

SEPTEMBER 1995

HOROLOGICAL TIMES™



American Watchmakers-Clockmakers Institute

Ladies' Mesh Watch Bands to fit Seiko • Pulsar • Citizen & many other brands!



Sliding Clasps

Sliding clasps complete with top portions. Fits Lorus, Sharp and many others! Available in 6, 7, 8 & 15mm. Yellow & White.

\$3⁵⁰ each

Ladies Mesh Watch Bands

Now you can offer your customers a quality micron plated or stainless band at a reasonable price and keep the extra profit for yourself. Width at case is 9.8mm, width of fork end is 8mm, and width at clasp is 7mm.

\$8⁹⁵ Y **\$4⁹⁵** S/S

Need It Tomorrow? Call Us Today!

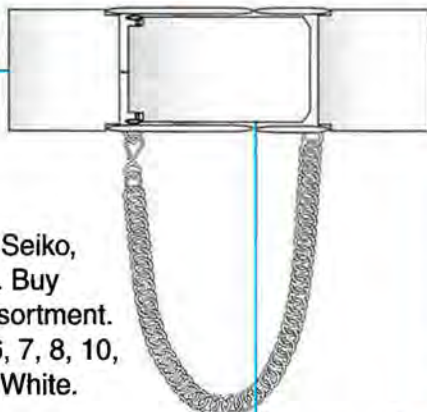
POPULAR Foldover Clasps

Our popular clasps fit Seiko, Pulsar & many others. Buy separately or in an assortment. Available in sizes: 5, 6, 7, 8, 10, 15 & 16mm. Yellow & White.

\$2⁹⁵ each

Clasp Assortment: contains 10 ea. Ladies' & 10 Mens' buckle spring bars; 12 ea. Y & W safety chains; 12 foldover clasps (1 each 5, 6, 7, 8, 10, & 15mm in Y&W) in a plastic compartment box.

A \$50.00 Value!
ONLY \$29⁹⁵



Center Catches

These handy catches fit many brands – and at this low price, you'll want to stock up now! Available Widths: 2, 3, 4, 5 & 6mm. Yellow & White (Assortments available)

\$11⁹⁵ / Doz. or **\$1⁹⁵** each

Seiko Type Safety Chains

First quality with hooks and eyes in gold or rhodium finish.

\$5⁹⁵ / Dozen **\$40⁰⁰** per 100



Esslinger & Co.

1165 Medallion Drive • St. Paul, MN 55120

National Wats: 1-800-328-0205
Order by Fax 24 Hrs. a day: 612-452-4298
Toll-Free Fax: 1-800-548-9304
Inquires: 612-452-7180

HOROLOGICAL TIMES™



Official Publication of the American Watchmakers-Clockmakers Institute

Henry B. Fried	4	Questions & Answers
J.M. Huckabee	10	As A Clockmaker Turns Adapting a Tool Slide Rest to the Watchmakers Lathe
Fred S. Burckhardt	14	Rock Quarry
Archie B. Perkins	16	Technically Watches Antique Watch Restoration, Part CXVII
Henry B. Fried	22	Bonnixsen's Karrusel Watches Part 8
Jack Kurdzionak	24	Affiliate Chapter Column Affiliate Chapter Annual Meeting
Henry B. Fried	25	Book Review <i>The Top 300 Trade Secrets of a Master Clockmaker & Watches, Complete Price Guide No. 15</i>
Marshall F. Richmond	26	Pickle Barrel Course in Jewelry Repair, Part 11
David A. Christianson	30	Timelocks The Sargent & Greenleaf Family of Timelocks, Part IV
Henry B. Fried	34	Repairing Mechanical Watches & Clocks A Complete Series of Bench Practices, Part VII
David A. Christianson	40	The Novice Watchmaker Stem Gaskets

HOROLOGICAL TIMES (ISSNO 145-9546) is published monthly and copyrighted by the American Watchmakers Institute, 701 Enterprise Drive, Harrison, Ohio 45030, for \$45.00 per year (\$4.50 per copy) in the United States and \$50.00 per year, \$5.50 per copy outside the U.S.) Second class postage paid at Cincinnati, Ohio. POSTMASTER: Send address changes to *HOROLOGICAL TIMES*, 701 Enterprise Drive, Harrison, Ohio 45030

OFFICE HOURS: Monday through Friday 8:00 AM to 4:00 PM (Eastern Standard Time). Closed on all national holidays. PHONE: (513) 367-9800, AWI HOTLINE: (513) 367-7799 (24-hour recording), FAX: (513) 367-1414.

Election Results & Recent Appointments 2

AWI Staff Assignments 39

WOSTEP Report 45

AWI Building Dedication 46

Anniversary Banquet 48

DEPARTMENTS

Ask Huck	8
AWI Material Search Network	38
News of the Trade	42
Education Update	44
Classified Ads	52
Advertisers' Index	56

Executive and Editorial Offices

AWI Central
701 Enterprise Drive
Harrison, OH 45030
Telephone: (513) 367-9800
Fax: (513) 367-1414
AWI Technical Hotline: (513) 367-7799

Milton C. Stevens: Editor-In-Chief/Publishing Director
Donna Baas: Editor/Advertising Manager
Katherine J. Ort: Associate Editor
Diane M. DeVillez: Art & Production Director

Nancy Wellmann: Office Manager
Mary Sansalone: Seminar Coordinator
Sharon McManus: Circulation Manager

Technical Editors

Robert F. Bishop	J.M. Huckabee
James H. Broughton	John P. Kenyon
Fred S. Burckhardt	Archie B. Perkins
David A. Christianson	Robert D. Porter
Joe Crooks	Marshall R. Richmond
Henry B. Fried	

AWI Officers

Joseph L. Cerullo, CMW, CMC: President
Charles Cleves: First Vice President
Roland R. Iverson, CMC: Second Vice President
Greg Hostetter, CC: Secretary
James H. Broughton, CMEW, FAWI: Treasurer

AWI Directors

Robert F. Bishop, CMEW, FAWI
Alice B. Carpenter, CMW, CMEW
M.R. Carpenter, CMC, CMEW
Wes Door, CMW
Henry Frystak, CMW
Ewell D. Hartman, CMW, FAWI
Gerhard M. Hutter, CMW
Robert A. Nelson, CMW, CMEW, FAWI
Robert D. Porter, CMW
Marshall F. Richmond, CMW

Jack Kurdzionak: Affiliate Chapter Director
Toby Witherspoon: Research & Education Council
Director
Wes Door, CMW: Immediate Past President

Milton C. Stevens, FAWI: Executive Secretary
James Lubic: Education & Technical Director
David LaFleche: Communication & Finance Director
Henry B. Fried, CMW, CMC, FAWI: Technical Director

Reprinting and reproduction is prohibited without written permission from the American Watchmakers-Clockmakers Institute. Copyright © 1995 by the American Watchmakers-Clockmakers Institute.

★ Fellows of the American Watchmakers Institute ★

Robert F. Bishop	*Orville R. Hagans	Robert A. Nelson
James H. Broughton	Ewell D. Hartman	*Hamilton E. Pease
George Daniels	Harold J. Herman	Milton C. Stevens
Henry B. Fried	Gerald G. Jaeger	*Marvin E. Whitney
Josephine F. Hagans		*Deceased

Cerullo to Serve Second Term as President



Joseph L. Cerullo was elected to a second term as president of AWI during the Board of Director's meeting in June.

Cerullo was the only incumbent executive committee member to be re-elected. Selected for the other executive committee offices were: Charles Cleves, First Vice President; Roland Iverson, Second Vice President; James Broughton, Treasurer; and Greg Hostetter, Secretary.

Recent Appointments

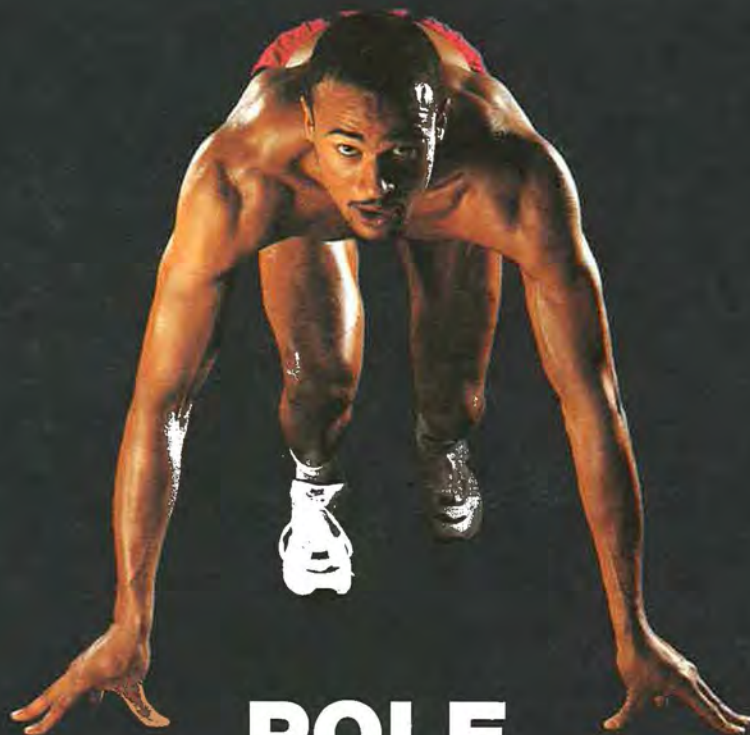
Due to the death of Marvin E. Whitney, two appointments were made to fill the vacancies created.

Gerhard Hutter, West Palm Beach, Florida, was named to fill the unexpired term of Marvin E. Whitney as AWI Director. Mr. Hutter stated he was especially honored to finish Marvin's term because it was Marvin Whitney who convinced him to serve on the AWI Board of Directors several years ago.



M.R. "Buddy" Carpenter, Tarboro, North Carolina, was appointed to fill Marvin Whitney's unexpired term of Trustee of the AWI ELM Charitable Trust. When Marvin, due to his long illness, was unable to help in arranging the Orville R. Hagans Time Display in the new headquarters, Buddy volunteered and spent several weeks working long hours at headquarters to arrange the display. His reasoning was that somebody had to get the job done.

ON THE FRONT: The new AWI Headquarters.



POLE POSITION



CHRONO It is only by respecting every single detail and being able to time exceptional performances to the hundredth of a second that you can earn the title of "leader". Our quartz chronograph fitted with a time-zone mechanism as well as ADD, SPLIT and LAP functions enables us to claim such a position.



ETA Division
SMH (US) INC.
35, East 21st Street
USA - New York, NY 10010
phone: (212) 505 41 81
fax: (212) 505 67 87

The exciting new features of ETA's **ALARM** latest FLATLINE ETA 251.265 calibre include an integrated alarm system and a numerical liquid crystal date display, as well as a battery end-of-life indicator (EOL). With all these extra and really useful functions, this major, innovative movement is ... right on time!

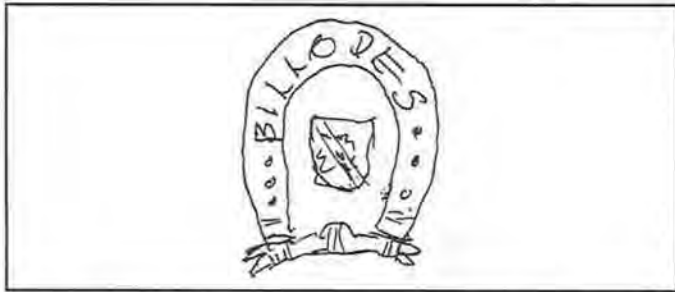
Questions & Answers



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

Q. I would appreciate any information you may be able to give on the watch described herein: It is a key wind, hunting case movement, brass with ruby jewels set in white metal. The movement measures 44 mm in diameter which is marked as shown below. This mark also appears in the case back. The name on the dial is K. Serkisoff & Co., Constantinople.

Charles Miller, Louisville, Kentucky



A. Billodes was a name used by the Zenith Watch Company during the early part of this century and the latter part of the 1800s. The name was especially reserved for trade with the Turkish market.

The movements appeared much like the Longines calibers but were Zenith nonetheless.

Serkisoff & Co. of Constantinople (now Istanbul) was the retailer or Zenith-Billodes agent.

A Billodes watch can be found pictured in the book, *The Swiss Watch*. It should be noted that at this point into the twentieth century, Zenith still had a market for key wind watches in Turkey.

Henry B. Fried



Q. I am enclosing a couple of snapshots of a tool which was given me in 1933. The donor had no idea what it might be. Through the sixty years I have possessed it, I have never met anyone who recognized it. The measurements round out well in metric so perhaps it was made in Europe. The whole thing is black with the faint remnants of a design of green leaves and red dots for flowers on one side. It fits comfortably in the hand and the tube projecting from the bottom fits a hole in a base made of the same material, cast iron, turning freely. The base of the top piece is threaded and, when turned, operates two claws which extend through holes in the top and down the sides about one-third the way down. The claws, which are opposing, can be raised or lowered and have a rocking motion which must be to clamp some uneven object. It resembles, more than anything else, a modern engraving block. However, it must be in the neighborhood of a hundred years old. Engravers that far back usually placed the article to be engraved on a small leather cushion filled



Borel



Example of
one of the
styles in asst.

Japanese Style Crown Assortment # 951



Borel has put together this unique assortment of crowns made to replace crowns on Seiko, Pulsar, Lorus, & Citizen watches. Includes 5 new numbers (*) for a total of 53 popular numbers, from 2.5mm to 6.5mm diameter. Put up in a 60 bottle cabinet with tap chart and a case number to crown number booklet. Saves money, as these crowns are a fraction of the cost of the genuine. Refills available in both yellow and white. Swiss made.

#951/2 Asst. of 106 total crowns, 1 each yel. & white of 53 #'s **\$ 139.-**

#951/1Y Asst. of 53 total crowns, 1 each yellow of 53 #'s **\$ 79.-**

Both assortments available with Quartz crown gauge for an additional \$ 15.

Crowns for Seiko - Pulsar - Lorus - Citizen

Stock #	Diameter	Stock #	Diameter	Stock #	Diameter
J-25M04	2.50 mm	J-35M98	3.50 mm	J-40MH1	4.00 mm
J-25N02	2.50	J-35ME9 *	3.50	J-40MJ3	4.00
		J-35MR8 *	3.50	J-40N51	4.00
J-30E02	3.00	J-35N18	3.50		
J-30M22 *	3.00	J-35N20	3.50	J-45D01	4.50
J-30M98 *	3.00	J-35N57	3.50	J-45M04	4.50
J-32M29	3.25	J-35NA1	3.50	J-45M10	4.50
J-32N23 *	3.25	J-35NH9	3.50	J-45M30	4.50
		J-35R34	3.50	J-45W29	4.50
J-35D03	3.50				
J-35D15	3.50	J-39M04	3.90	J-50D05	5.00
J-35E09	3.50	J-40M16	4.00	J-50M04	5.00
J-35M03	3.50	J-40M17	4.00		
J-35M06	3.50	J-40M24	4.00	J-55M06	5.50
J-35M10	3.50	J-40M32	4.00	J-65M02	6.50
J-35M34	3.50	J-40M35	4.00		
J-35M68	3.50	J-40M69	4.00	J-506-2254	3.50
J-35M82	3.50	J-40M71	4.00	J-506-2614	3.50
J-35M86	3.50	J-40M81	4.00	J-506-2874	3.50
J-35M94	3.50	J-40M97	4.00	J-506-4494	3.50

Suppliers of Quality Products to Watchmakers and Jewelers Since 1920

Jules Borel & Co.

1110 Grand Avenue

Kansas City, MO 64106-2348

Order Desk **800-776-6858**

Order FAX 800-776-6862

Local 816-421-6110

with sand, holding it with one hand while cutting with the graver in the other hand. I am hoping you have someone at headquarters who will recognize it, or perhaps you might publish the photo and it might be seen by someone who will recognize it.

Robert A. Pool, Pompano Beach, Florida

A. I have looked over your photos carefully and failed to come up with any logical or positive identification. I doubt whether it is a horological device.

I have a number of old tool catalogues as well as the definitive, encyclopedic books on old watch and clockmaking tools by Ted Crom, and I have failed to come up with anything that could be associated with your device.

Some such devices end up in watchmakers benches for no connective reasons or perhaps may have been a special device for an unusual factory operation needed for a passing product or special non-horological order. I wish that I could do more.

Perhaps someone may come up with some solution. I too would be glad to see that.

Henry B. Fried

Q. I have just finished overhauling a very interesting animated clock, and am trying to obtain any information available as to the maker of the clock and its vintage. Overall dimensions of the clock are approximately 4.5" x 4.5" at the base, by about 10" tall.

Referring to photos 1, 2, 3, and 4, the lower (base) section of the clock houses a governed mechanism with three output cams. One of the three cams transmits a vertical oscillating motion, via a pull-wire, to the lifelike bird in the top section of the clock, randomly rotating the bird through 180 angular degrees in small left-to-right increments. The second cam, via a pull-wire, imparts a vertical motion to the bird, as though it were "pecking" at the ground, simultaneously as it rotates back and forth. The third cam operates a small bellows, which has a simple orifice in the face of the bellows which is mounted stationary to the base of the clock. A hole through the base, in line with the orifice, allows a light "chirping" sound to emanate from the clock base during the animation cycle described.

The clock movement appears to be French. It has a lever escapement, and is a minute repeater activated by the small button directly below the bird cage. An alarm is also incorporated.

Referring to photo 5, the only identification found on the movement is at the lower left side of the rear plate. The trademark is a letter "B" which is inscribed in a circle. Directly above the circle are the digits "135," possibly the clock's serial number.

Any assistance in determining the vintage, and possibly the maker of this animated clock would be greatly appreciated.

Richard C. Dreibelbis, Fair Lawn, New Jersey

A. In the book, *A Century of Fine Carriage Clocks*, by Terwilliger, Fenelli, and Blackwell, you will find a photo of a clock which looks very much like yours. There is also one in the Time Museum in Rockford, Illinois. Both were made by Japy Freres & Cie, dating from the late 19th century.

The inscription "B" in a circle, according to Charles Allix in his earlier large book on carriage clocks, is noted but without positive identification to a Brunelot as "found in many good to high quality carriage clocks." Tardy, in his listings of French makers, has but one line as having operated in Paris about 1870. Possibly he was a retailer.

I have seen some of these in auction catalogues. The bird action is described a bit in the three books on Automaton by Chapuis-Droz.

Henry B. Fried



Photo 1.



Photo 3.



Photo 2.



Photo 4.



Photo 5.



PAT HEBERT
Line Tender
Eveready Manufacturing Plant
Bennington, VT

Thinking Caps

In 1974 Pat Hebert went to work for Eveready® as a Janitor. With three small children to support, she was happy to *get* the job but not content to *stay* in it. Competitive by nature, Pat will tell you that she has

always "loved to learn." She has since mastered many jobs within the company, her decision to become a Line Tender being the latest accomplishment. Pat is just as ambitious in her spare time

interests as she is on the job. She sews, crochets, skis (cross country) does aerobics and reads psychology.



Precision is the name of the game in the manufacture of any quality product, but when it comes to assembling components for something as small as a watch battery, it assumes an extra measure of importance. The bowl in the foreground holds the caps (anodes) which form the metal case around the battery. In the background is Pat Hebert, Line Tender on the

Gel Line. It is Pat's responsibility to make sure everything happens "by the book" on the line — and that means getting exactly the right amount of gel in the battery in precisely the right place, then capping it so there are no leaks, dents scratches or other flaws. Because of the commitment Pat and her fellow workers bring to their jobs, Eveready® watch battery

customers can be assured that their battery was built with as much skill, care and precision as the watch it powers.



the Powerful Difference

EVEREADY® WATCH BATTERIES
Exceptional quality and dependability, the result of a sophisticated manufacturing process, a high degree of technical expertise and *people* dedicated to making the difference.

 **EVEREADY®**

©1991 Eveready Battery Company, Inc.

Ask Huck

Clockmaking Bits About...

*Pivot Polishing Tools
Drill Bits and Broaches*

By J.M. Huckabee, CMC, FBHI



Question: Do you consider a pivot polishing tool necessary for limited clock repairs?

