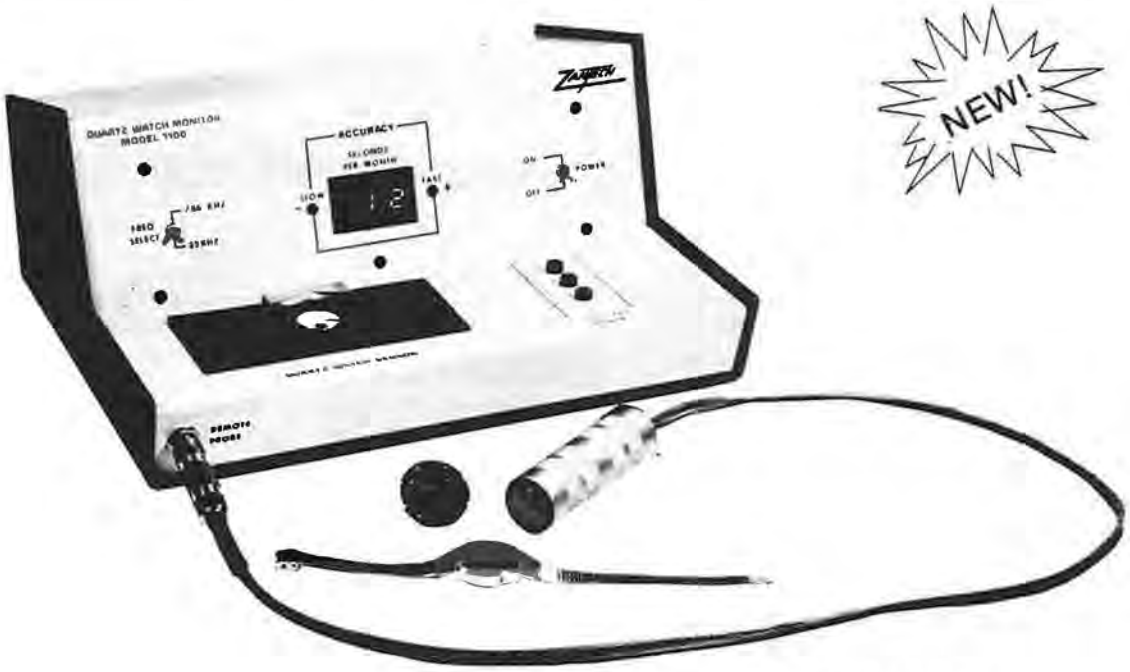
For those who do not already have a specific method of storing watch batteries, we recommend a cabinet, similar to the one pictured above. The unit is called "Quick Pic 45" and is available in K-Mart or similar stores across the country. For the address of your nearest dealer, contact Akro-Mils, Box 989, Akron, Ohio 44309. The nice feature of this particular cabinet is that it has an all metal case, which can be easily hung on a wall or placed on a shelf. Since this model contains 45 drawers, the entire AWI system will fit into one cabinet by placing a spacer in each drawer and assigning two numbers to each drawer. Those using a large volume of batteries may want to look for a cabinet with more drawers or perhaps use two of these.

One important feature of this system, as mentioned by Mr. Hartman in his August article, is that everytime a battery is installed, the AWI identification number should be inscribed either on the battery retainer or in the cell compartment of the watch. By doing this, future replacements will be handled more easily. All you need to do is to note the AWI number and obtain the proper replacement from the compartment and install. No need to fuss with a chart, measure dimensions, or look through interchangeability booklets. This not only saves time for you and your customer, but it insures the installation of the proper battery.

The advantages to your customer are obvious. In addition to the advantages already mentioned, this system allows you to purchase the brands of batteries you wish to handle. You will be able to take advantage of special sales when they come along; costly duplication of inventory will be eliminated; and comebacks, due to improper installation, should be eliminated.

Once your system is organized, you will be able to order replacement batteries from your distributor by the AWI identification number. Distributors have been supplied with the AWI charts. More can be supplied upon request. Some distributors are already using the number system in their private assortments. Others plan to do so in the future. If this system is used by those who are involved with installing watch batteries, it will soon become the standard of the industry. Think how convenient it would be if manufacturers were to inscribe the battery number on the retainer in new watches. Perhaps they will some day.

QUARTZ WATCH TIMER



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THE ROCK QUARRY

By Fred S. Burckhardt

Old Watchmakers Never Die–They Just...

Joe, the watchmaker, got up to wait on a young man wanting to buy a watch. He took one of the old models out of the case and handed it to him. The fellow looked startled and said, "What is this?"

Joe replied, "It's a self-winding watch with a calendar."

The young man asked, "What are these two sticks in the center?"

"They're called hands," said Joe. "They turn around and point to the hours and minutes. Over here in this little window is the date. It changes automatically at midnight."

"Where does the battery go?" queried the young lad.

"You don't need a battery with this watch," answered Joe. "All you have to do is wear it and it winds itself up."

"Hey, that's heavy," said the young man.

"No, not really," explained Joe. "It's one of the lighter weight models we have in stock."

"Well, it must be something new," the youngster said. "I've never seen anything like this before. I do remember my grandfather talking about a watch like this. He said he had to turn a little thing on the side to wind it up."

"Yes, that's this part here. It's called a crown," replied Joe.

"It is nice," the young man said, "but I need something that will figure sines, cosines, logarithms, percentages, plus show the time, month, date, and year in digital form. I also want it to sound an alarm, show the weather forecast, give the correct date to plant potatoes, onions, and cabbage, and have an AM–FM radio."

Joe hesitated a minute, then said, "I've never heard of a watch like that. If there was one, it would cost a fortune."

The young man said, "I saw one down the street at the shoe shop, and it only costs $19.95. The shoemaker said he would even throw in a gold band for the same price. I guess I'll go back and buy it. Thanks anyway for your time," he said as he walked out the door.

Joe put the watch back into the case, walked slowly to his bench and sat down. He opened his staking set and started to carefully wipe off the punches until they were bright and shiny. I thought I could cheer him up a little. As I approached Joe, I could see he was in deep thought. It seemed as though this once great man was now an empty shell.

"Joe," I said, "let's talk about it. Maybe it will make you feel better."

"I don't know Boss," Joe toned. "It seems there is nothing left to talk about. After forty years at the bench, things just aren't the same. All I do anymore is change batteries, fool around with transistors, resistors, and push buttons. If only once in a while I could run a mainspring through my fingers, or get the feel of a stem and crown or even . . . no, it's just too much to wish for!"

"What, Joe? Tell me," I said.

"Well, I was going to say, if I could just replace a balance staff one more time. Oh, for the good old days." moaned Joe.

"Yes, Joe, I know what you mean," I answered. "We had some good times back then. Remember the time you flipped that click spring and we spent an hour and a half on our hands and knees looking for it?"

I glanced over at Joe and noticed a little twinkle in his eyes and a faint smile on his lips.

"And how about the time you slipped and ran your screwdriver through that hairspring?" Joe seemed to come to life again as he let go of a chuckle.

"Don't forget the time," mused Joe, "when Mrs. Greenlee brought in her husband's watch, the one he was wearing when he fell into the lake. What a beautiful job that was. I had to replace all those winding parts and a couple of train wheels. I'd sure like to get my hands on one like that again. I guess I just forgot about the good old times," Joe said, smiling like his old self again.

"That's okay," I said. "We all tend to do that once in a while. After all, we . . . hold on a minute! Isn't that Mrs. Greenlee coming in the door? She's heading over here to the watch repair department! This may be it, Joe." As Joe sat straightening his tie and brushing off his bench, I walked over to greet Mrs. Greenlee.

"Hello, Mrs. Greenlee. What can I help you with today?" I asked.

"It's my husband's watch," she replied. As she opened her purse, I could see Joe rubbing his hands together. "It isn't working anymore. It probably needs some batteries," she said.

"Joe's head dropped into his hands and a tear ran down his cheek.

"What's wrong with your watchmaker?" she asked. "He looks like he lost a good friend."

"He did, Mrs. Greenlee," I replied. "He's lost many good friends."

Joe took the watch and replaced the batteries. As Mrs. Greenlee was leaving the store he turned to me and said, "You know Boss, for a minute there I thought she meant her husband's old watch."

"Come on, Joe. Times have truly changed," I said, "but things are not as bad as you make them out to be. Remember, you are known as the fastest meter in the West and that's something to be proud of."

"I guess you're right Boss. Thanks," said Joe.

It was getting close to closing time, so we started to put away the merchandise. I watched Joe as he dusted off his lathe and carefully replaced the cover. Then, he put the mainspring winders in the drawer and closed the lid on his staking set.

After locking the door, Joe and I walked across the parking lot into the sunset. I put my hand on his shoulder and offered one last bit of encouragement.

"Maybe tomorrow will be better, Joe," I said. "Maybe tomorrow." HT

(Continued from page 24)

my movement, the chime mainwheel has double clicks. If you pry back one click, the clickspring will hold it away from the clickwheel. Use the other click in the normal way as you let down the spring.

Before you remove the back plate, block the escape wheel. The long verge arbor goes all the way from the front plate to the back plate, and the rear pivot will be out of its hole when you do remove the back plate. A rapidly spinning escape wheel will do damage. You may feel hesitant about taking off the back plate when the time and strike mainsprings are still wound up, so take a moment to study the way the movement is held together. On my movement, the back plate is held in place with screws fitting into the movement pillars. Removing the screws and the back plate will still leave the pillars in position. They are themselves screwed into the *front* pillars. Picture the front part of the movement, the time and strike portion, as though it were a standard striking movement. Its back plate would be held on by nuts. In this Waterbury chime movement, the nuts have been replaced by the threaded rear pillars.

After the chime part of the movement has been removed, you *must* put mainspring clamps on the time and strike mainsprings and let the springs down. The clamps will now fit because the chime parts are out of the way. You will want to mark the main wheels, flies, warning and locking wheels for later identification. Clean the movement and install bushings, polish pivots, and take care of any other necessary work.

