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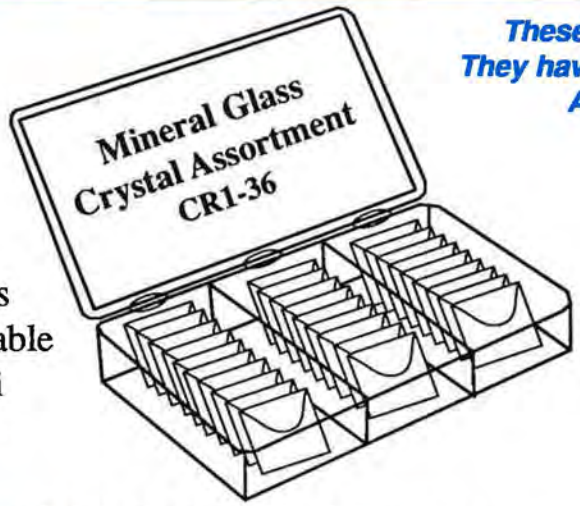
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President's Message



Wanna be AWI president? Know what you have to do to get there?

First, you have to be elected to the AWI Board of Directors. How do you do that? Well, someone must place your name in nomination. To do that, they simply write to the current chairman of the Nominating Committee stating that they would like to nominate you to run for the Board of Directors. The committee then contacts the person you nominated and they send that person a paper to fill out giving all the pertinent information the nominating committee needs.

About the middle of February, each potential candidate is asked to write a statement, usually about what he/she would do for AWI if he/she were elected to the Board. The question generally changes slightly from year to year.

Ballots are mailed out to the members sometime around the middle of April. They are usually due back within 30 days. Along with the ballots, a fact sheet is enclosed. The fact sheet contains a picture of each candidate, a statement of his/her qualifications, and the candidate's statement of his/her opinion on what he/she would do as a Board member. Candidates' pictures also appear in the April issue of *Horological Times* so that members become aware of who is running for the Board.

See how easy that was?

Now to the mechanics of actually being elected. It helps, of course, if your name is well known. So how do you become well known?

You could volunteer for committees. You would, of course, work hard on those committees so your name would become well known. You don't have to be present at the annual meeting to volunteer for a committee. You only have to ask AWI for a list of the committees so you could fill it out and return it by the first of July.

You could write articles for *Horological Times*; and the *HT* is always looking for good writers. (You wouldn't have known who I was if I hadn't first been Chairman of the Research and Education Council. One of the duties of that particular chairman is to write an article each month about the horological schools.)

You could attend the annual meeting in Cincinnati. You don't have to be a delegate to attend; you only have to be a delegate to vote at the Affiliate Chapter meeting. Or, your association could elect you to be the delegate or the alternate delegate to the Affiliate Chapter meeting.

I think if you asked each past president of AWI how they got started, they would tell you they did many, if not all, of the things I listed.

Wanna be AWI president? It isn't difficult. None of the things I listed are unpleasant or immoral. It is always nice to work with people across the country who have the same interests at heart. And with each of the things I listed, not only will you be making yourself a name, you will also be helping your fellow horologist. AWI and you would both benefit.

Give it some thought.

Alice B Carpenter

ON THE FRONT: Purple iris—sometimes called a flag—by Jack Goldstein of Cranford, New Jersey.

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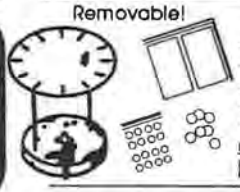
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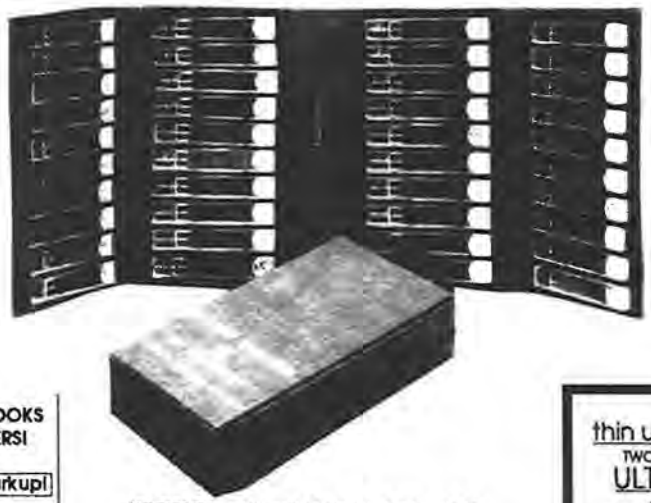
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Questions & Answers



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

Grandfather Clock

Colonial Mfg. Co.

Q Enclosed please find a photograph of a Grandfather Clock with all the specifications marked on the panels and movement.

Could you kindly give me some history on this clock, such as age, quality, and anything else that would be of interest to me?

Frank Albert
Largo, FL



77" tall

Genuine Mahogany
Colonial Mfg. Co.
Zeeland, Mich.

Inside back panel

4 I 352
incised stencilled

A *I have examined your photo of the long-case clock. It is fairly modern, and the company that made it is still in business at P.O. Box 813, 4060 E. Paris, Kenwood, MI 49508.*

The serial number might allow them to tell you just when the clock was made and to whom (wholesaler) it was sold. The quality varies according to which German movement they used. In my opinion the wind-up movements (with key--as yours) are better in quality than those with the chain-link, pull-up variety. However, one can't tell unless the movement is at hand to examine it.



Q Enclosed are some photos of the case and movement of a clock I purchased not too long ago. On the face the name "Paris" appears. My question is whether you know what type of pendulums belonged to this clock. It is difficult to apply the formula for length of pendulum since the top and bottom plates are riveted.

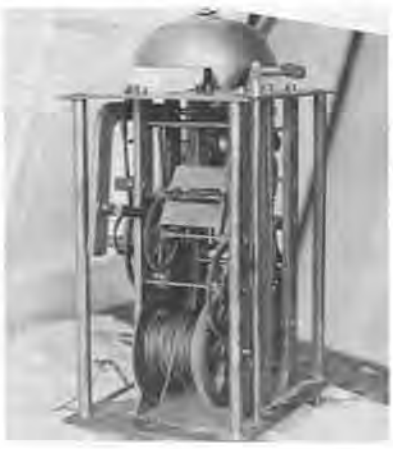
I would also like to know the shape of the weights. Were they similar to the cuckoo clock weights or the regular brass pipes? Also, if it is possible, would you know the circa?

I was a former member of the New York Horological Society; we have met there on several occasions.

Thank you and keep well!

Manuel Iglesias
Miami, FL





The *New* Borel

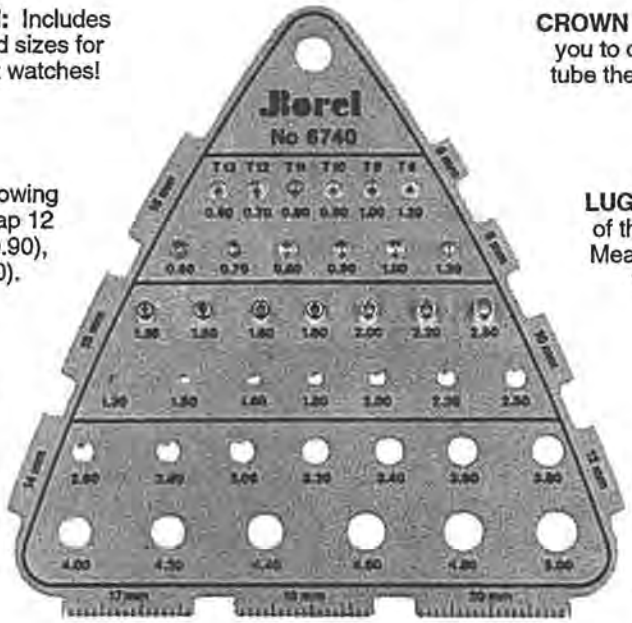
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Shown actual size

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QUESTIONS & ANSWERS
(Continued from page 4)

A *I have examined the photos of your movement and I am familiar with them. They reveal a French Morbier clock movement of the latter part of the 19th century. These were made in the town of Morez in the Morbier region of France.*

The movements are characterized by the metal vertical plates and most often by the unusual striking arrangement. The pendulums were seconds beating but made of thin pressed brass with very ornate decorations. The striking had a vertical rack cut on both edges. That permitted a repeat of the striking a short few minutes after the original striking. This arrangement would satisfy the farmers who bought these and who'd be awakened in the middle of the striking. So before they fell off to sleep again, the second striking would inform them of the correct hour.

Henry B. Fried

Q Thank you for publishing such an excellent magazine. Although I run primarily a jewelry store, I am only handling what I consider to be first-eschelon watch problems. I think our publication is a very valuable source of information.

A good customer brought in the Patek Philippe wristwatch you see in the enclosed photos. I can find no reference to this particular timepiece in my literary reference publications. Can you tell me anything about it?

Thank you for any information you may be able to impart.

Frank A. Bartley
Myrtle Creek, OR





A *I have examined your old Patek Philippe wristwatch. I could have told you the exact year in which it was made had you given me the serial production number on the movement.*

I have searched through my book on Patek Philippe wristwatches by Huber and Banbery, and couldn't find anything like it in their book. It appears to me that this is an early model wristwatch made and converted into a man's watch from a ladies' pendant timepiece. As such, it might be considered rare.

Also, Patek has a record of every watch made and sold. A letter to them will bring an authentic response. If you wish, send me the serial number on the movement and a photo of the movement. The hands are radium-filled, which puts the date earlier than WWII and possibly the 1920s, which makes it rare. The crown for winding is more like that from a pendant watch also.

Henry B. Fried ❑



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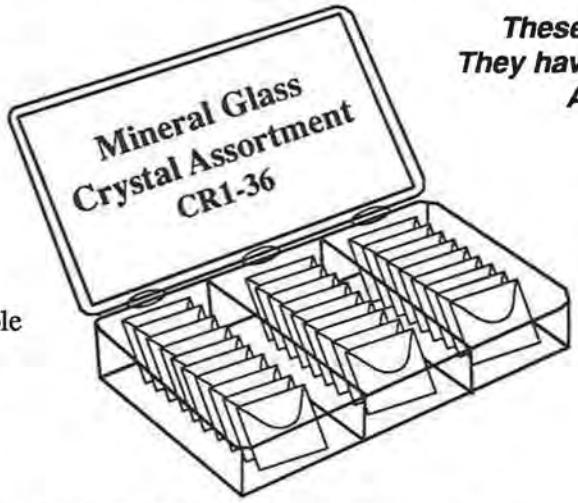
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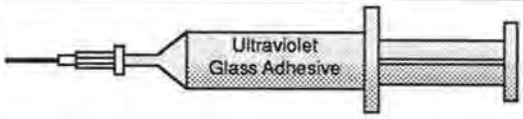
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Contains 1 Each of Most Popular Sizes From 16.0mm–32.5mm
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Clear Styrene Storage Box
Contains 1 Each of Most Popular Sizes From 13.0mm–36.0mm
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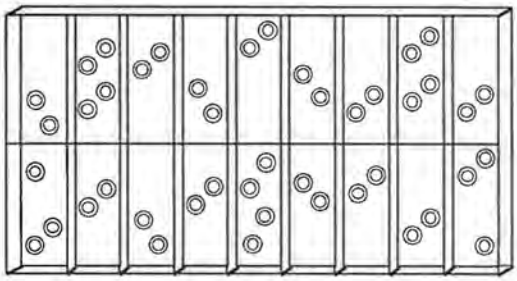


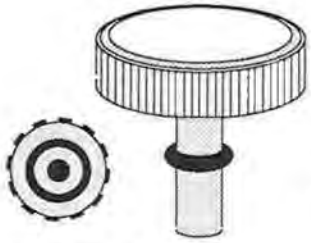
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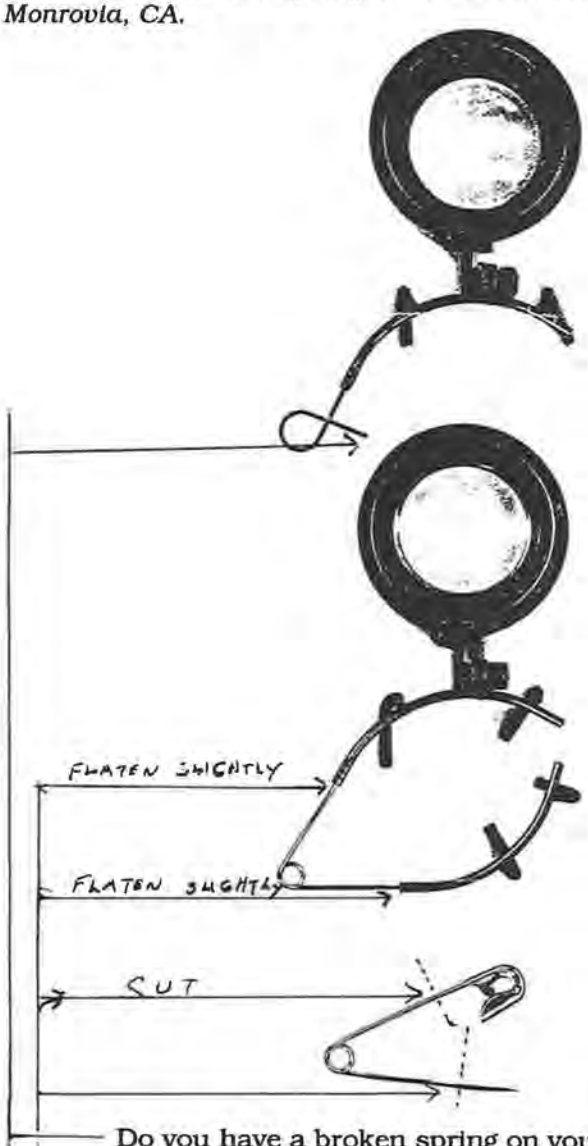
Bench Tips



Joe Crooks

REPAIRING BROKEN SPRINGS ON ARI LOUPES

This month's tip is from John Michaelson of Monrovia, CA.



Do you have a broken spring on your ARI loupe? It's $20.00 for a new spring. It can be repaired with a 10¢ safety pin.
Cut.
Flatten slightly here.
Insert pin here. It will not break.

John, you sure don't waste time on words, but I bet the nice drawing you sent me took some time. You draw almost as pretty as Henry Fried.

I'm running your article for two reasons: (1) to show the members of AWI how nice you draw and (2) because the parts for ARI loupes are getting hard to find and are expensive. Looks like the baby diaper pin would last longer because of the double circle for the spring.

Bench tips are to save watchmakers time and money! Thanks for the tip. ❑

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May 4-8	Clock Repair III (restoration)	David Christianson
June 1-5	Watch I (staffing, poising, & timing)	James Lubic
June 8-12	Watch Repair II (hairspring vibrating & finishing)	Hal Herman
June 15-19	Watch Repair V (pocket watch repair)	Archie Perkins
June 20-24	Complicated Watches	Antoine Simonin
July 6-10	Clock Repair VI	John Nagle
July 13-17	Clock Repair VII	John Nagle

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James Adams, CMW, FBHI



ASSOCIATIONS

Periodically, watchmaker and clockmaker associations (or as they are sometimes called, horological associations) become dormant. A malaise creeps in and things start to slow down. If allowed to continue on this path, these associations are at risk of total failure. What does total failure mean to the individual practioner of horology as opposed to a healthy dynamic association?

Failure of an association deprives the individuals of access to new ideas and the explaining and demonstrating of new and old techniques. Failure of an association forces the individual back into his isolated 144 square inch world. He doesn't see or understand what's happening out in the real world.

Well, let's get a little hard-nosed here and speak of the individual member's wants.

The individual who considers joining his peers for mutual benefit is most likely seeking craft knowledge, sociological support, exchange of ideas, and experiences. As long as any one or more of these prerequisites are available, the association is a success. It takes a careful structuring of the association to present the maximum desired mix to satisfy the individual enough to want to return. Along with that, there must NOT be, or perceived to be, a ruling or exclusive clique running the show. The meeting location should be consistent in date, time, and location. Dues levels should be such as to cover operating expenses. Expenses, such as printed material, postage, and miscellaneous accrued costs must be covered. There is also the prime necessity of an association newsletter. This newsletter should contain what was presented at the last meeting, what to expect at the upcoming meeting, what general types of future programs will be coming along, advance reminders of dues renewal, list of officers, and when elections of officers are to be held. AWI Central can send you an example of an association newsletter containing these important elements.

Newsletters should be sent, no . . . let me say MUST be sent to all known horologists, jewelry stores, and members of AWI and the NAWCC within 75 miles of the meeting location. Why 75 miles? That's just slightly more than one hour's drive. If the programming is of such interest to the members and capable of increasing their monetary worth, 75 miles is nothing. When these non-members continually receive your newsletter and begin to understand what values (potential monetary values) are involved, they (or at least some) will want to see firsthand what is being offered.

Programming an association meeting seems to be the crux of the problem encountered in associations. Without interesting and pertinent presentations, malaise sets in and it's downhill from there to extinction.

A listing of actual programs presented by an affiliate chapter of AWI is shown here to give you an idea of what can be done. The interesting thing about this listing is that with the exception of two programs, the entire lot was put on by the association members! Even

POSSIBLE PROGRAMMING

Meters	Networking Among Horologists
Materials	Fusee Watches
Coils	Networking with Quartz Watches
Dial Feet	Self-Esteem
Clock Bushings	Cylinder Escapements
Quartz Troubleshooting	Wooden Clocks
Package & Shipping (UPS)	Jewelry Repair
Retrofitting	Gemstone Enhancement
Howard Watches	Bushing Worn Stem Holes
Grandfather Clocks	Used Rolex & Vintage Watches
Dynamic Poising	Chinese Gold & Unusual Stones
Cuckoo Clocks	Bushing Worn Clock Plates
Problem Quartz Watches	The Polytest & Quartz Watches
Effective Use of Time	Clock Mainsprings
Improving Self-esteem	Watch Repairing, Past & Future
Three Faces of the Jeweler	The Recoil Escapement
Mainsprings	Elementary Electronics
Microfiche	

at that, I sometimes get envious of some of the educational resources some associations have that we don't. But, quite frankly, that envy prods us on to do even bigger and better things. An association never wants to become smug or complacent. That, too, will kill.

What about the individual member? What is his role in the association? Is it to sit still like a bump on a log or is it better to prod and stimulate the association? Stimulate how? One good way is to request programs of interest to you. What if five people at one meeting request five different programs? It's the association's obligation to honor these requests, hence five NEW presentations. I bet all, or most of them, can be done by or through the attending membership. That has been our experience.