Answer: Yes. I can't imagine the problems a repairman must have when pivots are not restored to good condition. This is the prime source of "latent stoppers" and the necessity for long test runs on repairs.

We are indeed fortunate that we have numerous ways to approach the problem. Some require more time and skill, or may be less desirable for other reasons.

Some of the *Random Clock Talk* tapes show several methods of pivot work. Most are easy to accomplish, but are very dear in time required to build the tools. Others are simple. However, the tapes do not show the most simple, or the most complex methods I use.

Let's start very simply. Chuck the arbor in a pin vise, rest the opposite pivot in a notch in a wood bench pin, spin the piece and finish the pivot with a burnisher and pivot file. This works pretty well but requires more skill than some other methods.

Not all pivots will need help. Pull a fingernail over the pivot surface. If you feel ringing around the pivot, it needs help.

Most pivot polishers are some form of fixtures for a lathe. One tool I have has a rotary carbide wheel that cuts pivot and shoulder at the same time.

Some of the tools on the mentioned tapes are fast and suitable for larger repair shops. Whatever method, pivot work pays in reliability.

Question: What is a good recommendation on drill bits for the clockmaker?

Answer: For mid-range clock sizes, you will find holes and pivot holes in the range of a set of numbered drill bits; that is numbers 1 - 60. These range in diameter from 0.228" to 0.040". You may want to add sizes 61 - 80 with a diameter range of 0.039" to 0.0135".

I do not recommend industrial quality bits because clocks use lots of brass and mild steel; really quite easy to drill. I've been using some imported bits for about five years, reported to be in M-2 steel. These were inexpensive and most satisfactory.

You may find a few pivots in mid-sized clocks that are smaller than a #60, and winding arbors larger than #1.

I have drills from 1/16" to 1/2" in 1/64-inch steps and sizes A - Z. There is almost no need for sizes over 1/4" in clock repairs.

A clockmaker probably will never own a set of plug gauges. However, a drill shank in good condition makes a pretty good rough substitute. A set of round pivot broaches also serves as a substitute plug gauge. Slip the broach snugly into a hole and measure its diameter at the hole mouth.

Learn to sharpen your drill bits, and don't burn their edge; they will serve you well for many years. □

**HERMLE - KIENINGER - URGOS
MOVEMENTS FROM**

Butterworth Clocks, Inc.

- largest distributor of Hermle movements
- distributor of Kieninger movements and parts
- exclusive distributor of Urgos movements
- over 100 models in stock--largest selection in the U.S.

TOLL-FREE (800) 258-5418

1715 Pearlview Ct. • Muscatine, IA 52761

Factory-fresh • Most models bronze brushed
Same day shipping, 2-year warranty
Call for free price list

If you have any questions, please write:
"Ask Huck", c/o *Horological Times*,
701 Enterprise Drive, Harrison, Ohio 45030

EUROTOOL® products from TWIN CITY

For innovative tools of the trade!

Easy to use!



\$8.95

"Gucci Style" Watch Strap Notching Pliers

Notch watch straps to fit "Gucci Style" watches. Eliminate double inventory. Made of stainless steel. **PL816T**

Wooden Case Holder

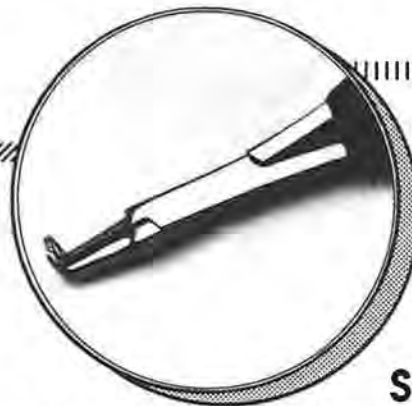
Genuine hardwood will not scratch watch case. This holder is stable and larger than most, accommodates most sizes. **MV302**

\$3.00



Unbeatable Price!

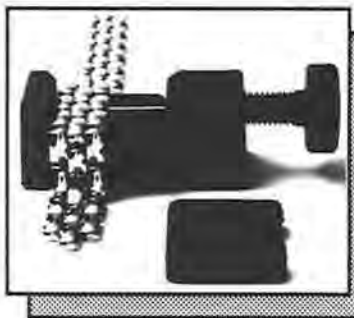
Saves Time



\$4.95

Split Ring Pliers

A new plier that opens split rings easily. Just put the tooth jaw between the overlapping split ring and squeeze the handles. **PL588T**



\$14.95

Link Remover

Ideal for removing pins from metal link watch bands. Made of glass-filled nylon, this unit includes an extra spacer to accommodate thinner bracelets. The pusher pin is hardened tool steel. Will not scratch or mar gold or silver. **RM118T**

NEW! The Ideal Bench Mat

Bench Mat

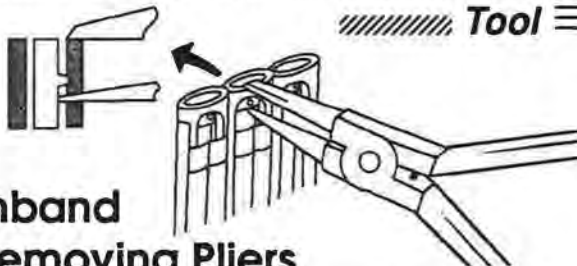
- Non Glare Surface.
- Cushions and protects jewelry and watches.
- Measured grid imprint useful for sizing work.
- Cleans up easily.



BN105 (8-1/2' x 12') \$8.50 **BN107 (12' x 18') \$17.95**

An Essential Tool

\$8.50



Watchband Link Removing Pliers

Adjust watch bands quickly and easily! The perfect tool for removing clip springs in link watchbands. **PL399**

Prices good through 10/15 95.



TWIN CITY SUPPLY

6150 Wayzata Blvd., Minneapolis, MN 55416-1239
(612) 545-2725

USA: 800-328-6009 FAX: 800-328-6001

As A Clockmaker Turns

Adapting a Tool Slide Rest to the Watchmakers Lathe

Part 1

By J.M. Huckabee, CMC, FBHI



Overview

The watchmakers lathe is the gem of tools for the clockmaker. It has more utility than any other single tool and will abridge a number of other major tools. For the larger work in clockmaking we need a tool slide rest. Many tools of this type may be adapted to a typical lathe, and various modifications will further extend their use.

This subject will be in a four-part series that covers tools, adaptation, and modification of a typical slide rest. One very useful adaptation is improvement in measurement techniques used with the slide rest.

The Typical Lathe and Slide Rest

A typical lathe and slide rest is illustrated in Figure 1. This is a Moseley-style Conoidal Spindle Lathe built by Boley around 1910. The slide rest was built by Hammel Riglander (HR) in 1961. The slide rest is somewhat larger and stronger than most other makes. It has three slides and a simple tool bit holder. It is a "drop-on fit" to most watchmaker lathes of either Moseley or WW style that have a spindle height of about 50 mm. This illustration shows that a lathe with a long bed is to be desired. This is a short bed, being only 10 1/2" long.

The heavy cuts with our set-up will require larger pulleys and a belt that is not elastic. Figure 2 shows the large pulleys and an oil-soaked leather belt. The pulley form is "V" shaped, about 60°, and the belt does not touch bottom. This gives non-slip operation at moderate belt tension.

The original Boley pulley was of hard rubber. It crumbled with age and was replaced with this one of aluminum. This one has been in use about 30 years. The Boley Index was preserved, the pulley over-fits onto the original hub. This is a nice solution to a worn or damaged pulley (see Figure 3).

Functional Consideration

One of my work guidelines is that the workpiece should not exceed a four-diameter collet overhang. If heavy cuts are to be made, this should be held to

two or three diameters. The piece in Figure 3 is 1/4" in diameter, in a collet pocket depth of just a little over one diameter. This is much too long to be machined without a tailstock support. The overhang here is about 5/8". However, this may be well used for grinding, polishing, and possibly light work with a file.

The tailstock runner in Figure 4 has a lever-screw and pocket to accept various inserted devices. A point center would be the proper support for the workpiece in this illustration.

Workmanship Efficiency

Our tools and procedures should be set up so the jobs are easy, accurate, and time-efficient. Improved productivity means improved earnings.

This handy motor switch in Figure 5 saves lots of time. The motor has a quick start-stop time and runs at a constant speed. A countershaft of heavy pulleys increases both start and stop time. The motor pulley here is wood, for weight reduction. It is not unusual to start-stop a hundred times per hour, which can rob productivity with a slow-acting drive system.

The Tool Bit Holder

In Figure 6, we have a tool holder commonly called a "universal tool holder." This is the original holder from Hammel Riglander. It is a good tool, but each time it is removed, your set-up is lost. Tool holders are legion in number and another type is often better for a specific application.

The tool holder of Figure 6 is secured by a small rod through its hold-down screw head. The original rod was much larger with a necked-down end. Each time it was picked up there was a 50/50 chance you had the wrong end. This small rod with both ends rounded solved that waste of time. The screw tip was cut down so that it gets tight with the rod angle shown. Now I, a right-handed worker, can pick up the tool and release the bit without even looking at the piece.

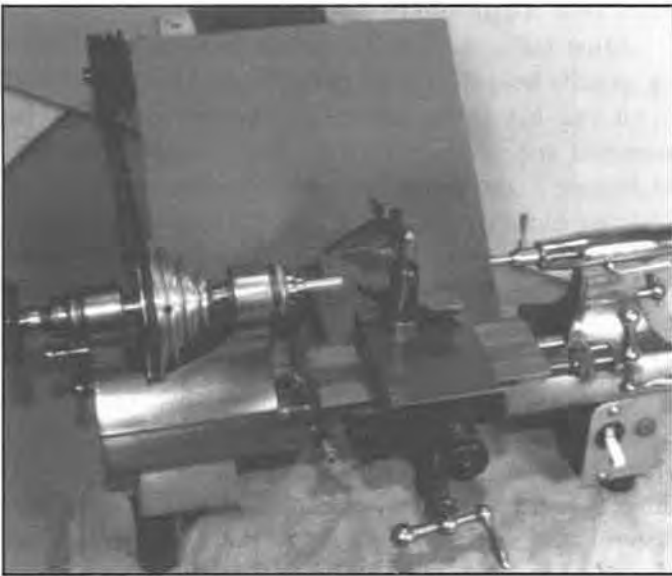


Figure 1. A short-bed Boley Lathe with a Hammel Riglander Tool Slide Rest.



Figure 4. Work length overhang is a never ending problem. This piece is just over 1/2" long.

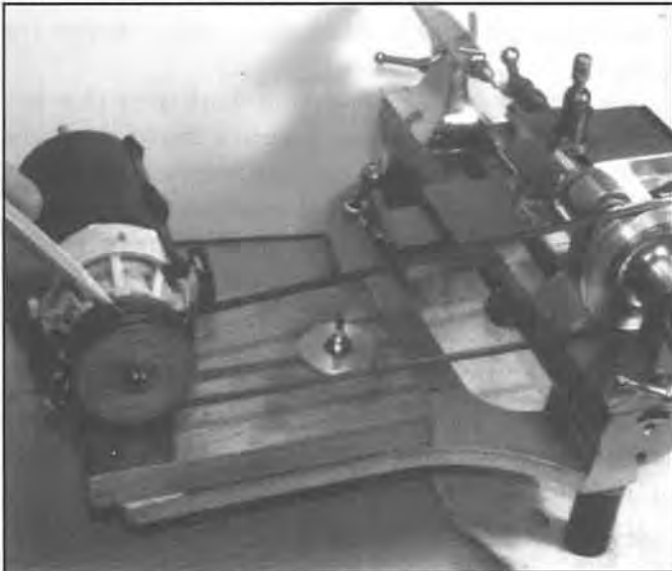


Figure 2. Large pulleys are used for non-slip drive at heavy loads.



Figure 5. A convenient switch and constant speed motor improves productivity.

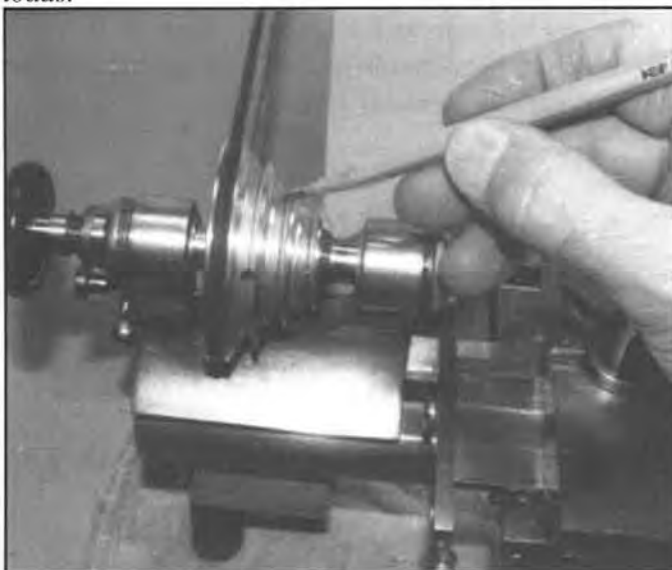


Figure 3. This shop-built aluminum pulley replaced the original hard rubber pulley.

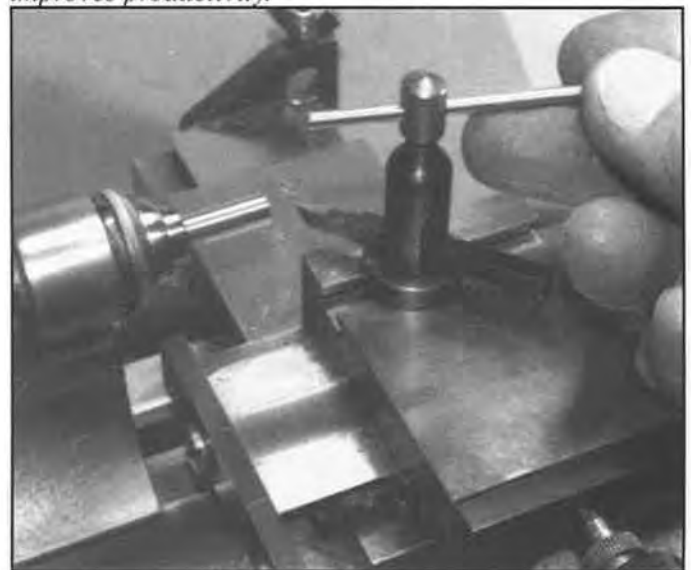


Figure 6. The original Hammel Riglander Tool Holder and a release tool.



Figure 7. Thickness of this swashed spacer adapts the tool slide rest to your lathe spindle height.



Figure 8. The Hammel Riglander Tool Post as supplied with the 3-deck tool slide.



Figure 9. The workers eye-view of the Tool Post and Bit.

Tool Post Adjustment

Most lathe work requires the tool bit edge to be on spindle height of your lathe. Some exceptions will need the bit to be above, or below center. The swashed spacer is rotated to raise or lower the bit. In Figure 7, the spacer is thicker under the working edge of our tool bit. Lathe adaptation may require an additional spacer under this one, or possibly making one that is not as thick as this one. This example is hard, but other shop-built spacers I use are made of brass.

The original Hammel Riglander pieces are illustrated in Figure 8. This gives an idea of the piece size typically used with an American-style watchmakers lathe. Note the adjusting rod with its necked-down right end. Compare to the rod in Figure 6, the one that I recommend. Many tool bit forms are used; for instance, right- and left-hand turning, internal boring, and others. About six different bit shapes are commonly used, with other rarely used shapes for unique jobs.

In contrast to the congested work area that appears in other illustrations, Figure 9 shows that your work is in full view and easily observed. However, in some types of work it may be cumbersome to make measurements with a caliper, or micrometer. Work that is supported between centers is readily removed for measurements.

Forward

Study the top-right section of Figure 9. This bracket with its wing nut and port hole is a shop-built modification to our tool. This accommodates a dial gauge, micrometer stop, or other devices that aid in measurement and improved productivity. Part 2 of this series will show how the modification was made. A dial gauge gives slide motion readings of 0.001" per division which is vastly superior to crank dial accuracy. That modification is adaptable of other tools of similar size and origin.

□

**HAVING
TECHNICAL PROBLEMS?**



**CALL THE AWI
HOTLINE**

(513) 367-7799

SAVE TIME & MONEY WITH ZANTECH

FALL 1995

SAVE TIME: Clean Movements Fast and Effectively with Quartz Clean and PlastiClean

QUARTZ CLEAN

Quartz Clean has revolutionized the work of hundreds of watchmakers. It is ideal for cleaning quartz movements as well as spot cleaning clock movements. Quartz Clean is a high purity, rapid penetrating solvent which quickly dissolves contaminants and flushes them away. After spray cleaning, simply dry movements with dry filtered air.



QC-16 \$12.95

PlastiCLEAN

PlastiClean is an effective, inexpensive system for cleaning Plastic Quartz Watch and Clock Movements. PlastiClean's powerful microscopic cleaning action penetrates tiny crevices in the movement, lifting out dry oils and residue. Tested to be completely safe for all PLASTIC Quartz Watch Movements.



QC-PL12 \$21.95

SAVE MONEY: Get More for Your Money with Reduced Prices on our Popular UV Light and Anti-Static Dial Brush

AC Powered Ultraviolet Light Source

The fastest and easiest solution for cementing in mineral crystals. Apply ultraviolet cement with the extra fine dispensing needle to insure a neat, uniform seal. Place the watch under the AC powered ultraviolet light and the cement will completely cure in two minutes. Excess glue can be easily removed with rubbing alcohol.



FREE

ultraviolet
cement
included!
(a \$5.00 value)

Ultraviolet Light Source TO-UVL2

\$35 95
List \$39.95

Anti-Static Dial Brush

Static electricity attracts dust and lint to watch dials. Black dials are especially vulnerable. This new Anti-Static brush removes the static charge and wipes away dust and lint, prior to casing the movement. The soft delicate bristles will not damage the watch dial or hands. A must for all serious watchmakers.



Anti-Static Dial Brush TO-BR100

\$15 95
List \$19.95

ZANTECH[®]
INC

77 SHADY LANE • TRENTON, NEW JERSEY 08619

ORDERS ONLY

(800) 441-7569

TECHNICAL HOT LINE

(609) 586-5088

Prices and availability subject to change without notice. Minimum order \$15.00.

Fax # (609) 586-8221

Rock Quarry *et tu*



By Fred S. Burckhardt

I know this will be a disappointment to most of you, but I'm not perfect. Close, but I do have one fault. This became obvious to me while I was packing things at the shop and getting ready to move to a larger location.

"What is this fault?" you ask. I'm a *saver*! Some of you know what I'm talking about. A saver is someone who can't throw anything away. After all, how do you know something won't be of any use later on?

What do I save? How about old, set clock mainsprings. There must be at least fifty of them in boxes lying around the shop and even a few were found underneath some shelving. What did I do with them? I put them all together in another box to take them with me. You may think this is foolish, but what if there happened to be a clock mainspring shortage like there was during the war? Laugh if you must, but don't come to me when you can't find them anywhere else.

Another great find was a large box of used electric clock movements that I replaced with quartz movements. You can never tell when these will come in handy. I cut the cords off and save them in another place in case I get a clock in that needs a new cord. How many times have you had to close your business to run to the store to buy a new cord? Think about that for a moment!

Do you save old watch crowns? I must have at least five pounds. When times are slow, I take a file and go around the knurled edge and they're just like new again. If the cap has worn off, a little gilt paint will work wonders.

Do you save old tweezers? I'm not sure how many pairs I have. Some have one or both tips broken. Others have been

sharpened so many times they're only about two inches long. They come in handy in tight places. Three pairs are broken in two. I tried gluing them, but it doesn't last very long. These work fine if you are used to using chopsticks.

Do you save old leather watch straps? Why would anybody in their right mind save these? I'll tell you why. Have you ever had a customer come in and ask if you had a keeper for their strap or they were in need of a buckle? If you can't sell them a new strap, why not the parts from an old one? Some straps are not worth keeping. Never keep the ones from those who perspire a lot. I kept one and after about three weeks I swear I could see that thing move.