Reassembly is next, and probably represents our biggest concern with the movement. Put the time and strike portion together first, and adjust the strike train. You can lift the strike unlocking lever manually, but the strike warning lever will not be there until the chime train is assembled. The strike warning, at least, does not have to be "set" because the strike train uses the pin (21) for warning and locking. Before you leave the strike train, check for three points: 1) strike adjustments must be complete, because you cannot separate the front and middle plates again; 2) the rear pillars must be screwed on tightly, as they hold the time and strike movement together; and 3) the clamps must be removed from the time and strike mainsprings because you will not be able to get them off when the chime portion is in place. Except for minor adjustments, we are finished with the strike train.

Before you assemble the chime train, several parts must be added. Install the chime silencer arbor (19), which is pinned to the front movement plate. The chime silencer lever, not shown in Figure 5, is screwed to the middle plate. The screw hole is located next to the front pivot hole for the chime fourth wheel. Next, check the disc with the two strike hammer lifting pins (23) fastened to it. The pins must be set so the strike hammer (25) will not be left "on the rise" when the hour strike ends. It is not possible to actually install the strike hammer at this point, so just take a "trial position" by placing it in its location and gauging the clearance of the pins visually.

Install the chime main wheel next. There is also an easily forgotten part which can go in now. It is a plain arbor which acts as a hammer stop, and it fits below the pivot point for the chime and strike hammers. The second wheel, which is a solid gear in my movement, can go in next, and then the locking plate gear. The pin barrel fits in so that it is driven off the locking plate gear. Besides the chime levers, you now

(Continued on page 37)

We Salute These New Members!

ALVAREZ, Aurelio J.–New Orleans, LA
ASHBY, Tim–Lexington, KY
BOND, Joseph P.–Charleston, WV
BOSWORTH, Robert–Nebraska City, NE
BOUCHARD, Joseph G.–Mobile, AL
BURGA, Luis A.–Rosemead, CA
BUTLER, Randy M.–La Grange, GA
CLAUDIOUS, Charles–Scarborough, Trinidad
CRUZ, Ricardo–El Paso, TX
DEMPSEY, Roy B.–Lindsay, CA
DINH, Vu Duc–Cincinnati, OH
EBERHART, Daniel J.–Dumfries, VA
FITZPATRICK, Michael–Cortez, CO
FLORENCE, Mary L.–El Paso, TX
GOESSMAN, Thomas B.–Seattle, WA
GOWEN, Harold H.–Greenville, NC
GRECOE B.–Andover, MA
GRUNHART, John L.–Pittsburgh, PA
HAMILTON, James–Bellefontaine, OH
HANNEMAN, John H.–Grand Terrace, CA
HARSHFIELD, David A.–Flushing, MI
HEIDT, David–San Diego, CA
HOMEN, Manuel J.–Mission Viejo, CA
HUE, Le Ngoc–Allentown, PA
KAMMEIER, Douglas M.–Quincy, IL
KENDRICK, William M.–Mesa, AZ
KETTLER, S.–Great Neck, NY
KRAJEWSKI, David J.–West Allis, WI
LAKINS, Charles R.–Dallas, TX
LEIGH, William F.–Davenport, IA
LEIGHTNER, Kaye M.–Burlington, VT
MADDOX, Arnold L.–Denver, CO
MILLER, Merle R.–Carson, CA
MURPHY, Roland G.–Jarretsville, MD
RAAB, Henry–Tomahawk, WI
RAMBO, Isobel–Conestoga, PA
REDDEN, Joseph F.–Castile, NY
ROMANEK, Harvey L.–St. Petersburg, FL
ROTHSTEIN, Samuel–Maplewood, NJ
SCHULER, David C.–Detroit, MI
SERVINSKY, Robert P.–Lewistown, PA
STUART, Daniel J.–San Jacinto, CA
TANNAHILL, William J.–Whittier, CA
THEISS, Mark–Anchorage, AK
TIBBETTS, Beverly S.–Methuen, MA
TRAVIS, William R.–Lodi, CA
TRUJILLO, Lucia M.–Fullerton, CA
TRAN, Dong Van–Cincinnati, OH
VANEK, Alma K.–Mobile, AL
VON BLON, L.W.–Mansfield, OH
WILSON, John T.–Willard, OH
YAU, Shui-Cheong–Hong Kong

CHIME AND STRIKE
(Continued from page 35)

have two gears and the fly left. The two gears look similar, but it is the chime warning wheel which has the gear nearer to the end of the arbor. The other gear is the chime locking wheel. Do not forget the verge, which should not be left for last as you put the plates together.

We are not quite ready to put on the rear plate. The three arbors which have the various chime levers fastened to them must go in. This part of the job can be frustrating, because the crisscrossing levers shown in Figure 4 can be a real puzzle. First, locate the three sets of pivot holes for the three arbors. Pick up the first arbor, which belongs in the lowest of the three holes. This arbor has the chime lift lever (17), the chime unlocking lever (6), and the chime warning lever (1) attached to it. Install the lever as shown in Figure 4, remembering that the chime lift lever slips into the time and strike portion of the movement, to work with the star cam.

The next arbor fits in the highest of the three holes, located on the vertical center strip of the movement plate. The arbor has the strike lift lever (12), and the strike warning lever (7) attached to it. Observe that the strike warning lever goes *under* the rear strike unlocking lever. If it does not, the strike train will not start because there is no lifting action. In addition, make sure that the strike warning lever rests *over* the third arbor of the strike train, not under it. An incorrect installation here will mean that the warning lever will not reach the strike lock pin.

The third of our levers has the chime drop lever (9) and the chime locking lever (4) attached. As you install this arbor, you must set the chime gears in their correct relationships. First, arrange the locking plate so that the chime drop lever falls into one of the four slots. It does not matter which slot you choose. Next, place the chime fourth wheel with the chime lock pin (3) resting against the chime locking lever (4) as shown in Figure 4. Check the chime warning run now, by setting the chime warning wheel. When the gear train is in the locked position as we have set it, the chime warning wheel and pin (2) should have a half revolution run before hitting the chime warning lever. Figure 4 shows the correct setting for the wheel.

At this point, finish up the major part of the reassembly by installing the back plate and getting all the pivots in their holes. Tighten the pillar screws. Now add the chime and strike hammers. The hammers pivot on a long screw which is threaded to fit into the middle movement plate.

(Continued on page 48)

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

A Wooden Movement

Back in 1947 I received the following letter from Mr. T.C. Merrill of Idaho which may be of interest to watchmakers and clock hobbyists.

Mr. Merrill wrote, "For the last 27 years I have been trying to explain to my customers what made their watches tick and why, so three years ago I decided to make a large watch movement of hard wood, and I just recently completed it. The movement is 19½ in. in diameter and 6 in. thick. The entire movement, with the exception of the hairspring, is made of wood. I was unable to obtain a mainspring of sufficient strength; consequently I had to devise another barrel and drive the watch off the rim of the center wheel. As soon as I can get a stronger spring, I will put in the original barrel as first planned.

This wooden model has created considerable interest, and I thought it might interest you."

THEO

Fig. 1. Mr. Merrill and his wood watch.

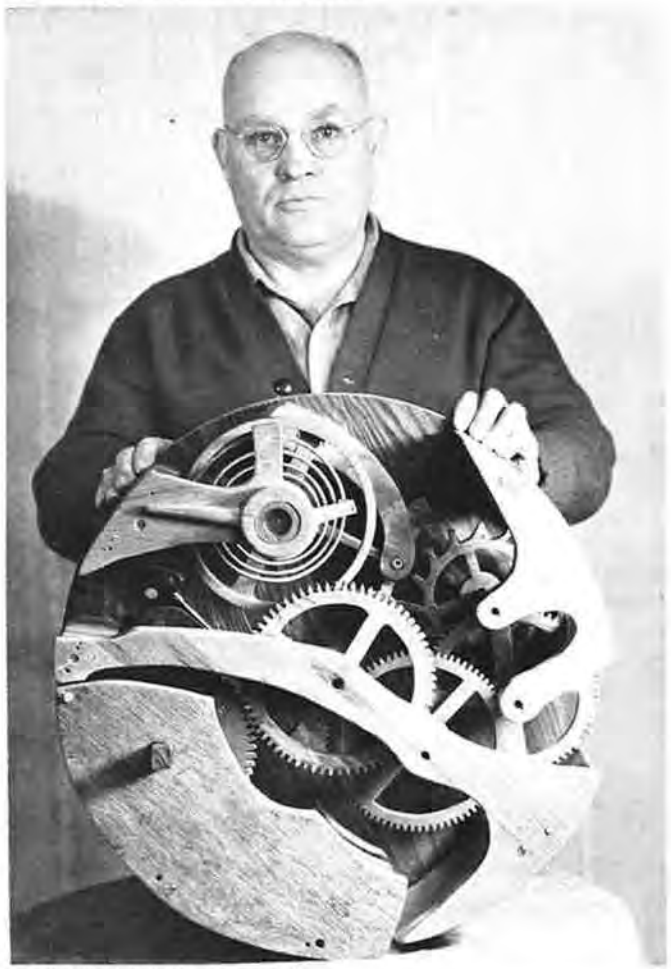


Fig. 2. Movement and dial.