Let me give you a basic and proven way to conduct a successful meeting. Meetings should be held at the same place and same time frame each time. Keep the business portion as brief as possible. "I didn't devote an evening and drive 35 miles to listen to this. Get on with what I'm here for." KEEP THE BUSINESS SHORT, keep the programming at 45 minutes or longer (or longer means the question and answer and discussion time). Don't ignore a new face. Integrate them as rapidly as possible.

By using this information and your own innovative thinking, your association has to be a smashing success. ❑

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TIMELOCKS



David A. Christianson, CMW, CMBHI
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Mosler Timelock Movements

Part III

THE 16/s WALTHAM

As we've seen in Parts I and II of our earlier study of the Mosler timelock movements (September and October 1989), this company developed a very unique system of timelock mechanisms (Figure 1). Although their timelocks served the same purpose as other timelocks (i.e., allowing a safe or vault to be opened only during specified times during the business day), their timelocks were controlled by modified, but regular production, pocket watch movements (Figure 2).

This system provided a series of several decided advantages over others who were manufacturing timelocks at the time:

1. The company could go into the marketplace to purchase movements that were already being produced. They didn't have to contract to a watch or clock company for movements that would require special designs, manufacturing, and tooling costs as other timelock companies had to do, thus realizing a considerable savings in start-up costs to begin with.

2. Repair parts would be readily available through established parts suppliers. Other manufacturers had to contract for the spare parts that were unique to their specially designed movements, adding quite a bit to the costs of after-sales servicing of these movements.

3. As a regular production watch movement became obsolete, a current production movement could be readily adapted to any of the Mosler timelock mechanisms.

The Mosler Company began production in the latter part of the 19th century using a slightly modified 18/s Illinois movement (see "Timelocks," September 1989 *Horological Times*). As the world moved into the 20th century, watch designs changed

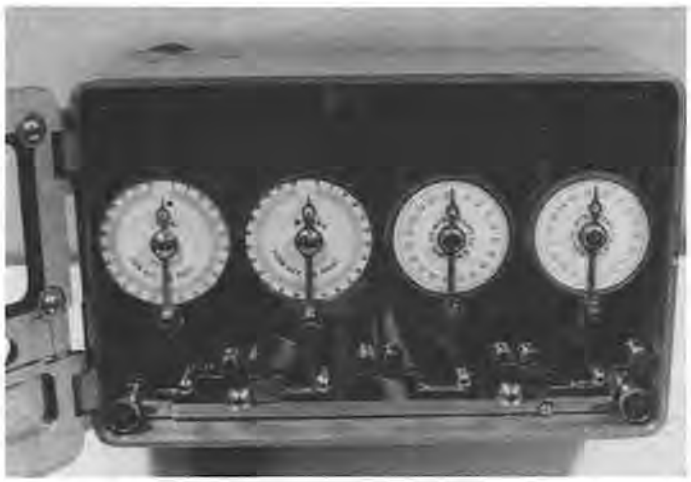


Figure 1. Typical Mosler timelock.

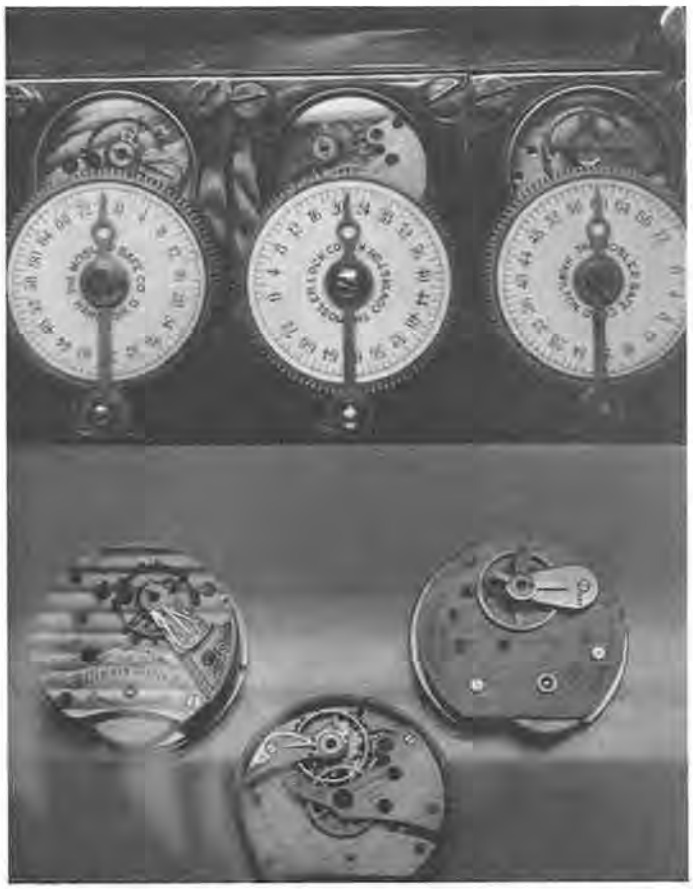


Figure 2. Three Mosler timelock movement blocks (above) containing modified pocket watch movements (below). From left to right: 18/s Illinois (circa 1890); 16/s Waltham (circa 1945); 18/s Swiss Recta (circa 1960s).

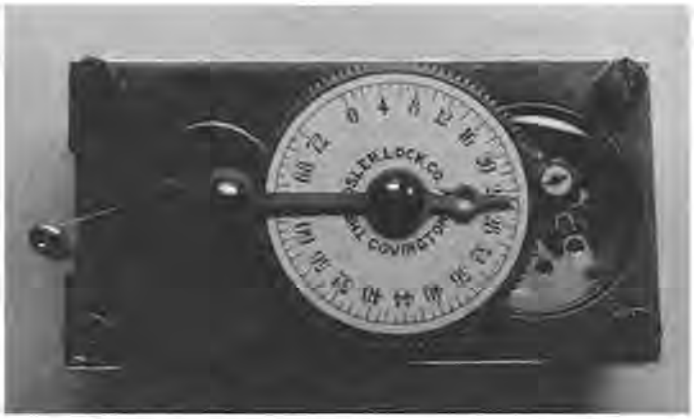


Figure 3. Waltham movement block removed from timelock case in Figure 1.

with improved technologies and changing consumer tastes and the old 18/s Illinois movement went out of production. Mosler then chose the 16/s Waltham model #16-A with an adaptor ring to allow this movement to fit into their regular movement blocks (Figure 4).

THE DISASSEMBLY PROCEDURE

Using your usual watchmaker's sense, caution, and skills, this Mosler movement will not present any new challenges. The procedures are the same as those for the other Mosler timelock movements that we've looked at before, but we'll go through the entire procedure as a matter of record.

RELEASING RESERVE POWER

The amount of power stored by the mainspring could be just the reserve power (that which is retained by the mainspring when the movement is entirely run down) or any amount of power depending on when the movement stopped running.

Keep in mind there is no ratchet click on this movement's mainspring that is accessible from the outside to easily release power, so:

1. Place the movement block upside-down in one hand, gripping the barrel with the thumb and forefinger of the same hand. Grip tightly, making sure that your fingertips are dry and not greasy since the barrel's surface is quite smooth (Figure 3).
2. Loosen and remove three of the four screws on the barrel cover plate.
3. Loosen the fourth screw and at the same time you'll feel the barrel trying to slip in your fingers.
4. Remove the fourth screw.
5. Grasp the barrel with your other hand and allow the barrel to slip slowly in your fingers until the mainspring unwinds completely (Figure 4).

This is not as tricky as it seems. You'll have plenty of control of the mainspring barrel with a firm grip since the spring is quite soft compared with clock springs of comparable size.

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DISASSEMBLY (Refer to Figure 5)

1. Remove dial pointer and pinion.
2. Remove dial (Figure 6).
3. Never remove trip lever.
4. Remove power on mainspring.
5. Push mainspring arbor and barreled spring out of block.
6. Remove arbor from mainspring by twisting backwards as with a watch.

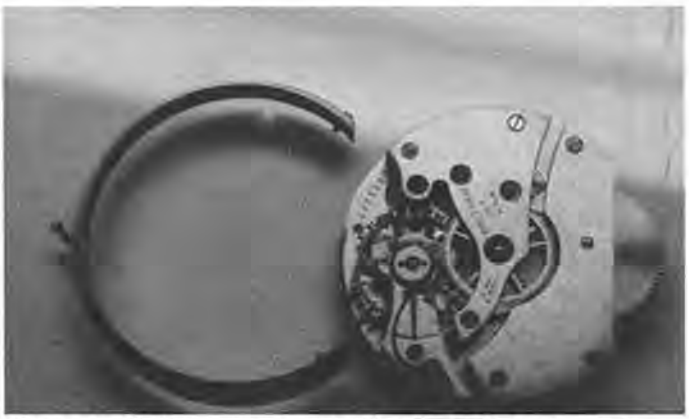


Figure 4. Waltham movement with adaptor ring removed.



Figure 5. Releasing mainspring power.



Figure 6. Removing barreled mainspring/ratchet wheel assembly.

7. Examine click, click spring, and teeth of the ratchet gear assembly.
8. Remove the back plate of the movement block by removing the four screws (Figure 7).
9. Turning the movement over in your hand, movement will drop out into your hand.
10. Disassemble the movement as with any watch movement. Note that the movement is merely a modified version of a standard pocket watch, except that some holes and cutouts were not made for use as a pocket watch (Figures 8, 9, and 10).

NOTE: The outside movement ring (or adaptor ring) is quite brittle and snaps quite easily. This ring is held on with three screws. Remove the three screws and lift the adaptor ring straight up to remove. Handle with extreme care.

REPAIR PROCEDURE

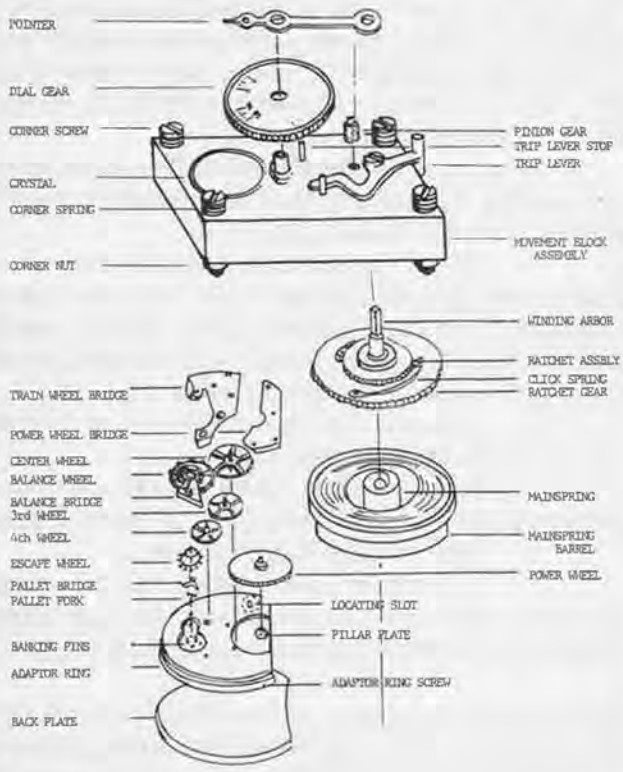
Repair of the Mosler timelock movement requires the same skill, knowledge, and material as with any watch movement of similar design.

Common problems encountered are:

1. loose or broken roller jewel
2. worn pivot holes (quite common)
3. broken balance staff pivots
4. broken jewels (not as common)

Figure 7

MOSLER 16/s WALTHAM MOVEMENT



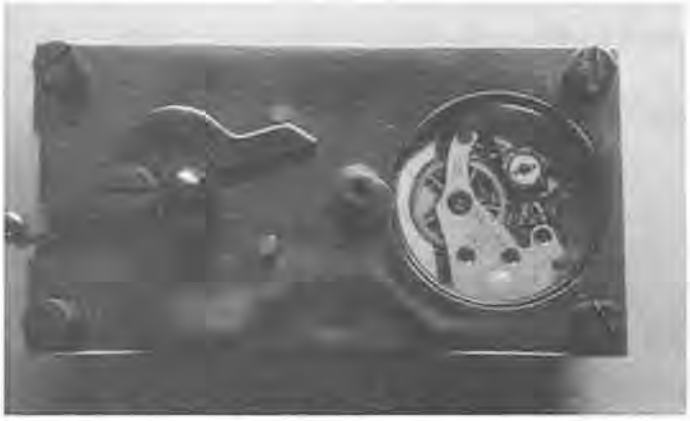


Figure 8. Movement block with dial pointer, pinion, and dial removed.

5. most commonly, foreign matter and dried lubricants
6. balance assembly out of beat.

Clean as with any pocket watch movement and make usual repairs. The movement should be hand oiled, balance cap jewels should be removed and cleaned with pegwood, and all hole jewels, pivot hole jewels, and pivot holes should be pegged.

Be sure to put the movement "into beat;" in other words, the balance staff, pallet fork, and escape arbor **must** line up so that the movement will be self-starting. Some of the later movements by Mosler and other makers were designed to be self-starting by using specially designed escape wheel teeth and greater angles of lift on the pallet surfaces, but this is not the case with the Waltham movement.

REASSEMBLY

1. Reassembly of the movement is the same as all pocket movements.

2. Place the movement into the movement block.

3. Replace the ratchet gear assembly into the mainspring barrel along with the mainspring.

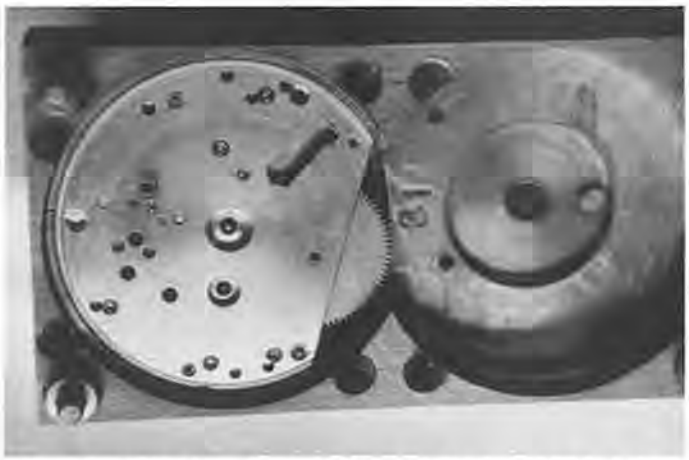


Figure 9. Back of movement block with mainspring and movement cover plate removed, exposing the movement.

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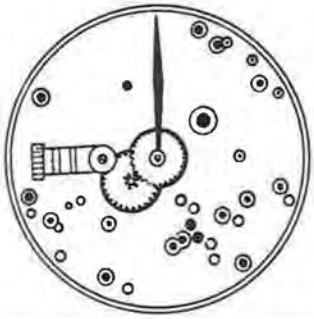
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Figure 10. Model 16-A Waltham watch movement taken from the E & J Swigart Co. *Illustrated Manual of American Watch Movements.*

WALTHAM



16 SIZE — MODEL A (1945)
RUNNING BARREL
16 A Grade No. 1617-17 Jewel



4. Oil the ratchet click with a heavier clock oil or a light watch mainspring grease.

5. Insert the ratchet gear/mainspring/barrel assembly into the movement block.

6. Replace the movement back plate and screws; always tighten opposite screws.

7. Turn the barrel until (a) tension is on the mainspring and (b) the screw notches on the barrel line up with the screw notches on the movement block and replace the screws.

8. Apply reserve power; wind the mainspring arbor nine half-turns (4-1/2 full turns).

9. Hold trip lever to the right as far as possible.

10. Place winding pinion on the winding arbor with the **collar up**.

11. Insert the dial so that the stop pin is as close as you can get it to the flat side of the trip lever.

12. Replace the pointer so that it is pointing to zero on the dial and replace the screw.

TESTING THE MOVEMENT

Turn the dial to four hours. The movement should start on its own and run down to "zero" time as indicated by the dial, whereupon it will stop running and the trip lever will be pushed to the right.

While the movement is running, check its rate on your timing machine. If needed, rate can be adjusted as with any pocket watch by removing the glass tension ring and glass covering the balance wheel (dial must be removed first).

If the movement doesn't self-start, check alignment of the staff-pallet arbor-escape arbor. If the movement doesn't run down, you have a mechanical problem such as worn pivot holes, lubrication, bent pivots, foreign matter, etc., as in any watch. ❑



Figure 11. Model 16-A Waltham timelock movement.



Figure 12. Pillar plate of #16-A movement.

ASSOCIATION NEWS

ARIZONA

The Arizona Clockmakers & Watchmakers Guild held their monthly meeting on March 17, 1992. Bob Frohlich was welcomed as a new member.

The first program of the evening was a video on the sizing of watch bracelets by Zantech Video. The second program was a review of the tape-slide presentation on the AWI Identification Mark System. This presentation was in preparation for several months by the AWI Identification Mark Committee. After some minor revisions, it will be sent on to AWI Central for use by the various Affiliate Chapters. The Arizona Clockmakers & Watchmakers Guild is funding the film and development costs as a donation to AWI.

TEXAS

The Texas Watchmakers Association 45th Annual Convention will be held May 22, 23, and 24, 1992 at the Wyndham Austin Hotel at Southpark Business Center. The toll free phone number for reservations is 1-800-433-2241.

On Friday, May 22, an all-day seminar will be conducted by J.M. Huckabee. The seminar will be followed by an Open House hosted by the Capital Area Watchmakers Guild. A state-wide auction will be held Friday evening, open to everyone. Saturday will be a day of various seminars of interest to horologists, an organized tour for the ladies, a banquet, and an evening dance. On Sunday, the Past Presidents' Breakfast and the General Meeting for the Texas Watchmakers will close out the convention.

If you wish additional information, please contact Kip Naleski at 8103 Hillrise Drive, Austin, TX 78759. All watchmakers are welcome to attend the 1992 convention.