How many material tins do you have? I can't get myself to throw them away. Right now, I probably have more than some of the supply houses. They come in useful every once in a while. I have used them for storing some parts but I always forget to label them, so I spend hours opening and closing tins.

It has taken years, but I do have a nice assortment of rusty watch material. In fact, I would venture to say that it is one of the largest and finest collections in the United States—no, in the world. Several watchmakers have seen it and wanted to purchase the collection, but sorry, it's not for sale. It's true; I was offered a lot of money, but money is of no value. This collection could never be replaced, so don't write and make an offer.

Do you save old price lists? This is something you should never do. Looking at the old prices takes a strong heart and stomach. Even so, I've saved them for years. One is very old. It was signed by a guy named Methuselah when he was just a teenager. It was a repair price list for sundials.

When was the last time you threw away a broken loupe? I have two double loupes with broken lens. These are used with glasses. The black plastic eye loupes with scratched lens and broken plastic holders are a real treasure. These are useful when a customer asks if he/she can borrow a loupe to look at a stone or something.

Last but not by any means least, how about material flyers that you know will never be of any use, but yet you hate to throw them away. They contain some specials that you know you will never use, but then again, someday they could become of some value?

This could go on and on, but I'm sure you get the drift. The real message is, don't be a saver. On the other hand, isn't it hard to throw away good stuff? □

YOU HAVE TRIED THEM ALL . . . NOW TRY
PLYMOUTH

WE ARE A FULL SERVICE MATERIAL SUPPLIER.

WE SPECIALIZE IN **ROLEX** PARTS,
MATERIALS FOR QUARTZ WATCHES
AND HARD-TO-FIND MATERIALS FOR
AMERICAN BRACELET & POCKET WATCHES,
CLOCK MATERIALS, & TOOLS.

SEND FOR A FREE SET OF CIRCULARS.

PLYMOUTH WATCH MATERIAL CO., INC.

87 Nassau St., Room 909
New York, NY 10038 Telephone (212) 267-4441

CRYSTAL PRESS/CASE CLOSER

Comes complete with 14 assorted nylon dies. The nylon dies make case closing a snap without scratching or marring cases.

CRY-905

DRS Price \$31.95



BATTERY START-UP SYSTEM

System includes:

- Sixty-drawer organizer with labels.
- Quick check — will gauge unmarked battery for size and number.
- "How to Change a Battery" manual.
- 270 of the most popular batteries.

DRS Price \$139.25



ECONOMY BATTERY ASSORTMENT

Set contains:

- 100 batteries.
- Compact organizer.
- Easy Check.
- "How to Change a Battery" manual.

DRS Price \$39.50

DRS Inc.

The Jewelers' Department Store

Authorized  EVEREADY® Dealer

DRS features
 EVEREADY® batteries because they are manufactured in the U.S. with the most exacting production standards. Because of its world class quality, it is the battery of choice with major U.S. watch manufacturers.

BATTERY SPECIALS

Bat.#	Price	Bat.#	Price
317	\$0.65	371	0.35
319	0.50	377	0.35
321	0.40	379	0.40
362	0.35	395	0.40
364	0.25	397	0.40

Min. 100 pieces assorted.

CASE HOLDER

A must for every watchmaker, this case holder clamps onto the edge of your bench. This holder is made of metal and will hold any size movement. Jaws are two-sided to fit both gents' and ladies' watch cases.

MV 201

DRS Price \$14.95



EVEREADY BATTERY TESTER

Suitable for all types of mercury, silver and lithium cells.

W-35

DRS Price \$9.00



L.G. MASTER CASE OPENER

Universal wrench that opens almost every size and shape case. Complete with four sets of jaw pins.

CO-600

DRS Price \$42.50



DRS Inc.

THE JEWELERS' DEPARTMENT STORE

Toll Free: 800-223-8960 Fax: 800-526-8682



56 West 47th St. New York, NY 10036

(212) 819-0470

FAX: (212) 354-2270

Technically Watches

Antique Watch Restoration, Part CXVII

By Archie B. Perkins, CMW, FNAWCC, MBHI
©1995 (All rights reserved by the author)



Characteristics of Hairsprings

A hairspring is made from material that has a rectangular cross section. The strength of a hairspring is dependent upon its thickness, width, and length. Figure 1 is used to illustrate this characteristic. View A shows a section of hairspring with a given width, thickness, and length. If we change any one of these dimensions, we will be changing the strength of the section of hairspring.

View B, Figure 1 shows a section of hairspring that has a width which is two times as wide as the one shown in View A. When this is done, keeping the thickness and length the same, the spring will be two times as strong. In other words, to double the width, we double the strength if the thickness and length remain the same. When we make the width one-half as wide, then the spring will be one-half as strong if the thickness and length are unchanged.

If the thickness of a spring is changed, the strength of the spring is affected the most. Changing the thickness changes the strength as the cube of the thickness (T^3). If we double the thickness without changing the width or length, the spring will be eight times stronger. (See View C, Figure 1.) The following is an example. If we take a hairspring that is .06 mm thick and cube this thickness, $.06 \times .06 \times .06$ equals .000216. Now, if we double the thickness to .12 and cube this $.12 \times .12 \times .12$, we would have .001728.

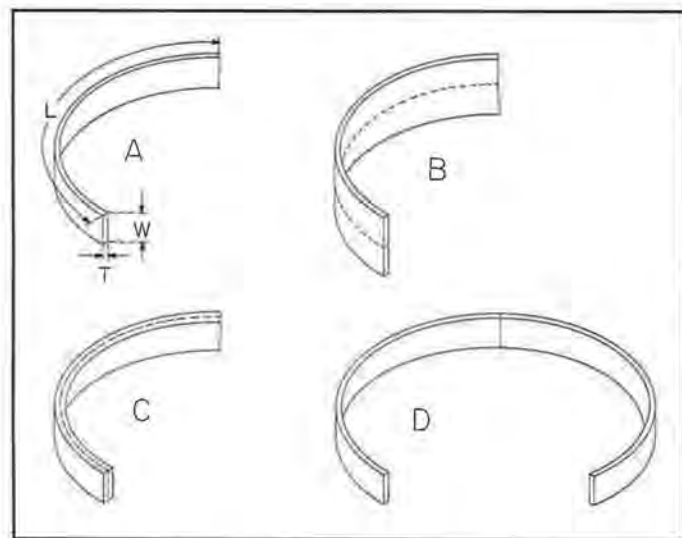


Figure 1.

If we divide the last number by the first number, we will have $\frac{.001728}{.000216} = 8$,

or 8 times stronger. If a spring is made one-half as thick, it will be one-eighth as strong.

View D, Figure 1 shows a section of spring that is twice as long as the spring in View A. When the length only is changed, the strength varies in inverse proportion. As the length is doubled, the spring will be one-half as strong. When the spring is made one-half as long, it will be twice as strong.

Calculating the Length of a Spiral Spring

Figure 2 is used to show how a spiral spring is calculated to determine its length. The formula used to determine the length of a spiral spring is:

$$L = \pi \times N \times \left(\frac{D+d}{2} \right) \text{ when:}$$

- L = Length of spiral
- N = Number of coils
- D = Diameter of spring
- d = Diameter of inside coil
- π = Pi or 3.1416

To use the formula to determine the length of a given spiral spring, the following information is needed: number of coils - 9.5, diameter of spring - 12.00 mm, and di-

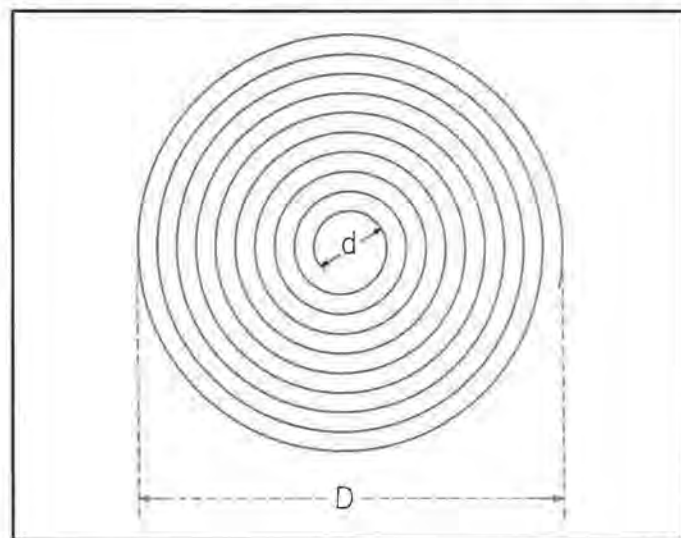


Figure 2.

iameter of inside coil - 3.00 mm. Thus,

$$L = \pi \times N \times \left(\frac{D+d}{2} \right)$$

$$L = \pi \times N \times 7.5$$

$$L = 3.1416 \times 9.5 \times 7.5 = 223.839 \text{ mm.}$$

Any fraction of a coil, such as the tongue, is added to this amount to have the total length.

Truing Hairsprings in the Round

A hairspring is out of true in the round when the spaces between coils are not equal at one point or another. The bend causing the condition is usually found at 90° from the point where the spacing is the closest or the widest. To locate the bend, follow the correct coil spacing inside where the distortion occurs and follow these spacings outwardly until the space starts closing up or opening up. The bend is at this point and exactly 90° from where the space is off the most. It is very important to locate the bend exactly and straighten the spring at the exact point where the bend is; otherwise, there will be two bends instead of the original one bend. In other words, the spring will be in worse shape and need two corrections instead of one. It would be better to take ten minutes to locate the exact bend point and ten seconds to correct the bend than to take ten seconds to locate the bend and ten minutes to correct the bend. The correction should be made with the least possible amount of bending. Spring material becomes damaged very quickly with unnecessary bending.

To true hairsprings, a piece of plate glass that has been frosted on one side is used as a rest for the spring while it is being straightened. The spring is rested on the smooth side of the glass. The frosting on the lower side of the glass helps to cut down on the shadows of the spring. The glass can be frosted by rubbing two pieces of glass together with wet, fine carborundum powder between them.

Another method of supporting the spring is to use a flat glass in a watch or clock bezel. In this case, the glass does not need to be frosted. The bezel raises the glass far enough off of the bench that the shadow of the hairspring is not seen.

The tweezer used to hold the hairspring while the bend is corrected should not have sharp corners on the inside of the jaws. The sharp edges should be removed and slightly rounded. Figure 3 shows a bent hairspring on a frosted glass and the method used to correct the error in the spring. Two 90° lines have been made on the frosted side of the glass with a pencil to be used for locating the exact point of the bend in the spring. The spring is placed on the glass and centered over the center of the two right angle lines. Then, the spring is turned until one line is centered with the closest or widest point of the spring. In this particular case, the line goes through the closest point which is at "a." The bend will be 90° back of this closest point or at "b." The hairspring should always be placed on the glass

Livesay's

Inc.
Tampa, Florida

25 Years of Quality Service

We Stock Genuine Rolex Parts



• ASSORTMENTS • BANDS •



• BATTERIES • BENCHES •



• BOOKS • CASE OPENERS •



• CLEANING SOLUTIONS •

• CROWNS • CRYSTALS •



• CRYSTAL FITTING SERVICE •



• DIAL DOTS • DOMES •



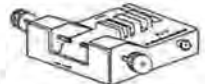
• MOVEMENTS • REPAIR ENVELOPES •



• TOOLS • WATCH PARTS •



• WATCH TESTERS • VIDEOS •



LIVESAY'S, INC.

YOUR ONE STOP SOURCE



Your Headquarters For Batteries, Watch Material, Tools, Findings, Bands, Jewelry Boxes, Casting Supplies, Watch Movements, and Much, Much More. Catalogs Available.



Phone Orders

(800) 476-2715

Toll Free 24 Hour FAX Orders

(800) 476-8016



Tampa (813)229-2715 Local Fax (813)221-8016

895

as shown so the operator must reach across the body of the hairspring to grasp the bend in the hairspring.

To straighten this hairspring, it is held with the tweezers close to the bend at "c," then a needle or a hairspring pin is used on the inside of the coil as shown and pulled outward in the direction of the arrow until the coil is positioned over the broken line. This will place the coil at a normal spacing from the next coil. The coil will need to be moved beyond where it should be in order for it to come back to the proper position. It is a good idea to take an old spring to practice the bending. In other words, bend the spring out of true and then straighten it just to get the feel

and nature of the work before actually doing controlled corrections.

When straightening hairsprings, how close the needle is away from the holding tweezers depends on how sharp the bend is in the hairspring. If the bend is sharp, the needle would be placed closer to the holding tweezers in order to correct the sharp bend. If the needle is used too far from the holding tweezers, a second bend is likely to occur without correcting the first bend. The needle should be held in an upright position so it is flat against the coil; otherwise, the coil may be thrown out of flat when the spring is trued. Care also must be used so the spring will not be pressed

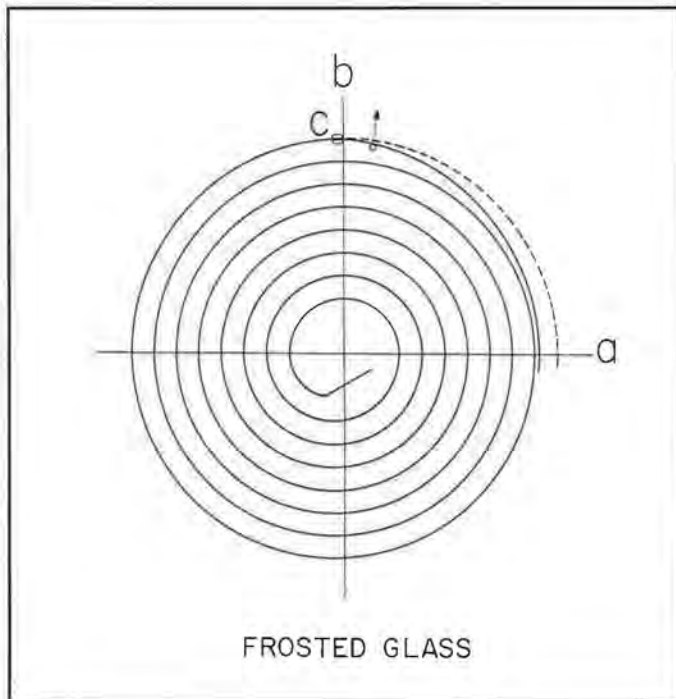


Figure 3.

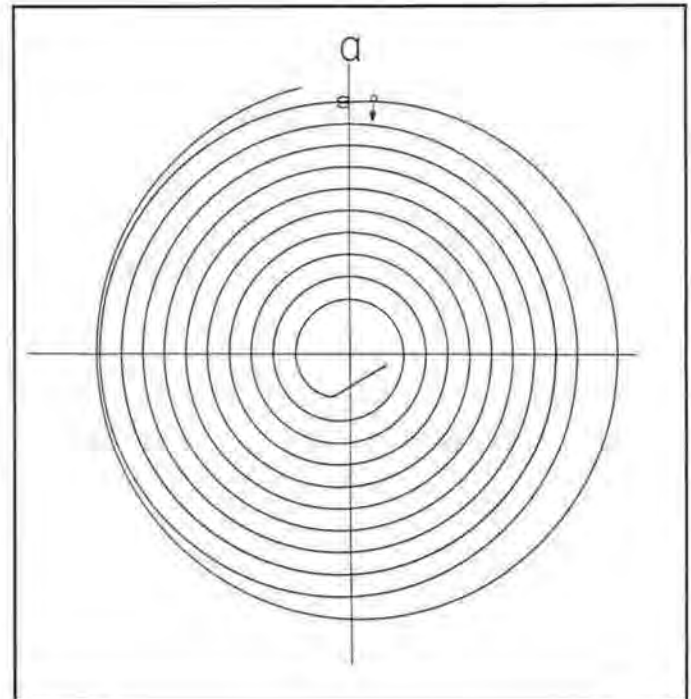


Figure 5.

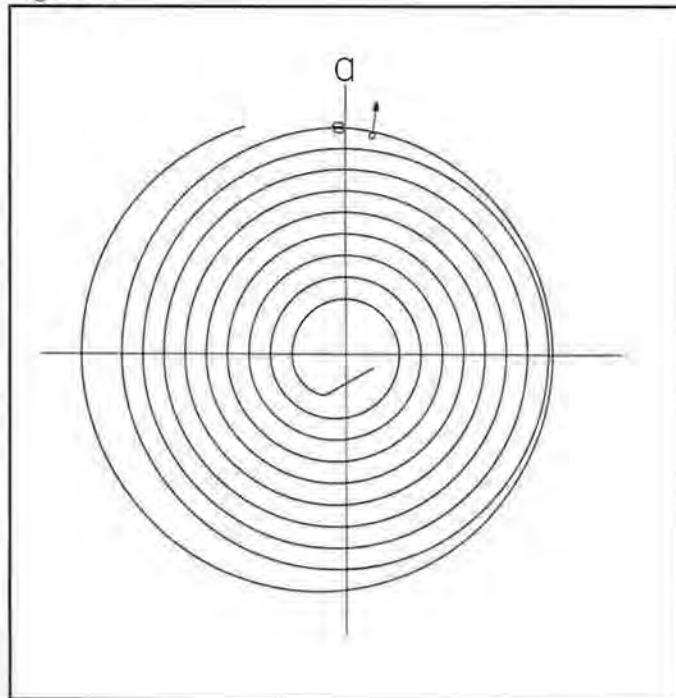


Figure 4.

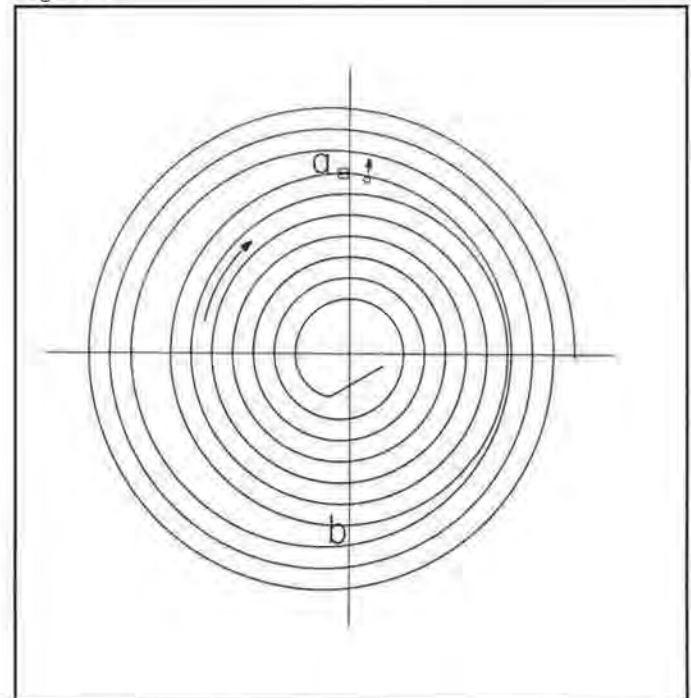


Figure 6.

too hard against the glass with the tweezers as this could throw the spring out of true in the flat.

Figure 4 shows an out-of-true hairspring. Note that the spring has a close point as well as a wide point between the coils. When the hairspring is placed on the glass and centered with the cross so the horizontal line goes through the center of the wide and close space, it is determined that the bend is at point "a." The tweezers are used to grasp the spring at point "a" as shown, then the needle is used to push out on the coil near the tweezers to correct the close spacing. At the same time, the wide space will also be corrected if there are no other bends in the spring.