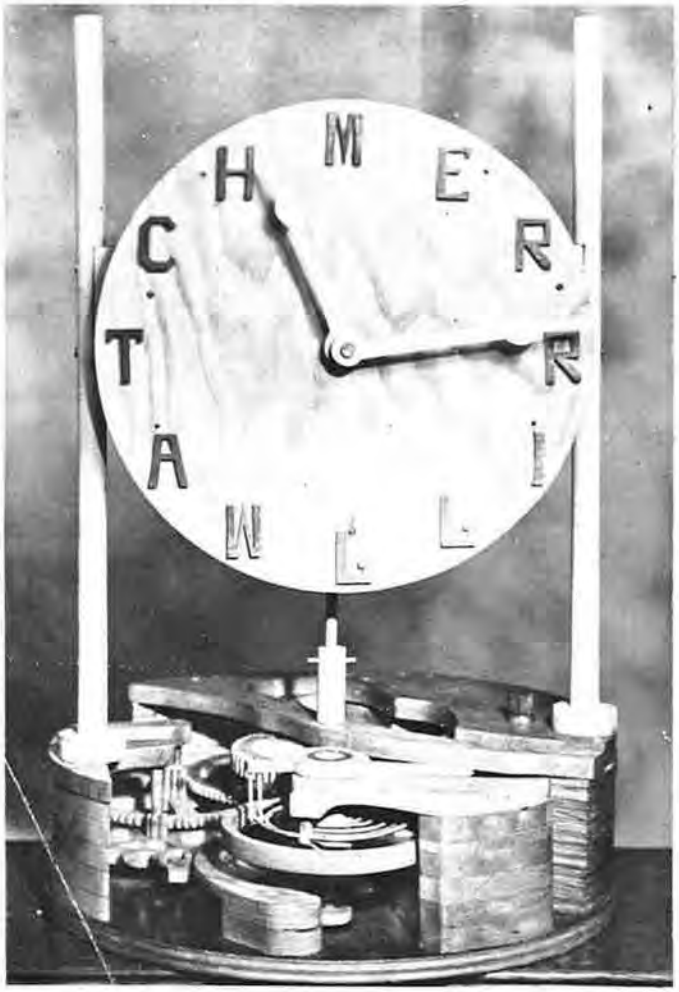


Fig. 3. Side view of wood watch.

QUESTIONS & ANSWERS

(Continued from page 22)

maker, or perhaps a reference book? Unfortunately the movement has no name inscribed, just a numer 1630. Any assistance you can render will be greatly appreciated.

Andrew F. Erny
Springfield, Virginia

A Evidently, your clock is from rather modern times. George V (George Rex, the Fifth) was King of Great Britain from 1910 to 1936. This was a public clock, government or royal issue in post offices, railroad stations, etc.

Brian Loomes, in his book, The White Dial Clock, *of which the second edition was recently issued, should make interesting reading for you in your quest for more information.*

You might also write to Richard Good at the British Museum in London who I know and who is quite knowledgeable. He can contact Mr. Loomes, and there should be little trouble in his obtaining the required information you seek. Do not forget to send him sufficient international postage certificates to cover his return reply. In Loomes' book, The White Dial Clock, *he mentions the many dial makers, methods, and designs. Of course, this is mainly about dials before the period of your clock, but nevertheless it should be informative. Loomes also remarks that making large dials of porcelain was rather difficult; however, I doubt that your clock has a porcelain dial.*

The second edition of The White Dial Clock *was published by David & Charles. Their U.S. address is North Pomfret, Vermont. It might be easier to obtain it on loan from either the libraries of AWI of NAWCC. I reviewed the book for the* Jewelers' Circular Keystone, *who sells it for the price of $32.00 (Chilton Co., Radnor, Pennsylvania 19089). Both NAWCC and AWI used my reviews with permission in their own publications.*

SHOP TALK

By Wes Door, CMW

Fitting Stems

To fit a stem we must first select the proper one. To make this selection, we must know the brand and model number. We learn this by observing the movement and noting the model number on one of the bridges, under the balance, or on the dial side of the pillar plate.

We might be lucky enough to tell the needed new stem by looking at the old stem or we might just glance at the back of the movement and know by experience which model we have. This is especially true if we have older models such as A. Shield (AS970, AS1158) or Fontainmelon (FF120 or FF60).

Using our memory recall saves time, and it may be better than looking up numbers. For instance, suppose we glance at a stem (the old stem, that is), and decide it is a FF60. We simply select this FF60 new stem, and complete the job.

However, let us suppose that we first looked at the model stamp and it said FF69. This model has a full plate and certainly doesn't look like the FF60, but by checking our catalog (or microfiche listing), we find that the same stem fits both models. We saved time by trying our hunch first. (We all know these two models interchange. It is perhaps a poor example, but it is explained here for a reason.) As we look at the yoke bridge, we notice a slight change in the FF69; however, even the yoke bridges interchange in these two models.

In most watches the yoke bridge, detent, and setting lever are used to indicate specific models, and this age-old method of matching these parts in our watch to the catalog pictures of these parts is called the "fingerprint" system.

In newer models it is continually more difficult to find this information available. Now we must rely on finding a model number stamped somewhere on the movement or match stem by previously mentioned "sight memory" system. We might simply take an assortment of stems, spread them out on our bench top, and start looking and hopefully find one to match, or find one close enough to adjust by cutting down to fit.

Cutting to fit is seldom practical. However, it is sometimes the only alternative, short of making a completely new stem. Stem making is less practical, but sometimes necessary. Presuming we have no stem available and cannot order one to fit, then we must choose this route of altering a stem to fit or cutting a completely new one.

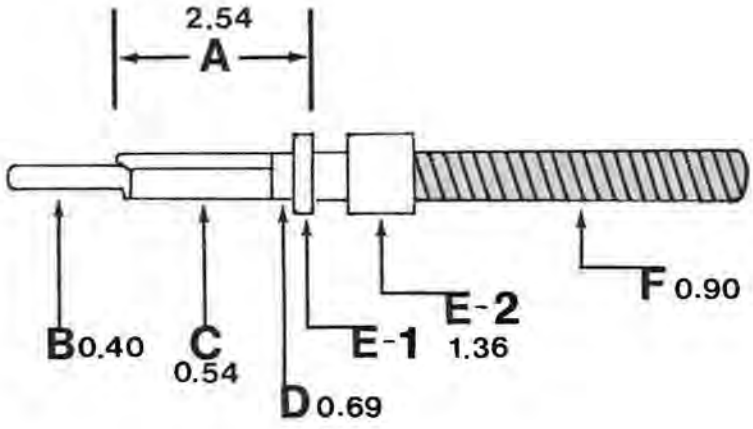
In altering a new stem naturally the ideal stem to choose is one needing only minor corrections. I personally desire a stem with the correct square and correct square-to-hub length, if possible. If too many corrections are to be made we might as well start with a round rod stock and make the complete stem. We will discuss this later.

First, we measure the old stem and calculate all important measurements (see illustration in Figure A). Normally we are fortunate in having most of the stem to measure, since breakage usually occurs in the middle of the hub, or just the threaded end breaks off.

Now, we measure stems from our assortment and make our preliminary selection by first "eye-balling" stems to

Figure A.

A. Length of Square-to-Hub
B. Pilot (or Pivot)
C. Square
D. Shoulder
E. Hub
F. Thread



obtain a close match. Since we prefer the square being correct, if it is possible we will choose one with this square correct or even the square-to-hub correct.

Let's presume our stem has measurements as shown in Figure B. Comparing Figures A and B, we note the following corrections are needed: the pilot, the shoulder, and the hub need to be reduced (see Figure C).

We chuck the hub of the stem in our lathe and proceed to cut the pilot down to 0.40mm. Since the pilot is very small and at the end of the stem, we prefer to polish this small amount needed, rather than cutting it down with a graver. First we use a coarse stone, and then finish with a fine one. A rouge on a wood stick or diamantine powder to finish could also be used (a slender piece of peg wood is ideal). Polish at high speeds.

Next, the shoulder needs this same 0.02mm removed and we may polish it down to size. It is possible to use a graver, cutting the 0.02mm down using a low lathe speed.

Our hub is next to cut. We need to first rechuck this stem to expose the hub so we can cut it to fit. The needed 0.12mm may seem like a great amount, but our lathe (even at low speed) will accomplish this cutting quite fast. After cutting just a little, we should check our measurements with a micrometer. It is not desirable to overcut, and our micrometer will also help assure us that we are cutting both sides of the hub area even enough, remembering that the slot of the hub is a shoulder used to actuate the detent both for winding and setting. As we pull the stem out to set the shoulder, E-1 in Figures A and B is used. In pushing the stem back in to the wind or neutral position, the shoulder E-2 is used. Before cutting this shoulder completely down to the 1.36 mm, we should check the stem by placing it in the watch, because we might want or need this oversized hub diameter to properly compensate for a worn stem bearing. Naturally it would be absolutely a "no-no" to ever brooch out a stem bearing to fit a stem.

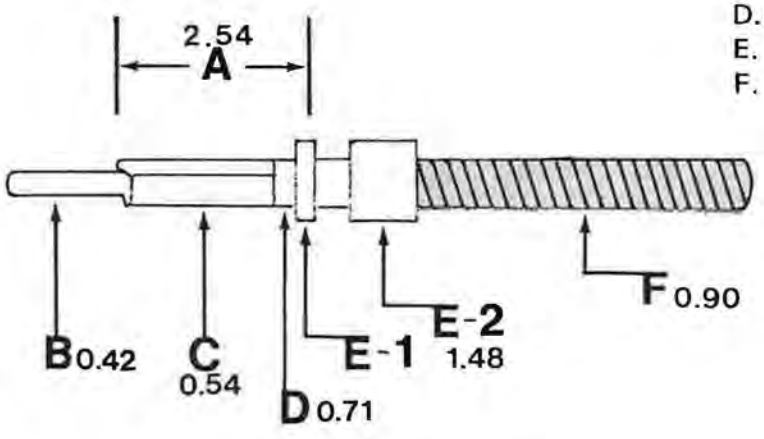
The rule is this: It is always correct to make a part to fit a watch, but never to make a watch fit a part. Even after saying this, there are a few very rare occasions where cutting out just enough to clean up a bearing may be all right, but this is in very few cases. It is just as easy (or easier, for that matter) to do work properly. As we pull the newly-cut stem out of our lathe and place it in the watch, we can be proud to be called watchmakers.

Figure C.

		Old Stem	New Stem	Amount Needed to Reduce
B	PILOT	0.40	0.42	0.02
D	SHOULDER	0.69	0.71	0.02
E	HUB	1.36	1.48	0.12
	From→	Fig. A	Fig. B	

Figure B.