UPCOMING CONVENTIONS

May 8-10, 1992
North Carolina Watchmaker's Association
Annual Convention
Hampton Inn -- Morehead City, NC

May 16-17, 1992
Arizona Clockmakers & Watchmakers Guild
Annual Convention
Las Campanas Quality Inn -- Cottonwood, AZ

May 22-24, 1992
Texas Watchmakers Association
45th Annual Convention
Wyndham Hotel at Southpark -- Austin, TX

October 3-4, 1992
Watchmakers Association of Pennsylvania
Annual Convention
Penn State University Campus -- State College, PA

October 23-25, 1992
Florida State Watchmakers Association
Annual Convention
Howard Johnson Hotel -- Daytona Beach, FL

October 23-25, 1992
Illinois Watchmakers
16th Annual Convention
Keller Convention Center -- Effingham, IL

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The Apprentice Clockmaker



J.P. Kenyon, CMC

Metals Used in Clockmaking

INTRODUCTION

This is the first of a series of articles to be written primarily for the novice clockmaker. The intent will be to cover selected areas of clock repair and related technology with little assumed in respect to background knowledge. This approach should be helpful to the amateur as well as the seasoned clockmaker, hopefully, without frustrating the former or boring the latter. A full understanding of fundamental concepts is necessary for a logical approach to the resolution of problems at the bench.

CLASSIFICATION OF METALS

One method used to classify metals is based on a relationship to iron. Compounds derived from iron are referred to as *ferrous*. All other metals are considered to be *non-ferrous*. Ferrous metals used in clockmaking are iron and steel. Non-ferrous metals used are brass and bronze.

NON-FERROUS METALS

An alloy is a substance made up of two or more metals melted together. Brass is an alloy of copper and zinc. An average composition for brass used in clockmaking is 65% copper and 35% zinc. A mix of 70% and 30% respectively is considered to be soft brass. Antique clock plates were made of this mixture because of its workable properties. Gear wheels and most machined parts are made from a 60/40 ratio which is stronger due to the added zinc. In some cases, lead and other metals are added to the alloy in small amounts to modify hardness, color, and other properties.

TABLE 1
CLASSIFICATION OF STEEL

Soft steel	<0.25% carbon
Medium steel	0.25-0.6% carbon
Hard steel	0.6-1.7% carbon

Bronze is an alloy of copper and tin. Sometimes small amounts of other elements such as zinc are added to modify its properties. It is a harder material than brass and sometimes used for bushings. Brass and bronze become hardened when rolled or hammered. The hardness disappears when heated to red, then cooled rapidly.

FERROUS METAL

Steel is produced by refining molten pig iron. In the process, iron is purified of most of its natural impurities and a certain amount of carbon is added. Steel is classified on the basis of carbon content which is directly related to hardness (see Table 1). As a rule of thumb, the better the grade of the clock, the harder the steel that is used for arbors, pinions, and other parts. The physical properties of the steel can be adjusted to fit the requirements of the part by techniques known as hardening, tempering, and annealing.

HARDENING STEEL

High carbon steel is hardened by heating it to at least

1200 degrees F, then cooling quickly by submerging it into water or oil. Hardness is governed by the temperature to which the steel is heated prior to cooling. Color changes observed during heating are used to determine the specific end-point for desired properties to be developed when cooled by dunking. Steel heated to white then cooled by dunking is very brittle. When heated to bright red and dunked it is somewhat less brittle. Steel heated to dull red then dunked is even less brittle.

Steel which has been heated for hardening then cooled by submerging it in water is hard and brittle. Steel cooled by dunking it in oil tends to be somewhat less brittle. A specific oil formulated for this purpose with a safe flashpoint must be used to avoid a possible fire or explosion.

A propane torch, alcohol lamp, or bunsen burner are commonly used for heating. The item may be held with pliers, forceps, tweezers, or placed on an asbestos-free heating block. To prevent uneven contraction and warping, the item must be quickly dunked or dropped into the cooling medium.

TESTING FOR HARDNESS

To test steel for hardness, a file can be drawn over its surface. If the file slides over without making a scratch, the piece can be considered hard. If scratches occur, the part is soft and will have to be rehardened.

TABLE 2
TEMPERATURE-COLOR RELATIONSHIPS

Temperature (degrees F)	Color
430	Pale Yellow
450	Straw Yellow
490	Yellow-Brown
500	Brown-Yellow
520	Brown-Purple
530	Light Purple
550	Dark Purple
570	Dark Blue
600	Pale Blue

TEMPERING STEEL

Steel that has been hardened is much too brittle for clockwork, so the hardness must be reduced by a process called tempering. This is accomplished by heating the hardened steel to a reduced temperature as indicated by a color change, then quickly cooling

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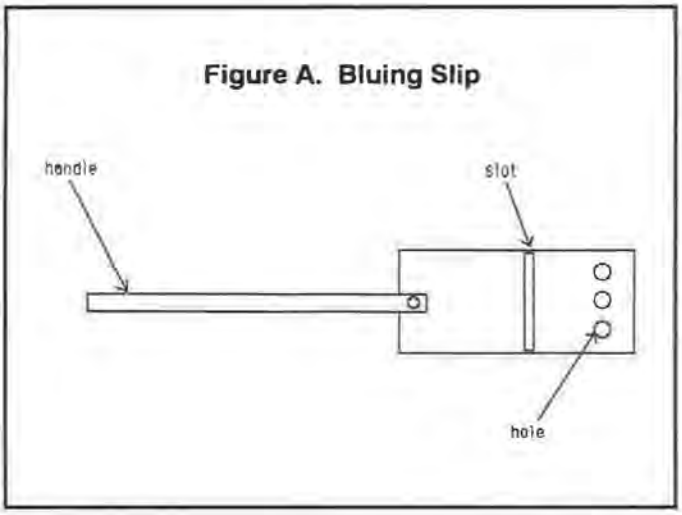


Figure A. Bluing Slip

it in water. Prior to heating, the surface of the piece must be brightened so that color changes will be visible. As with hardening, different colors represent distinct temperatures. The color of the piece will change from shades of yellow, brown, purple, blue, and grey. The hardness reduces as the colors go from yellow to grey, where it is considered very soft and the temper is considered to be completely drawn. Refer to Table 2 for the relationship of heating temperature to color.

ANNEALING STEEL

Annealing is a technique used to remove all of the hardness from a piece of steel. It is accomplished by heating the piece to a cherry red color and allowing it to cool slowly. The cooling process can be done by air, sand, or in an annealing pan filled with pumice stone or some other suitable medium. An annealing pan permits some control of the cooling process.

BLUING STEEL

Steel screws and small parts to be blued can be placed on a bluing slip which is designed to hold the pieces and insure that they are heated evenly to achieve a uniform color. A slip can be made by cutting a piece of sheet brass into a rectangle and attaching an iron handle by riveting it to the brass. A groove should be filed across the slip for round parts and several holes should be drilled near the end for holding small screws (see Figure A).

When heating for the purpose of bluing screws or other parts, it is important to clean and polish the surface prior to heating if good results are to be achieved. Care should be taken not to touch the polished surface with fingers because oil from the skin will leave fingerprints or marks resulting in an uneven color.

Next time we will begin to cover some of the basic tools needed to repair clocks. ❑

New Products

VIBROGRAF USA CORP. INTRODUCES SPIROL HAIRSPRING CLEANER

Mr. Joseph Presti, President of Vibrograf USA, announced the release of a new hairspring cleaner--SPIROL. Mr. Presti stated, "With the increased production of mechanical watches, Vibrograf saw the need to develop a better hairspring cleaner for today's watchmaker. SPIROL is provided in a specially designed 4 oz. bottle for easy use. This bottle has a separate chamber that eliminates waste. This new product is faster drying, degreases without leaving stains, and has no chlorinated hydrocarbons. It is environmentally safe."

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



SPIROL hairspring cleaner from Vibrograf

SY KESSLER TEAMS WITH BAUSCH & LOMB

Sy Kessler Sales, Inc. recently announced they are teaming with Bausch & Lomb to market their line of jewelers loupes and magnifiers through a nationwide network of jewelers supply wholesalers. Bausch & Lomb loupes have been the standard for jewelers and watchmakers throughout the years.

Sy Kessler Sales markets Renata watch batteries, Ceres diamond testers, ultrasonic cleaners, scales, gem microscopes, diamond selling aids, diamond grading sets, and other products in addition to Bausch & Lomb.

For the name of your nearest authorized Kessler/Renata dealer, contact: **Sy Kessler Sales, Inc., 2263-C Valdina St., Dallas, TX 75207; (800) 527-0719.**



Bausch & Lomb loupes from Sy Kessler Sales

When contacting manufacturers for information about these products, tell them you saw it in the Horological Times!



BERGEON--Fully compatible with quartz watches, Bergeon's 6740 gauge provides highly accurate measurements of setting stem and crown threads from 0.60 to 1.20 mm, the internal diameter of crown tubes and gaskets from 1.30 to 2.50 mm, the external diameter of crown tubes from 1.30 to 2.50 mm, the external diameter of setting crowns from 2.60 to 5.00 mm, along with distances between case lugs. Dimensions are 85 x 85 x 85 x 1 mm. **Bergeon & Cie SA, 11 av. du Technicum, CH-2400 Le Locle, Switzerland; (039) 31 48 32.**

News in the Trade

L&R HONORS EXCELLENT SERVICE BY STAFF

L&R Manufacturing Co., a leading manufacturer of ultrasonic cleaning systems and solutions, presented a Customer Appreciation Award to Pam Hoffmaster, Department Head of Customer Service at L&R.

Pam received the award for outstanding service to all customers during 1991. This included direct contact with key accounts, follow-up of service-related issues, and rapid response to customer requests.

In presenting the award, James J. Lazarus, President of L&R, stated, "Pam provides the leadership that carries through in all our representatives. At L&R, customers are number one, and Pam and her staff demonstrate this daily with outstanding service and attention to detail. We strive to be a customer-sensitive and service-oriented company. Pam has put that philosophy into motion, and we are proud of the accomplishments of her and her staff."



Pam Hoffmaster and James Lazarus of L&R Manufacturing Co.

TEXAN APPOINTED TO FED CONSUMER ADVISORY COUNCIL

John V. Skinner, President and CEO of Jewelers Financial Services, Inc., a subsidiary of Zale Corp., has been named to the Federal Reserve Board Consumer Advisory Council. Their first meeting of 1992 was held on March 26th in Washington, D.C. Of the 30 Council members, Skinner is the only representative from the retail industry.

The Council advises the Federal Reserve Board on the implementation of federal laws governing consumers' rights and responsibilities when dealing with the financial services industry. The Board investigates laws such as the Consumer Credit Protection Act (CCPA)--including the Truth in Lending, Equal Credit Opportunity, the Community Reinvestment and Electronic Fund Transfer Acts.

The Council represents consumer, community and financial industry interests. It also includes leaders from various segments of the financial, academic, state government, and consumer and community areas. Individual appointees are selected by the Board to represent and express the viewpoints of their particular constituency. Skinner was selected from more than 300 candidates for one of 13 positions open on the Council this year. He will serve a three-year term.

Skinner joined Zale Corporation in 1984. He has served in numerous leadership positions in consumer credit and retail organizations such as the National Retail Federation, where he presently serves as Chairman of the Credit Management Division.



John V. Skinner



Maragaret Thatcher (right) gives her views on the U.S. economy to Patricia Granger (left), President and CEO of UTAC America. UTAC hosted a luncheon at the St. Regis Hotel in New York where Mrs. Thatcher was the guest speaker.

MARGARET THATCHER ADDRESSES BUSINESS LEADERS IN NYC

Addressing a group of business leaders in New York City, Margaret Thatcher, Britian's first woman Prime Minister, told them that America should have nothing to fear from its foreign competitors. Mrs. Thatcher gave her speech on Jan. 27th at the St. Regis Hotel in a luncheon organized by The CEO Institutes. The luncheon was hosted by UTAC America, Inc., a leading marketer of luxury watches and jewelry including Audemars Piguet, Bertolucci, Breguet, and Bonini Fine Jewelry.

"We were extremely pleased when we were informed that Margaret Thatcher would be available to speak in the U.S.," said Patricia Granger, President and CEO of UTAC America who introduced Mrs. Thatcher. "This is a woman of historic accomplishments and certainly one of the great leaders of our time."

Mrs. Thatcher touched on a number of topics which ranged from the breakdown of communism in Europe to the competitive pressures that the United States is facing from its trading partners. She stressed that although the Japanese are extremely proficient in three areas--cars, electronic consumer goods, and automated machines--the United States is a world leader in many others. She included aerospace, pharmaceuticals, entertainment, chemicals, oil and gas, fast food, and tourism.

In commenting on what she has seen in the newspapers, Mrs. Thatcher said, "Don't be afraid of Japan, and don't condemn Japan, because she produces jolly good cars and videos and automated machine tools--which people want and choose to buy. Let it never be said that the greatest free enterprise nation on earth condemns others for producing goods efficiently and at a competitive price. She does. And she does a lot of it here."

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PART LXXVII
COMPLETING THE MISSING TRAIN JEWEL SETTING

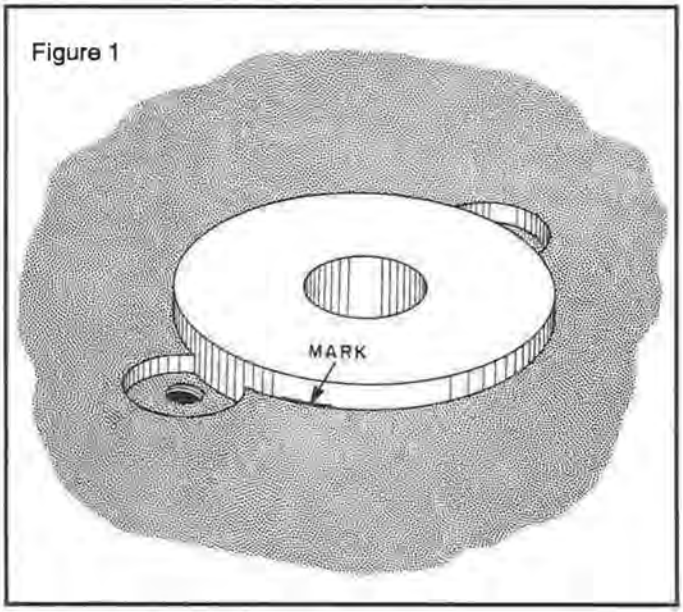
After the train jewel has been set, the setting turned down in diameter to fit the hole in the plate, and the shoulder turned on the setting, then one would proceed to complete the setting.

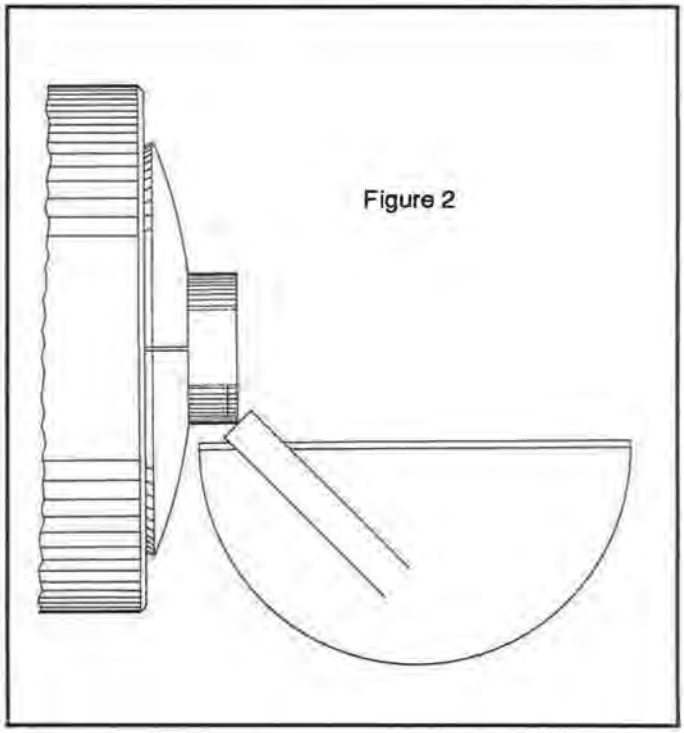
First, the setting is placed in its hole in the plate, making sure that it seats down against the seat in the hole. Then the setting is marked for length as shown in Figure 1. A needle or small scriber can be used to make the mark on the setting. Next, one would proceed to turn the end of the setting off to establish its length.

CHUCKING THE SETTING FOR TURNING ITS LENGTH

When shortening the setting, it can be chucked true in a wire chuck. Figure 2 shows how a piece of pegwood can be used over the T-rest against the corner of the setting to true the setting while the lathe is turning slowly. For this operation the setting should be semi-tight in the chuck to allow it to true up. When the setting has been made to run true, the chuck is then tightened on the setting.

Figure 3 shows how the graver is presented to the end of the setting for shortening the length of the setting. When shortening the setting, one must allow enough extra length for finishing the top of the setting after the setting has been stripped out. This should be about .1 mm. The end of the setting should be faced as flat as possible. A straight edge can be used across the end of the setting to determine if it is flat.