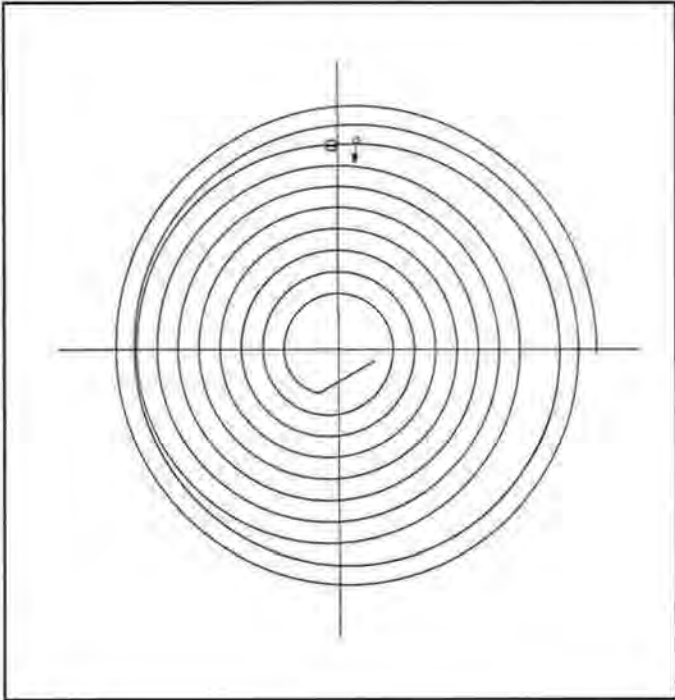


Figure 7.

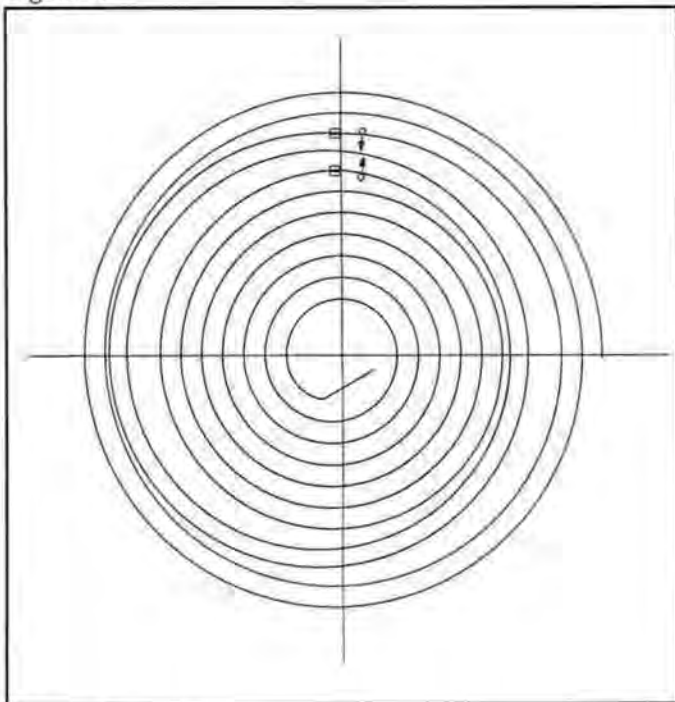


Figure 8.

Correcting the one bend will correct the coil for a complete turn if there are no other bends in that coil.

Figure 5 shows a hairspring that is bent outward at point "a," which is just the opposite to the example shown in Figure 4. In this case, the coil is held at point "a" and pushed in with the needle, as shown, to close up the wide space which will also open up the close space on the opposite side.

Figure 6 shows a bent hairspring in which the bend is on the fourth coil in the body of the spring. At a glance, it could appear that the bend could be at point "a" or point "b." The only way to really tell where the bend is located is to start inside the spring where the coil spaces are normal and trace the spaces outwardly in the direction of the arrow. When a point is reached where the space starts opening or closing as in this case, the bend will be located at point "a." To correct the hairspring, it is held with the tweezers at the bend and the coil is pulled outward to open up the close space and, at the same time, the wide space will be reduced.

Figure 7 shows a condition that is just the opposite to that in Figure 6. The bend is located, then the spring is held with the tweezers up next to the bend (not on the bend) while the needle is used to push the coil inward to close up the wide space and open up the close space.

Figure 8 shows a hairspring that has two bends. The bends are on the third and fifth coils from the outside of the spring. Since both bends are closer to the outside coil of the hairspring, it is recommended that the inside bend be corrected first, then the outside bend is corrected. In other words, we would work from the inside of the spring toward the outside. If the bends should be nearer the center of the spring, we would work from the outside of the spring toward the center of the spring.

The inside bend is corrected by grasping the coil with the tweezers next to the bend and pulling out on the coil with the needle until the close and wide spaces are equal. The second bend is corrected by holding the coil with the tweezers next to the bend and pushing in on the coil with the needle to equalize the wide and close spaces.

Truing Hairsprings in the Flat

When truing hairsprings in the flat, two tweezers are needed. It is a good idea to have two tweezers of the same style and shape. The points should be the same distance apart and require the same pressure to close the points. A light touch is needed for truing hairsprings. This is gotten by having the points of the tweezers fairly close together, not more than 2.00 mm apart.

Figure 9 shows three different styles of tweezers that can be used for truing hairsprings in the flat. View A shows two hairspring tweezers first developed by the Elgin Watch Company and later made by Dumont. These tweezers have strong points which are shaped so when the tweezers are being used on a hairspring and held normally in the hands, the

side of the point is vertical and at right angles to the coil of the hairspring. This causes the bend to be made square with the coil. If the bend is made at an angle to the coil, the coil is likely to become twisted where it is bent. This would cause the coils to go askew.

View B, Figure 9 shows two tweezers that were made from regular tweezers by reshaping the points. This shape of tweezer cannot be bought like this but must be shaped this way by the

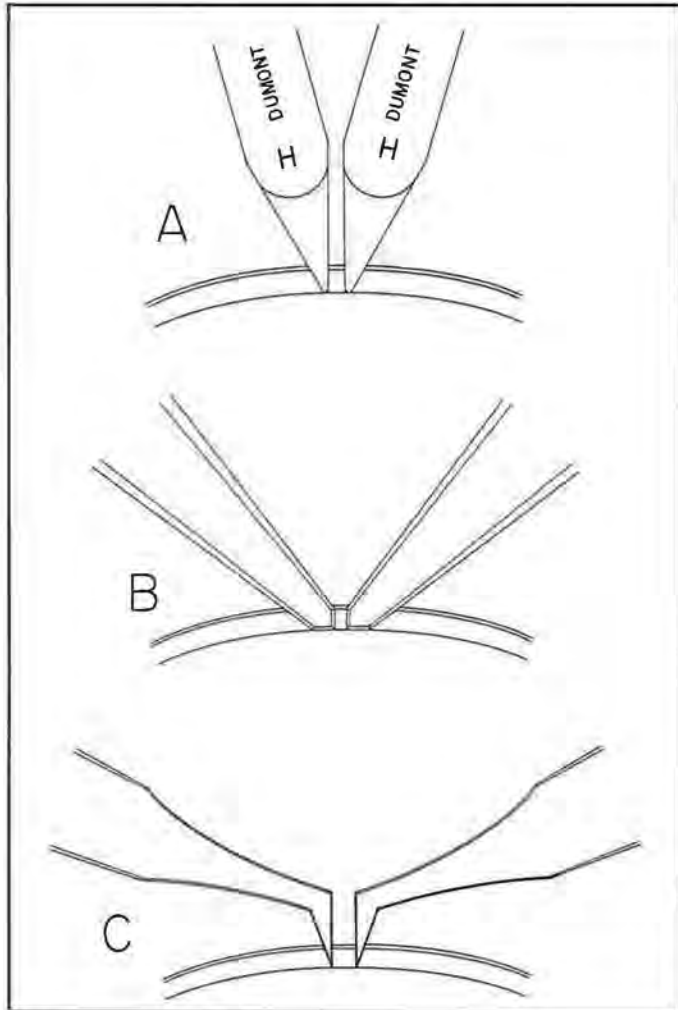


Figure 9.

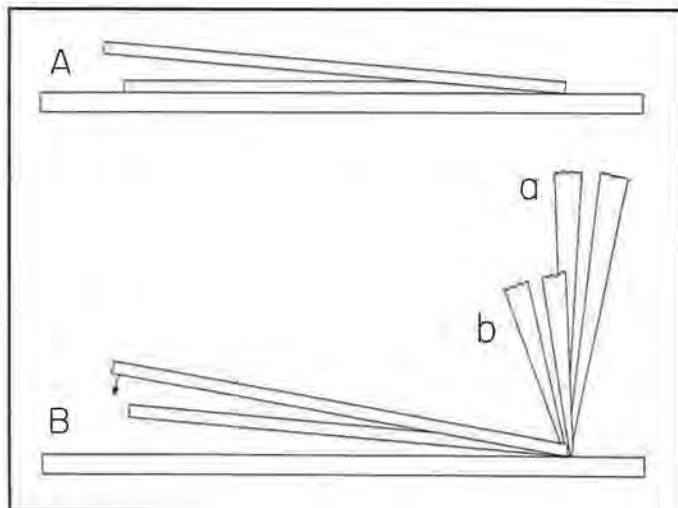


Figure 10.

watchmaker. This shape of tweezer allows the coil to be bent at right angles to the length of the coil.

View C, Figure 9 shows a special shaped tweezer that can be bought in Dumont quality. Its style is #6. Some watchmakers prefer this style of tweezer for hairspring work.

Figure 10 shows how a hairspring is trued in the flat. View A shows an out-of-flat hairspring resting on the hairspring glass. The outside coil is higher than the body of the spring. The bend will be 180° from the point where the high coil is the greatest distance above the body of the spring. The hairspring is centered on the intersection of the lines on the glass with one of the lines going through the bend point.

View B, Figure 10 shows the spring being trued. To true the spring, grasp the bent coil next to the bend with tweezers "a." Then, tilt the body of the spring slightly off of the glass as shown. This is done to allow the high coil to be bent down enough to level the spring without forcing the high coil against the glass and causing the coil to go askew. After the hairspring has been tilted off of the glass, then tweezers "b" is used near tweezers "a" to pinch the high coil down level with the body of the spring, keeping the coil centered with the body of the spring all at the same time. This method is used regardless of where the bend is in the body of the spring.

Correcting an Edgewise Bend

There are times when a coil gets an edgewise bend as shown in Figure 11. This type of bend is removed on a piece of soft wood such as an emery stick handle. To remove the bend in the hairspring, it is held on the bend with a sharp, pointed tweezers and pressed against the wood as the tweezers point goes into the wood. This must be done with caution to avoid overdoing the correction and damaging the spring. After the edgewise bend has been removed, the spring is leveled by the method shown in Figure 10.

Leveling a Spring That Has Been Stretched

There are times then the watchmaker is confronted with a hairspring that is cupped out of flat because of an accident. This usually occurs when the balance cock is removed from the watch while the hairspring is still attached to the cock. The balance staff pivot gets caught in the lower hole jewel or sticks in the hole without the watchmaker knowing that it has. The watchmaker lifts the balance cock too far and stretches the hairspring, leaving it cupped.

Figure 12 shows how the hairspring can be held on a broach while the tweezers is used to pull the hairspring away from the cupped position to stretch the spring to remove the cupped condition. This manipulation should be done with caution to avoid overdoing the process.

"Antique Watch Restoration" will continue next month. □

BIBLIOGRAPHY

Bulova School of Watchmaking. "Training Unit Number 6," *Hairspring Truing*. New York, pp. 6-9.

Garrard, F. J. *Watch Repairing and Making*. London: Crosby Lockwood and Son, 1928, p. 146.

Jendritzki, H. "The Swiss Watch Repairer's Manual," *Swiss Watch and Jewelry Journal*. Lausanne, Switzerland, 1953, pp. 68-70.

Sweazey, Thomas B. "Master Watchmaking Lesson 18," *Collecting and Truing Hairsprings*. Chicago: Chicago School of Watchmaking, 1908.

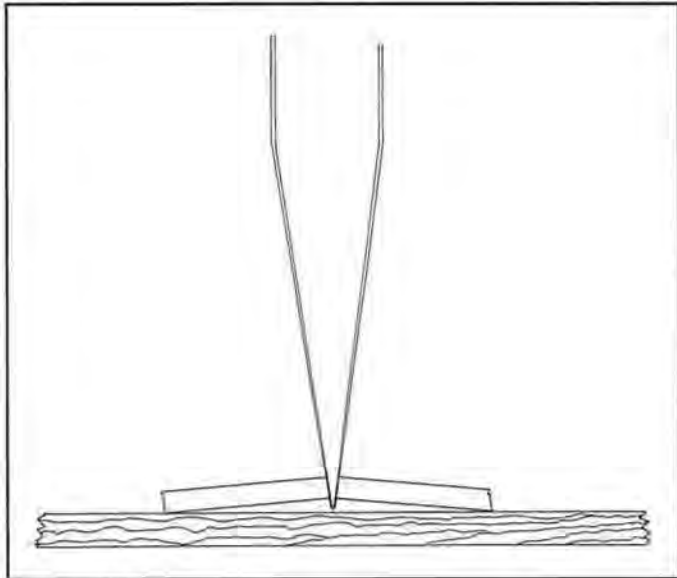


Figure 11.

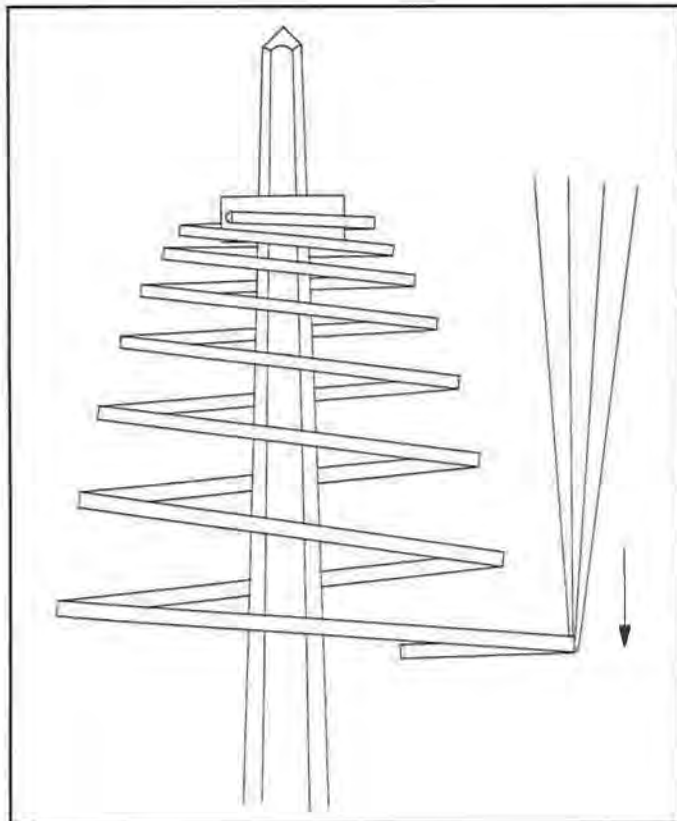


Figure 12.

QUALITY URGOS 5 TUBE! 4/4 WESTMINSTER!



URGOS 5 TUBE MOVEMENT

Quality built 4/4 Westminster 5 tubular bell cable driven movement from Urgos (Factory #03021). All the features you would expect in a first class movement. Automatic night shut-off from 9:45pm to 8:00am, overwind protection, exact second beat, and auto beat adjustment. Supplied with a beautiful 42" long lyre pendulum (measured from hand shaft to tip of pendulum) with 10 1/2" bob, and twisted rods. Plus a 11" x 15 1/2" fancy brass colored moving moon dial with raised Arabic numerals, which attaches directly to the movement. Comes complete with hands, key, 5 tubes, tube rack, weights, weight shells, mounting hardware, and instructions.

084115 - Complete \$1,295.00
084115M - Movement only \$665.00

BIM BAM

MECHANICAL STRIKE BIM BAM MOVEMENT

Quartz mechanical strike movement has a 16" adjustable pendulum with 2 3/4" bob. Operates on 1 "D" cell battery. Movement strikes on the half hour and hour - counting the hours on the hour. Operates normally with or without pendulum. Dimensions: 5 13/16" length, 4 5/8" height, 1 15/16" deep. Handshaft is 7/8" total with 7/16" threaded. Complete with hands and hardware. Note: There is no second hand available for this movement.

812133\$44.95 each



S. LaRose, Inc.
Worldwide Distributors to Horologists

3223 Yanceyville St., P.O. Box 21208
Greensboro, N.C., 27420, USA
Phone: (910) 621-1936
Fax Number: 1-800-537-4513

Bonnixsen's Karrusel Watches

Part 8 (Last in the series)

Performance of Karrusel Watches

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

Karrusels with Fusee Mechanisms

Gazeley, in his book *Watch and Clockmaking and Repairing*, mentions fusee equipped karrusel watches that gave very good performances. He attributes their superiority to the equal power distribution of the fusee mechanism and its maintaining power unit within the fusee. His precaution included attention to the maintaining power clicks and its stop work.

The Performance of Karrusel Watches

The question can then be asked, "How well did these keep time?" The answer is a positive one. Karrusel watches by Bonniksen and those by Smith and others received "Kew A Certificates" from the Observatory at Greenwich, many with grades over 80 (the perfect mark was 100). Correspondence received by Bonniksen in January of 1905 from Charles Chree, Superintendent of the Observatory Department, stated that of the 46 karrusel movements received from Mr. Bonniksen in 1904, 45 passed of which 40 were "especially good" (marks over 80).

Another letter stated that the number of karrusel movements from all sources sent for trial during 1905 was 96. Of these, 93 passed the A trial and 74 out of the 93 were endorsed as "especially good."

An earlier letter received from the Royal Observatory at Greenwich, dated 1902, stated that between 1896 and 1902, 181 karrusel movements were among the watches classified. Of these, 82 were purchased by the government. A footnote by Bonniksen added that since the aforementioned date, an additional 49 were bought.

The Smith & Son catalog, published in 1905, proudly featured a karrusel "Revolving Escapement" watch which received "the record" number of marks at Kew Observatory for a pocket chronometer. The watch obtained 88.1 marks of a perfect 100: 33.1 of a possible 40 for variation of daily rate, 37.6 out of a possible 40 for changes of position, and 17.4 of a possible 20 for temperature variation.

The watch had a 19K cased "half chronometer" compensated balance, revolving escapement, overcoil hairspring, ruby jewels, diamond end stones to the escapement. Pivots were of the finest hardened steel. The mainspring was an extra width and length for equalization of power. It also had a double roller and ruby pallets. Advertised price at that time, £105. The regular "revolving escapement" watches with Class

A, Kew Observatory Certificates, £5 extra. Those with "especially good" certificates, that is over 80 marks, £10 extra.

Other Karrusels

Reinhard Meis, in his encyclopedic book, *Das Tourbillon*, pictures many karrusels and their types including those mentioned here. Aside from these, Meis's book also contains many good photographs and his own fine drawings. These include a 39-minute karrusel by Bonniksen whose carriage is supported by a fixed bridge which supports the pivoted balance bridge. Meis also shows his cross-sectional views of these plus one of a 29-minute karrusel by William and Ernst Holland whose English patent number 202329 was granted September 16, 1902.

A number of 52 1/2-minute karrusels were made by Adolphe Lange of Glashutte and are shown in good photographs. A 7 1/2-minute karrusel by Henry Hughes & Son of London, 1905, also has a supporting bridge as is typical of a 6-minute type by J. Player & Son of Coventry, 1905. Another by George Rossiter of London, 1900, is also catalogued here in photos. Included in this photographic section is a 52 1/2-minute karrusel by Patek Philippe, dated 1928, serialized production number 198202.

Modern Watches with Revolving Escapements

There appears to be a Renaissance of very complicated, price-wise, high-end watches being made and sold at this time. Many of these feature the tourbillon inclusion. One wrist watch made by the International Watch Company (IWC) is billed as a "flying tourbillon" as it has no upper supportive bridge, however delicate, to detract from the full view of its one-minute revolution.

The IWC claims their watch to be "the world's most complex mechanical wristwatch with a limited edition of 125 in Rose Gold, 125 in Platinum, and 1000 in Steel." They celebrate its 125th Anniversary with this watch named "Il Destriero Scafusia" (Versatile Wonder Horse).

Before describing its details, the revolving escapement will be described together with their fine exploded view.