A. Length of Square-to-Hub
B. Pilot (or Pivot)
C. Square
D. Shoulder
E. Hub
F. Thread



REPAIRING ANALOG COILS

(Continued from page 8)

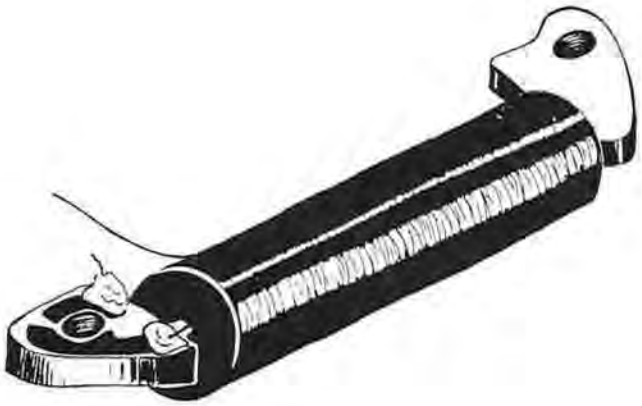


Figure 1A

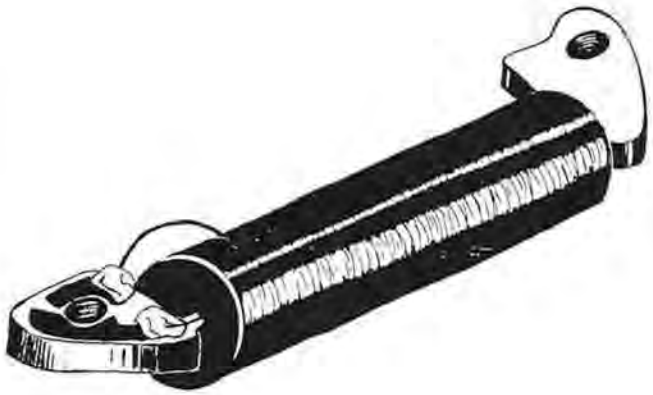


Figure 1B

applying the epoxy to the coil, position the broken wires as close together as possible. Silver epoxy is not a perfect conductor, therefore it is possible to have a high-resistance connection if the broken wires are too far apart. It may be necessary to thin the epoxy with a drop of rubbing alcohol in order to make it more fluid and easy to apply. A small paint brush (000) is ideal for this application.

Since most breaks in the coil usually occur on the exposed surface, this type of repair can be made without removing the coil from the movement.

3. No visible damage

If no visible damage can be seen, and the continuity check shows the coil to be open, it is possible to repair it by following this simple procedure. Keep in mind that the coil may have been damaged by previous service attempts and breaks can occur on the bottom side of the coil during disassembly. Therefore, proceed as follows:

A. Remove the coil from the movement, and place it in a small movement holder, grasping it by the edges.
B. Mix the epoxy according to instructions.
C. Dilute the mixed epoxy with a very small drop of rubbing alcohol until it is the consistency of a thick paint. Avoid over-thinning to prevent it from running down the side of the coil.
D. Using a small paint brush, coat all of the exposed wires of the coil with the thinned epoxy.

This procedure should connect any unseen surface breaks in the coil.

CAUTION: Do not paint the terminals of the coil. This will cause a short between the two terminals, and current will pass through the short and not the coil.

The coil can be tested immediately after painting, as well as during the painting. Coils can be tested in and out of the movement.

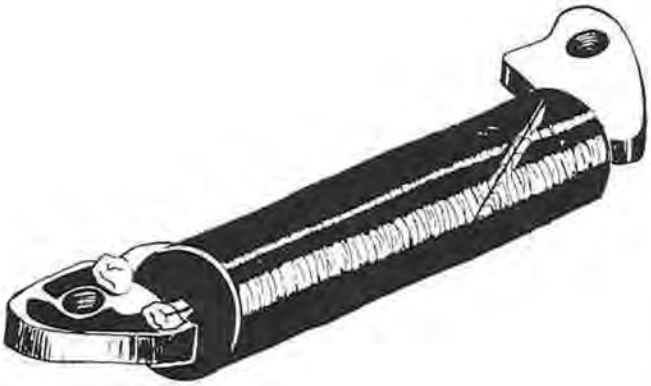


Figure 2A

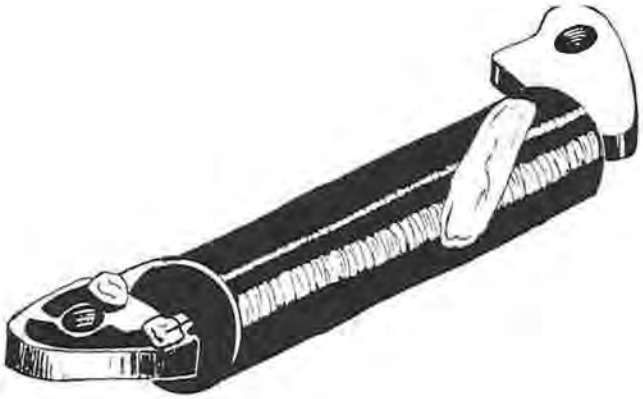


Figure 2B

The Importance of Qualified Craftsmen

In last month's article I requested help in informing the general public that there are watchmaking schools in the United States as well as a great need for watchmakers. I hope the state and local guilds have brought this up at their meetings and will make an attempt to form committees to assist the AWI and REC in our effort. At our present rate in the United States, we will eventually run out of qualified craftsmen to fulfill the needs of the general public.

As we have found in the past, services rendered in the jewelry store increase sales. To have a well-rounded store, you as a store owner should include such services in your advertising. If you gain customers through service, you will be gaining a family for life.

Where do we go from here? How many jewelry stores have a jeweler, watchmaker, clockmaker, or engraver on the premises? How many store owners turn down work because they don't have anyone to repair it? When you buy a new car, do you expect the dealer to service it? Then why not put the watchmaker, clockmaker, jeweler, or engraver in your store?

In the past when a watch was sold to a customer, the watchmaker explained how the watch functioned; if an automatic, how it works; if a calendar, how to set it. Now in the age of quartz, how many watches are sold and the customer is told to read the directions?

If the watch was purchased at a discount store, where does the customer usually wind up? In your store. In essence what this is saying to you is: You must not let sales get away. Above all, keep the service your customers deserve in *your* store. With these efforts on your part, we will not wind up with repair centers throughout the United States.

I feel the time has come for us to show what made America great. Think about the times when we could go into any store or business with something to be repaired and had confidence that the item would not only be returned to us repaired properly, but that it would give us the service we expected for a few more years.

If you are fortunate enough to have a craftsmen in your store, be proud and advertise it. Let's get back on track and start putting qualified people into our stores to offer the service your customers need. SUPPORT YOUR SCHOOLS!

TECHNICALLY WATCHES
(Continued from page 16)

Third, replace the pulley set screw. See Figure 18.

Fourth, replace the sleeve bearing onto the end of the headstock spindle. Be sure the key in the sleeve bearing lines up with the keyway in the spindle. Place some oil on the bearing surfaces of the sleeve bearing. Press the bearing on with the fingers as far as possible. See Figure 19.

Figure 18.

Figure 19.

Figure 20.

Fifth, support the end of the headstock spindle on a block of hardwood as in Figure 20, while using another block of hardwood and a hammer to tap the sleeve bearing onto the spindle. The sleeve bearing should be tapped on until there is some resistance when the pulley is turned by hand. Replace the split nut onto the spindle and hand tighten it. Then tap the back end of the spindle with a wood or rawhide mallet to create the proper amount of end shake on the spindle. After this, if the spindle doesn't turn freely, then back up the split nut slightly and retap the end of the spindle. Repeat if necessary until the spindle turns freely without noticeable end shake.

Sixth, replace the two outside dust sheilds.

Now the bearings have been completely reconditioned, which places the headstock in first class condition. Although it is an old lathe, it will operate as well as new.

"How To Use The Modern Watchmaker's Lathe" will continue next month.

Book Review

Watch and Clock Making and Repairing by W. J. Gazeley. 427 pages, 314 black and white drawings. Reprint of 1958 edition, republished in 1982 by Van Nostrand Rheinhold at $24.95.

This is a standard reference for the watch and clockmaker by one who, in his time, was one of England's leading watch and clockmakers and lecturers. In his London shop, one saw the rarest and oddest escapements for timepieces awaiting their turn for repair – some over two years.

The contents of this book reveal the methods of an acknowledged master. Covered in its pages are the basics for the apprentice, the tools, materials, methods of drilling and filing, screw making, tapping, and polishing. The use of the turns and lathes, gearing, wheel cutting, winding, and setting mechanisms are shown in clear black and white drawings. Also, mainspring practices and hairspring manipulations are discussed. Striking mechanisms in clocks and repeating mechanisms in watches are covered. Pendulums, balances, escapements for clocks and watches, and musical alarms in watches and clocks are explained and illustrated. Also included are chapters on the tourbillon and karrusel devices in watches, all shown and detailed in the instruction.

Gazeley also indulges the reader in detailed methods of making escapement parts. This book contains a wealth of constructive information, otherwise unavailable. Despite some errors in a few drawings, it still deserves its position as one of a few standard reference books.

Henry B. Fried

White Dial Clocks, the Complete Guide by Brian Loomes. 268 pages, 91 illustrations, hard covers, and colored dust jacket. Published in 1981 by David & Charles, Inc. at $32.00.

White dial clocks as the subject of this second edition of Loomes' book concerns the origins, history, and development of long case clocks with painted dials. This is an expanded edition of the first entitled *The White Dial Clock*.

In this "Complete Guide," Loomes has expanded the illustrative examples and included an entire section of American-made, long case clocks with painted dials. The author discusses their differences from other types of dials on long case clocks, the dialmakers who supplied the "false dial" (iron backplates), and their makers, together with the names of those who made them and methods of identification, and the development and progress of these dials.

Regional differences in design, character, and workmanship are covered very well with many examples illustrated. Cases are also dicussed as well as movements, weight, and spring-wound models.

Hints and warnings to the buyer, restoration factors, and many other facets should educate the reader and prospective buyer of any older long case clock. The author also discusses workmanship factors and suggests methods of judging these as well as methods of discovering "fakes," or name-changing to make the clock appear as coming from nobler beginnings.

Loomes is a very well respected horological author, and this expanded edition is commended for its comprehensive and informative contents.