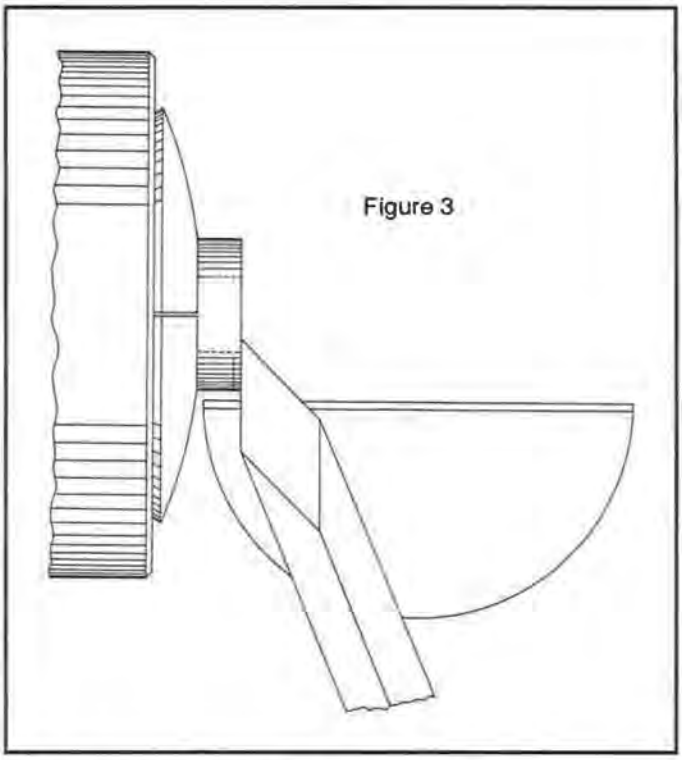


Figure 3

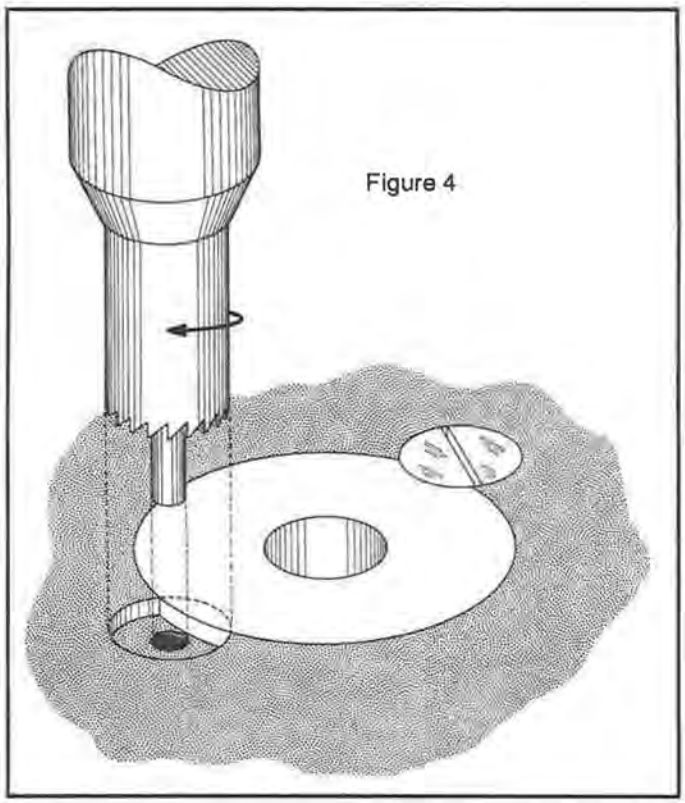


Figure 4

COUNTERBORING FOR SCREW HEADS

Figure 4 shows how one would counterbore the top of the setting for the jewel screw heads. For best results, the counterbore used should have a pilot to guide the counterbore. The pilot should fit closely but freely in the jewel screw hole. The counterbore will cut more smoothly if it has five or more teeth. The more teeth on the counterbore, the smoother its action will be. The counterbore can be held in a pin

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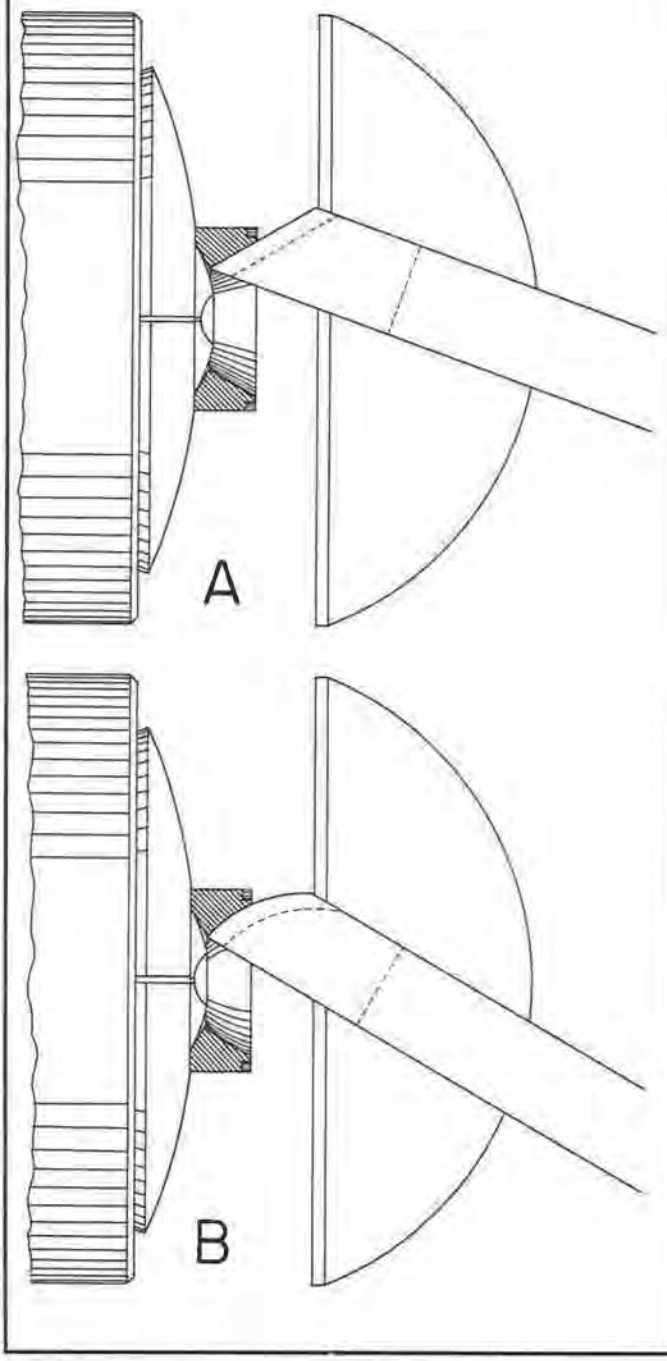
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vise while being used. The plate or bridge is held so it is square with the counterbore when the jewel setting is being counterbored. The counterbore can also be held in a chuck in the headstock of the lathe while it is being used. In this case, the plate or bridge can be held level on a drill pad fastened in the lathe tailstock spindle. The lathe should be turned very slowly for this operation. The counterbore should be turned in the direction of the arrow in Figure 4.

When counterboring the jewel setting, one should screw one of the jewel screw heads down on top of the setting to hold the setting to prevent it from turning while the other side of the setting is counterbored, then a jewel screw is placed in the newly counterbored position as the opposite corner of the setting is counterbored for the other screw head. Counterbores can be purchased from your local watch and clock distributor or they can be made up special for the occasion.

Figure 5



STRIPPING THE SETTING

After the setting has been counterbored for the screw heads, the setting should be stripped out so there is a good view of the jewel from the top side of the setting. This is shown in Figure 5. View A shows a straight stripper being used to strip a train jewel setting. The stripper actually bright cuts the surface. Not only must the stripper be extremely sharp, but the surfaces leading up to the cutting edge must be smooth and highly polished. It is a good idea to first bevel the setting out to shape the surface with a sharp smooth graver and then use the stripper for bright cutting the bevel only. The surfaces on the stripper can be made smooth on some 4/0 polishing paper cemented flat on a piece of glass, then the surfaces of the stripper are polished by moving the stripper on the polishing paper and polishing block in line with the length of the cutting edge of the stripper.

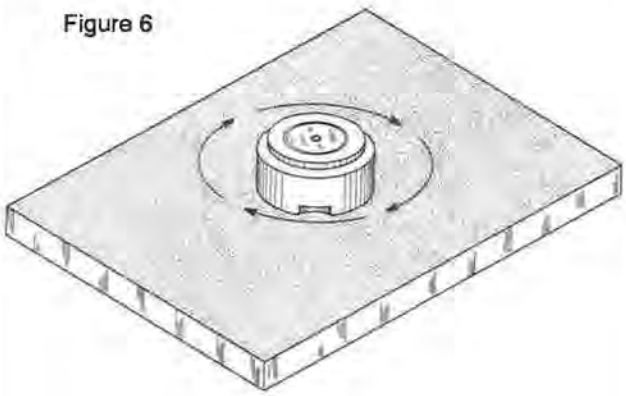
A stripper made from a strip of sapphire does an excellent job of stripping jewel settings. The watch factories used diamond strippers. Diamond strippers do a beautiful job and hold up well when used in production.

View B, Figure 5 shows a setting being stripped with a curved stripper. A curved stripper is usually used on thin settings; however, one should strip a setting so it will match the other settings in the watch.

BURNISHING THE TOP OF JEWEL SETTINGS

After a setting has been stripped, one should burnish its top flat. The first step in burnishing the top of a jewel setting is to grind the top flat and smooth. This is done on a finely ground or frosted glass. This is shown being done in Figure 6. The setting is held on the surface of the glass with the tip of the index

Figure 6



finger while the setting is moved in a circular motion on the glass.

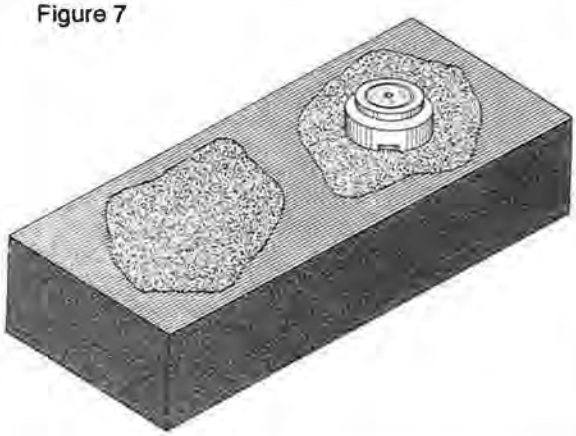
METHODS USED TO FROST GLASS

To frost a piece of glass for grinding the tops of jewel settings flat, one can use fine carborundum powder. The glass should be flat plate glass or it can be flat welding goggle lenses. Two glasses should be frosted at the same time. Some water and carborundum powder are applied to one of the glasses to form a thin paste on the glass, then another glass is used in a circular motion against the paste on the first glass until the two glasses are frosted. The glasses must be cleaned thoroughly before being used to grind jewel settings.

Another good grinding powder that can be used to frost glasses is 600 grit alumina. In fact, one can possibly use a finer alumina powder and produce a fine enough finish on the glass which would actually burnish the top of a setting and give it a final bright finish.

Another method that can be used to frost a glass which is fine enough to give the tops of jewel settings their final flat bright finish is to frost the glass chemically. In past years, the author has frosted glasses by using a glass etching paste called ETCHALL. This came in a tube and was obtained from a hobby shop. This paste does not seem to be made anymore.

Figure 7



The readers could check with hobby shops or glass etching shops for chemicals to use for frosting glass.

POLISHING TOPS OF JEWEL SETTINGS WITH A JASPER STONE

Another method that can be used to obtain the final flat finish on the top of jewel settings is shown in Figure 7. The stones that are shown are jasper stone. The stones are set into sinks in a block of wood by using cement. One of the stones is finer than the

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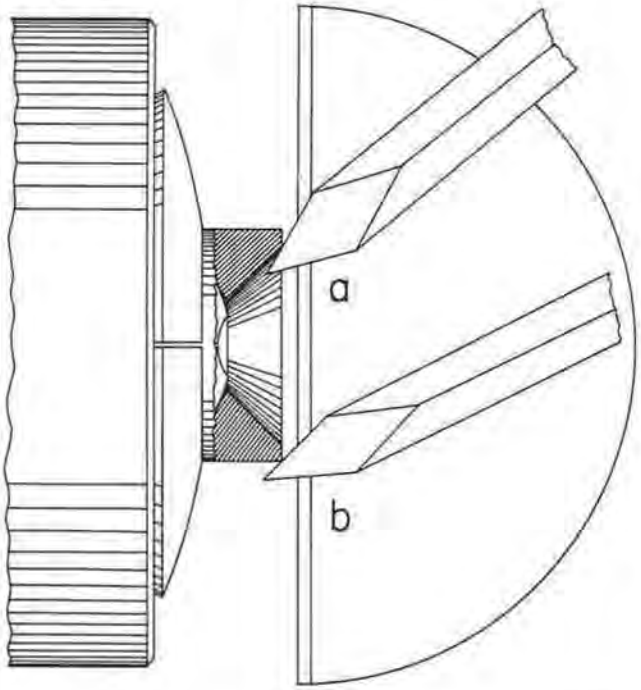
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Figure 8

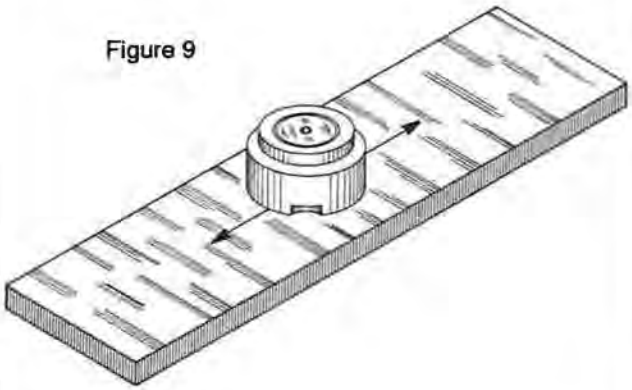


other. The coarser stone is used to grind the top of the setting flat and the finer stone is used to obtain the final finish to the top of the setting. Note: When using the frosted glass or jasper stones, they must be kept clean and dry. Also, it is a good idea to keep a piece of watch tissue wrapped around the finger that is used to move the setting on the glass and stones. The jasper stones are used in the same manner as the frosted glass.

Sometimes during the grinding and polishing of the top of a setting, a burr builds up on the corners of the top of the setting. Pieces of this burr often break off onto the glass or stones and cause the surface of the setting to become scratched. To prevent this from happening, one should chuck the setting true in the lathe and use a sharp smooth graver to remove the burr. This is shown being done in Figure 8. View "a" shows the burr being removed from the inside corner of the top of the setting. In this case, the lathe should be turning backwards. View "b" shows the burr being removed from the outside corner of the top of the setting. In this case the lathe is turned forward.

Another method that can be used to finish the tops of jewel settings is to first grind the top of the setting flat on the frosted glass, then burnish the top of the setting on a burnish file. This is shown in Figure 9. The file should have fine cross lines. To obtain the proper finish on the surface of the file, first make sure that the surface of the file is flat. This can be checked with a straight edge. Then the cross lines are gotten on a piece of 4/0 polishing paper which has been cemented flat on a piece of plate glass. The burnish file is moved across the paper, flat on the

Figure 9

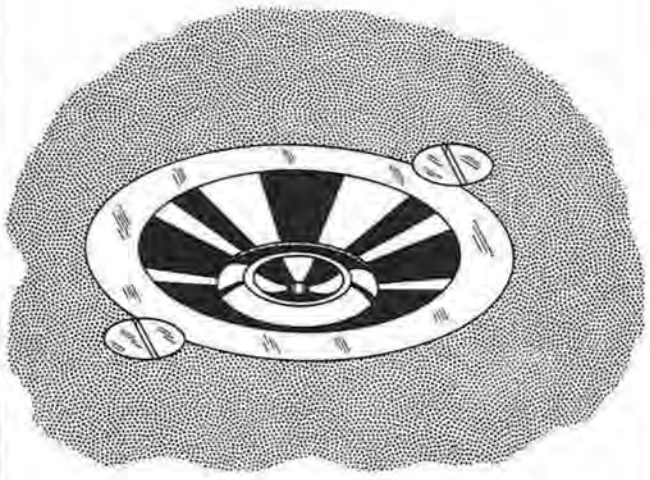


paper, in a crosswise direction to the length of the file. All of the cross lines should run square across the file. The top of the setting is moved flat on the file, back and forth lengthwise of the file as shown in Figure 9. A piece of watch paper is wrapped around the finger that is used to move the setting on the burnish file. The file must be kept clean.

Figure 10 shows the finished setting that was made to replace the missing setting. The new setting has been stripped with a straight stripper and the stripping bright cut so the light lines show up straight and brilliant. The top of the setting has been burnished flat and bright and flush with the plate. The screw heads are level and flush with the top of the plate as they should be. This type of job will do credit to any watch and to the maker of the setting as well.

"Setting Bezel Jewels" will continue next month. ❑

Figure 10



AWI MATERIAL SEARCH NETWORK

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

BB3 New England 16 size, 7 or 11 jewel, Dan Patch stop watch, driving wheel, BF #8060.

EE3 Baumgartner 134 Mickey Mouse Watch, Bradley on the dial, needs hands. Hour 1mm long, 1.45mm hole; minute hand 9mm long, .85mm hole.

EE4 Waltham 16 size Vanguard 23 jewel, Grade 1623, balance complete, Part #4883V.

EE5 3/0 or 27.94mm round, Canour (A.E.J.J.) Co. USA duplex escapement, needs staff.

EE7 Girard-Perregaux LED Module, GIP 5020.

If you can supply any of these items, please contact: **AWI Material Search Network, AWI Central, P.O. Box 11011, Cincinnati, OH 45211; Fax (513) 661-3131.** ❑

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Ask Huck

CLOCKMAKING BITS About...

By J.M. Huckabee
CMC, FBHI



TOOLS FOR CLOCKMAKING and MATERIALS FOR MAKING CLOCK WHEELS

Q. I would like to expand my watchmaking business into clock repairing. What additional major tools should I purchase?

A. You are wise to be cautious in making major investments early in another business venture. I'll discuss this on the basis of my personal opinion and suggest you modify my recommendations with your own good judgment.

First you should add hand tools to augment whatever you now own. Get a feel for the market of your area as to class of work, size of clocks, and complexity of repairs. By example, a shop and tool setup for fine jeweled clocks may not be suitable for antique clock restoration.

Early on you will need cleaning facilities. They may range from very simple to complex and expensive. Be sure the methods used will earn their cost and yield a profit.

If you delve into restoration of antique movements, a well-equipped lathe will be a necessity, and is probably the second major tool needed. It is improbable that a new watchmakers lathe will ever yield a profit in clock repair. Seek a reasonably good used machine or a small lathe of another type. Remember that the basic lathe is only the beginning cost. Tools to outfit one may well exceed the basic cost. However, a well-equipped lathe in skilled hands is the king of all power tools. The lathe can abridge the work for numerous other tools.

My next suggestion is a small drill press--a bench-top tool with about 8-inch swing, 2-inch stroke, and 4-8 inches over the table or base. Spindle speeds should be in the range of about 500-2,000 RPM. This is the type machine commonly available in the $100-$150 range. Bits in the 1-60 size and fractions from 1/16-1/4 inch will be needed. The drill press doubles as a bushing reamer driver and bushing press. By the purchase of a set of bushing reamers and a bushing assortment you have solved another major tool problem.

From this point I recommend that you start making specialized tools--clock size punches, bench blocks, lathe fixtures, etc.

I know the argument: Don't build tools that you can buy; purchased tools are less expensive. This is a very true statement. However, you learn new skills and workmanship efficiences in designing and building which can never be purchased with money. Again, use caution and good judgment, and in a short period of time you will have a well-functioning clock repair business.

Q. Where do you obtain raw materials for making clock wheels? What are the problems in cutting the gear teeth; and how do you cut the wheel windows?