If we examine the IWC "Flying Tourbillon" from the bottom up, we can immediately see the similarity to the karrusel of Bonniksen. The sturdy main plate has a cylindrical hollow stud, threaded on its inside. Directly above this is

the carriage's fourth wheel which will engage the escape wheel pinion above. It also contains the lower escape wheel jewel. Above this is the titanium carriage with its yellow toothed ring attached. The center of this carriage contains a cup-like receptacle. This carriage is secured by the screw just above its center to the main plate with freedom to revolve. Directly above it is the titanium roller bearing which is secured to the carriage by the two screws. Above this is the right angled pallet and the twenty-toothed escape wheel. The titanium skeletonized bridge above contains the framework which is fitted to the carriage below and secured by the three screws which fit through the pallet and escape bridge and into the raised threaded posts. The balance is next, its bottom pivot resting in the lower balance jewel and cap jewel in the roller bearing piece shown below the escape wheel.

The balance itself is secured to its bridge above. This is done after its triangular stud and regulator pins have correctly straddled the overcoil hairspring. Three short screws secure this bridge to the framework below the balance. The watch beats 28,800 V.P.H. (8 per second). The titanium construction provides a very sturdy housing yet is but a fraction as heavy as brass or similar metal that might be used for this unit.

The carriage is motivated by a larger regular fourth wheel which also contains the seconds hand. This is enmeshed with the large wheel on the periphery of the carriage. It turns the carriage as noted earlier, at one revolution a minute. The driv-

ing wheel (not shown) is placed opposite the crown and stem at the Figure 9 position. □

REFERENCE MATERIAL AND BIBLIOGRAPHY

Bonniksen. *The Karrusel*, 1905.

Britten, F.J. *Watch & Clockmakers Dictionary and Guide*, 14th revised edition.

Gazeley. *Watch and Clockmaking and Repairing*.

Helwig, Alfred. *Drehganguhren*, Berlin, 1927.

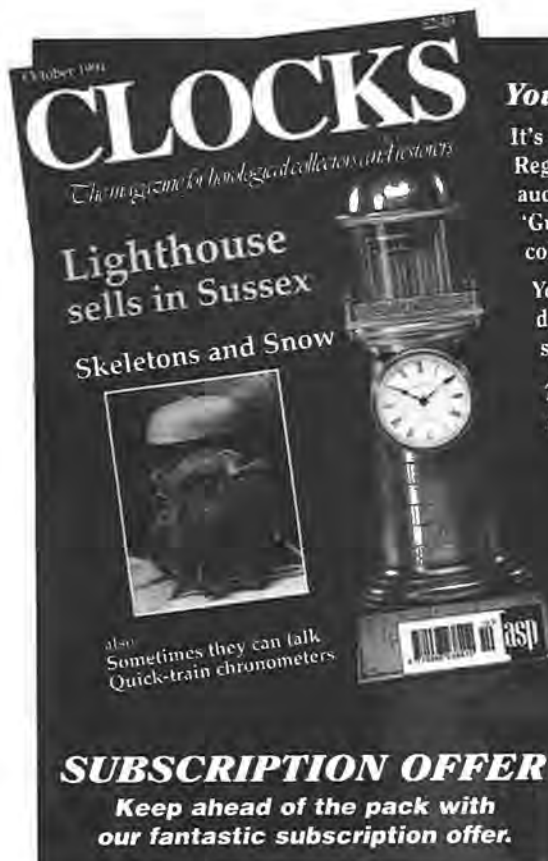
Meis, Reinhard. *Das Tourbillon, Faszination der Uhrentechnik*, 1993.

Randall, Anthony J. and Richard Good. *Catalogue of Watches in the British Museum: Pocket Chronometers, Marine Chronometers and Other Portable Precision Timekeepers*.

Smith & Sons Ltd. *Guide to the Purchase of a Watch*, 1905.

Wellaton, James C. *Le Tourbillon*, 1957.

Wright, T.D. *Technical Horology*.



CLOCKS
The magazine for horological collectors and restorers

Lighthouse sells in Sussex
Skeletons and Snow

also
Sometimes they can talk
Quick-train chronometers

RSJ

Your invitation to discover *Clocks* magazine.

It's sheer inspiration for horological collectors and restorers. Regular features by the finest horological authors, include full up to date auction reports and enlightening features on rare and unusual finds from 'Grandfathers' to sundials. With fantastic colour photography, *Clocks* is a collectors item in its own right.

You can be a truly international clocks enthusiast with our one year direct delivery subscription offer. We have an exclusive offer for first time subscribers only. Prices have been slashed from \$56 to \$46!

That's a saving of \$10, the equivalent of 2 free issues isn't that something worth having?

Yes, I would like to subscribe to *Clocks* magazine for 1 year (12 issues). Please commence my subscription from the.....issue.
Phone our subscription hotline on: (310) 375 6258 quoting your Visa/Access details, or complete this coupon:
At \$46 for 12 issues (USA only). I enclose a cheque/M.O. for \$.....
made payable to Wise Owl Worldwide Publications, or debit my Access/Visa:

Signature..... Expiry.....
Name.....
Address.....
Post Code.....
Home Telephone Number.....

Please post this coupon to: Wise Owl Worldwide Publications,
4314 West 238th Street, Torrance, CA 90505 - 4508 U.S.A.

SUBSCRIPTION OFFER
Keep ahead of the pack with
our fantastic subscription offer.

Affiliate Chapter Column

Affiliate Chapter Annual Meeting

By Jack Kurdzionak



The affiliate chapter delegates began arriving at the Drawbridge Estate on June 22 for their annual meeting. They were warmly welcomed at the registration desk in the hotel lobby by AWI staff members who had all the necessary badges, schedules, and information packets ready. It was a good time for many to renew old friendships.

Later that evening our chairman, Greg Hostetter, hosted a reception for all the delegates. It provided a social setting at which delegates could become acquainted before the formal meeting on Friday morning. This was the second time we have had a reception of this sort and it was an outstanding success. The idea of the evening reception was first conceived about three years ago because many inexperienced delegates were unfamiliar with the structure of the annual meeting. It was begun last year and continued this year, and all who attended benefited from the meeting with the chairman and the other delegates. We were able to introduce ourselves to each other and informally discuss matters that could be brought before the meeting on Friday morning. AWI's Jim Lubic and David LaFleche answered many questions while the chairman led the open discussion of issues that concerned the affiliate chapters.

On Friday morning at 8:00 A.M., Chairman Greg Hostetter opened the meeting with the customary formalities followed by the introduction of the delegates and their alternates. Fred Burckhardt spoke of the watch cell contest, how much the proceeds of the contest contributed to the ELM Trust in the past year, and then he answered questions from the delegates about the Trust.

After the chairman appointed the parliamentarian and committee members, we were honored to welcome to our meeting one of the finest watchmakers in the world, Dr. George Daniels. Dr. Daniels extended greetings from the British Horological Institute and invited us all to visit the BHI when traveling in England. President Joe Cerullo welcomed us to the meeting. His speech was followed by the keynote speaker, Mr. Gene Kelton, Technical Director of the Citizen Watch Company of America. □



Photo 1. Dr. George Daniels addresses delegates. Gene Kelton, keynote speaker, is seated to the far left.



Photo 2. Delegates from 23 chapters meet in session.

Book Reviews

The Top 300 Trade Secrets of a Master Clockmaker, by J. M. Huckabee. Soft cover, 11 x 8", 111 pp., 134 illustrations. Published by A.W.I. Press, © 1994, \$21.00.

Mr. Huckabee is a most ingenious clockmaker who has practiced his trade for more than fifty years. He was last employed by IBM as an Advisor Scientist in the Discipline of Magnetics. Personally, this reviewer knows him as an authentic and most reliable contributing member of the "Answer Box," a department I conducted in the *NAWCC Bulletin*.

The articles he contributes to *AWI's Horological Times* are among those most widely read. This new book with its very clear photos of clock repairing and procedures is one of the best of such aids to reach novice and experienced clockmakers alike.

There are over three dozen main topics covered. Among these are: trade secrets practiced in American antique clock restoration, bearing practices and the winding arbor, wheel assembly techniques, screw making, worn pivots and pivot holes, hand problems, good and foolish tools, Igraham and Sessions differences, straightening that wheel wobble, escapement set-up, suspension springs and pendulum rods, and time train study. Others concern the lathe and the making of many hand tools.

Safety precautions are covered with many original and valid instructions. The clear, close-up, and detailed photos are in sharp focus. The section on pivoting awkwardly positioned arbors is superior in its instruction. Also, mainsprings and clock wheels are included with simple instructions.

Replacing a dial is covered in fourteen photographic views with concise instruction. Wheel installation, disassembly techniques, and wheel assembly techniques take thirty-one illustrations. Each illustration has corresponding instruction directly beside or beneath it. The author uses the ordinary watchmakers lathe and accessories. His bag of tricks mirrors his ingenuity without sacrificing quality. His frank explanations about tools and equipment should be a valuable guide to any clockmaker.

Pendulum suspension springs take up a final section and contain a useful chart of pendulum lengths in inches, millimeters, and vibrations per hour, minute and second accompanied with the adjustments each will bring in seconds, etc. This book's instruction covers the general repairs to the Connecticut-type of clock movements. The instruction certainly is universal in its application. This book is highly recommended since its price is less than a session of personal instruction from this acknowledged master.

Henry B. Fried

Watches, Complete Price Guide No. 15, by Cooksey Shugart and Richard E. Gilbert. Soft cover, 1,100 pp., 6,000+ illustrations, Published by Shugart Publications, ©1995, \$21.95.

This 1995 edition of *Watches, Complete Price Guide* has grown to 1,071 pages, fifty-four more than the 1994 edition. There are numerous pages of advertisements which in their own way may be informational. The extra pages of text, which are thinner in order to maintain a manageable thickness, are of a glossy stock that allows for more distinct photos of watches and their details.

Comparison of the book's contents against last year's edition shows extensive reediting, placing of the print, and much revision of the current values of many items.

Among the additions is an upgrading of the many marks found in the numerous gold-filled watch cases. The full page of solid gold marks remains the same as last year's.

In the pages devoted to the "Market Report (1994)," the authors state that pocket watch activity continued to be strong during the past year, and that highly-jeweled Railroad watches showed an increase in value. Due to diminishing availability, American keywinders also appreciated in value. Foreign watches and older verge watches also rose in price.

Patek Philippe, Assmann, Lange, and other high-grade complicated watches brought 30 to 50 percent more than previous estimates. Wrist watches also showed some rise over previous years.

The Swatch "was soft in 1994; collectors' habits have changed." The authors predict that 1995 prices should do well, and advise the buyer to be bolder in bidding for better quality and scarce items as these are finding ready buyers.

General information has been expanded. An example of a useful addition is the listing of word pronunciations: LeLocle (luh lokel), or repousse (reh-poo-say). Another page compares the definitions of European terminology and United States derivatives with many examples which if followed would, at the very least, make the beginning collector appear knowledgeable.

For the beginning collector, this book qualifies as a manual which, if assiduously studied, should put him in a superior position, collector-wise. For those who have the older volumes, this new one at \$21.95 is about a penny a page and chocked full of carefully compiled and edited current information. Minor variations in a few definitions are too few to detract from its overall usefulness.

Henry B. Fried

Pickle Barrel

Course in Jewelry Repair, Part 11

Jewelry Crafting and Repair

By Marshall F. Richmond, CMW



Finishing, Preparatory to Polishing

Usually there is much work to be done before the actual polishing, when jewelry has been assembled, rings sized, prongs replaced or retipped, or any other work has been done that requires bending, soldering, hammering, or any kind of shaping. Often, rings that have been sized larger are intentionally made about a half-size smaller with a heavier piece of material than the shank where it is to be installed. When gold soldered, a ring can be hammered out on the ring mandrel with a steel chasers hammer. This will shape it as well as stretch it to the exact size needed.

Before bringing a ring to size, it is wise to take it off the mandrel as soon as it is rounded, and with the half-round inside ring file complete shaping the inner surface. Then put the ring back on the ring mandrel and hammer to the exact size needed. It is wise to turn the ring over, because if the shank is very wide it will be only minimally smaller due to the taper in the ring mandrel. With this method a ring can be sized to as close as one-eighth of the desired size for the more particular customers. The sides can then be filed with a flat file to get the width shaped, then the outside of the shank can be made to match the other sides of the added piece. Sometimes it can be left flat, sometimes filed to half-round, some others have grooves or patterns to be engraved. The object should always be to make the ring look as much as possible like it did when it was new.

When doing solder work, the ring is often shielded with borax, or boric acid mixed with alcohol, and burned off after the piece being soldered has been dipped in this solution. Even fluxes use borax. All this should be removed before polishing and can be done so by soaking or boiling in water or pickling solution. Pickling solution is best, for it will also remove any oxides that can be difficult to polish. If not removed, the borax or boric acid crystallizes under intense heat and does not polish off easily with polishing abrasives. This will allow only the surrounding metal areas to polish leaving an uneven polishing job after the entire project is finished. Therefore, the best time to remove any residue is before even starting to shape the article.

When prongs on rings have been replaced or tipped, they need to be shaped to match the other prongs. Usually when prongs are tipped, there is a slight excess of solder over the edge of the girdle of the stone which can easily be removed with a needle file. Most likely, the top of the prong over the upper edge of the stone is too large to match the other prongs. This can also be reduced and shaped with a needle file. If a dome shape is wanted,

a cup bur in the flex shaft tool can be useful. When using the cup bur it is helpful to use beeswax or another lubricant in the cup which will produce a fine finish as well as protecting the cutting edges inside the cup from excessive wear. In replacing a prong, regardless of the method used, there will always be an excess of metal that has to be removed to get the desired shape. If this is done with the stone in the setting, it is sometimes difficult to get a file into the sides of the prong. Sometimes a rotary bur in the flex shaft tool will work well, and sometimes I resort to using hand gravers but caution must be used so as not to bend the prong while applying pressure to make the cuts. If the stone has to be removed because it will not stand the heat, the sides of the new prongs can easily be shaped with a narrow needle file. The outside can be shaped with a flat, fine-cut file and the inside with setting burs. It is sometimes advantageous to go ahead and polish the sides of the prongs before setting the stone. In replacing prongs or tips, it is good to leave the repaired prong a little larger than the others for if any question arises later on with another prong breaking, you can identify the one you replaced.

When heads or settings are replaced there is always an excess of solder where the head joins the shank or where a setting joins the piece of jewelry to which it is attached. This can usually be removed with small needle files thus making it ready for polishing with abrasives. Gold tips with solder already applied are now available from most material suppliers and all that needs to be done is prepare the prong needing the tip. Flux both the prong and the pre-soldered tip, put it in place and apply heat until the solder flows. There should be very little shaping before polishing. This could cut the time needed for tipping and allow more production in a day's work. Any shaping that may be needed can be done in the same way as with other methods of tipping.

In replacing full shanks, the same procedure is used as in changing heads, except the head is old and the shank new. In replacing heads, the head is new and the shank is old. In replacing half-shanks, I always use "V" joints by filing a wedge shape on one side of the joint and filing a "V" cut with a triangular file on the other side. When the shank is installed, the ring should be 1/2 to 1 size smaller than you want. The finishing process can start with rounding the ring on the ring mandrel, then filing the inside of the joints smooth. Next place it back on the mandrel and hammer these joints till the ring is almost to size; this will tell you if you have good solder joints if they do not break when stretching. The outside edges and outside of the shank can then be filed to

shape. When ready to polish, check again for size. If still slightly small, a ring can be brought to size by hammering with the raw-hide mallet which will not mar or change your semi-finish but will stretch the ring to the exact size.

In replacing full bezels there is often much work to be done in getting prepared to set the stone. Sometimes the stone fits a little too snugly or maybe some solder has flowed inside the bezel and will not let the stone set deep enough or level. This excess metal must be removed and it can be done using several tools. Sometimes a hand graver is all that is needed while other times some can be removed by filing or with the use of rotary burs. In some cases a jewelers saw can be used to an advantage. After the stone is set in the bezel, the edges must be bent over the stone. This can be done with a burnishing tool, a flat bottom punch by hammering, or sometimes the edge can be hammered down with the chasers hammer if much caution is used.

After the edges of the bezel have been burnished or hammered over the edges of the stone, they need to be smoothed. This sometimes requires filing, for even the burnishing tool may leave the edges slightly wavy. On the outside edges where the bezel attaches to the ring base there can also be some excess solder. This should be removed with needle files which then prepares the job for the final polishing.

One of the most common jobs we are called on to do is gold solder an engagement ring to a wedding band. Figure 1 shows an engagement ring put together with binding wire and ready to solder. Figure 1A shows the engagement ring side as the wed-

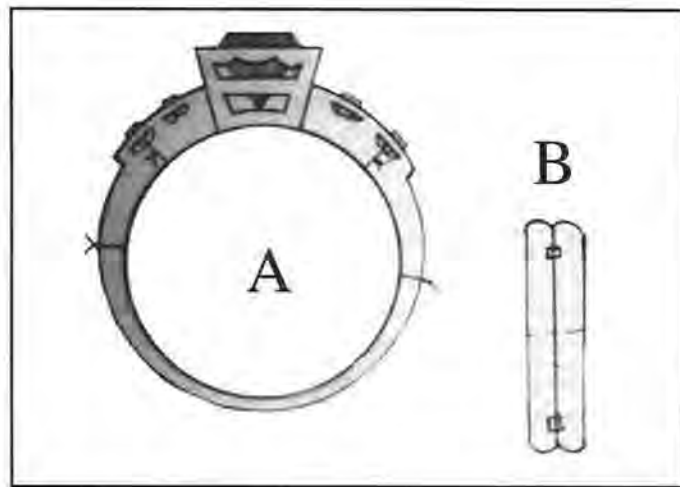


Figure 1. ding band is behind it. Figure 1B shows the bottom of the shanks with the chips of solder ready to heat and flow.

Often customers request to have the size of the rings altered. When the solder is flowed, the rings can be out of round. Also, the bottom can appear to be one shank so the rings must first be rounded on the mandrel. Then the inside, where soldered, should be filed smooth with the half-round ring file. Next the ring should be hammered to size by hammering both the bottom and the sides where soldered. When the size is correct, the sides should be filed to shape and the bottom filed to round the edges. To make the bottom of the shank appear to be two rings, a groove can be cut in the bottom between the two shanks with the jewelers saw.

WITSCHI

is Proud to Present
The NEW
HANDY!!
only \$1850⁰⁰

It's a good instrument for the novice and the expert.

It's so user friendly it "BEEPS" at you if you make a mistake.

Automatically lets you know if it's an ordinary 32KHZ or an inhibition (Gate Time) movement.



- User friendly, all measurements run automatically
- Measures the rate of all quartz and common mechanical watches
- Measurement of IC and total consumptions
- Automatic measuring times
- Measurement of resistance, also tests for short circuits and interrupts
- Watch batteries tested, with low and high drain
- Able to communicate information on a PC or a Citizen Printer via an RS 232 interface

Witschi Electronics U.S.A., Ltd.
P.O. Box 2 • 303 Broad Street • Palmyra, NJ 08065
Tel.: 1-609-829-1179 • Fax: 1-609-829-2266
Tel.: 1-800-882-7977 (U.S., Can. & Mexico only)

The groove can then be widened with a triangular file rounding as you file so when finished the general shape of the bottom of the shanks will look like two half-round shanks. After polishing, the job will be complete.

Engagement rings, especially, become worn below the stone. This condition can be repaired by making a plate and gold, and soldering it in place. Figure 2A shows the place of wear and the plate made to cover it. Figure 2B shows the plate in place. This wear is caused by wearing the engagement ring next to the wedding band as they rub together. If the rings are to be again worn without gold soldering them together, it is well to leave the plate plain. It can be pierced by drilling and using small needle files and rotary burs if the customer insists on it looking like it originally did. There is usually filing to do on the inside of the ring with the inside half-round ring file, and the ends and top with flat files and needle files. Check the finger size: it should be the size recorded on the job envelope when the ring was accepted for repair.