Henry B. Fried

Affiliate Chapter Column / Robert Allis

Special AWI Programs Await You

Another month is upon us and, as usual, I have no idea about what to write. There was a time when I used to get a few letters from readers, but of late, you stand mute, and I am running out of ideas. Since Autumn is approaching, and we are beginning to gather back indoors again, I would like to ask if you are availing yourselves of all of the AWI bench courses and slide programs, and if not, why not? They cover just about any subject you can think of in the horological world. A great deal of information is available from bench courses on the latest electronic timepieces to a slide program on the fabulous Packard collection of complicated watches, as well as courses for the beginning clockmaker to a course on restoration of old clocks. You name it, we have it. However, nothing can be done unless you request it.

Since most of these courses and slide programs must be assigned to a responsible person or group, they are generally made available only through recognized guilds and chapters. If you live in the "boonies" and do not have a group to serve your needs, then I suggest that you get in touch with AWI in Cincinnati and present your problem. Usually some type of arrangement can be made. After all, that is what AWI is all about: to serve the horologist. If you do belong to a horological association and they are not taking advantage of these programs, it is time to get in touch with your officers and ask them to get on the stick. After all, this is the main purpose of belonging to the organization: to swap knowledge and ideas and to further your proficiency in your chosen profession.

For the past year or so, I have been regaling you with what you should or should not do to help one another, and I feel certain that it must be getting as monotonous for you as it is for me. So this month I would like to deviate a bit.

I am sure that all of you can tell stories of some of your disgruntled customers, and I would like to hear of some. Here is one that happened to me a few months ago. One fine day a gentleman walked into our store with his watch in his hand, an Accutron 214 model. He handed it to me and said, "See this watch? It's 24 hours slow." After checking it with my own watch, I could see that it was right on time and assumed that he was trying to pull my leg a little. I suggested that perhaps it was only 12 hours slow or maybe even 12 hours fast. It was only after he started getting a little irate that I realized that he was dead serious about it. I did an about-face and started treating it as a serious matter. I then asked him to leave the watch with me for a few days and assured him that I would make it right. I checked it thoroughly and could find nothing wrong. Then it finally dawned upon me just what the problem was. It seems that he had been in the store a few days before with the complaint that his watch had stopped. Upon checking it, I found the battery to be dead. From there, the conversation went like this:

"You just replaced the battery two months ago," he indicated.

Upon checking the back of the case, I replied, "NO, it was five months ago."

"You're wrong, it was only two months ago," he argued.

"Ok, it was only two months ago," I said. "In either case, I am going to replace it free."

Again he repeated, "It was only two months ago."

In final desperation, I said, "All right, it was only two months ago. Here is your watch. There is no charge. Try it and see how it works."

And so, three or four days later he brought the watch to me with the complaint that it was exactly 24 hours slow. I checked the time on it for a short while and gave it back to him and although I did nothing to it, he informs me that it is now keeping correct time. Evidently he objected to the fact that I had insinuated that he was lying and this was the only way that he could think of to complain. I guess the moral of this story is that the customer is always right even when he is wrong.

I hope you enjoyed this and do not mind my putting it in this column. From now on I will try sticking to my job of reposting on the affiliate chapters.

...from all around the ASSOCIATION...

ILLINOIS and OHIO Conventions

The Illinois Watchmakers held their annual convention on September 25 and 26, 1982, in Rockford, Illinois, home of the famous Museum of Time. Convention registration began at 10:30 Saturday morning, and activities began with a tour of the museum.

The Saturday evening dinner speaker was Mr. William Andrews, curator of the Rockford Museum. Mr. Andrews was born and educated in England. He is a watchmaker, clockmaker, teacher, and writer, as well as an exceptional speaker.

Mr. Fred Burckhardt, past president of Texas Watchmakers and member of AWI Board of Directors, was the Sunday afternoon speaker. Mr. Burckhardt also conducted one of the six seminars offered that weekend.

OHIO

The Watchmakers Association of Ohio had a most successful 36th annual convention at the Marriott Inn in Columbus, Ohio on July 30, 31, and August 1, 1982. The event was chaired by Norm and Gracie Basch (mother and son), whose efforts in making the convention a success, were greatly appreciated.

The Friday night Western-style dinner and dance was received quite favorably by the 62 in attendance. The night's activities included square dancing.

The Saturday night banquet was a huge success. Paul Crider, Awards Chairman, presented awards to Ralph Giantonio for his 25 years of service to the organization; to Al Gruenig for the many years of service as Executive Secretary; and to Don and Grace Basch for many years of chairing the convention.

New directors elected for WAO for three year terms were Paul Crider, Larry Hilvers, Jacob Montgomery, Millard Willen, and C. W. Curtis. The three retiring board members are Howard Opp, Tom Love, and Frank Toy. These gentlemen's work and efforts have been greatly appreciated.

The new officers for the coming year are Al Brehl, president; Will Ludwig, vice-president; Paul Crider, secretary; and Wilmer Hilvers, treasurer.

INDIANA

The July meeting of the Northern Guild was held in Merrillville, Indiana. The guest speaker was Mr. Ed Radigan of the Radigan Travel Agency, Merrillville, Indiana.

The June meeting was of a more technical nature. Tom Drake and Wayne Shumaker of Wesley and Company presented a full program, consisting of the history, proper use, and replacement of watch and calculator batteries.

An AWI slide program was featured recently at a Madison Guild meeting. Also discussed was the WAI Spring Workshop held in Bloomington, Indiana. A fine time was had by the 15 attending members.

FLORIDA

On September 12, 1982, the Florida State Watchmakers Association and the American Watchmakers Institute presented a seminar on the repair of Seiko Quartz Analog and Seiko LCD chronograph alarm, caliber A159. Each participant disassembled, checked, timed, troubleshot, and reassembled this very popular watch. AWI furnished the watches, spare parts, technical bulletins, and the instructor, Mr. Leslie L. Smith, CEWS.

COLORADO

The first annual picnic of the Colorado Horological Society was held at Daniels Park near Denver on Sunday, July 21, 1982. The picnic was attended by more than fifty horologists and family members. The arrangements for the picnic were made by President Milton G. Lyon and Mrs. Lyon. Everyone had a great time.

When Colorado Horological Society was organized in 1976, it became an affiliate chapter of AWI. There are more than one hundred members in the chapter.

(Continued on page 56)

The above photograph shows Milton Lyon seated in center foreground with chef's cap and Mrs. Lyon in right foreground.

YOU CAN HELP US TO SERVE YOU BETTER!

Your AWI membership card signifies that you are entitled to the many services offered by your association. However, we must have the correct information from your card to be able to serve you most efficiently.

The illustration below points out the important, coded information on the right side of your membership card. Always use your AWI membership number when corresponding or ordering from AWI!

CHIME AND STRIKE

(Continued from page 37)

Add the brass spacer bushing first, the rear chime hammer. As you push the screw further in, install each hammer in turn. The strike hammer is closest to the middle plate, and goes in last.

The pin barrel must be synchronized with the locking plate. Loosen the set screw on the pin barrel, between the gear and the pin barrel itself. Now you can rotate the pin barrel by hand, causing the hammers to rise and fall without the rest of the chime train being affected. First, establish a known chime point to work from. Rotate the chime train, stopping after the first quarter chime. This, as we know from past jobs, is the four-note sequence of Westminster. In our movement, the four chime hammers work from rear to front in succession for the first quarter. All you need to do now is to operate the pin barrel by hand, watching the hammers rise and fall. When you observe the four chime hammers move in order from rear to front, stop. Tighten the set screw and work the chime train through several more hours to make sure that the hammers work properly. The last four notes of the third quarter chime are also the same pattern of descending notes, so you can watch for that. There is a hole in the back plate which serves as a viewing port for the pin barrel at the point where the pins lift the hammers.

After the installation of the pendulum suspension bracket and the through-the-dial regulating arbor, you are ready to test the movement. The main thing you are looking for in the chime and strike trains is correct counting. Even one "mistake" by the gear trains probably means something is wrong and will occur again. If you repair this Waterbury movement for a customer, explain how to synchronize the chime, strike, and hands again. Otherwise, the customer will be calling you the first time he lets the clock run down. TH

OBITUARY

Charles H. Mann passed away, recently, in Tacoma, Washington. He had been active in AWI and local state watchmaker affairs for many years. He served as Chairman of AWI's Watch Distributor Liason Committee and was a member of the AWI Board of Directors from 1974 to 1980. Mann was a Past President of the Washington State Watchmakers Association. That organization honored him as "Washington's Most Active Watchmaker" in 1971. A graduate of Bradley School of Horology, he also attended the University of California at Berkeley.

AWI Bench Courses 1982

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

OCTOBER

2-3	H	Seattle, WA	Benesh
10	F	Huntsville, AL	Opp
10	J	Detroit, MI	Bishop

NOVEMBER

14	J	Hollywood, FL	Bishop
21	C	Lancaster, PA	Broughton

JANUARY 1983

24-28	K	Cincinnati, OH	Whitney & Benesh

FEBRUARY 1983

12	A	Mobile, AL	Jaeger

JUNE 1983

6-10	K	Cincinnati, OH	Whitney & Benesh

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

NAME: _____

ADDRESS: _____

CITY, STATE, ZIP: _____

SEIKO INTRODUCES NEW MIRRORED ROTATING DISPLAY

Seiko Time Corporation recently announced the introduction of a new mirrored rotating light motion display (WD019) for use on counter top, shelf, or in store windows.

The rich new display, designed to meet the requirements of jewelry and department stores, accommodates six Seiko quartz watches. A mirrored background allows the consumer to see the superb thinness and elegance of each watch as the unit rotates.

The 15"h x 8"w unit prominently features across the top, the Seiko logo and its statement of leadership. Included with the display are eight promotional cards highlighting specific gift-giving occasions. The promotional cards are designed to attach to the base of the display. This new merchandise aid, designed to add another dimension to Seiko's collection of watch displays, is available from Seiko's nationwide network of distributors.

For additonal information, contact Seiko Time Corp., 640 Fifth Ave., New York, NY 10019.