A. Wheel work deals with a technology in which there is essentially no standardization. Each clock is built with its own engineering and manufacturing preferences as established by its company. This means that we find countless numbers of gear teeth profiles, wheel thickness and diameters, and bore diameters. It's rare that we find pieces which are directly interchangeable without some form of modification and fitting.

S. LaRose shows a few wheel blanks in their catalog. It saves lots of work when a wheel blank is available. Even so, diameter and bore diameter will usually require adjustment. Material called half-hard leaded brass works best. Other brass that is half-hard makes good wheels but is not as free machining as the leaded brass.

Wheel windows, called crossing-out in many old texts, are most often cut with a jewelers saw and file. A good job takes lots of time!

I mount the wheel blank on a stub arbor with the largest bore diameter feasible. This is in the interest of rigidity. The blank is supported on both sides with back-up plates for additional rigidity. These plates are usually free-machining hard aluminum in a diameter that is slightly smaller than the root diameter of the finished wheel.

The cutter throws an entrance and exit flash on the wheel. This can be obviated by stacking three

blanks and discarding the two outside pieces. This saves lots of cleanup time. On thin wheels the backup plates are made up to wheel diameter and support, as well as protecting the wheel blank. The cutter also cuts the plates.

The cutter should be sharp and driven as fast as feasible, considering cutting ability and avoidance of chatter and resonant vibration. The cut should be supplied with a constant liberal quantity of lubricant-coolant. Various cutting lubes can be used, but a water-soluable oil is a better coolant. It's messy indeed!

Sheet brass for wheel blanks is not readily available in small quantities. I usually purchase small sheets in a variety of thicknesses from a local hobby store.

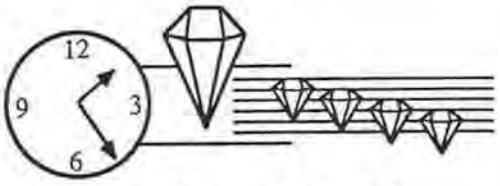
You may find the bore of your new wheel is not in the absolute center of the wheel. This is the result of an imperfect fit to the arbor, or an arbor that is less than perfect. I rebore the hole in the lathe with what is called "turning in a box" technique.

For wheel mounting, the arbor and its old hub, or a new rough hub where applicable, is set up on centers and the hub face and seat machined to a trial-fit to the new wheel.

A new wheel that is prepared by the "box technique" and a hub that is prepared by the "on centers technique" will run absolutely true in round and flat. Caution should be exercised to prevent distortion in the staking operation.

Making a single wheel for a specific purpose is a long and tedious job. Even so, many fine antique clocks are redeemed by the many craftsmen who delve into this facet of clockmaking. ❑

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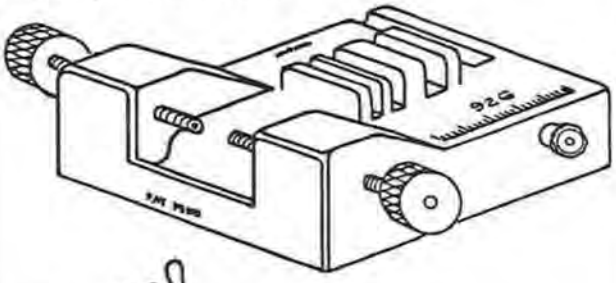
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592

BULLETIN BOARD

A. NEW REQUESTS

NEWALL CROWN ASSORTMENT #25
Dayton Koch, Sacramento, CA, is seeking a copy of the chart that identifies crowns in the Newall Crown Assortment #25. It has 144 bottles.

LECOULTRE CALIBRE 219
Philip Kanarek, Bayside, NY, is seeking a service bulletin for LeCoultre Calibre 219, especially the dial side. Jaeger-LeCoultre in Switzerland has advised that they do not have such service information.

B. RESPONSES

EUROPEAN CLOCK (MARTI FRENCH CLOCK)
From the several responses we received it becomes apparent that Steve Makowski may have erred when he drew the markings on his French clock to be "P" Marti. Several responses indicate it should be "S" Marti. J.E. Coleman (page 140) quotes from a letter from "R" Marti confirming that the firm was originally known as "S" Marti.

Henry Fried responds: *I think the inquirer might have mistaken the P. Marti for an F. Marti. Tardy, the most comprehensive listing to date on French makers of all types of timepieces, lists only Samuel, Fritz, and Marti, all between 1840 and 1908. Also, there is a Japy, Marti & Roux of c-1864 to 1880. There is a Samuel as well as a Fritz Marti of Montbeliard and Fritz of Vieux Charmont. S. Marti made round movements, "Pendule de Paris," the common type but well-made hour and half-hour strike movements between 1841 and 1912. S. Marti exhibited in Paris during 1841 to 1851-1852. In 1860, Samuel Marti obtained the "Medaille de Bronze." In 1900, Samuel was awarded the Medaille d' Or. Fritz Marti is known to have operated in Vieux Charmont about 1876.*

The only other source possible is, of course, Kathy Pritchard, who seems to have ALL the information. Thorpe's book on the French Marble Clock lists no more than what I have given here. My own records show that I have seen an S. Marti et Cie (Bronze medal in 1867) at 22 Rue General LeClerc, Montbeliard (Doubs) France. I hope this helps.

SETH THOMAS
In response from J.A. MacKinnon, New Lynn, Auckland, New Zealand, J.M. Huckabee responds as follows:

The clock movement for which parts are needed is almost certain to be a Seth Thomas #10. Several movements were built similar to the #10, all having the same balance wheel and escapement lever.

Many of the movements were used to drive a chart recorder and had no motion works or hands. Those were wound from the rear. Some were used in locomotive clocks with winding from the front.

As common as this movement is encountered, surely someone has some escapement parts for this AWI member.

Description: This movement uses a brass balance wheel with flat hairspring. The arbor has conical pivots with a fitted steel guard roller with the impulse pin inserted into the balance wheel arm.

The pallets are of one-piece steel (anchor shaped) pressed onto a steel arbor. The fork is of brass, fitted onto the same arbor.

Balance pivots are steel screws, sometimes found with an inserted jewel of the simple cup-type.

The movement is well powered, 8-10-day run, and quite reliable in a dust-free environment. However, its accuracy is similar to that of a spring-driven alarm clock.

SOUND FROM CHIME RODS
From the February/March request of Harry Carlson concerning a problem his firm is experiencing with sound from new wall and floor clocks, Ron Spokovich, Johnstown, PA, responds with the following important information:

While I do not have lengthy experience in the field of clock repair, I do have over 200 years experience in the endeavors of journeyman machinist and tool maker. Problems in metallurgy, and those areas relative, plague us as well. I hope that I can offer a solution to your problem, or at least point you in the generally correct direction.

Perhaps a short tale of experience will show how important various factors can be. Just a few years ago I worked in a shoddily run small machine shop that also did its own casting operations of brass and aluminum alloy. Management, deciding to save money, started using scrap brass and alloy of unknown origin in casting of brass items. Thusly, casting problems of all sorts arose and many castings resembled Swiss cheese in their consistency. The castings were practically unmachineable and the shop's operation costs rose to the point of almost causing bankruptcy. So, it does not always pay to "cut costs," for there are many operations that there simply isn't a shorter or cheaper way to do.

There are a number of things you want to look for. This may be a little time consuming, perhaps costly, and the legwork is unavoidable unless you luck out. I'll mention the areas that I've had actual experience with.

** Poor metallurgy in your chime rods, poor or inconsistent alloying, or change of heat settings in the melt from pour to pour.*

** Poor processing techniques such as temperature variances in the hardening or tempering processes; elevated temperatures in the grinding, drawing, or polishing operations.*

** Inconsistency in the drawing process; in the case of tubing, that will cause changes in surface hardness and nonuniformity of size which, in effect, will cause "dead spots."*

** A change in the sequential steps formerly used in the manufacture of tried and proven rods or a change*

somewhere along the line with regards to your vendor or the material he procures or the processes he employs.

** As for wood, improper kiln drying can cause problems as well as can fungicide treatment of wood which could introduce foreign material to the microscopic structure of the wood.*

** Different species of wood can look identical but be quite different in composition.*

** Improper anchorage of soundboards or related components, either too loose or too tight, can cause a change in dynamics and thusly affect resonance.*

** Inconsistent sizing of the wood, as to dimensions, can affect resonance, and such can be clearly shown in examples of violins that are not uniform in their soundboards or in misplacement of their soundpegs.*

There are many other variables to consider, but as I don't have intimate knowledge of your processes of manufacture, I cannot comment thereon. Both wood and metal are in different, and sometimes similar, worlds. Wood has grain considerations, as to cutting, and, believe it or not, the same case sometimes exists in metals.

There may be variables I have not mentioned, but I wanted to attempt to shed some light upon those areas with which I have become familiar over the years by actual experience.

I hope that I may have been even slightly helpful or may have pointed you in the right direction. I have been somewhat broadbased, but you'll have to start at the end and work one step at a time, all the way to the beginning unless you're lucky. Possibly you may be changing vendors, but I hope that's a last resort.

C. ITEMS STILL NEEDED

ADVANCE WATCH FROM HONG KONG

Jim Stanley, Fort Wayne, IN, observes that most are aware of the Advance Watch which is marketed out of Southfield, MI; however, he is seeking a Hong Kong watch with the name Advance on its dial and case. There seems to be no relationship between the MI Advance and the Hong Kong Advance watches. Mr. Stanley is seeking the name of the distributor of the Hong Kong variety so he can purchase spare parts and bracelet parts.

VIBROGRAF VIBROSONIC A800 SCHEMATIC

Ashley Womble, Marietta, GA, is seeking a schematic for a Vibrograf Vibrosonic A800. We will return your copy to you if you will send it for copying.

SEAUBIN CLOCK

Simon Allalunis, Pittsburgh, PA, is seeking information on a Swiss-made Seaubin clock. Can anyone name the distributor or service agent in the United States?

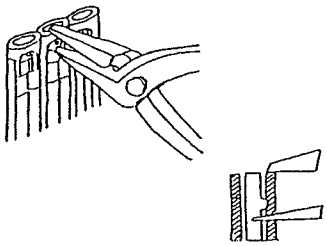
LONGINES 1268Z CHRONOGRAPH

Elmer Tazuma, Seattle, WA, is seeking spare parts information and hopefully a service bulletin for a Longines 1268Z Chronograph. Longines in New Rochelle, NY is unable to supply.

(Please turn to the next page)

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(Continued from the previous page)

NO-KEY BATTERY CLOCK

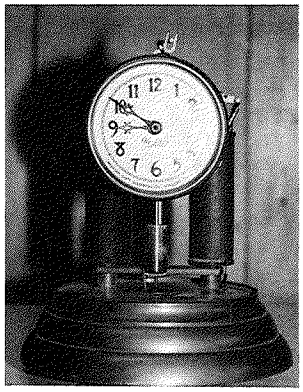
Raymond Novak, Muskego, WI, sends these three photos of a clock he has. It was manufactured or marketed by Mountain State Electrical Co., Wheeling, WV. Novak seeks the answers to these questions:

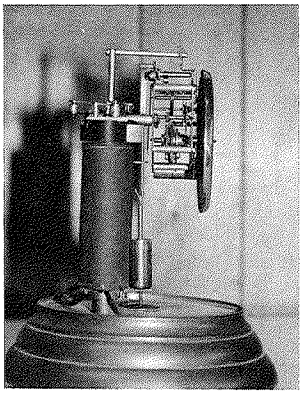
What voltage is needed to operate the electromagnet?

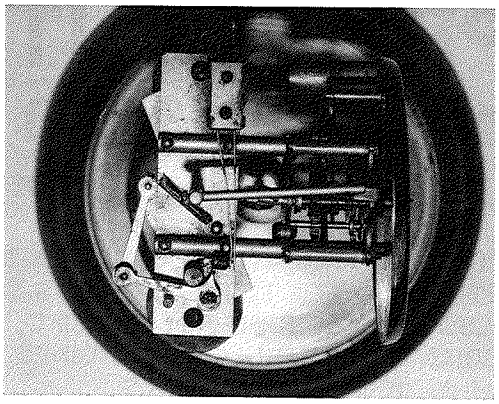
How are the points set to energize the magnets?

How does the electromagnet system wind the clock?

Is there anything special to look for in servicing the clock?







Do you have information regarding this month's requests?

Do you need information about one of this month's responses?

If so, send a self-addressed, stamped business-size envelope and your request to: "Bulletin Board," c/o AWI Central, 3700 Harrison Avenue, Cincinnati, OH 45211.

❑

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ALL BOOKS SHIPPED POSTPAID.

We Salute These New Members

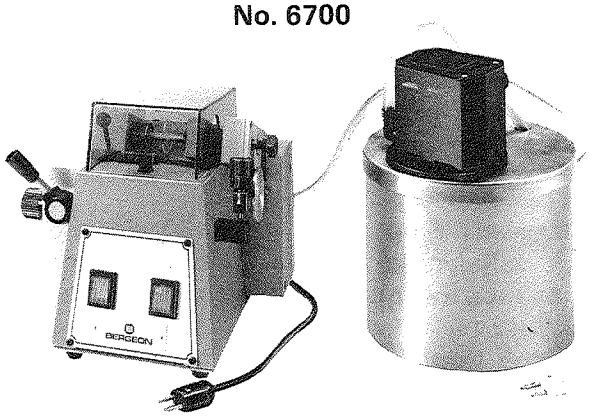
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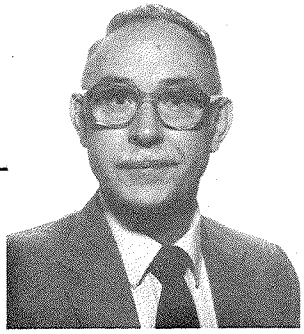
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ROCK QUARRY et tu



HOW VALUABLE ARE YOU?

PART I

Fred S. Burckhardt

WHAT ARE YOU WORTH?

In this case we are not going to be talking about the monetary value of a person. Rather, we will be discussing the inner quality or worth of a person that renders him or her useful, desirable, and valuable.

If you think about it for a minute, you will realize that a person may possess these traits but may not be worth much in a monetary sense. On the other hand, a person can be a millionaire, but as a person may not be worth very much.

Let's think for a moment about the type of person you are and how valuable, desirable, and useful you are when viewed through the eyes of others.

HOW MUCH ARE YOU WORTH TO YOUR EMPLOYER?

One of the first jobs I had as a watchmaker was in a large shop where I sat next to an older fellow who had been with the company for many years. In this particular shop, if you were a 'new' person, you didn't ask a lot of questions except if they pertained to the repair of watches. I noticed that every so often the fellow next to me would write something down on a small notepad. For a long time I was tempted to ask what he was writing but waited until we became better acquainted. Finally I asked. He told me he kept a record of each job he turned out. When the amount of his finished work matched the amount of money he was getting paid, he would almost come to a screeching halt. I asked him why he did this. His answer was that he hasn't gotten a raise in years, so why should he do more than was necessary? He couldn't understand that his employer had to make a profit on his work. In fact, his employer was losing money having him as an employee because of the additional benefits being given to him. You see, he could never understand the reason for never getting a raise.

For some reason, there are many who feel the same way as this fellow. They think because they do the work, they should make all the money. Sorry, it doesn't work that way. If you aren't happy working for someone else, go into business for yourself. Here again, several trade watchmakers have made mention they didn't think what their accounts charged for retail was fair. First of all, if you are doing trade work, it's none of your business how much your accounts charge their customers. Worry only about what you are getting paid. If your price structure is right, you should be making a good living.

One time at a store meeting the employees were asked if there was a particular subject they would like covered at the next meeting. A woman employee who had been in the business over 20 years, popped up and said, "I'd like to learn more about colored stones." Now you may be thinking this was rather commendable for her to display her eagerness to learn. The truth was, not more than three feet from her desk was a display of booklets covering all of the most popular gemstones. The store received not less than six trade magazines each month and there were GIA and AGS books available to those who wanted them. Not once did she ever look at the brochures, read the magazines, or take any of the books home to read. Yet she wanted to learn more about colored stones--that is, as long as she didn't have to go to any bother to learn. Like many others, she wanted to learn by osmosis where she could absorb all knowledge through her skin and not have to go to any trouble to do so.

One employer offered to pay his watchmaker's expenses to attend bench courses and seminars but the watchmaker always had an excuse for not going. The answer was always the same: "I'd like to, but..." You see, he just couldn't get off his BUT! This is a big problem with many people. Is this why many employers feel the repair department is nothing more than a necessary evil? Why isn't the department showing a profit? Is there not enough work? Is the pricing not correct? Is it that the people in the department aren't producing?

What about you? Do you do just enough to get by, or do you put a little extra effort into your job? Do you do the little extra things that are sometimes needed without having to be asked? That little extra

could be all you need. It's like a pot of water. If the water boils, it's still nothing more than hot water. But just a fraction of a degree more, and it turns into one of the most powerful forces on earth--steam!

Elbert Hubbard, a prominent businessman, says, "The world bestows its big prizes, both in money and honors, for but one thing, and that is initiative. And what is initiative? I'll tell you, it's doing the right thing without being told."

If all you want is 144 square inches and do the least amount you possible can, fine. But don't complain if you are paid accordingly. Remember: How useful, valuable, and desirable are you to your employer?

HOW MUCH ARE YOU WORTH TO YOUR FAMILY?

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

One time when I was president of the local guild, a watchmaker came into my shop and started to complain that he wasn't making enough money to take proper care of his family. He went on for a long time telling me about the long hours he had to work and all the extra things he had to do at the store. He kept repeating, "If I could find another job I sure would take it." I told him to talk to his boss and see if some changes could be made. Several days later I received a call from one of the stores. They were looking for a watchmaker to replace a fellow who was moving to another state. It was 40 hours a week and paid almost twice as much as what this fellow told me he was making. I called him right away and told him the name of the person to see.

Not hearing from him for almost a week, I called to see how he made out. He told me he decided to stay where he was. I questioned him about the hours and money offered in the new job, but he told me he would have to do some paperwork, and he didn't like that. To top it all off, he never did talk to his boss. So here he was right back where he was before.

So who was this fellow hurting? Himself? No, he was hurting his family. The opportunity was there to give them a little more, maybe better clothes, a better car, a little money in the bank, and maybe once in a while a nice restaurant instead of the "Golden Arches."

Are you able to do more for your family? Maybe give them some of the advantages you didn't have yourself? If you are able to do these things for them and you're not, how useful, valuable, and desirable are you to them?