Soft solder is used in many cases for attaching pin-stems, safety catches and emblems. You should use a solder that flows at a low temperature and be careful not to use more solder than is necessary. If you do, it seeps out around the edges of the object being soldered and must be cleaned away. Cleaning away excess solder can be done in several ways, the first being trimmed away with a hand graver, file, or abrasives. Another is to dissolve it with acid being careful that the acid does not get under the object being soldered and loosen it. Muriatic acid will dissolve most soft solders. On solid gold or silver objects, it can be polished off after the heavier coating has been scraped or removed with gravers or files. On gold filled or plated objects, polishing will most likely go through the coating and leave an undesirable appearance. The best way to avoid this is to be stingy with the amount of soft solder used. If you are equipped to do electroplating, the place where polishing has penetrated the plating can be covered up to look like new.

Today a great fad is solid gold chain which is available in many types and weights. Probably the most popular is flat chain

which is made in many weights and thicknesses. The light weight flat chains are delicate and if not handled with care get kinks in them that are sometimes impossible to straighten. They also get broken especially at the ends where the catch or ring for the catch is located. A kink that can't be straightened can be repaired by cutting out the bad place and gold soldering it back together with a slightly lapped joint. Usually no more than 1/4" of the length of the chain is lost and the ends can also be repaired by gold soldering. Even new end caps can be installed. To prepare these for polishing, place them on a steel bench block and hammer them flat with the chasers hammer.

If necessary, the edges can be filed so when polished it will hardly show except for a short, stiff place in the chain. Some heavier chains can be repaired without the repair showing. Curb links or cable links can be cut, fastened to the next link, and gold-soldered so it will not show. Rope chain can be gold-soldered but usually a stiff place will occur at the gold-solder joint. After hammering, filing, or whatever is necessary to shape the repair, the chain should be soaked or boiled in pickling solution and then polished.

Before starting to polish, all work should be done that requires soldering, bending, filing, or shaping so after polishing the job is complete and ready for the final inspection. Final inspection should be thorough for occasionally a flaw in material or workmanship will be found. If a flaw is found, it has to be corrected even though it may require soldering. Soldering at this point means shielding with the alcohol and boric acid burn-off. After the correction is made, the steps to prepare for polishing have to be taken to save additional work.

Hand gravers are almost a necessity in doing extensive jewelry crafting and repair (see Figure 3). Many think hand engraving is letter engraving but the same gravers are also used in trimming, cutting, grooving, and diamond setting. With study and practice you can learn to use these most needed tools.

The next article will cover polishing and cleaning. It will be a discussion on tools, abrasives, the polishing motor, chemicals, and necessary supplies. □

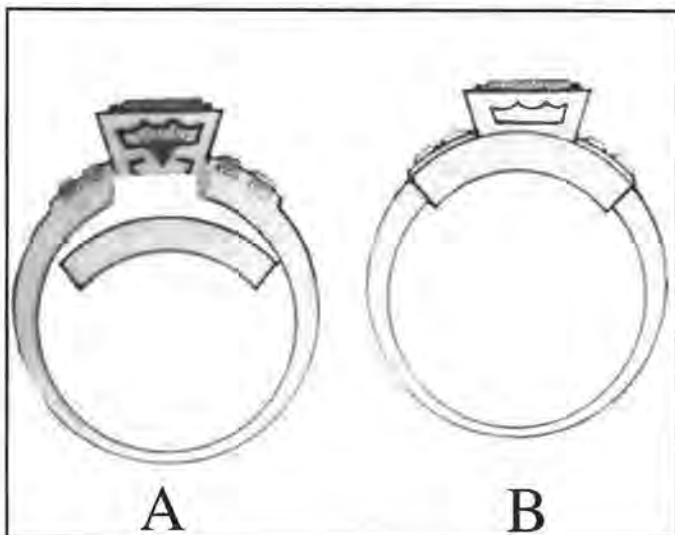


Figure 2.

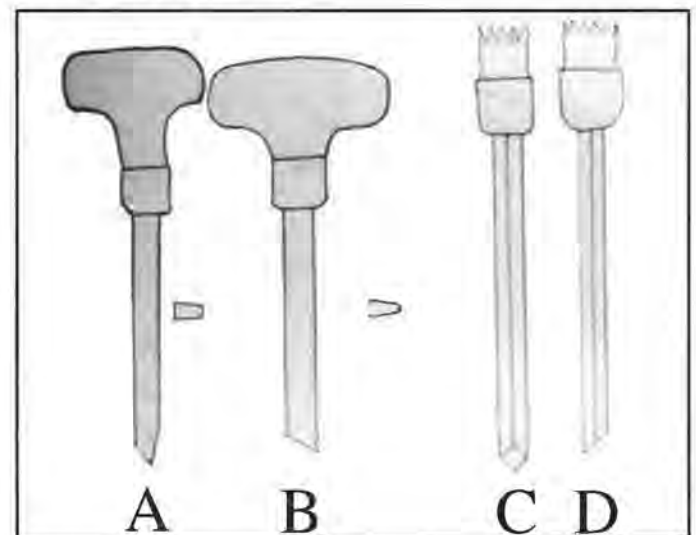


Figure 3. A—Flat-bottom engraver's graver, B—Round-bottom engraver's graver, C & D—Turning gravers.



S.T. International Supply

jewelers tools and watch materials

Battery Starter Kit includes

- 225 Assortment Batteries 50 Different Types
- 60 Drawer Steel Cabinet (MC-300)



NO. BAT 225
Our Best Battery Deal
All for Only
\$115.00
81/2 lbs.
Reg. \$129.00

Economy Watchband Shear



SH-300
\$69.95



**Continuous
Script Dial
Letters Connect**

EN-850
\$280.00

Inside Ring Engraver



EN-860 **\$625.00**
*Free Shipping

Crystal Master II

Replacement Discs		
GR-129	600 Grits	\$92.00
GR-131	1200 Grits	98.00
GR-133	1500 Grits	112.00
GR-137	8000 Grits	125.00

GR-503 Reg. \$375.00



SALE \$318.75



Engraving Machine

Measurements: 11" H x 14" W x 14 1/2" D

EN-775B
Reg. \$1,325.00

SALE *Free Shipping
\$1,195.00



Professional Watchmakers Bench

Measures 38 3/4" W x 20" D X 39" H.
MADE IN U.S.A. **Shipping Weight 126 lbs.**

BN-255D Reg. \$495.00

Sale \$395.00

*Free Shipping

-Free Letters of your
Choice w/ Purchase of
Engraver No. EN-775B
*Limit 1 letter per unit

Miniature Single Line Block	
6:1 Ratio	2 1/2 Ratio
"I LOVE YOU"	"I LOVE YOU"

EN-1015 \$127.50

Double Line Script	
6:1 Ratio	2 1/2 Ratio
"Fred Hogman"	"Fred Hogman"

EN-1003 \$187.50

Double Line Block	
6:1 Ratio	2 1/2 Ratio
"John Adams"	"John Adams"

EN-1008 \$170.00

Single Line Block	
6:1 Ratio	2 1/2 Ratio
"Arnold Romery"	"Arnold Romery"

EN-1007 \$170.00

Deluxe Jewelers Bench

Measures 18 1/2 D x 39" W x 39" H
Shipping Weight 99 lbs.

BN-250A Reg. \$369.00

Sale \$255.00

*Free Shipping



OHAUS SCALES

The "Balance of Choice" for the Jewelry Trade
Build and Serviced in the USA

C-305P	300gram/190DWT	\$189.00	\$129.00
CT-600	600gram/390DWT	\$380.00	\$329.00
CT-600L	600gram/390DWT/3000CT	\$495.00	\$435.00
CT-1200	1200gram/780DWT	\$480.00	\$420.00
CT-10	50CT	\$495.00	\$435.00



RN-600 reg. \$324.00

Ring Stretcher & Reducer
Sale \$199.00

Triple Duty Repair Envelopes



EV-110/1	001-1000
EV-110/2	1001-2000
EV-110/3	2001-3000
EV-110/4	3001-4000
EV-110/5	4001-5000
EV-110/6	5001-6000
EV-110/7	6001-7000
EV-110/8	7001-8000
EV-110/9	8001-9000
EV-110/10	9001-10000

**SUPER
SALE
\$35.95**

Offer Good Through Sept. 29, 1995

***Free Shipping** When you order \$100 or more you get free shipping! (UPS Ground Only)

to place an order call: **S.T. International Group Inc.**

Toll Free Tel. (800)441-1042

Toll Free Fax. (800)572-2356



Timelocks

The Sargent & Greenleaf Family of Timelock Movements, Part IV

By David A. Christianson, CMW, FBHI

In Collaboration with Walter Brueggeman, CPL (Professional Locksmith & Timelock Specialist)

Copyright © 1995



The Electronic Influence

Electronics in the timelock industry is so new that anything said, by expert and outsider alike, tends to be merely speculation colored with one's own prejudices and preconceived notions.

We've stated previously that "electronic timelocks are not faring very well in the industry." Yet we continue in the next breath stating that "Sargent & Greenleaf will have to convert to electronic locking devices if they are to remain viable in the market place." We're assuming that electronics in the timelock industry will be the future, as it seems to be in every other facet of our lives. But we don't know for sure.

We have gone on to state that "the timelock industry has produced only two electronic timelock movements. A model by S&G that is so expensive that the industry has essentially rejected it, and a model by LaGard that is so unreliable (but affordable?) that the industry has essentially rejected it, too." This quote, too, is said tongue in cheek. The Sargent & Greenleaf model may have proven affordable in the long run. As we all know, development costs come off the top and are charged against the first few runs of production, with each unit thereafter dropping in cost as development costs are gradually recouped. However, this has now become a moot point because S&G has recently dropped this model from its product line. Perhaps this electronic model may serve as a springboard for another, less expensive version later on as knowledge and experience increase. We don't know.

What we do know is that the mini-timelock has answered the needs of the fast-food restaurant and convenience store industries. The current models of mechanical timelock movements in use are reliable and repairable. Also, it will be cheaper to repair them than to replace these mechanical mini-timelock movements when they begin to fail through use. The new electronic timelock movements will have to come down in price considerably before they will be a significant alternative to the repair of the current mechanical movements. Although the new electronic timelock from LaGard is attractively priced as far as new timelock movements go, lock makers, timelock makers and distributors will undoubtedly continue to devote their energies to the development, manufacture, and

promotion of electronic versions of locks and timelocks for new installations.

Let's, for a few minutes, pull out our crystal ball and try to peer into the future of the timelock industry. Right now banking rules and insurance industry guidelines encourage, and in many cases, require the use of timelock protection on vaults used in our nation's banks and Savings & Loans. Even in other areas of government and commerce, the use of timelocks is encouraged. After all, there is something to be said for a protective device that is sealed up in the vault or safe and cannot be unlocked at anyone's whim, no matter how desperately he might want it unlocked. However, electronic perimeter protection is so improved that more reliance is being placed on perimeter protection than on timelock protection; so much so that it is safe to say that timelocks in the future won't be used at all in the banking industry or in any industry that uses large vaults for protection.

However, for the small business that uses the protection that safes and money chests provide, the timelock will continue to offer an affordable level of added protection on these smaller safes and chests, even in conjunction with limited electronic perimeter protection: a level of protection adequate enough for the smaller user and much more affordable than the highly sophisticated electronic surveillance systems available to the larger institutions.

A Prediction for the Future

What this speculation and supposition all boils down to is:

1. Timelock protection will be around for a long time to come.
2. Mechanical timelock movements will be around for a long time to come.
3. The need for timelock movement service will continue to grow rather than diminish as more and more users discover that it is more efficient to repair than to replace.
4. The watchmaker will become more and more involved in the timelock movement repair as manufacturers and service companies discover that they can no longer handle the demand or don't want to handle it.

Here are Some More Predictions for the Very Near Future

LaGard will elect to sell electronic locking devices only and will push the use of the SmartGuard™ for all fast-food operations where a delayed action timer (DAT) and timelock functions are required. Keep in mind that I said *electronic locking devices*, not timelocks, that have a delayed action timer that allows the safe to be opened only during a preset time period. Once the safe is unlocked from the outside, either with a key, a combination lock or a push-button key pad, an electronic timer (DAT) is triggered that keeps the door from opening for a preset period, usually 6 to 15 minutes. This waiting period is designed to thwart would-be robbers who would not want to wait around 6 to 15 minutes from the time the safe is unlocked until the door can be opened. A timelock on the other hand allows the safe to be opened without any delay once the preset opening time has been reached. In other words, once the timelock has been set for eight o'clock in the morning and the door is locked, the safe cannot be opened until eight o'clock in the morning or any time after that until it is relocked and reset. Definitely a thwart to would-be robbers, except at the preset opening time (see Figure 1). In the near future, the electronic timelock by itself will only be used for banks, credit unions and retrofit applications.

Sargent & Greenleaf will advertise their electronic locking device with DAT and will use the mini-timelock in its present mechanical form as its primary backup. This

will allow S&G to remain the premier manufacturer for the high-end market which includes the banks and Savings & Loans.

We've said that S&G would be forced to convert to electronic timelocks in order to survive. We now think they will not convert at all, since it is already too late. The introduction of an electronic locking device with DAT by



Figure 1. Prominent sign on the door of a local convenience store. Receipts can be inserted through a slot in the safe, but the safe can only be opened at a specific time by the armored car service when daily receipts are picked up and taken to the bank to be processed.

Vibrograf U.S.A., the leading watch equipment supplier, introduces the latest equipment for the professional watchmaker of the '90's...

WATCH-MATIC Mechanical Watch Timer



LCD Graph Display
Shows Rate, Beat and Amplitude.
Two Year Guarantee.

QUARTZ PLATFORM

Can be added to test quartz and tuning fork watches



SM-8810

Our newest watch water resistant tester features a low-drift detection system that provides the greatest accuracy to-date. Test results can be printed. Pressure-vacuum test to 330 Ft.

Vibrograf has six models of waterproof checkers - one for every budget and need.



Call or write today for our
Free Full-Line Catalog



WATCH-MASTER Quartz Watch Timer & Analyzer

Reasonably priced. Handy instrument. Allows watchmakers to perform most tests recommended by quartz watch manufacturers. Automatic and user friendly.



THREE PAYMENT PLAN WITH APPROVED CREDIT ~ LEASING PLANS AVAILABLE

For more information, or the name of your local distributor contact:

VIBROGRAF U.S.A. CORP.
504 Cherry Lane, Floral Park, NY 11001
Tel: (516) 437-8700 Fax: (516) 437-8708





Figure 2. LaGard's new 2-movement electronic timelock by Ciposa S.A.



Figure 3. The LaGard/Ciposa timelock movement in the now familiar style and size of the Sargent & Greenleaf pattern.



Figure 4. A closer look: note the UC 357 cell (actually two, one stacked on top of the other) at left of center, the release lever in the center, and the "winding arbor" at lower center which is used to program and activate the movement.



Figure 5. Rear view of the movement. Note the mainspring barrel which houses the mainspring that powers the release lever.



Figure 6. Movement with outer cover removed.

Star Safe (AMSEC), which has a long enough opening and closing window to be used as a timelock for fast-food operations, may be a cheap alternative to a normal timelock. This, along with the introduction of many new locking devices from Asia (many with DATs) has forced the price of any electronic locking device down. This eroding of lock prices will result in the following:

- A. LaGard will be the premier electronic lock manufacturer and will sell only to the high-end original equipment manufacturers (safe and vault makers).
- B. Sargent & Greenleaf will be the premier mechanical lock manufacturer and will sell to original equipment manufacturers, lock distributors and service men, just as they have done in the past.
- C. The rest of the marketplace will be dominated by foreign lock manufacturers and the price of a cheap safe will be driven lower as electronic locking devices (not timelocks or DATs, but electronic locks) become as cheap to produce as quartz watches.

The LaGard/Ciposa Electronic Timelock Movement

All speculation aside, the movement that LaGard has bet its future on is the electro-mechanical movement designed and manufactured by Ciposa S.A., the electronics division of St. Blaise of Switzerland (see Figure 2). This is the movement that we've called unreliable, yet I'm just as sure that the statement is very presumptuous and premature.

The movement, as you can see in Figures 3-9, is built on the footprint of the now very familiar Sargent & Greenleaf family pattern that we've looked at throughout the previous three articles. The movement uses a digital liquid crystal display, electronic setting and an electronic micro-processor that controls an electro-mechanical step motor. Although I now understand that they will be introducing one with an analog display that shows hours in the normal way and does not have to be programmed. This movement has supposedly been on the European market for two years. The stepping motor drives a cam wheel and gear train that triggers the release of a coiled mainspring at the appropriate time to release the blocking bolt of the timelock case through a snap-action lever arrangement. This is just like the snap action employed by the mechanical S&G snap-action #2 movement.

The actual setting of the digital time display and daily safe opening times, along with the winding of the snap-action spring, are all done through the turning of a conventional winding arbor square located in the lower center of the movement (the same place that the winding square is located on the conventional movement). It is a unique approach to providing the accuracy and dependability of an electronic time-keeper combined with the smoothness to snap open a blocking lever in the time-tested manner of the mechanical snap-action timelock. This, like the quartz analog watch, can be a watchmaker's movement. The movement can be disassembled easily, the mechanical portion can be serviced, and the electronic portion can be operated upon as well, as long

as spare electronic components and assemblies can be made available.

As for reliability, time will tell. And if LaGard remains committed to this movement, any nuances and difficulties can be resolved to the benefit of both themselves and the end user, as well as the watchmaker who would be called upon to service it. □

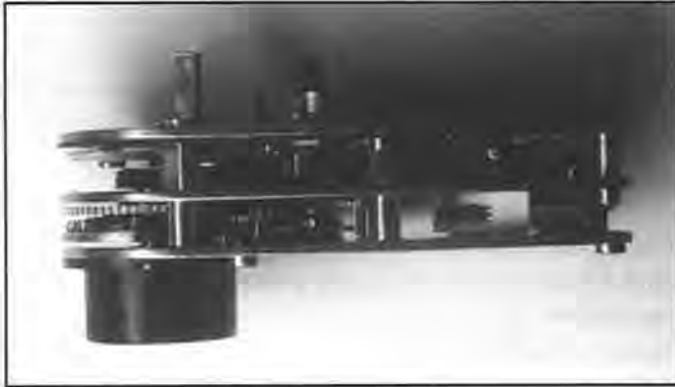


Figure 7. Side view of the movement.

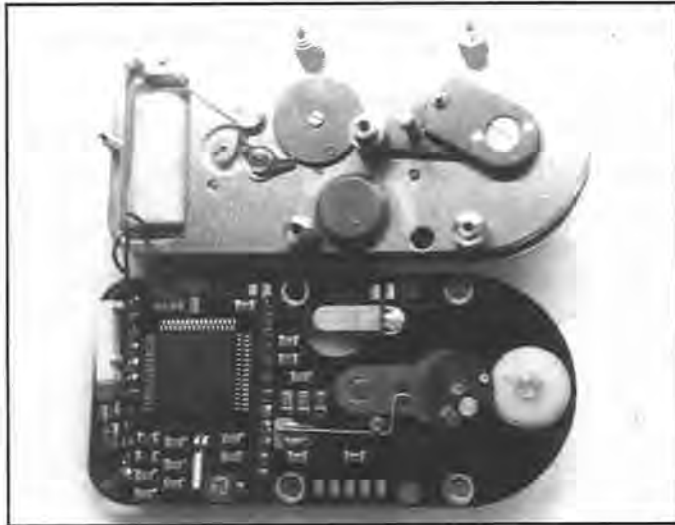


Figure 8. Circuit board removed.



Figure 9. Side view of the movement with the circuit board removed.



Complete Suppliers to Watchmakers & Jewelers Since 1918



Watch Parts ♦ Watch Bands
Eveready & Renata Batteries
Crystals ♦ Cleaning Solutions
Tools ♦ Equipment ♦ Supplies
Casting Supplies

The
UNITED TOOL & MATERIAL CO.

535 16th St., Suite 840
Denver, CO 80202-4243

PHONE & FAX

TOLL FREE 1-800-332-4158



Mastercard & Visa Accepted



ROLEX

WATCH MATERIAL

FOR GREAT SERVICE ON ALL
CROWNS, SAPPHIRE & PLASTIC
CRYSTALS, TUBES, GASKETS,
MOVEMENT PARTS, ETC.