Seiko's new, motion display case.

CAS-KER CO. OFFERS NEW CATALOG 182

A new catalog featuring clock movements, accessories, and tools is now available from the Cas-Ker Co., importers and distributors of jewelers' and clockmakers' equipment.

The new catalog includes a wide selection of quartz, pendulum and strike clock movements, hands, dials, numerals, tools, etc. Readers are invited to request the catalog by writing to Cas-Ker Co., P.O. Box 2347, Drawer A, Cincinnati, Ohio 45201. The cost is $1.50 per copy or free with an order for merchandise.

New Cas-Ker catalog.

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

NEW ADDITION TO THE ACU-MIN LINE BY MOODY

A four piece pin vise set and four individual pin vises have been introduced to the Acu-Min® line of precision miniature tools for industry by Moody Tools, Inc.

Acu-Min®pin vise set.

These new pin vises are ideal for holding wires, scriber points, small files, taps and drills securely while performing precise operations in electronics, industry, and hobby.

The set contains four individual pin vises, sizes .000"-.055", .025"-.075", .045"-.125", and .110"-.187". The pin vise set is packaged in a vinyl storage pouch while the individual pin vises are conveniently inventoried in shelf packs of ten.

Retail price for the four-piece set is $27.25, and the individual pin vises range in price from $5.90 to $7.80.

For additional information contact: Lynn E. Murphy, Moody Tools, Inc., 42-60 Crompton Avenue, P.O. Box 230, East Greenwich, Rhode Island 02818, (401) 885-0911.

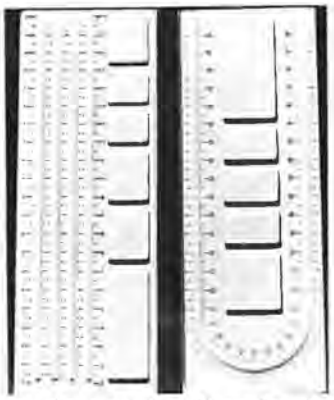
CASE OFFERS FAST, ACCURATE PEARL AND BEAD STRINGING

Bates Sample Case introduces two professional, one-piece, all plastic beading trays with a strand capacity of 1 - 40"+, and a bead capacity of 20mm+. Model PT1 is for single strands and model PT2 is for multiple strand assemblies.

Ideal for the professional and the amateur alike, this precision, one-piece, Poly-Styrene Pearl and Bead Stringer tray holds up to six different beads in readily accessible bins. Approximately 8in. wide and 21in. long, it will last a lifetime. Available in white only.

For an immediate response, dealers and distributors should contact Bates Sample Case Co., Inc., 1700 W. Pico Blvd., Los Angeles, CA 90015.

Bates Sample Case has a complete line of Gem and Jewelry cases and displays in stock or made to order.



Beading Trays from Bates Sample Case.

WATCH PRESENTATIONS BY TIMEX

Timex recently introduced a selection of new watch products at the Jewelers of America International Trade Show. Emphasizing technology as well as style, the collection features mechanical,

quartz analog, and digital models. The mechanical line includes 10 new models. Highlights for women include an oval-shaped, gold tone style with a champagne brushed dial and sporty brown strap. Suggested retail is $26.95. Also being shown for the first time are two designs with integrated block-style bands. In gold tone with a black dial or silver tone with a brushed silver dial, they retail for $31.95 and $36.95, respectively.

The ladies quartz collection has added a line of dainty, dress-up designs. Retailing from $54.95 to $64.95, they feature thin, finely styled cases in gold or silver tone. Round or oval shaped, they wrap the wrist with a brown leather strap or block-style band with safety chain.

Men will also find a generous selection of fashionable quartz timepieces. The newest additions, priced from $44.95 to $54.95, all feature comfortable, convenient expansion bands. In gold or silver tone, with round or rounded square face, they display raised hour markers, step-motion second hand, and calendar window.

For more information, contact Timex Corporation, Park Road Extension, Waterbury, CT 06720.

New designs from Timex.

BULOVA MILLENIA®

This contemporary achievement in classic elegance has a champagne dial with silvertone minute track, reflecting the octagon-shaped stainless steel case and goldtone bezel. The innovative design continues with faceted goldtone accents on each link of the stainless steel bracelet to complete the symmetrical look.

This Millenia model is water-resistant to three atmospheres and features an ETA Swiss movement and scratch-resistant Dura-Crystal®.

The Bulova Millenia collection is priced at $350.00

For further information contact Bulova Watch Co., 75-20 Astoria Blvd., Jackson Heights, NY 11370.


New from the Bulova Millenia® collection.

QUARTZ ALARM BY ERNEST BOREL

Among the many new and exciting offerings for this year, is an alarm which incorporates all the latest innovations in its thin quartz movement. The alarm wakes or reminds with a gentle yet persistent beep. The high-grade, stainless steel case and band has discreet gold accents, and the dial can be either in silver or gold tone. Contact Borel Watch Company at their new, larger quarters at 818 Grand, Kansas City, MO 64106.


New quartz watch with alarm from Ernest Borel.

REPRODUCTION CLOCKS FROM HERITAGE

Reproduction clocks introduced by Heritage at the International Jewelry Trade Show in New York recently, included the epicyclic style skeleton clock as originally designed and made by William Strutt in the early 1800's. The limited edition runs for eight days on a single winding, incorporates a fusee, and is fitted with a brocot-type escapement. It is supplied on a solid mahogany-finish base with fabric-covered overlay and a clear glass cover. Approximate dimensions (including cover) are: height 12"; width 14"; depth 9¾". Suggested retail price is $2,750.

For further information, contact Heritage International (London) Limited, 3 Richard Court, Alston Road, Barnet, Hertfordshire EN5 4EZ, England.


Skeleton clock—William Strutt design.

NEW LOOK FOR L & R JEWELRY CLEANER

Paul MacKay, new products manager for L & R Manufacturing Co., announces the new, bolder look on one of the Ellanar home products, Deluxe Jewelry Cleaner.

The Deluxe Jewelry Cleaner is a powerful, exclusive formula in an eight ounce, wide mouth, plastic jar with a unitized (single unit) cleaning basket and brush for easy scrubbing of small objects. The newly designed label easily accommodates an imprint and is provided by the manufacturer in most cases. Order through your local distributor.

CONFERENCE PROVES TO BE HUGE SUCCESS

The First Annual Quartz Watch Service Conference was held recently at Brevard College, Brevard, North Carolina, a resort community in the foothills of the Smokey Mountains. Reports indicate that it was well attended by digital watch technicians and mechanical watchmakers, all seeking to expand their knowledge of all types of quartz watches.

Ewell Hartman represented the American Watchmakers Institute (AWI) with a program entitled "Batteries are Big Business." During his presentation, he announced the new AWI Battery Number System. The simplicity and usefulness of the new battery chart will soon become the industry standard, according to Hartman.

Louis Zanoni of Zantech, Inc., introduced a newly completed article on watch alarm circuit troubleshooting.

Martin Fromm of Armitron Corp. and George Jones of Timex Corp. both described their warranty service programs. Martin Fromm described Armitron's new warranty service program for their watch brands, Armitron, Quasatron, Sutton, and Ann Klein. Their program is designed to provide parts and information to individual watchmakers in order to provide local personalized service to its many customers. "As an industry leader, the maintenance of quality service will always remain our number one priority," declared Fromm, Customer Service Manager for the New York-based Armitron Corporation.

Timex is continually seeking watchmakers for its very successful warranty program. Anyone interested should contact George Jones (501) 568-7010.

Louis Zanoni, conference chairman, presented a detailed paper on quartz watch alarms. The complete article will be serialized in the *Horological Times* early next year.

Ewell Hartman, chairman of AWI Battery Committee, presented the new AWI numbering system at the quartz watch service conference. This numbering system is reported to be a welcome relief from the many conflicting charts presently available.

The digital, analog quartz, and marketing workshops proved to be well received. Many watches were repaired and service techniques improved under expert supervision. Tom Hughes, President of National Digital Corp., presented many innovative marketing methods designed to increase sales and make the public aware that quartz watches can and should be serviced. He pointed out how successfully the watch clinic program was working out.

The conference was so successful that planning for next year's conference has already begun, according to a Zantech report. Any individual or company interested in presenting a technical or marketing report related to the quartz watch service industry at the next quartz watch conference should contact Mary Zanoni at Zantech, Inc., 77 Shady Lane, Trenton, NJ 08619 (609) 586-5088.

Arthur J. Cohen, President of Pulsar Time, Inc.

COHEN NAMED PRESIDENT OF PULSAR TIME, INC.

Pulsar Time, Inc., announced recently that Arthur J. Cohen has been named president of the company succeeding Arthur Schwartz who has left the company. Mr. Cohen, a veteran of more than 25 years in the watch industry, was executive vice-president in sales and marketing of Pulsar Time, Inc.

Pulsar offers a complete men's and ladies' analog and digital quartz line in the $45 to $165 suggested retail price range.

In the beginning of September, the company moved its service center facilities into a much larger complex in nearby Mahwah, NJ, to accommodate present and future requirements.

JA ANNOUNCES FUTURE SHOWS

In order to help retailers and exhibitors plan ahead, Jewelers of America (JA) is publishing the dates of its jewelry trade shows over the next four years, according to chairman Michael D. Roman. The schedule is as follows:

New York show dates for February: 1983–Sun., Feb. 6 to Wed., Feb. 9; 1984–Sun., Feb. 5 to Wed., Feb. 8; 1985–Sun., Feb. 3 to Wed., Feb. 6; 1986–Sun., Feb. 2 to Wed., Feb. 5.

New York show dates for July: 1983–Sat., July 30 to Wed., Aug. 3; 1984–Sat., July 28 to Wed., Aug. 1; 1985–Sat., July 27 to Wed., July 31; 1986–Sat., July 26 to Wed., July 30.

Chicago show dates for August: 1983–Sun., Aug. 21 to Tues., Aug. 23; 1984–Sun., Aug. 12 to Tues., Aug. 14; 1985–Sun., Aug. 11 to Tues., Aug. 13; and 1986–Sun., Aug. 10 to Tues., Aug. 12.