We'll continue with Part II in next month's issue.

❑

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Current Trends

One of the most discouraging aspects of the shows during the past two years is the noticeable decrease in the quality of the watches and clocks offered for sale. One of the main reasons for this is the fact that many prices have dropped because of the current worldwide economic conditions. There are many dealers unwilling to sell their watches and clocks at the current market levels. Many dealers I spoke with during this last show feel it's not worth the risk of bringing expensive items to the shows when they probably won't sell under current conditions and prices. For watch dealers there is always the constant danger of being robbed. In fact, one of the dealers from Florida was robbed inside the Greater Cincinnati Airport after the show. The clock dealers have different reasons. Clocks are very heavy and expensive to transport along with chance of breakage during shipping, loading, and unloading. Many dealers feel it is better to wait for more favorable economic conditions and the prices will rise.

The auction houses seem to still be getting quality items at the present time. It takes approximately six months to sell an item through one of the auction houses. This was beneficial when the prices were increasing. Now we are in a downhill market, and many watches decrease in value during this time period. The following watches were auctioned by Southeby's in New York on February 11th of this year.

Figure 1 is a 14K yellow gold Rolex chronograph wristwatch with registers and tachometer. It is marked Rolex Oyster Cosmograph on the dial. The case reference number is 6263, made circa 1970. The high-quality screw-down chronograph buttons make this watch truly water resistant. It sold for $13,000.

Figure 2 is an 18K yellow gold "Helm" wristwatch made for Cartier by the European Watch and Clock Company, circa 1935. The movement is an 18J, adjusted to two positions and temperature. There is also the original Cartier deployment buckle accompanying this watch. It sold for $50,000.

Figure 3 is an extremely rare, cushioned, shaped Patek Philippe wristwatch, circa 1928. Beside the usual triple date on this calendar watch, it has the moonphase at the 12:00 position rather than at the bottom. The serial number is 198060. Figure 4 shows the movement and the caseback. This watch was accompanied by a certificate confirming the manufacture of the watch in 1926 and its subsequent sale in August of 1928. This watch sold for $280,000. The watch brought this high of a price because it was the first and only cushioned, shaped moonphase Patek wristwatch sold at auction.

Figure 5 is a platinum perpetual calendar watch with moonphase made especially for Henry Graves, Jr. by Patek Philippe & Co., circa 1945. There was also the following written in the catalog description: "Henry Graves,



Figure 1

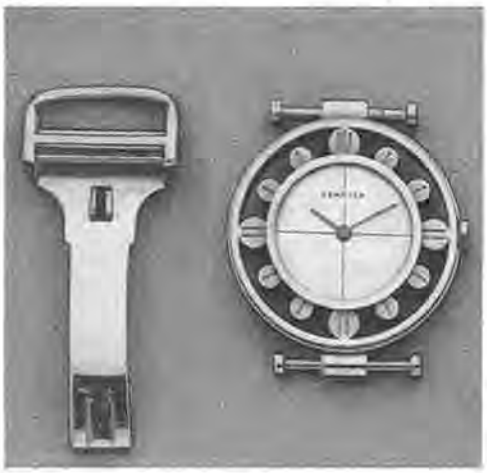


Figure 2



Figure 3



Figure 4



Figure 5



Figure 6

Jr. shares with J.W. Packard the distinction of being the greatest patrons of Patek Philippe in the 20th century, culminating in his request to the company for a watch more complicated than Packard's, sold April 6, 1927 for 12,815 SF." The result took five years to produce and was delivered to Henry Graves on January 19, 1933 for the price of 60,000 SF. This remained the most complicated watch made until the Calibre 89 in 1989. This watch sold for $67,100.

Figure 6 is a large 14K pink gold, single button split second chronograph wristwatch with a minute register by Longines, circa 1920. This watch was accompanied by a certificate from Longines confirming the manufacture of this watch as a split second wristwatch in 1920 and the fact that it was sold in this same year to their agent in New York. It sold for $13,000. The watch is very large, at 47 mm in diameter. I've seen other large watches that have been converted from hunting case pocket watches into large wristwatches. The fact that it is confirmed by the company to be an early wristwatch is what makes it so valuable.

Here are a few samples of some other prices during the last six months. Stainless steel Rolex bubble-back with refinished dials have been selling in the $700-$900 range. Plain thin round or square-shaped Patek Philippe wristwatches were being sold in the $1800-$2000 range at the shows recently. This is down considerably from the prices of four years ago. Platinum rectangular Pateks that were selling for $15,000 in 1989 are now fetching $7,000. Rectangular 18K gold designs that were bringing $7,500 are now selling for $4,500. Dealers are wondering if this is a good time to buy more of these watches, or if the prices will be going down a little more.

My last article (March '92 issue) discussed the rise of the Swatch watches. If I were writing that article today, it could be titled "The Rise and Fall of the Swatch Watches." There were so many Swatch chronographs and scuba watches at the Chapter 23 NAWCC Cincinnati show that they couldn't all be sold to the Europeans. One friend of mine came with $20,000 worth of chronographs, scuba, and moonphase Swatches. Fortunately, he found a buyer two days before the show opened up and was lucky to get his money back that he paid for them. I don't think this will affect the prices of the rarer models yet, but it has put a bad taste in a lot of dealers toward Swatch buying. This may be a temporary condition brought about by the lack of Europeans at this last show. It happened that the auction in Europe and the NAWCC show in Cincinnati fell on the same weekend. Perhaps if the bigger dealers from Europe had come, then the price of these watches would not have fallen. ❑

CORRECTION --On page 33 of last month's issue, the Watch Battery Analyzer from Redco Supply was featured for $149.95. **The correct price is $49.95, no battery purchase necessary.**



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BULOVA WRISTWATCH
Model 10AK
10-1/2 Lignes, 15 Jewels

The Ordnance nomenclature for this timepiece was: Watch, Wrist, Bulova, 15 jewels, Model 10AK. Although this model was Swiss in design, it was manufactured in the United States (Figures 1 through 4).

This 10-1/2-ligne movement was fitted in a screw-back type waterproof case with an unbreakable crystal. It was sealed with a rubber gasket and a snap dust cover. The case back was secured with a decagon case wrench. The Ordnance Department serial number was preceded by the letters "OF" which appeared on the outside back of the case.

Three different styles of dials were fitted to this watch. One dial had a silver background with luminous hands and numerals while the other two dials had black backgrounds, one having luminous hands and numerals, while the other did not. The hands and numerals on the nonluminous dial were painted white.

The hour orbit of all three dials used large Arabic numerals 1 through 5 and 7 through 12 to indicate the hours. The minute divisions on the black dials had a small numeral at each 10-minute graduation while the silver dial had only a heavier black line mark. The white second hand on the black dial watches traversed over a small subsidiary dial with white line marks at each five-second increment. The figures 15, 30, 45, and 60 delineated the four cardinal points of the seconds' dial orbit. The second-dial orbit on the silver dial watches was divided into seconds, with 10-second divisions indicated by numerals. The manufacturer's name appeared on the black dial watches below the numeral 12, while the silver dial watches were not so marked.

The movement was fitted and secured to a case ring with two case screws. The snap dust cover protected the movement which was sealed with a rubber gasket. ❑

Figure 1. Bulova wristwatch, 15-jewel, 10-1/2-ligne size, front and back.

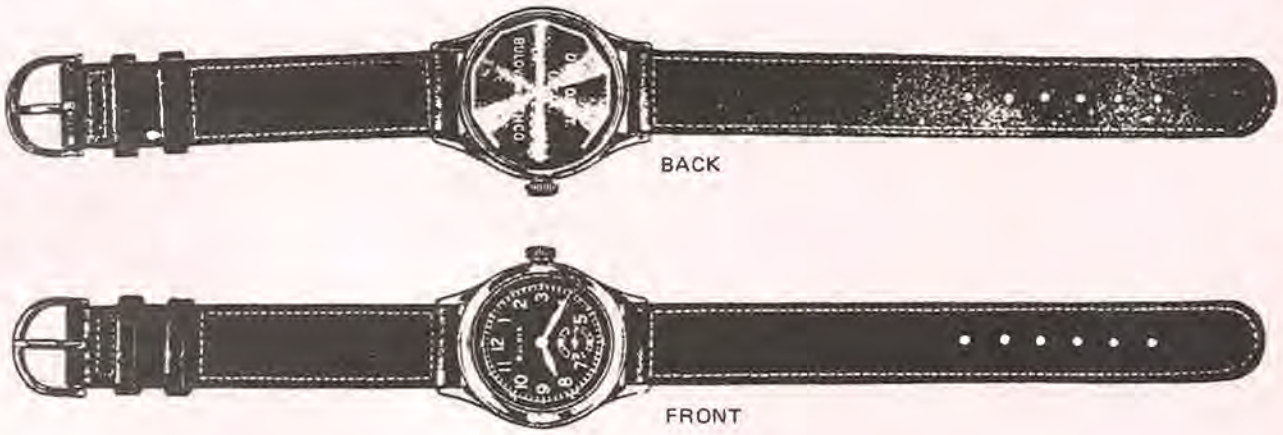




Figure 2. Bulova Model 10AK, 15-jewel, 10-1/2-ligne wristwatch. Ordnance, nonhacking, black dial with luminous hands and marking. Eccentric second hand, stainless steel screwback waterproof case, No. OF440293 (Dr. G.W. Huckaba, Memphis, TN).



Figure 3. Bulova Model 10AK, 10-1/2 lignes, 15 jewels. Silver dial with luminous hands and numerals. Movement fitted in a water-resistant screwback case with snap-on dust cover. Non-hacking. Back of case engraved: ORD DEPT, USA, OF-00236, Bulova Watch Co.



Figure 4. These three photos show Bulova's Model 10AKCSH, 16-jewel, 10-1/2-ligne, Type A-11 wristwatch with indirect drive sweep second mechanism and hacking device. Black with white hands and numerals. U.S. Army AAF (Dr. G.W. Huckaba, Memphis, TN).

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JEWELRY CRAFTING AND REPAIR
More About Solder and Its Application

In last month's article we discussed soldering, brazing, welding, flux, and pickle. This discussion was based on my own personal experience, as have been all previous articles. All the methods and procedures work well for me, but this doesn't mean that there aren't other methods of achieving the same results. Some could be better than the ways that I use, but I have always said that if something works well for you, use it and share it with your fellow craftsmen. This article will be a continuation, starting with what I consider the simplest and easiest solder to use and apply--soft solder.

SOFT SOLDERING

As a general rule, jewelers don't make repairs on costume jewelry (jewelry of lesser quality than gold-filled or sterling silver jewelry). Rhinestone (foil-back cut glass) jewelry, gold-plated, brass, nickle-silver pewter, and die cast metal with a low melting point are all considered costume jewelry. Many repairs can be made on this type of jewelry using soft (lead base) solder. Since soft solder melts and flows at a low temperature, many repairs can be made without removing or damaging stones, such as foil-back rhinestones. Even some better jewelry can be repaired with soft solder in installing pin stems, catches, or joints. Hinged bangle bracelets with a catch in the ends that open are usually sweat-soldered with soft solder. Since the solder is flowed inside the tube, it does not show; and if the catch needs to be removed by heating the end of the tube around the catch, it will slide out as soon as the outside metal gets hot enough to melt the solder. Some of these tubular bangle bracelets are good quality gold-filled, or even karat gold, although the ones made of costume jewelry are usually just gold-plated.

As heat is necessary in the application of soft solder, the most popular and practical heat applicators are the soldering iron, soldering gun torch, or electric soldering machine. Most tips that are used to apply the solder are copper instead of iron. This is because copper is a better conductor of heat than iron. Also, its end can be kept in shape easier due to its softer hardness for filing and cleaning. When clean and fluxed, it can easily be coated with solder. This is called tinning. When solder is applied to any surface it can be wiped with a damp cloth which will remove excess solder. This will leave a thin coat of solder covering the end of the iron or a surface that is to have solder applied to it.

The first soldering irons that I can remember had a steel rod with a wooden handle, and a cylinder or hexagonal piece of copper about three or four inches long with the end pointed, leaving four flat sides to the end. The diameter of the copper cylinder could vary from one inch, depending on how heavy it needed to be to retain enough heat to apply the solder to the work. These irons were heated usually with a gasoline blow torch made to apply the blue flame directly to the copper end. They could also be heated in a bed of coals from a wood or coal stove. When electricity became plentiful, electric soldering irons were developed. They were thermostatically controlled to produce the correct temperature to flow solder continuously without having to wait from time to time for the iron to heat. Electric soldering irons did not have to be so big and heavy because the heat was constant. They did not need the heavy copper to retain heat long enough to be transferred to the object being soldered.

Next are the soldering guns which can be gripped like a pistol. The electric is controlled with the trigger; the solder tip is much smaller. The latest is a battery-operated small soldering iron suitable for very light soldering--even circuit connections on electric watch circuit boards. For small solder jobs, enough solder can be built up on the tinned end of the soldering iron to carry over to the work.

To solder a small hole in metal that can be soldered, make sure the surrounding surface is clean, then flux with the zinc chloride flux solution using a small flux brush. With the iron or gun (hot) and a little solder built up on the end, hold the heated solder on the metal over the hole. As the heat transfers from the tip through the solder to the metal surrounding the hole, it will flow over the hole. When this happens, remove the tip and let cool. This will usually make the hole air- or water-tight. Catches, pin backs, pin stem joints, tie tack backs, pierced earring posts, and many other findings are available for soft soldering. They have a small round plate made on the end that is slightly convex and is meant to be sweat-soldered to the piece it is intended for. The convex round plate can be fluxed, heated, and a little solder flowed into the convex, making it full of solder. The place it is to be applied to can be fluxed and a spot of solder applied with the point of the soldering iron or gun. The finding to be attached can be held in place with tweezers, then heat applied with the soldering gun or iron until the solder flows, letting it settle tightly on the piece it is being attached to. Soft solder can also be applied with a small torch. It works even better in many cases for soldering on findings.

Although most good jewelry charms are sterling silver or gold-filled, there are some charms that are die

cast of pewter or a similar lead base metal, then plated with yellow or white metal. Sometimes they are brought in to be attached to the bracelet with jump rings, and the jump rings soldered. Even using soft solder to solder these jump rings sometimes causes the cast ring on the end of the charm to melt. These can be repaired with soft solder, a jump ring, and soldering gun. The jump ring can be soldered to the charm with enough of a buildup of solder to look like it did originally. If the charm is plated with a yellow color, a little gold fingernail lacquer or gold paint can be applied with a small brush, and the repair will hardly be noticeable. Although whenever the charms and bracelet are gold-filled, sterling silver, or karat gold, I always hard solder them using karat gold or silver solder (depending on whether they are yellow or white gold, or gold-filled or silver). A lot of costume jewelry costs less when bought than the cost to repair it, but some people are willing to pay that price. The cost of the repair should be discussed with the customer, and if you both agree, then the repair should be made. This is of course if you feel that you can make a repair that would be durable and also look good to the satisfaction of the customer. If you don't feel that you can do this, it's best to turn down the job.

HARD SOLDERING

Gold, silver soldering, and brazing are all hard soldering, and in most cases the metal to be soldered must be heated red-hot in order to flow the solder or bonding metal. Soft soldering many findings that are made for it has its place, but in most fine karat gold or sterling silver jewelry it's better to hard solder the findings. This is because when polished out they will look like it is cast on the piece to which it is soldered. A good example of this is soldering posts on pierced earrings, which should be at least 14K yellow or white gold and attached with 14K solder. Post findings that have the small cup on the end are for soft soldering. If it is hard soldered to the post and heated red-hot to hard solder it to the earring, it may melt this solder joint and then the post might slip out of alignment. I usually make my own posts from .8 mm diameter gold wire. It can be cut to length, chucked in the flex-shaft tool, the end rounded, and then the groove cut with a small round (rat-tail) needle file. This will let the clutch back seat and hold tightly.

When hard soldering, the metal that you are soldering to must have a higher melting point than the solder you are using. When soldering tie tack posts or pierced ear posts, keep in mind making a neat solder joint, and usually no filing will be necessary before polishing. Flux the post on the end where it is to be soldered to the tack or earring. Flux a piece of hard solder, touch it to the end of the post while heating. A dome will form on the post end. With a piece of pegwood, apply a slight amount of flux to the tack or earring, and heat until it sizzles. When the end of the post is held in place by hand or with the third hand tool, and enough heat is applied to melt and flow the solder, it will leave a slight radius around the post, making it strong enough that the post can be straightened with no danger of it breaking off in the solder joint.

There are so many formulas for hard solder that it would be impossible to list all of them. However, for general jewelry crafting and repair, 14K yellow and white easy-flow solder will meet most of the gold solder needs. Hard-flow and welding solder can be used to an advantage in some work where other solder joints are to be made close to the earlier ones. This also will prevent solder joints coming unsoldered later if repairs need be made close to the earlier solder joints.

For most silver solder repairs, easy-flow silver solder is usually adequate. A strange result that I cannot explain is this: in silver soldering brass (a yellow metal) and silver solder (a white metal), the solder joint evidently turns yellow. This is because after it is polished out, it is difficult (if not impossible) to find the place where it was soldered. As the hard solder joints that were previously mentioned were on small objects and required a small amount of heat, these could be made with a small torch and small tips. But with hard soldering on larger objects sometimes the little torch with oxygen and acetyline will not produce enough heat, even with the largest tip. I have a hoke torch on my bench for such occasions. This hoke torch uses propane and oxygen, but will produce enough heat to gold solder very large gent's rings, or silver solder heavy turquoise silver rings. Many of these large silver rings can be sized either larger or smaller without removing the turquoise stones by shielding them with wet tissue. Silver is such a good conductor of heat that it takes a lot of heat fast to make these silver solder joints--and it's quick enough that the heat doesn't dry out the tissue and then damage the stone(s). When the heat gets to the paper, it's close to the point of scorching; this is the time to remove the heat and find a source of greater heat, or remove the stone(s).

It seems that retail jewelers are mostly limited to ring sizing and the most basic of jewelry repairs. Some jewelers even send out their ring sizing to a trade shop. Very few will even consider repairing costume jewelry, but people will pay to have it repaired, and if you're able to accommodate them by making these repairs they will also bring their fine jewelry to you for repair or service. To me, repairing costume jewelry presents a challenge. If I can make money by accepting a challenge, I can also get a lot of satisfaction from it.