"WE ONLY SELL GENUINE ROLEX PARTS"

CALL: S&G INDUSTRIES

TOLL FREE: 1-800-942-0047

FAX: 1-800-423-4256

"WE STOCK WHAT WE SELL"



WE GIVE QUICK AND EFFICIENT
SERVICE 24 HOURS A DAY!
7 DAYS A WEEK!

New Jersey: (908) 469-7200

Repairing Mechanical Watches & Clocks

A Complete Series of Bench Practices

Correcting the Bent Hairspring, Part VII

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

Bent Hairsprings

Bent hairsprings are of two types: those which tilt from the main body and level of coils to occupy different levels, called "out-of-flat"; and those which cause the spiral development to become disorderly and unequal, called "out-of-round."

Choosing the Right Tools

Hairspring tools consist of finely pointed tweezers and long, thin, polished needles set into light holders such as pegwood or plastic sticks. Only the most delicate pointed tweezers should be used for work near the collet.

Experienced watchmakers and hairspring workers prefer short, pointed tweezers over the long tapered types. Short tweezers are stronger, yet can reach in between most coils of the hairspring. The strongest tweezers possible should be used, as they permit you to get closer to the work and they relay greater sensitivity while making corrections.

Find the Bending Point

The first step in attempting to correct a bent hairspring is to find the source of error, or the bending point. The exact spot of the bend can be elusive because it might be

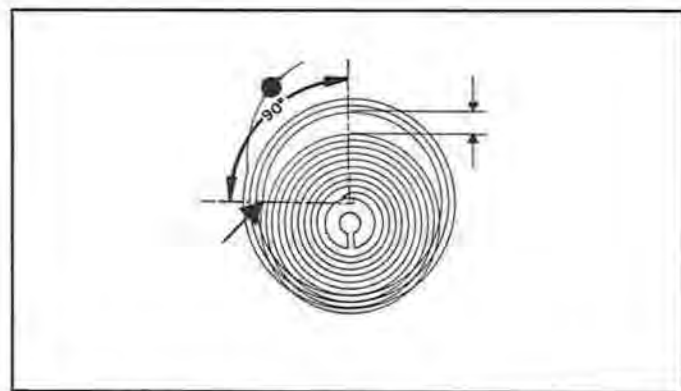


Figure 40. Before attempting to repair a bent hairspring, locate the exact bending point of the coil. You will notice with an outward bend that there is an area of greatest space between the coils. Progressing inward toward the collet, the source of the turn is 90 degrees, or one-quarter turn around, designated by the arrow.

hidden under another coil. In some cases the bend is so gradual that its exact beginning is difficult to find.

Figure 40 shows a hairspring bent outward in-the-round. The bend is a sudden, sharp deviation and easy to spot. Notice that when a spring is bent outward there is an area where the space between the coils is greatest. The source of the bend is one-quarter turn inward toward the collet.

On Figure 40 a cross-line illustrates a system for locating the deviation point. The area of the greatest space between the coils is at 90 degrees to the bend itself.

Correcting the Outward Bend

After determining the point of bending, grasp the spring with tweezers at this point but a little behind the bend, closer to the collet as shown in Figure 41. If the bend is near the outer end of the hairspring, nudge the hairspring with a finger of your free hand. You will have a more direct and sensitive touch than if the "feel" has to go first through a tool and then to the fingers.

The tweezers act as a vise, while you nudge the entire section of spring outward of the bend. Do not be concerned that the nudging finger is actually pressing on the outer coils, as in Figure 42. The spring will only bend at the point held by the tweezers. Using the finger whenever possible is the safest method. There is less chance of introducing a new bend in the "fault."

If you use two tweezers, grasp the hairspring with one and use the second closed, as you would a needle. If both tweezers are grasping the spring, any shake or miscalculation will result in a new bend, similar to that in Figure 43.

Rather than chance excessive bending or new bends in the opposite direction, nudge the spring lightly and repeatedly so that the bend back to normal is made in gradual increments.

Compounding the Problem

If the bend is close to the collet, do not use the finger to nudge the hairspring directly. A fine polished needle set into a pegwood stick is best. Grasp the hairspring with the tweezers, as usual. Sometimes if the bend is close to the collet it is advisable to grasp the hairspring on the side of the bend closest to the *stud* and not the collet. This al-

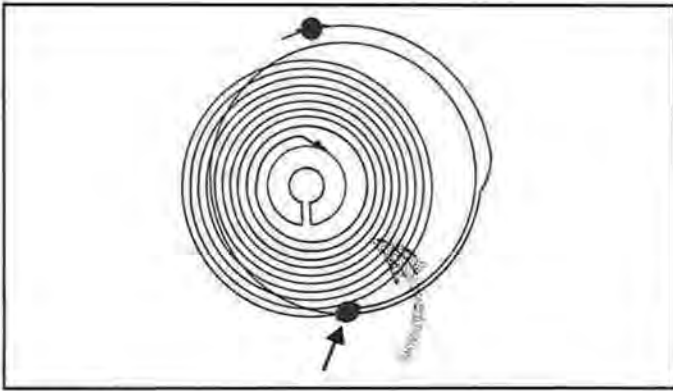


Figure 41.

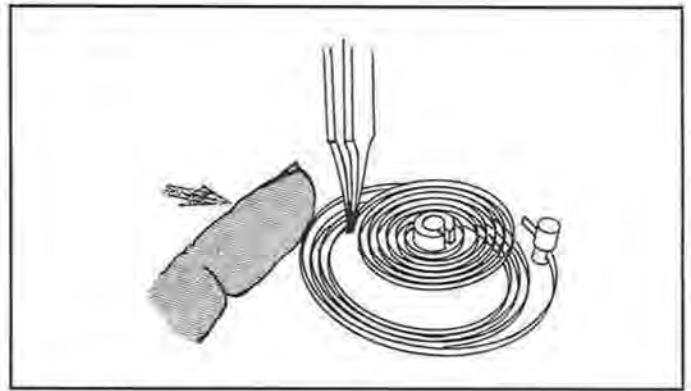


Figure 42.

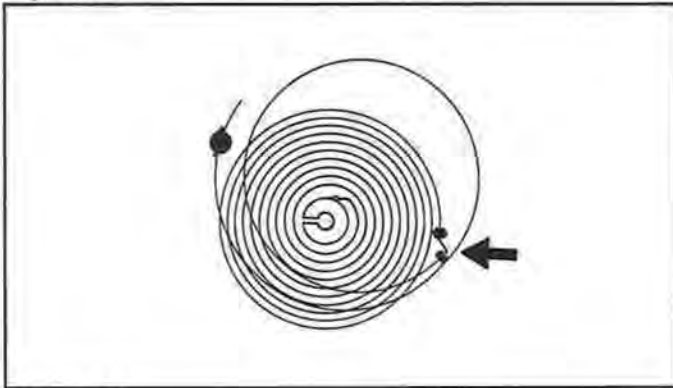


Figure 43.

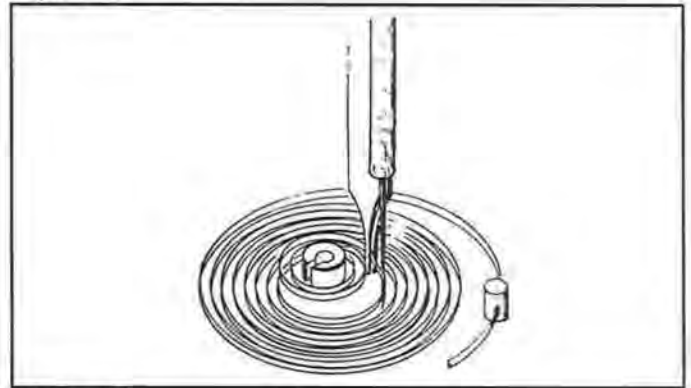


Figure 44.

Figures 41, 42, 43, and 44. To correct an outward bend, grasp the spring with tweezers just behind the bend as shown in Figure 41. Using your finger, as in Figure 42, nudge the section of spring outside the bend. The tweezer acts as a vise. If you prefer to use a second pair of tweezers, use it closed. If both pairs grasp the spring the slightest shake will result in a new bend, as in Figure 43. A polished needle is best to nudge a bend so close to the collet as in Figure 44.



The
Wm. S. McCaw Company

WHOLESALE JEWELRY

Since 1913

1722 Madison Avenue
Toledo, Ohio 43624

Tel 419/243-3720
Fax 419/243-0321

GENERIC ROLEX MATERIAL

PLASTIC CRYSTALS (all popular numbers)	\$6.00ea - \$15.00/ 1/4dz
SAPPHIRE CRYSTALS (check our quality)	\$39.95 & up
CASE TUBES - SWISS MADE (5.3mm & 6.0mm)	\$5.95ea
TUBE GASKETS - SWISS MADE (5.3mm & 6.0mm)	\$6.00/dz

CALL TOLL FREE 800-472-0200 or 800-537-0343



Wholesale Watch Materials • Tools and Findings • Jewelry • Boxes



lows the needle to nudge the spring and collet back to normal gradually, as in Figure 44.

If there are two or more bends in the hairspring, correct the more severe bend first. This restores at least a partial appearance of an orderly spring and lessens the confusion of coils overlapping each other. If multiple bends cause confusion, the simplest procedure is to correct the outermost bends first, working gradually toward the center. Then more critical and exact corrections can be made afterward.

Again, a reminder—moderately pointed tweezers are recommended for correcting coils near the stud, while finer tweezers are needed closer to the collet. Near the collet the radii of the curves are shorter and sharper. Therefore, any corrective force exerted near the collet has a greater effect and causes a sharper bend than the same force applied to a coil near the stud.

When a coil has been bent inward, as in Figure 45, it looks in worse condition than one with an outward bend. This is because the coils cross one another and, as does Op art, confuse the eye as it follows a spiral path along the spring to pinpoint the bend. Actually, an inward bend is easier to correct.

Determine the bending point with the same 90-degree method described earlier. The one exception with an inward bend is that because the fault has caused a diminishing of space, we trace it from the point of *least* space back one-quarter turn toward the collet.

Manipulate a pair of tweezers with flat inside surfaces so that the blades straddle the bend, as in Figure 46. Pinch the tweezers gently to bring out the bend and restore the curve. If you squeeze too tightly, the bend will be overcompensated. It will then have to be corrected as if it was an outward bend, which we described previously.

The Gradual Bend

If a spring has been bent so slightly that the bend is not sharp and cannot be spotted easily, it becomes more important to discover the exact point of deviation. Otherwise, an inexact point of correction will only introduce a new bend.

Follow the path between the coils outward from the collet with your eye until the space between the coils either diminishes or becomes greater. Then use the 90-degree method to determine the bending point.

Figure 47 shows an example of a bend which confuses efforts to correct it because it appears that there are a number of bends. Actually, there is only one bend, situated at A. This bend has caused the spring, one-quarter turn outward, to press against the adjacent coils and force them to touch one another at B. This, in turn, has caused the spaces diametrically opposite to become a like amount greater, at C, D, E, and F.

In such a case, pinch the hairspring at A to bring the coil outward. This relieves the pressure against the two inner coils at B and diminishes space F back to normal.

Again, pinching the spring when a bend is closest to the collet has a greater effect than the same manipulation closer to the stud. A glance at Figure 48 makes this clear.

Gradual bends can be corrected by a series of small bends, each close together to form a gradual curve resembling the correct spiral. Sometimes the correction can be made with the finger, as in Figure 49. Diametrically opposite the anchored bend, push the hairspring with the finger to hump up that portion of the spring momentarily and restore the correct curve. Of course, take care not to overbulge the spring.

Crinkled Hairsprings

Fortunately, crinkled hairspring sections are usually confined to the area near the stud. They are often caused by pinching from the pins of a nearby regulator. Inexperienced corrections further the crinkle while the spring is still attached to the balance bridge.

The corrective procedure is literally an ironing-out of the spring using two pairs of tweezers. With the stronger of the two, grasp the good portion of the spring tightly. With the weaker tweezer, preferably one with an oiled smooth inner surface, grasp the spring as close to the strong tweezer as possible and lightly move it away from the strong tweezer, as in Figure 50. Repeat this operation, increasing pressure on the spring until it is free from crinkles. Then correct the curve as with a gradual bend.

Some watchmakers correct crinkles by resting the spring edgewise on a polished piece of white glass. The glass provides a smooth surface and contrasting background. Then rub the hairspring with the back of a rounded tweezer or polished needle. While the needle irons out the crinkles, it also causes the hairspring to curl upward, assuming nearly the curve which it formed originally.

By all means do not grasp the stud with the tweezer while ironing out the spring with another tweezer. This will only result in tearing the spring at the stud.

If correction must be made close to the stud, grasp the spring so that at least a tweezer's point breadth of light can be seen between the tweezer point and the stud. Then turn the spring so the stud points downward, enabling more of the spring to be seen and pinched. Hairsprings are weakest at the points where they enter the collet and the stud because the pinning and bending operations have already put these points under stress.

Many studs have two diameters. The larger is on top, while the smaller one bearing the spring is below. Turning the spring on its face allows the tweezer to get directly at the point where the spring enters the stud.

Correcting hairsprings which are bent out of flat is more difficult than correcting those which are bent out of round. If you place an out-of-round hairspring on a flat white background, you can watch the fault while you correct it. But in order to see the fault in an out-of-flat hairspring you must lift the spring and view it from the edge, select the bending point from the other coils, then lay it down again and remember the exact spot while proceeding to correct it. □

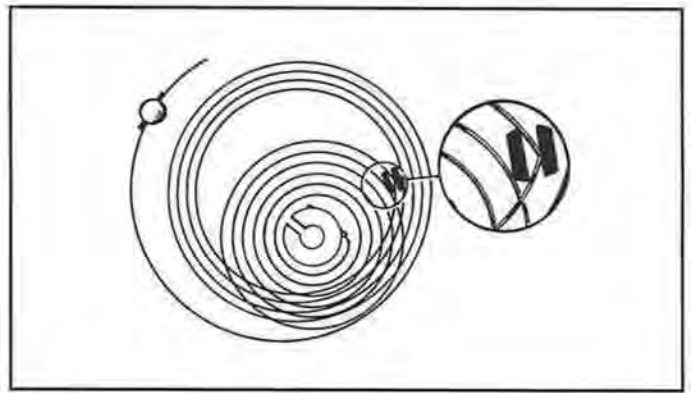
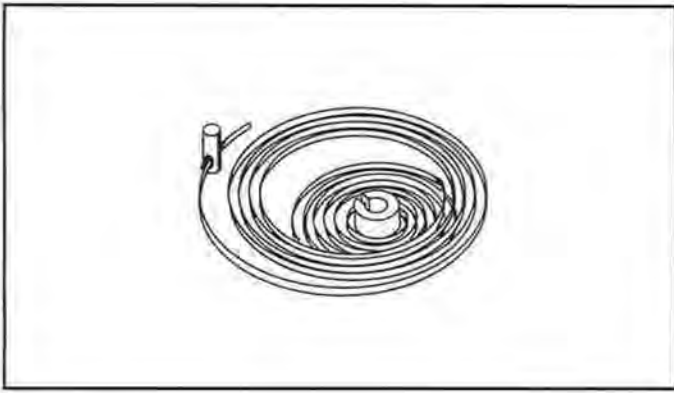


Figure 45.

Figure 46.

Figures 45 and 46. An inward bend, such as in Figure 45, looks more confusing because the coils appear to cross each other. Correct the bend by pinching gently between a pair of flat-surfaced tweezers, as in Figure 46.

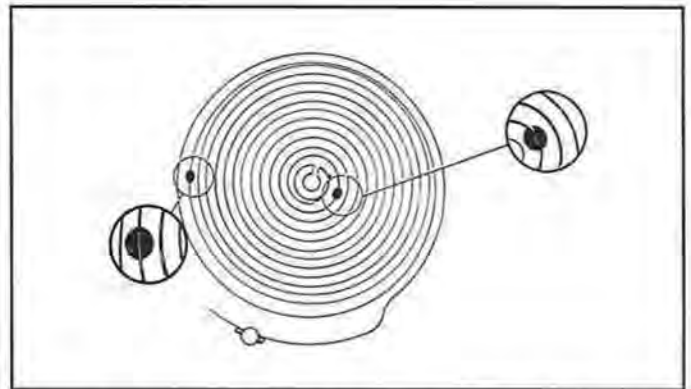
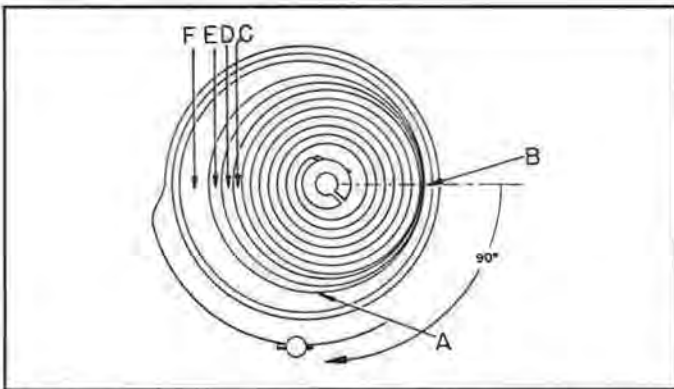


Figure 47. A gradual bend, at A, forces adjacent coils to touch one another at B, creating larger spaces at C, D, E, and F.

Figure 48. Pinching a bend in a coil near to the collet has a greater effect because of the more pronounced curve of the coil.

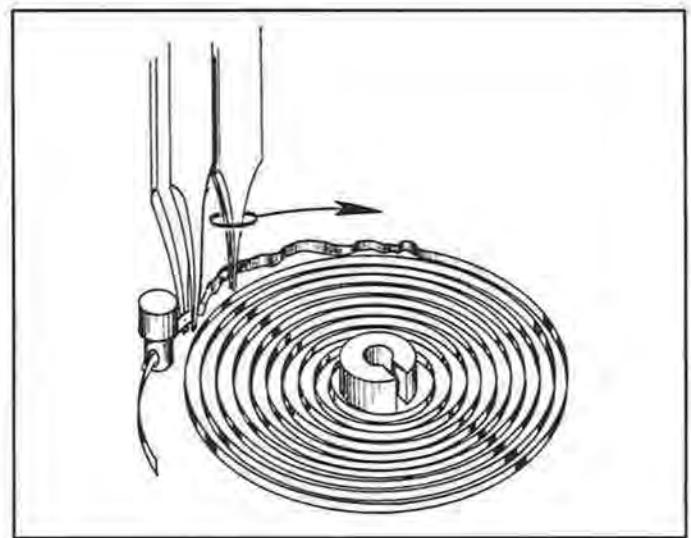
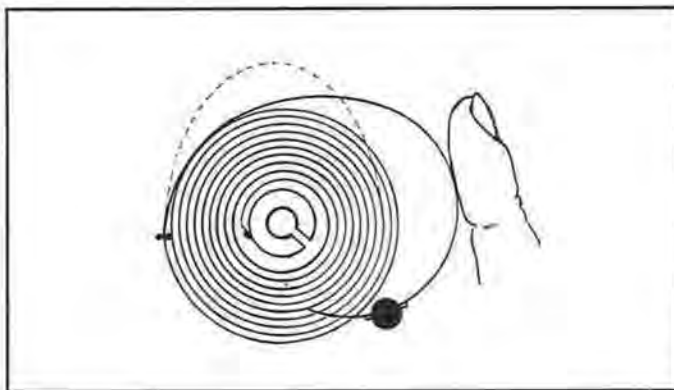


Figure 49. A gradual bend can be corrected by a series of small bends formed by humping the spring with the finger.

Figure 50. A crinkled hairspring is corrected by stretching or ironing out the coil between two pairs of tweezers.



WE'RE INTERESTED IN YOUR COLOR SLIDES

The American Watchmakers-Clockmakers Institute knows that there is a wealth of talent in its membership and that this talent is not only in the field of horology. There is seldom a gathering of a group of watchmakers and clockmakers where a camera is not also there.