"Schedules and commitments to exhibit halls and hotels are made years in advance," Roman comments. "This makes it possible for everyone involved to schedule their own plans accordingly. It should be noted that our 1983 Chicago show will be held later than usual," he said, "because when the original schedule was developed four years ago, we found that keeping to the mid-August schedule would have created a conflict with the California show." Since the two shows have many common exhibitors, and in view of the fact that the California show had seniority, Roman said that JA moved its own date for the Chicago show to come after California. Thereafter, JA will resume holding the Chicago show before the California show dates.

JA'S CHRISTMAS "J POWER" CONTEST

As part of its diamond jubilee celebration, and to help members tie in and benefit from its expanding national consumer advertising and public relations program, Jewelers of America (JA) has announced the second part of its "J Power" contest, devoted to Christmas promotions. The contest will offer prizes for the most innovative methods of using the JA logo in three categories: newspaper advertising, radio commercials, and store and window displays.

To help a member develop his own "J Power" promotion, JA has prepared a specially designed kit which includes materials and suggestions for each category. Deadline for submissions is December 20.

"This contest works for the best interests of our members," says chairman Michael Roman. "Members who have been displaying the JA logo on their doors and windows, in their local advertising, on their letterheads and promotional material, have been telling us that customers are coming into their stores with a greater sense of confidence in them as a result of their being identified with a national association of professionals."

JA is sending every member a brochure and request form to obtain the special "J Power" kit.

COL. GEORGE TOWNSEND DIES

Col. George E. Townsend, USAF Rtd., a silver-starred Fellow of The National Association of Watch and Clock Collectors and considered by many as the leading authority on American watches, died suddenly August 15. He was sixty-five.

The intense interest Col. Townsend had in American watches caused him to collect and actively research each, traveling extensively throughout the country researching American manufactories and their products, which resulted in his first book, "Almost All You Ever Wanted to Know About American Watches and Didn't Know Who to Ask" (1971). It became an immediate standard reference, containing his own meticulous, accurate drawings of the rarest as well as the common run of American-made watches, complete with dates and details as to production, models, company officers, make-up and short historical data. This book was followed by "The Watch that Made the Dollar Famous" (1974), an encyclopedic treatise on the American-made pin-lever type watch. "American Railroad Watches" (1977) was another equally well received book.

A native of Michigan, Col. Townsend spent over thirty years in the U.S. Air Force, retiring in 1971. He was a director of the National Association of Watch and Clock Collectors and a trustee of their museum, a member of the American section of the (British) Antiquarian Horological Society, and a member of the NAWCC's Bulletin Answer Box team. He lectured extensively on his specialties and held offices in various chapters of the NAWCC, which he joined in 1960.

–Henry B. Fried

GIA JEWELRY ARTS CLASSES ANNOUNCED

The 1983 schedule for GIA's one-week jewelry arts classes has been announced by the Education Department, GIA, Santa Monica, California.

GIA's traveling classrooms will provide students with hands-on experience in virtually all the skills required of the average bench jeweler. GIA instructors conduct the classes. All instruments, tools, and materials will be supplied by GIA. This is the first time GIA will take its course on the road. It includes sketching ideas, drawing and painting diamonds, cabochon and faceted colored stones, rendering white and yellow metal, and drawing various views of jewelry items, and much more. This course will be offered in Houston, January 31 to February 4; in Atlanta, May 30 to June 3; and in Chicago, August 8 to 12.

Other one-week jewelry arts classes offered are: one-week jewelry repair, one-week basic stone setting, one-week advanced stone setting. These three classes will be offered in 1983 as follows: in Phoenix, February 7 to 25; in Albuquerque, February 28 to March 18; in Houston, March 21 to April 8; in Baton Rouge, April 11 to 29; in Atlanta, May 2 to 20; in Richmond, May 23 to June 10; Paterson, NJ, June 13 to July 1; in Burlington, VT, July 4 to 22; in Pittsburgh, July 25 to August 12; in Chicago, August 15 to September 2; in Seattle, September 12 to 30; and in San Francisco, October 3 to 21.

In addition, one- and two-week jewelry arts classes will be offered on a regular basis at GIA's Santa Monica facility. These classes include one-week courses in jewelry repair, basic stone setting, advanced stone setting, and jewelry design; and two-week courses in faceting, and wax carving and casting. For further information regarding classes, schedules, and tuition, contact: Jewelry Arts Department, Gemological Institute of America, 1660 Stewart St., Santa Monica, CA; (800) 421-7250 tollfree outside of California.

HERB SCHMIDT IS MIDO/BOREL SALESMAN OF YEAR

Mido/Borel recently saluted Herb Schmidt, the winner of the 1981/82 Mido/Borel sales contest. His prize was a trip to Europe with stops in Switzerland at the Mido factory in Bienne and the Ernest Borel factory in Le Noirmont.

Herb Schmidt and wife Asta, flanking Marcel Aubry, owner of the Ernest Borel factory. J. P. Jaquet and E. Godat are on the left and right.

Classified Ads

Regulations and Rates

Ads are payable in advance $.50 per word, $.60 per word in bold type. Ads are not commissionable or discountable. The publisher reserves the right to edit all copy. Price lists of services will not be accepted. Confidential ads are $4.00 additional for postage and handling. The first of the month is issue date. Copy must be received 30 days in advance. (e.g. February issue closes for copy on January 1.)

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

Tradesman

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

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

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

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

You! Have tried the rest – Now! Try the best for your **custom made Horological and Instrument Parts and Tool repair. Precision Instrument, P.O. Box 70004, Charleston, SC 29405. Phone (803) 553-1198.**

Watch Repair for the Trade. Contact Little Switzerland Ltd., Swiss Master Watchmakers & Jewelers, P.O. Box 3195, Hilton Head Island, SC 29928, Phone (803) 785-7661.

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

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

QUALITY CLOCK REPAIR OR RESTORATION. FAST WHEEL AND PINION CUTTING, repivoting, etc. Parts made to order. Send sample for free estimate. No watch parts please. David Arnold CMC, CMBHI, 556 Ann St., Elgin, IL 60120. (312) 695-1689.

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

QUALITY CRYSTAL FITTING All types – glass – plastic – mineral. Send work to Crystal Fitters, Inc., 21 North Street, Middletown, New York 10940. Phone: (904) 343-4434.

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

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

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

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

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

Situations Wanted

Honest, dependable apprentice watch/clock repairman seeks position in NE Illinois (inc. Chicago) area. Completed watch and clock course–Gem City College, Quincy, IL. Contact R. Bensinger, 148 Circle, Apt. 204, Forest Park, IL 60130; (312) 366-1957.

High grade Watchmaker wants position in pleasant working environment. Can repair all models–Certified Rolex, Seiko, and Accutron Technician. Also some jewelry repair. Robert L. Vierra, 3110 7th St., Rockford, IL 61109; (815) 398-8332.

Wanted To Buy

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

TAILSTOCK COLLET (CHUCK) HOLDER FOR PEERLESS LATHE. NINO GONZALES, 2009 FAIROAKS DRIVE, AUSTIN, TX PHONE (512) 442-8689.

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

STERLING FLATWARE STOCKS–new or used needed. Call us before you sell for scrap. Also wanted: silver, diamonds, gold scrap, coins and coin collections. Call or write: Mr. Neff, HT, WFN Enterprises, 2300 Henderson Mill Rd., NE, Suite 318, Atlanta,GA 30345. Phone (404) 938-0744.

WANTED–UNIVERSAL 501 CANNON PINION, NEW OR USED. M.E. BLOOMER C.M.W., 131 CLINTON RD., NEW HARTFORD, NY 13413.

For Sale

SPECIAL – MENS' LIZARD GRAIN LEATHER STRAPS–$2.25 EACH. WRITE FOR LISTING. FLORO DISTRIBUTOR, 12-08 151 Place, Whitestone, NY 11357.

ESEMBL-O-GRAF LIBRARY in 28 volumes, Pittsburgh, 1955. Chronograph repairing is made easy by step-by-step procedure. Each small step of removing and replacing each part and making adjustments is clearly illustrated. No concentrated study is necessary. $200. Write EOG, P.O. Box 11011, Cincinnati, Ohio 45211.

Watch repair shop for sale. Sick, must sell. Ideal Jewelers, Box 1481, Marfa, TX 79843.

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

American pocket watches, movements, cases, material and tools for sale. Write for list. Want to buy watchmakers tools, American pocket watches, related items. Dashto Horological Services, 5296 Fairfield Shopping Center, Virginia Beach, VA 23464. (804) 495-2414.

SEDONA, ARIZONA: Well established business in prosperous community. Includes full line inventory, leasehold improvements and an excellent lease. Operate as full line, artistic specialty or craftsman repair shop, or all three. Priced for easy entry. Good extender for chain. For further details contact: Abbie Challis Realty, P.O. Box 3452, West Sedona, AZ 86340, or call (602) 282-4804 collect.

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

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

Miscellaneous

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

Dates To Remember

OCTOBER

1-3—Arizona Jewelers Convention; Alamos Hotel; Scottsdale, AZ

2-4—Pennsylvania Jewelers Assn. Convention; Holiday Inn; Greensville, PA

5-12—United Jewelry Show; Biltmore and Holiday Inn hotels; Providence, RI

9-13—Fourth Annual Exhibition of Fine and Gold Jewelry; Valenza Po, Italy

11-15—Hong Kong Watch & Clock Fair; Hotel Miramar; Hong Kong

17—Massachusetts and Rhode Island Jewelers Assn. Annual Convention; Lantana's Restaurant; Randolph, MA

30—Auction—antique watches and jewelry; International Casino; Aachen, West Germany. Viewing Oct. 23-29, from 2:00 to 10:00 PM.