In next month's article the discussion will be on solder and problems arising from it, and the possible solutions to these problems. ❑

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How to Start and Manage a Business

Part IX
Stocking Jewelry Inventory

In writing an article for any trade magazine (such as ours), it is always a real concern that the material therein is really helping enough of our members to be worthwhile. I was recently reassured that it had this interest after receiving phone calls from several members. With this explanation, let's continue with stocking jewelry inventory.

Normally we think of our business as being divided into four general classifications: watches, diamonds, rings, and jewelry. Watches (and clocks if we carry them) and watch bands would all fit into this general classification. Diamonds would include our complete diamond department, i.e. diamond engagement rings, wedding rings, diamond mountings, diamond earrings, loose diamonds, and other diamond items. Rings would include stone set rings, family rings, Black Hills Gold Jewelry, and pearls. Jewelry would include all other items.

DIAMOND DEPARTMENT

We have previously spoken about watches and bands, so we will continue on to our diamond department. If we decide to stock diamonds, we must first carefully select our stock from pre-determined companies whose salesman can and will help us with our purchases.

If we happen to be a graduate gemologist, have some other qualification, or are just very interested in gems, we may prefer to carry very well cut diamonds. "Ideal" cut diamonds are available from very few sources and they are more costly than the "run-of-the-mill" diamonds commonly sold. The bad news is they cost more because some of the diamond is ground away to cut it "ideal." This results in a smaller finished gem at a higher price per carat. The good news is the fact that if we sell these we have less competition because fewer stores will have these fine diamonds. Next we must decide if we are going to carry both loose diamonds and mounted diamonds. If we are (or have) a diamond setter, we may choose to sell mostly loose diamonds and set them up at the point of sale. This has the real value of having a variety of mountings or semi-mountings in stock which will match the smaller number of diamonds.

Purchasing diamonds can eat up our available inventory dollars very fast, so we must get the most for our money. On the other hand, we need to repair many watches or clocks to make as much money as we do on one nice diamond sale. Figure 1 shows a "Suggested Inventory System" which we may choose to use after modifying.

At this point in this article I was tempted to leave this chart blank since I have no idea of the available capital someone else might have, but I decided to live dangerously and fill in the blanks. The figures may be a little too conservative (maybe not), depending on the relationship one is able to establish with a supplier.

Most diamond suppliers have a "memo" service which allows us to receive a certain amount of goods for a short time. This allows us to show this merchandise to our customer before obligating us to buy. A good diamond ring catalog with retail prices may also help us. If our customers choose one, two, or even three rings, we may be able to receive these on "memo" to show and close a nice sale without a huge stock. Of course, a reasonable stock is necessary to entice our customer to allow us to get this special memo in to show them.

Remember, the chart (Figure 1) shows resale prices. It is necessary to think in these terms when we are filling out this chart. We must think from the customers' side of the counter. Notice, we have listed only two diamond ring sets at $150.00 and wedding rings at $50.00. Not too many sales are made under this price anymore, at least not in our area.

RING DEPARTMENT

The ring department shown on this chart includes stone set rings, not diamond rings. This may include onyx rings

FIGURE 1

DEPARTMENTS	SUGGESTED RESALE $ PRICE RANGES TO STOCK Numbers shown in each column indicate a suggested quanity to stock.							
	to $20	$50	$100	$150	$200	$250	$500	$1000+
DIAMOND DEPT.								
Diamond Ring Sets				2	8	10	5	3
Wedding Rings		6	6	4	2	2		
Diamond Dinner Rings					2	2	2	
Diamond Earrings		1	1	2	2	2	1	1
Loose Diamonds	5	10	5	3	3	3	2	2
RING DEPT.								
Stone Set Rings (Not diamond or family rings)		12	6	1	1			
Family Rings (Includes mothers' & daughters' rings)				1	1			
Black Hills Gold Jewelry (Includes rings, pendants, earrings, etc.)		8	4	2	1			
Pearls (Includes rings, necklaces, earrings, etc.)		2	6	1	1	1	1	1
JEWELRY								
Crosses and Lockets	1	6	1	1				
Charms	80							
Chains	60	4	2	1	1			
Ident. Bracelets	20							
Miscellaneous (Trophies, etc.)	2							

and also single stone set birthstone rings. Family rings include mothers' rings, daughters' rings, and other types of family rings. Some companies have displays available with brass samples to show customers. These rings are available in 10 or 14 karat, and with synthetic and/or genuine gems. They also come with the proper number of stones and the correct finger size. Black Hills Gold Jewelry is another possible place to put some of our dollars. Some areas are better than others, so a little research is needed. Pearls in rings, necklaces, earrings, etc. are always in season. A certain number of sales are always made if we can maintain a reasonable stock.

JEWELRY DEPARTMENT

The classification of jewelry includes all other items that we intend to carry in our stock. This includes crosses, lockets, chains, identification bracelets, etc. Notice that we have included a large number of charms and chains; these are both very good items. We also sell a large number of idents, including the Medilog® bracelet. These have a good turnover since we work with a reasonably small number of styles and just keep reordering.

Turnover is one of the real secrets of success. If we can buy a reasonable stock (and not lose sales by stocking this small number) and simply continue to reorder often, we will be successful. We will talk more about this later.

Look at Figure 1 again and write your own figures in. Then add it up and increase or decrease according to your desires and available capital. Good Luck! ❑

KEY TEST FOR QUARTZ WATCHES

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

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

CLOCKS Inside & Out!

Gerald G. Jaeger
CMW, CMEW, FAWI

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PART I

Repairing the Jaeger-LeCoultre Atmos Clock

Caliber 540

Repairing the Atmos is always a pleasing exercise of one's mechanical prowess. To attempt the Atmos and expect to repair it properly without the aid of a knowledgeable horologist on your first venture is a long and pitfall-laden adventure. The Jaeger-LeCoultre "Repair Notes" for Caliber No. 526 or 528 is an extremely well-written piece of technical material. However, it is very confusing and difficult to glean from it what it offers unless you have considerable knowledge into the workings of this fine timepiece.

This article and the following articles are primarily intended for those with experience with earlier calibers. The Caliber 540 is just different enough to present some problems. The most striking differences are the mounting of the motor and the chain pulley arrangement. All cap jewels are eliminated and the mainspring system has been modified considerably. The two mainspring concept employed in the earlier models was, to me, the finest scheme for delivery of constant power ever devised in spring-driven watches of an automatic or constant wind nature.

Probably the most striking procedural variation is the oiling of the escape wheel or the pallet jewels. Lightly oiling three teeth of the escape wheel is sufficient.

In order to properly follow the procedures I have detailed, you will have to obtain the Jaeger-LeCoultre "Repair Notes" for their Caliber No. 528. It is available at no charge to members from AWI Central. (Please enclose a mailing label.) Throughout the text, spare parts for Caliber 540 will be pictured (not actual size) as an aid to technical clarity. It, too, is available from AWI Central.

The special tools needed on previous calibers are not all needed on the Caliber 540. Please refer to the Repair Notes (Cal. 528) in Figure 1. You will need tools #1, 2, 4, 9, 11, and a movement holder or platform. You will also need a few easily fabricated stakes and punches.

We have previously discussed lubrication of the escapement. Jaeger-LeCoultre recommends Moebius 9415. In any horological application the oil recommended by a manufacturer does not always work the best for you. In all cases, the lubrication must be compatible with the solutions and chemicals you use in cleaning and rinsing. If you use a good quality synthetic oil which has, over the long term, been satisfactory, I would use that oil. I say this assuming the oil is fresh, the movement has been properly cleaned and rinsed, and the viscosity is correct for this type of job. The mainspring in Caliber 540 is more akin to a watch mainspring, so either a watch mainspring oil or a light clock oil would be appropriate. Jaeger-LeCoultre recommends Moebius 8141. The mainspring and mainspring arbor pivots and barrel bearing surfaces must be lubricated.

TOOLS FOR THE REPAIRER

Fig. 1



I Tube for threading the suspension wire through the upper bridge when assembling the balance.

II Tool for passing the chain through the 52 mm coil spring.

III Tool for threading the suspension wire through the balance stem.

IV Tool for removing the minute hand.

V Key for undoing the motor knobs.

VI Key for undoing the cylindrical balance securing nut.

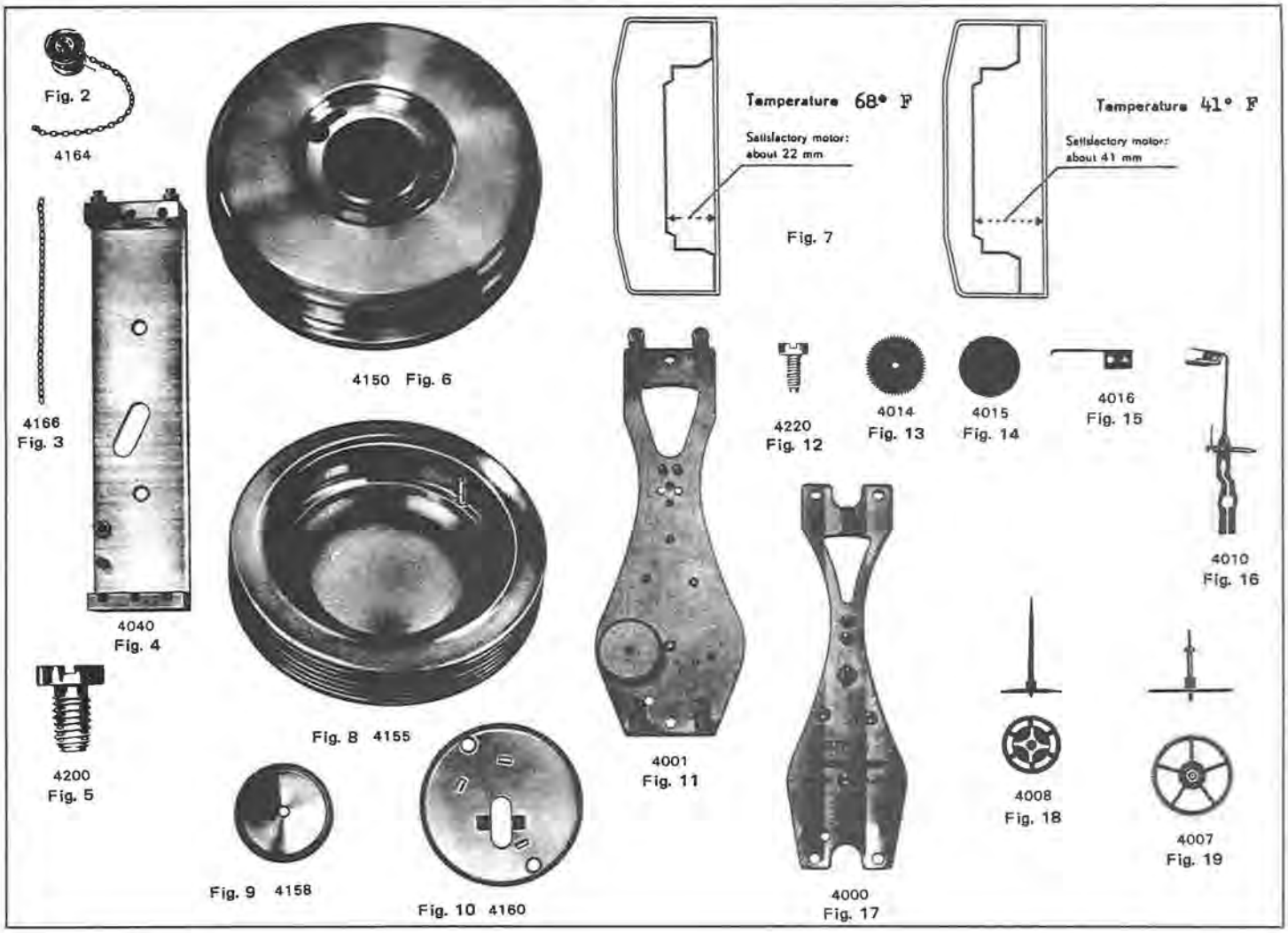
VII Stand for clock movement.

VIII Ring support for balance during assembly.

IX Tool for correcting balance poise.

X Tool for restraining notched regulator collar during resetting of index to zero.

XI Tool for holding balance stem in vice.



The stem for the assembled carrier pulley (Figure 2, Cal. 540, #4164) must also be lubricated. It is the pulley to which the chain (Figure 3, Cal. 540, #4166) is attached. The stem is the post on the movement frame (Figure 4, Cal. 540, #4040) which acts as the arbor for the chain pulley.

Removing the Movement From the Case

Lock up the balance of the Atmos and lay the clock on its backside. Remove the glass door and the two movement fixing screws (Figure 5, Cal. 540, #4200). Remove the rubber knob from the fixing foot (Cal. 540, #4366--not pictured). Unscrew the fixing foot, and remove the movement from the case.

Removing the Metal Drum

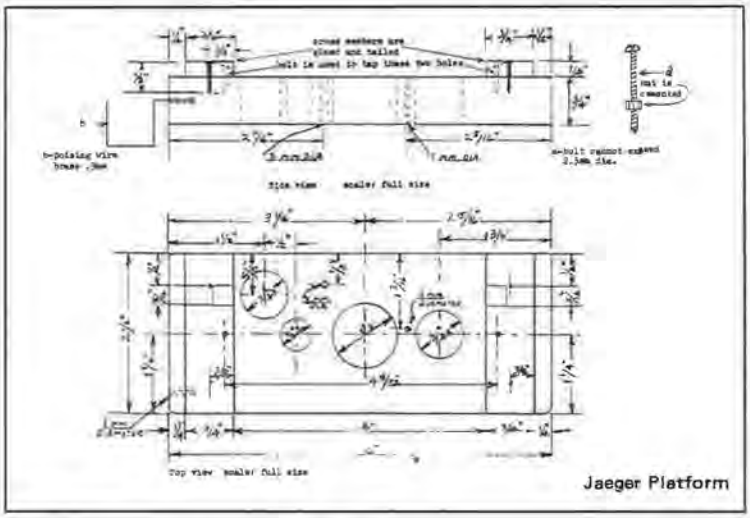
The metal drum (Figure 6, Cal. 540, #4150) is released from the frame of the clock by grasping it at the back and exerting a firm pressure toward the frame of the clock while applying a twisting motion in a counterclockwise direction. It is a bayonet-type fixing method, and requires about a 15° turn.

Observe Figure 7. Measure the distance from the top of the bellow (Figure 8, Cal. 540, #4155) to the top of the drum. It should be approximately 23 mm at room temperature and 40 mm when chilled. If the bellow meets these specifications it will not be necessary to remove it from the drum. If not, it will be necessary to replace the bellow.

Replacing the Bellow

To open the metal drum, it must be thoroughly chilled, and removal of the bellow must be done quickly. Grasp the drum with both hands and compress the two halves of the drum as much as possible. Exert a counterclockwise pressure on the back of the drum. It should turn about 15°. If it does not open, turn the back portion 2° or 3° in a clockwise direction, as you have probably turned it too far and the dogs have relocked. This is a design flaw and should have been corrected. It is bayonet-type connection and holds well, but can be stubborn.

Observe the back spring and the spring guide (Figure 9, Cal. 540, #4158). If it sags, hold it perpendicular to the frame, and measure. The spring guide should measure 45 to 48 mm from the lid for motor fixing (Figure 10, Cal. 540, #4160). This part is the bridge which holds the pulley and is attached to the frame. If the spring guide measures within this perimeter, count the unattached links which hang loose from it. This is the same number of links which should hang when you reassemble.



Jaeger Platform

Removing Gear Train

The gear train consists of the pillar plate or mainplate (Figure 11, Cal. 540, #4001), the front plate, the barrel, the wheels and fork, and is fully assembled. You will not have to let the mainspring power down prior to removal of the gear train. To remove the gear train, loosen the two screws for the mainplate (Figure 12, Cal. 540, #4220). They will be found at the extreme top and bottom of the gear train and fix the pillar plate and assembled gear train to the frame. The front plate is relieved at both top and bottom permitting easy access to the screws. Use a well-fitting screwdriver with a large enough blade and handle to loosen these two very snug screws. Exercise care so as not to lose the two locking washers used to keep the screws secure. **CAUTION: Be sure to compress the back spring and spring guide when removing the gear train. Failure to compress the spring can result in damage to the three-fingered click which is peened to the chain pulley.**

When the gear train is removed, let down the power of the mainspring by limiting the rundown of the winding wheel (Figure 13, Cal. 540, #4014) or lower ratchet wheel (Figure 14, Cal. 540, #4015) with your thumb while disengaging the lower ratchet wheel spring (Figure 15, Cal. 540, #4016) from the ratchet wheel. Use a piece of pegwood to disengage the spring from the wheel, being careful not to separate the spring so far as to stress the spring.

Disassembly of the Gear Train

Using a suitable gear train holder, lay the gear train complete on it with the mainplate (Figure 11, Cal. 540, #4001) down on the holder, and fix it to the holder. The Jaeger Platform accommodates the gear train complete properly. [Please refer to the footnote. Throughout this article, we will refer to the Jaeger Platform as the platform*. The (*) will indicate this platform, but you may use any platform or holder which properly supports the components of this fine clock.] Use caution that the fork horns and guard finger of the pallet fork and arbor (Figure 16, Cal. 540, #4010) and lower ratchet wheel (Figure 14, Cal. 540, #4015) have ample clearance. Remove the four screws which fix the 3/4 Platine (Figure 17, Cal. 540, #4000). Raise the 3/4 Platine just enough to provide clearance for the wheel pivots. Carefully remove the fork, the escape wheel, the first wheel, the barrel, and the arbor. Lift the 3/4 Platine from the mainplate. The center wheel (Figure 18, Cal. 540, #4008) will continue to lie in the pillar plate, and the second wheel (Figure 19, Cal. 540, #4007) will stay affixed to the 3/4 Platine. Remove the center wheel.

The gear train complete is now disassembled. The lower ratchet wheel (Figure 14) will remain attached to the mainplate. The lower ratchet wheel arbor passes through the mainplate, and the winding wheel (Figure 13) is staked onto the ratchet wheel arbor. To separate the two wheels provide a proper support* and drive the ratchet wheel arbor out of the winding wheel. You will note the lower ratchet wheel arbor is relieved on two sides where it enters the winding wheel. Use the proper sized stake so as not to distort the winding wheel hole.