NOVEMBER

13—The Watchmakers of New Jersey Dinner-Dance; Ramada Inn; New Brunswick, NJ

16-18—POPAI Market Place Trade Show & 36th Annual Awards Contest; Expocenter; Chicago, IL

19-28—Finnconsum '82; The Helsinki International Consumer Goods Trade Show; Finnish Fair Centre; Helsinki, Finland

Advertisers' Index

ASSOCIATION NEWS

(Continued from page 47)

NEW YORK

The Horological Society of New York, Inc., recently held a meeting, at which the speaker was Ed Pedzy, President of Zenith Mfg. & Chem. Corp. Mr. Pedzy, a long time member of HSNY, spoke concerning the latest watch servicing equipment.

A large audience heard Erich A. Lorenz, Manager of Consumer Service Division of Rolex Watch Company, speak about the Rolex watch and its founder Hans Wilsdorf. A film was shown entitled "Of Time and Man," as also were some new features of different models. These included a ladies' automatic movement calibre 2030-2035 which has two oriental rubies for regulator pins. Another feature is the magnetic braking of the sweep second pinion which avoids the questionable tension of the friction spring on other watches.

Discussed also was the calibre 3035 and 3055 which has special "Microstella" timing screws which have to be moved with a special key supplied by Rolex and are moved while the balance is in the watch. Also, the new Rolex Quartz, which is made exclusively by Rolex Watch Co., was on exhibit at the meeting. It was a very educational evening and well received.

MICHIGAN

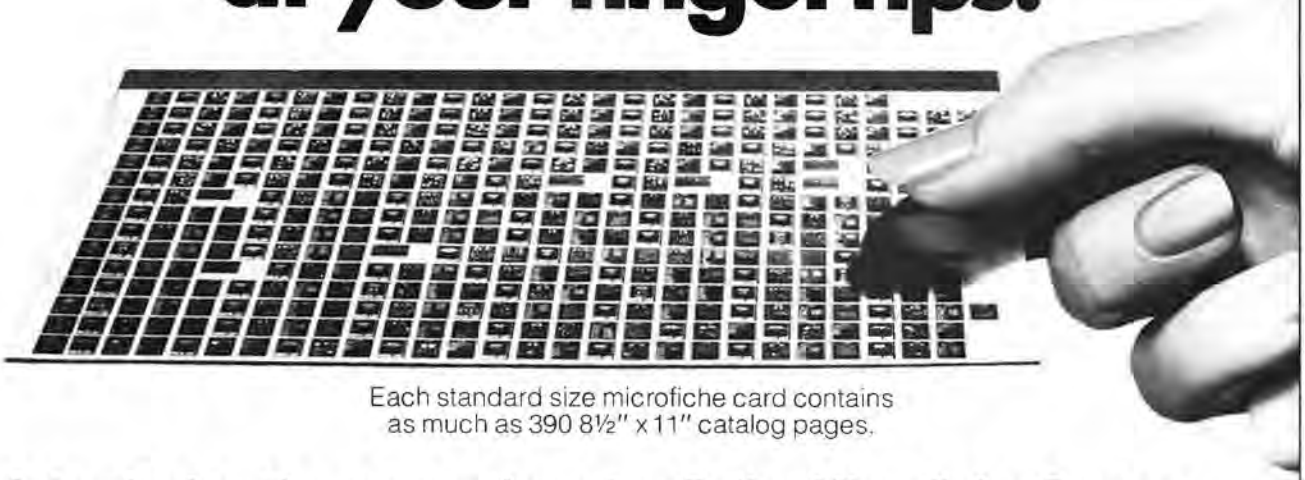
The 28th Annual Convention was a big success—many believed it to be the best in years. Covering three days, it included Henry Frystak, representing the Bulova Watch Company, who presented a 6-hour Bulova Quartz workshop. For the ladies, Irene Green spellbound those present with her knowledge and display of antiques. Many of the ladies brought their own items which were "disected and vivisected" under Irene's professional gaze.

Later in the evening, Charlie Barnes and Sean Monk ran a series of nine trotting races, at which everyone placed their "bets" with "fun money." Bob Moengen of the Jewelmont Corp. of Minneapolis gave a most informative program on the newest in tools and equipment. This included much on crystal removing and fitting. Some of the problems with new watch cases were well taken care of. Paul Fisk followed, representing AWI, with a very knowledgable program on clock repair. Also of AWI, Fred Burckhardt conducted a program on gemstones and jewelry in watch repair. It was unique, and conducted in the manner for which Fred is well known; it was serious, but there was enough "salty" Texas humor: Fred's trademark.

Jim Green showed a film about Pearl Harbor at which he was the only Michigan survivor from the U.S.S. "Arizona."

Lastly, an election of officers for 1982 was held. All in all, it was a grand convention, and the guild expresses thanks to everyone who made it so successful. HT

Now every piece of Seiko data you need can be at your fingertips.



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Get all the information you want, when you want it, fast. The lightweight Seiko Microfiche System conveniently saves you time, space, and money. Here's the kind of information it provides. Simply. Quickly. **Quartz Casing Parts List:** includes all casing part numbers for Seiko Quartz watches referenced by case number. **Quartz Movement Parts List:** contains all movement part numbers for Seiko Quartz watches referenced by calibre number, with pictures of the parts. **Mechanical Casing Parts List:** gives part numbers for all casing parts (crystals, crowns, etc.) for Seiko's mechanical watches. Referenced by case number. **Mechanical Movement Parts List:** includes all movement part numbers for all Seiko mechanical watches. Referenced by calibre number with pictures of the parts. **Master Band Cross Reference:** this list, never before available, provides you with the band number for all Seiko watches by both case number reference and model number reference.

Each microfiche card grid is titled and alphanumerically indexed for fast, easy reference. And all Seiko microfiche documents are scaled to 48x magnification, compatible with just about any standard microfiche reader.

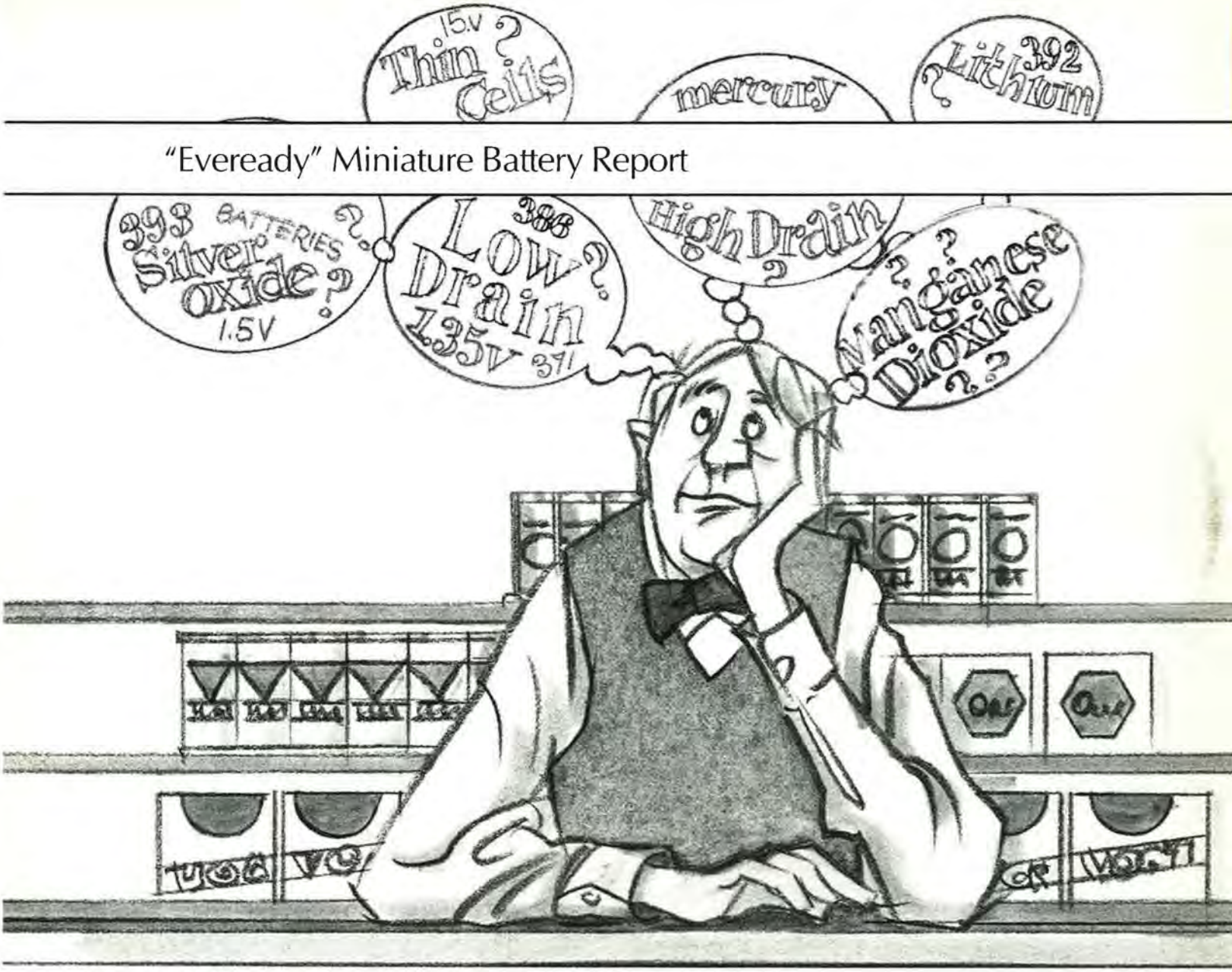
The current Seiko Microfiche System only weighs about three ounces and costs only $14.00. By comparison, the same information in hard copy version, if available, would weigh over 35 pounds and cost hundreds of dollars. The Seiko Microfiche System is the better way to put the information you need at your fingertips.

Order through the Seiko Material Department
555 West 57th St., New York, N.Y. 10019. ATTN: Information Control

Also available, while supplies last, are free Seiko Battery Replacement Manuals and a new Seiko Case Servicing Guide. Just write to the Seiko Information Control Department for your free copies of these guides.

SEIKO

"Eveready" Miniature Battery Report



Just Remember One Name...Eveready®

Announcing Eveready®
3.0 Volt Lithium Watch/Calculator Batteries.

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