The second wheel (Figure 19) is attached to the 3/4 Platine (the upper bridge). It is held secure as the minute wheel (Figure 11) is held to the second wheel arbor. Provide a proper platform* and drive the second wheel arbor out of the minute wheel. Care must be exercised that the working portion of the stake is cylindrical and its diameter does not exceed the size of the minute wheel hole.

The hour wheel is still attached to the 3/4 Platine. Provide a proper platform*, and from the backside of the 3/4 Platine drive the center wheel bushing (Cal. 540, #4013, not pictured) out of the center post which is frictioned to the front plate, and provides the arbor for the center wheel.

The center wheel bushing provides two functions. It is the front bearing of the center wheel and secures the hour wheel to the 3/4 Platine bridge. Care must be exercised to use a punch that fits into the center post. If too small a punch is used, the minute wheel bushing will be damaged; if too large a punch is used, the center post will be loosened from the 3/4 Platine. The gear train complete platform* will provide the proper support for hour and minute wheel removal.

Next month we will continue with mainspring removal, balance removal, and other aspects of the repair of the Atmos.

❑

Many thanks to Peter Bruno, Manager, Atmos Service and Parts Center USA, Inc. Mr. Bruno has been extremely helpful in all aspects of our AWI Atmos bench course. He has supplied me with much historical information regarding older calibers which we plan to make available to the membership in the future. For specific information on older calibers, Mr. Bruno can be reached at: ***145 Huguenot St., New Rochelle, NY 10802.***

*Jaeger Platform

WATCHES Inside & Out!



Robert D. Porter, CMW

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Once in a while a truly unique timepiece will cross our bench to make our day more interesting. A watch we American watchmakers don't see very often is pictured in Figures 1, 2, and 3. It is an investment grade A. Lange & Sohne; the work of the innovative watchmaker Augustus Adolph Ferdinand Lange, who obviously had his own ideas about how a watch should be made. Mr. Lange's perseverance in the face of difficult economic times is responsible for the establishment of a watch factory in Glashutte, near Dresden, Germany in the mid 1800s. You are invited to participate as this interesting watch is serviced.

A single edge razor blade is being used (carefully) in Figure 4 to remove the bezel. The second hand is being pulled in Figure 5. Figures 6 and 7 illustrate the use of a "pressure plate" made from 0.008" (0.2 mm) thick feeler gauge stock to spread the force exerted on the dial by the hand puller over a wider area (therefore, fewer pounds per square inch), thereby helping to reduce the risk of cracking the enamel dial. Please notice that the length of the plate is such that it is inside the double sunk part of the dial and does not bridge adjacent levels of the dial. These plates can be made of several different thicknesses of feeler gauge stock, using

Figure 1



Figure 2



Figure 3



Figure 4



Figure 5



Figure 6



the thickest plate that the clearance between the dial and hands will allow. Watch tissue is also used to help protect the dial.

The method used to hold the two dial feet in place makes use of new and old technology. The single dial screw is being backed out in Figure 8, and the tapered pin that holds the other dial foot in place is being levered out with a screwdriver in Figure 9.

Figures 10 and 11 are good views of the interesting mechanism under the dial. The means used to wind and set the watch is simple and unique. The winding pinion, clutch, setting lever, and spring are shown in the winding position in Figure 10. Moving the setting lever toward the crown shifts the clutch toward the intermediate setting wheel and allows the spring-loaded detent to lock the clutch in the setting position as shown in Figure 11. The detent piece is released, returning the clutch to the winding position by pushing in on

Figure 7



Figure 8



Figure 9



Figure 10

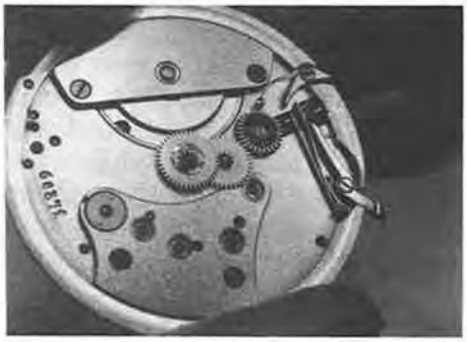


Figure 11

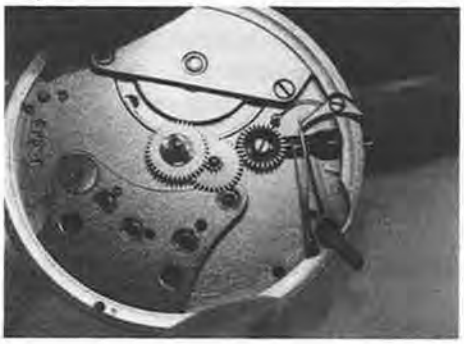


Figure 12



Figure 13



Figure 14



Figure 15



Figure 16



Figure 17



Figure 18



the crown when the watch is in the case.

The screws holding the hairspring stud and bridge are being backed out in Figures 12 and 13. The balance bridge is being lifted from the dial plate in Figure 14. Figures 15, 16, and 17 illustrate the unusual construction of the balance wheel. The two pairs of timing screws are prevented from backing out on their own by the spring action provided by slots in the balance through which the screws are fitted. Another unusual feature is that the impulse roller is integral with the balance arm as shown in Figure 17.

Figures 18 through 21 give good views of the location and removal of the pallet fork and escape wheel. Please notice (Figure 18) that the pallet fork has a banking pin affixed to the receiving arm of the pallet; its arc of motion is controlled by a hole in the lower plate. The single banking pin is clearly shown in Figure 20. The finish on the escape wheel and fork pictured in Figure 22 is a work of art. The escape wheel has the most perfect finish and work-

Figure 19



Figure 20



Figure 21



Figure 22



Figure 23



Figure 24



Figure 25



Figure 26



Figure 27



Figure 28



Figure 29



Figure 30

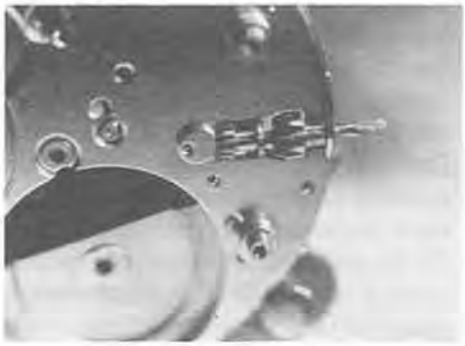


Figure 31



Figure 32



Figure 33



manship of any watch I have ever examined. I have read that Lange used concave and convex surfaces on the pallets to equalize the rate of lift of the impulse action. If so, it is so slight on this example as to be unnoticeable. The pallets are, however, curved from top to bottom, resulting in a line contact with the escape wheel teeth, thereby assuring oil retention on the line of contact by capillary action.

The quick release feature of the ratchet wheel is illustrated in Figures 23 and 24. A quarter turn of the ratchet screw will release the ratchet wheel from the barrel arbor.

Further disassembly views of the 43 mm movement are shown in Figures 25 through 32. A short bristled brush (Figure 33) coated with a mixture of penetrating oil and fine oilstone powder is being used in Figure 34 to remove rust from the plate through which the stem fits. The rust on the setting spring in Figure 35 is being removed (Figure 36) with a soft brass brush to which beeswax and steel polishing compound has been applied. The result is shown in Figure 37. Figure 38 illustrates the use of pegwood charged with the oil and oilstone mixture to polish the inside curve of the spring. It is important to thoroughly clean the penetrating oil mixture off the parts with alcohol before cleaning ultrasonically because the oil is not compatible with commercial cleaning solutions and comes out as a sticky residue on the parts. Oxidation on the setting spring screw is being polished out with a piece of steel polishing compound in Figure 39. 50,000 mesh diamond compound (from a "rock hound" lapidary supply store) is being used in Figure 40 to restore the finish on a case screw. A small dab of diamond compound is applied to a clean piece of paper (such as a 3" x 5" index card) backed up by a very flat surface (plate glass). The screw head is held firmly against the compound with tweezers and moved back and forth until the desired finish is achieved.

Figure 34



Figure 35



Figure 36



Figure 37



Figure 38



Figures 41 through 44 are views of the movement components after ultrasonic cleaning and during assembly. The case screw being refinished in Figure 40 is shown in the lower center edge of the movement in Figure 45. The movement is back in its gold case and is running smoothly in Figure 46.

Figure 39



Figure 40



The train was counted during assembly, providing the following information:

$$\frac{\text{(C)80 x (3rd)75 x (4th)70 x (E)15 x 2}}{\text{(3P)10 x (4P)10 x (EP)7}}$$

$$= \frac{12{,}600{,}000}{700} =$$

18,000 vibrations per hour of the balance wheel

Where:
The number of teeth and leaves in each wheel is:

	Wheel	Pinion
Center	80	not considered
3rd	75	10
4th	70	10
Escape	15	7

Number of impulses to balance per tooth of escape wheel: 2.

The motion work was also counted. The 12 to 1 ratio is achieved as follows:

$$\text{Wheel / Pinion} \quad \frac{\text{hour 40 x minute 36}}{\text{cannon 12 x minute 10}}$$

$$= \frac{1{,}440}{120} = 12$$

Most references show only a dial and movement view of some of these world-class timepieces. We watchmakers are in the enviable position of being able to service the products and appreciate the thinking, craftsmanship, and contribution to horology of men like Augustus Adolph Ferdinand Lange & Sohne. ❑

Figure 41



Figure 42



Figure 43



Figure 44



Figure 45



Figure 46



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TWO FINNISH WATCHMAKERS proficient in quartz, high grade mechanical, and some clocks. Graduate of Finnish and Swiss (WOSTEP) Watchmaking Schools, seek employment in USA. Speak English. References and info furnished on request. Please contact Fax 038/ 30 35 89, Neuchatel, Switzerland.

WANTED TO BUY

Rolex tools, parts, dials, and movements. TOP PRICES PAID! Also Rolex reference books and other materials. Watches Etc., 5934 NW 39th, Oklahoma City, OK 73122; (405) 789-2824.

WANTED: Boxed marine chronometer. Frank Beberdick, 11222 St. Lawrence Ave., Chicago, IL 60628.

Pocket & Wristwatches Wanted Dead or Alive! American Waltham, Illinois, Howard, Keywinds, Gold, Early American, Chronometers, Repeaters, Patek Philippe, Vacheron, Unusual, Historical, Fusees. CALL TOLL FREE 1-800-23J-BUNN or Write: Maundy International, P.O. Box 13028-H, Overland Park, Kansas 66212.

Back issues of *Horological Times* before July '91. Keith Merchant, 15917 Goggs Ave., White Rock, B.C. V4B2P1, Canada.

We buy watchmakers tools, equipment, material, and related items as well as jewelers and clockmakers tools and watch collections, etc. Specialize in estate purchases. Call or write Tom Mister, Dashto Jewelers, 983 Providence Square Shopping Center, Virginia Beach, VA 23464; (804) 495-2471.

ATTENTION WATCHMAKERS! Small ad, higher prices! We need your vintage watches for our European customers. Top prices paid for Patek, Vacheron, Rolex, Cartier, Movado, chronographs, and others. Buying all brands, new old stock. Buying mint boxed comic characters. Buying preowned modern Rolex and Cartier. Buying ladies enamels. National Watch Exchange, 107 S. 8th St., Philadelphia, PA 19106. 1-800-8-WATCHES.

Seeking to buy complete set of watchmakers tools, equipment, parts, etc. Please contact: Peter-Dieter Baier, CMW, Phone & Fax (803) 842-9500.

HAMILTON ELECTRIC REPAIRMAN seeks parts! Movements, balances, etc. desperately needed. Want anything related to Hamilton Electrics. Rene Rondeau, 120 Harbor Drive, Corte Madera, CA 94925; (415) 924-6534.

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* Gold Filled & Gold Scrap Filings 10, 14, 18K, Buffing Waste, etc.
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INFORMATION NEEDED

RESEARCH PROJECT - *BANK CLOCKS*
McClintock-Loomis Co. or O.B. McClintock Co.



Needed - ORIGINAL+Present locations of these clocks. If you have seen one in area, please send a note to:
Lloyd Larish
P.O.box 751 / Faribault, MN 55021.
(Please include: Building location/City/State & A or B for type, or a small sketch.

Note: many clocks have copper & brass case w/stained glass dials & panels.

Thank you for your help

Dates to Remember

MAY 1992

5–Servicing ETA Quartz Chronographs Bench Course (AWI); James Broughton, instructor; Kansas City, MO.*

5–Servicing ETA Quartz Chronographs Bench Course (AWI); Remy Waelchli, instructor; Denver, CO.*

6–Servicing ETA Quartz Chronographs Bench Course (AWI); Remy Waelchli, instructor; Oklahoma City, OK.*

8-10–North Carolina Watchmaker's Association Annual Convention, Hampton Inn, Morehead City, NC.

9-10–Beginning Lathe Bench Course (AWI); James Lubic, instructor; Alexandria, VA.*

15-17–Advanced Lathe Bench Course (AWI); Roy Hovey, instructor; Alexandria, VA.*

16–Introduction to Quartz Watch Repair Bench Course (AWI); Buddy Carpenter, instructor; Hattiesburg, MS.*

16-17–Cuckoo Clock Repair Bench Course (AWI); James Williams, instructor; Portland, OR.*

16-17–Arizona Clockmakers & Watchmakers Guild Annual Convention; Las Campanas Quality Inn; Cottonwood, AZ. For more information contact Bob Macomber (602) 778-5720.

17–Useful Techniques: Mechanical Watch Repair Bench Course (AWI); James Adams, instructor; Norfolk, VA.*

17–Introduction to Quartz Watch Repair Bench Course (AWI); Buddy Carpenter, instructor; Mobile, AL.*

22-24–Texas Watchmakers Association Annual Convention, Wyndham Hotel at Southpark, Austin, TX. For information: Kim Naleski, 8103 Hillrise, Austin, TX 78759.

29-31–Advanced Clock Repair Bench Course (AWI); Roland Iverson, instructor; Seattle, WA.*

JUNE 1992

7–Useful Techniques: Mechanical Watch Repair (AWI); James Adams, instructor; Nashville, TN.*

13-14–Beginning Lathe Bench Course (AWI); James Lubic, instructor; New York, NY.*

14–Introduction to Quartz Watch Repair Bench Course (AWI); Buddy Carpenter, instructor; Boston, MA.*

19-21–Advanced Lathe Bench Course (AWI); Roy Hovey, instructor; New York, NY.*

19-21–Advanced Clock Repair Bench Course (AWI); Roland Iverson, instructor; Denver, CO.*

20-24–Complicated Watches Course (AWI); Antoine Simonin, instructor; Cincinnati, OH.* THIS COURSE IS FULL.

23-25–AWI Research & Education Council Annual Meeting, Commonwealth Hilton, I-75 & Turfway Road, Florence, KY. Contact AWI Central for more information.

26–AWI Affiliate Chapter Meeting, Commonwealth Hilton, I-75 & Turfway Road, Florence, KY. Contact AWI Central for more information.

27-28–AWI Annual Board of Directors Meeting, Commonwealth Hilton, I-75 & Turfway Road, Florence, KY. Contact AWI Central for more information.

JULY 1992

18-19–Cuckoo Clock Repair Bench Course (AWI); James Williams, instructor; Omaha, NE.*

SEPTEMBER 1992

19–Introduction to Quartz Watch Repair Bench Course (AWI); Buddy Carpenter, instructor; Tucson, AZ. (If advance registrations warrant, another class will be scheduled for September 20, 1992.)*

19–Servicing ETA Quartz Chronographs Bench Course (AWI); James Broughton, instructor; Tucson, AZ. (If advance registrations warrant, another class will be scheduled for September 20, 1992.)*

19-20–Cuckoo Clock Repair Bench Course (AWI); James Williams, instructor; Tucson, AZ.*

OCTOBER 1992

10-11–Repair of the Atmos Clock Bench Course (AWI); Gerald Jaeger, instructor; Seattle, WA.*

***For more information on AWI Bench Courses and Regional Seminars, contact AWI Central, P.O. Box 11011, 3700 Harrison Avenue, Cincinnati, OH 45211; (513) 661-3838; Fax (513) 661-3131.**

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AWI BENCH COURSES

Fiscal 1992

To register for these courses, please send along with your request a registration fee of **$25 per instruction day** (For AWI members) to:

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Cincinnati, OH 45211

PLEASE NOTE: Registrations are limited and will be selected by the earliest postmarks. You may register by fax if you wish; if so, please include your Visa or MasterCard number, card expiration date, and signature. **FAX: (513) 661-3131.**
For more information, call (513) 661-3838.

MAY 1992

5--Servicing ETA Quartz Chronographs--Kansas City, MO
5--Servicing ETA Quartz Chronographs--Denver, CO
6--Servicing ETA Quartz Chronographs--Oklahoma City, OK
9-10--Beginning Lathe--Alexandria, VA
15-17--Advanced Lathe--Alexandria, VA
16--Intro to Quartz Watch Repair--Hattiesburg, MS
16-17--Cuckoo Clock Repair--Portland, OR
17--Intro to Quartz Watch Repair--Mobile, AL
17--Useful Techniques: Mech'l Watch Repair--Norfolk, VA
29-31--Advanced Clock Repair--Seattle, WA

JUNE 1992

7--Useful Techniques: Mech'l Watch Repair--Nashville, TN
13-14--Beginning Lathe--New York, NY
14--Intro to Quartz Watch Repair--Boston, MA
19-21--Advanced Lathe--New York, NY
19-21--Advanced Clock Repair--Denver, CO
20-24--Complicated Watches--Cincinnati, OH

JULY 1992

18-19--Cuckoo Clock Repair--Omaha, NE

SEPTEMBER 1992

19*--Intro to Quartz Watch Repair--Tucson, AZ
19*--Servicing ETA Quartz Chronographs--Tucson, AZ
19-20--Cuckoo Clock Repair--Tucson, AZ
*If advance registrations warrant, another class will be scheduled on September 20.

OCTOBER 1992

10-11--Repair of the Atmos Clock--Seattle, WA

COURSES & INSTRUCTORS

Introduction to Quartz Watch Repair
Buddy Carpenter, CMC, CMEW
Advanced Quartz Watch Repair
Robert Bishop, CMEW
Introduction to Clock Repair
James Lubic
Advanced Clock Repair
Roland Iverson, CMC
Repair of the Atmos Clock
Gerald Jaeger, CMW, CMEW, FAWI
Useful Techniques: Mechanical Watch Repair
James Adams, CMW, FBHI
Beginning Lathe
James Lubic
Cuckoo Clock Repair
James Williams
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Remy Waelchli
Advanced Lathe
Roy Hovey
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