Those of you who pride yourself in the beauty of your camera work can possibly participate in having your own picture reproduced on the cover of *Horological Times*. The covers of *Horological Times* are reproduced from color transparencies or slides. Remember, the format is scenery or nature, and what you submit must be a color slide. Color photos are not acceptable.

If your color slide is used, you will receive an 8 1/2 x 11 inch color photo. It will be framed and sent to you for your enjoyment. Mail your color slide with description to:

Horological Times
701 Enterprise Drive
Harrison, Ohio 45030

All slides become the property of the American Watchmakers-Clockmakers Institute.



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 directly.

- 7A2 Longines 18.69, 18 ligne, escape wheel
- 7A4 Gruen 850, 17 ligne, winding pinion, part #6228
- 7A6 Fusee chain, size 8" long x .020" wide
- 7A7 Rolex GMT Master needs a steel GMT bezel and retaining ring, case #6542/321925

If you can supply any of these items, please contact:

AWI Material Search Network
AWI Central
701 Enterprise Drive
Harrison, Ohio 45030

If a member wants to use this service, there is a fee: \$5.00 per part or the donation of a complete vintage watch movement per part. We prefer the donation of a vintage movement.



Stella

THE FINEST UNBREAKABLE ROUND WATCH CRYSTALS
A QUALITY NAME YOU CAN DEPEND ON

THE CRYSTALS
YOU NEED AT A PRICE
YOU CAN AFFORD!

WE HAVE **STELLA**

LO-DOME CRYSTALS HI-DOME CRYSTALS
HUNTING CRYSTALS RING CRYSTALS
TO NAME JUST A FEW

IF YOU HAVEN'T
TRIED US RECENTLY,
NOW IS THE TIME!

Contact your watch material supplier today and ask for us by name -- **STELLA**

Distributed by:

American Perfit Crystal Corp. 653 Eleventh Ave. New York, NY 10036

AWI Staff Assignments

Milton Stevens, Executive Secretary, recently announced the following changes in AWI staff assignments. Stevens explained that these changes will help to maximize the investment in a new building, video studio and equipment, computer network with new software, and the two new classrooms with a greatly expanded educational program.

"The important part of these changes," Stevens said, "is that by shifting responsibilities in certain areas we will better serve our members, and utilize our new equipment and facilities to the fullest without having to hire additional personnel."

James E. Lubic has been given a three-year contract to establish and implement the expanded educational program for the Institute. His new title is Education and Technical Director.

David LaFleche will assume the title of Communication and Finance Director. Because of the investment we have made in a computer networking system and hardware, and a similar investment in a video studio and equipment, it is necessary to have someone responsible for having these new systems perform to their fullest potential. David has the ability to accomplish this assignment.

In order to provide time for these new responsibilities, David's administrative duties will be assumed by the Executive Secretary. He will be assisted by Nancy Wellmann who will trade her title of Administrative Assistant for that of Office Manager.

Donna Baas will serve as the Editor of *Horological Times* and the current editor will become the Editor-in-Chief/Publishing Director. These changes will allow Milt Stevens to concentrate more on the technical content of the magazine while Donna Baas is responsible for the non-technical content. It will also allow Mr. Stevens to develop the several books we have lined up for publication during the coming year.

Beginning with the January 1996 issue of *Horological Times*, you will begin to see a change in the magazine format. The magazine content is good but the format is very stale. A make-over in the format will be welcome by most readers.

In order to free Jim Lubic for his new duties and Donna Baas for her new duties, Nancy Danner will once again assume responsibility for processing technical requests. Lubic and Baas have been doing these in recent years. Nancy will also continue with her library and data entry assignments.

□

STEAM DRAGON Atmospheric Steam Cleaner

Made in the U.S.A.

60 -90 P.S.I.
Dry Steam
Instantly on
demand!

\$749.⁹⁵
List Price



Minimum Maintenance

•No filling and no blowdown.

•Unlimited distilled water supply

•One Year Warranty

•Easily Repaired with readily available parts.

Rugged Construction

•All 16 ga. Stainless

•Solid State Electronics

•12" X 15" X 11" High

•Easily Portable / 29 lbs.

•1200 Watts / 10 Amp

Simple Operations

•Automatic burst control or Foot pedal models.

•Safe for Walls (no boiler) Stores heat not boiler Steam.

•10 Minute heat-up

Manufactured by Newall Manufacturing Inc. 30 East Adams Street Chicago, IL. 60603
312.236.2789 800.621.6296 FAX 312.236.2231



GREAT NEWS AMERICA!

by J.D. OLSON

It's called Whatiuse, and it is what I use. *Whatiuse* is an orange oil furniture polish and cleaner that contains NO silicone, and NO solvents have been added. It's all natural and won't leave residue on your fine wood.

Whatiuse is blended to replace the oil that time has removed from your furniture, and will leave the mild, pleasing aroma of oranges as it removes wax, grease and gum from your wood.

For your fine furniture, antiques, clocks, kitchen cabinets, gun stocks, the bow on your boat, or the wooden dash on your limousine, you will love what I use.

Just apply with a soft dry cloth and wipe off excess. That's all there is to it. And your furniture will look great. There is no mixing, and you don't need gloves.

You will receive two 8oz. bottles of *Whatiuse* for only \$8.95. The call is FREE, and the factory will pay all shipping charges. With Visa, Mastercard or Discover, call 1-800-868-7348 or send a check for \$8.95 to Whatiuse P.O. Box 2100, Eugene, Oregon 97402.

Available from fine furniture stores and select clock shops.



The Novice Watchmaker

Stem Gaskets

By David Christianson, CMW, FBHI

Stem Gaskets

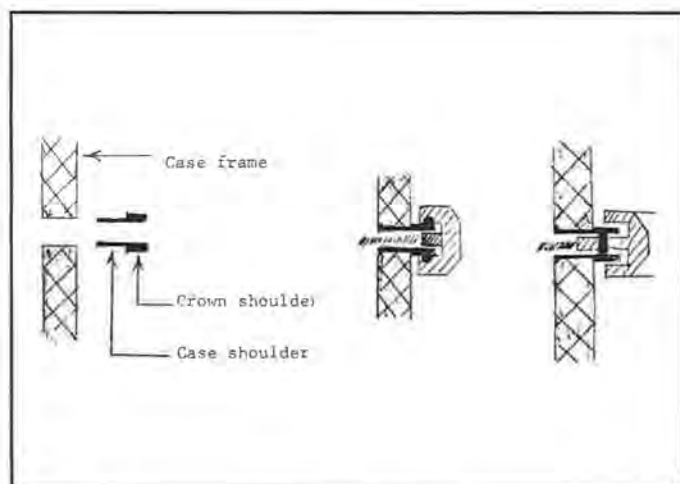
The stem gaskets are a fairly recent innovation. It seems that the Japanese came up with the idea and then the Swiss followed suit. Instead of fitting an O-ring crown gasket inside the crown and seating it against the outside of a case tube, the Japanese started fitting an O-ring around the base of a crown or even on the stem itself (see Figure 1). They would then seat it against the inside of a case tube or even inside the stem hole in the case frame (see Figure 2).

With the older Swiss system of the O-ring inside the crown, when the O-ring deteriorates and becomes hardened, the whole crown must be replaced. In the Japanese system, when the O-ring becomes hardened or flattened, just the O-ring needs to be replaced (see Figures 3 & 4).

Keep in mind that after a few years in use, whether the O-ring is in the crown or on the stem tube, the O-ring needs to be replaced. The rubberized O-ring begins to deteriorate and loses its ability to resist moisture. On the O-ring inside the crown (Swiss system), if the crown rotates easily and little or no drag is felt as you turn the crown, replace the crown. On the O-ring on the stem (Japanese system),

if the crown rotates easily and little or no drag is felt when you rotate the crown, replace the O-ring.

Each time a watch comes in for servicing, whether it be for a new crystal, new power cell, or cleaning, turn the crown to check on the amount of drag that the O-ring gasket puts on the case tube. If there is little or none, pull out the stem and visually check the condition of the O-ring. If it is hardened, dented, flattened, or filthy, suggest a replacement. If it is still supple and not distorted, add a bit of silicon gasket sealant to the O-ring and re-insert the stem and crown into the watch (see Figures 5 & 6). If a watch comes in for cleaning and lubrication, include a replacement O-ring stem gasket or crown into the price of the repair from the outset. To do less would be to invite trouble in the near future when the moisture or dust invades the watch case through the case tube and nullifies your cleaning job. To protect your cleaning job automatically lubricate a supple gasket on the case back, stem, crown, and battery hatch. Replace even a slightly defective case back gasket, stem/crown gasket, or battery hatch gasket. □



Drawing A.



Figure 1. Water-resistant crown with O-ring gasket built inside the crown which seats against the outside of a case tube.



Figure 2. Water-resistant stem O-ring gasket which fits around the base of the crown and seats against the inside of a case tube.



Figure 5. Lubricating the outside of the case tube prior to replacing the O-ring crown onto its case tube.

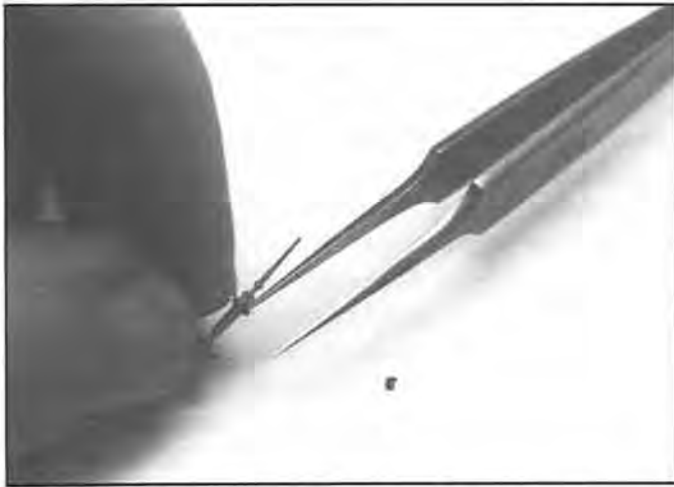


Figure 3. Replacing the old hardened, flattened stem gasket (half of which is lying in the lower center of the picture). The new O-ring is slid over the stem and up onto the recess in the hub of the stem using a fingernail and a pair of tweezers. Be careful not to stretch the O-ring any more than absolutely necessary to do the job.

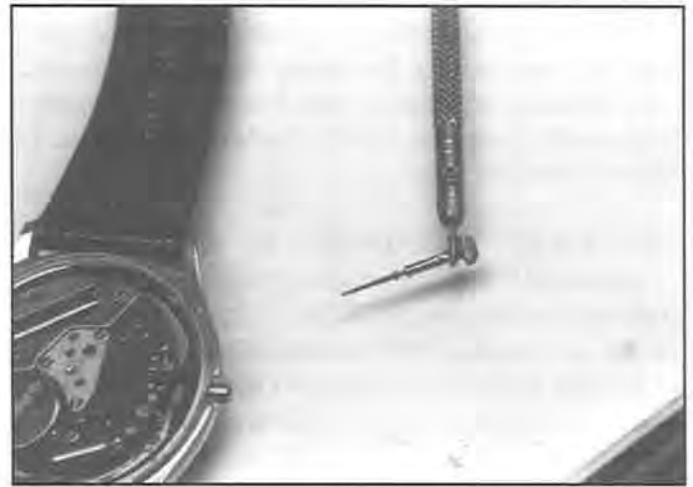



Figure 6. Lubricating the stem gasket prior to inserting the stem through its case tube and into the movement.



Figure 4. The recess in the stem hub onto which the new O-ring is slid.

Support
The AWI-ELM TRUST
SCHOLARSHIP PROGRAM
 BY SENDING YOUR OLD
 WATCH BATTERIES TO THE



AMERICAN WATCHMAKERS
 INSTITUTE
 701 Enterprise Drive
 Harrison, Ohio 45030

News of the Trade

ESSLINGER & COMPANY MARKETS A NEW LINE OF STONE RINGS

Patricia Liquad of Esslinger Company, St. Paul, Minnesota, advises that Esslinger has a new line of green-colored quartz jewelry mounted in 14K rings, pendants, and earrings. A natural stone like the amethyst, green-colored quartz is mined in shades from pale lavender to deep purple. The stone is then treated to obtain an emerald look-alike. The price for these stones is much less than the genuine or lab-created stones, and the green-colored quartz offers the advantage of being a genuine stone.

BUTTERWORTH MARKETS NEW CLOCK LINE

Pallas Import and Distribution Limited of Canada has named Butterworth Clocks, Inc. as its exclusive agent for its Henschel and Laurentien clock lines. They have been manufacturing clocks in Canada since 1890 and feature the Hermle 9-tube unit in eleven different models—the most available from any manufacturer. The clocks are also manufactured using Hermle gong chiming units. For information, contact Butterworth Clocks Inc., 1715 Pearlview, Muscatine, IA 52761, 1-800-258-5418.

VIBROGRAF U.S.A. INTRODUCES "WATCH MATIC"

Vibrograf U.S.A. has introduced the "Watch Matic" Mechanical Watch Rate Recorder. The "Watch Matic" measures the rate and amplitude of fine mechanical watches and can be used for hairspring vibrating. A Quartz Platform can be added to test all quartz watches. This Swiss-made instrument comes with a two-year warranty and can be serviced in this country. Contact Vibrograf, 504 Cherry Lane, Floral Park, NY 11001-1696, (516)437-8700.



JEWELERS OF AMERICA APPOINTS RUNCI EXECUTIVE DIRECTOR

Jewelers of America (JA), the world's largest jewelry association, announces the appointment of Matthew A. Runci to the position of executive director. The designation will be effective on September 30, 1995, upon the retirement of present Executive Director, Michael D. Roman. In his new capacity, Runci will be responsible to the Board of Directors for the overall operation of the association, including strate-

gic planning, operations and financial management.

Runci, 49, is a proven leader and team-builder with sixteen years of management experience as a senior executive with the Manufacturing Jewelers and Silversmiths of America, Inc. (MJSA), Providence, Rhode Island, a nonprofit, national trade association. "We considered numerous candidates inside and outside our industry and unanimously agreed Matt has the credentials to lead JA forward and build on the foundation Mike Roman laid," says Irving Getz, chairman of the Search Committee and past president of JA.

As a current president and CEO of MJSA, Runci is responsible for the direction of operations and activities for the association. During his tenure at MJSA, he has been credited for numerous accomplishments, including the steering of the association through a difficult financial crisis. Most recently, he led a year-long strategic planning project that resulted in a refocused mission, reformed governance structure, redefined membership eligibility criteria, and the development of an operating plan targeting the membership's priority needs.

Prior to his current position, Runci served in key management positions with MJSA, managing the association's federal and state government relations programs and export development services. A Boston College alumnus with a University of Virginia Ph.D. in Foreign Affairs, he taught political science at the College of New Rochelle, New Rochelle, New York, serving as department chairman from 1976-79.

Runci is an active member in the American Society of Association Executives (ASAE), the Twenty-Four Karat Clubs of the City of New York and Southern California, the Boston and Providence Jewelers Clubs, and the Women's Jewelry Association. He also volunteers as the Board of Directors' president for the Diamond and Jewelry Industries Development Corporation of New York City and serves on the Jewelers Vigilance Committee Board of Directors.

Jewelers of America is the national trade association for the professional jeweler. Its mission is to assist its members in improving their professionalism and profitability by providing access to meaningful educational programs and services, leadership in public and industry affairs, and by enabling members with common interests to act in their and the industry's best interests.

JOSEPH BULOVA SCHOOL GRADUATION MARKS 50 YEARS OF SERVICE

On June 30, The Joseph Bulova School held its Golden Anniversary graduation exercise. Joseph Nieves of the U.S. Department of Labor was a featured speaker. During the celebration, Simon Critchell, CEO of Cartier, announced a scholarship program sponsored by the American Watch Association. The program is designed to attract disadvantaged youths to the Bulova School.

News of the Trade

WHEELCHAIR BOUND ATHLETES HOOP IT UP IN A DEBUT SUMMER TOURNAMENT

The Bulova Blazers, the wheelchair basketball team of the Joseph Bulova School in Woodside, Queens, announced the first ever summer tournament for wheelchair basketball. The tournament ran from June 24-August 16, and was open to any member of the NWBA (National Wheelchair Basketball Association).

As the Joseph Bulova School celebrates its 50th anniversary, it also celebrates the independence and active lifestyles of all wheelchair-bound individuals.

"Being active is an important part of anyone's life, able-bodied or disabled. Since organized athletic activities for disabled athletes are limited, we felt it was important to supply an outlet to wheelchair-bound athletes this summer," stated Michael DeOrio, Athletic Director of the Joseph Bulova School.

The tournament was comprised of four teams of no more than eight players per team. The players for each team were selected by a classification number and an impartial lottery process. The total cost to participate in the tournament was \$70, and the amount was collected in three installments.

For more information about the Joseph Bulova School's summer tournament for wheelchair basketball, call Coach Frank Simmons at (212)996-3929, or Michael DeOrio at (718)424-2929.

JAZ WATCHES OFFER FASHION FLEXIBILITY

JAZ watches offer fashion flexibility with the introduction of JAZ Versatiles and Charm-ing sets. Whether the mood calls for informal elegance or a show of sophistication, the newest collection from JAZ creates just the right look.

VERSATILES. Moving from career to sport to dress has never been easier than with JAZ Versatiles. The most adaptable line so far, this new collection features interchangeable snap-on bracelets and screw-on bezels. Whether the look calls for the glimmer of gold complimented by the sparkle of rhinestones, the shine of a sleek silver-tone bracelet, or the welcome appearance of a two-tone sport link, JAZ Versatiles are made to accommodate. Elegant design is also what makes JAZ Versatiles so exquisite. Mix and match an assortment of bezels, from sporty to elegant, to handsomely complete any look. Each versatile gift-boxed set comes with two interchangeable bracelets and three interchangeable bezels and retails for \$125.

CHARM-ING. Nothing adds appeal like a charm and JAZ watches is the first watch company to bring this hot European trend from the streets of Europe to the United States. JAZ watches understand the allure of these diminutive trinkets and offers a watch that features the twinkle of charms.

But what makes these charms so extraordinary is their versatility. Available to be mixed and matched among watches, gold-toned faces call for charms designed in the likeness of crescent moons, hearts, and angels, while silver bezels are complimented by silver-toned hug & kisses, stars, and hearts. Gift boxed sets include a leather strap watch and three interchangeable charms and retail for \$75. JAZ watches, a division of the Seiko Corporation of America, will be available at fine department and specialty stores nationwide in time for your new fall look.



THE LATE GIL MARGOLIS' COLLECTION AT CHRISTIE'S

The Gil Margolis Collection of marine chronometers was a highlight of Christie's sale of Important Clocks on July 12, 1995.

During his lifetime Gil Margolis, a renowned American film editor, assembled one of the most comprehensive collections of marine timepieces to have appeared at auction.

It is the collection of a true connoisseur. Mr. Margolis had a very real understanding of marine horology and under his highly discerning eye acquired some of the finest works by the foremost chronometer makers.

The collection is international in scope, comprising a strong Continental European section, including pieces by Henri Motel, Ondine Dumas, Ulysée Nardin, and Constantin Vacheron, as well as an impressive American section which features the work of Elgin, Hamilton, and Waltham.

The collection also comprises a fascinating selection of horological books, a whole array of spare movements, and an exquisite group of four 19th Century large-scale working models by Mouline.

An eight-day marine chronometer by John Poole (estimate: £6,000 - 8,000) and a two-day marine chronometer with Hartnup balance (estimate: £5,000 - 8,000) are among the highlights of the collection.

□

Education Update

The week of July 9-13 was a very important week at Project Extend as it was the beginning of a new era in AWI education. Antoine Simonin, Director of WOSTEP introduced a new course to twelve AWI members in our new Marvin E. Whitney Education Center. The course, "Precision Timing," is an in-depth, hands-on training program designed to teach the intricacies and delicate process of precision timing adjustments. With all the high grade Swiss watches being manufactured and repaired today, this was a very important educational course for those involved.

The students had the opportunity to listen to one of the best horological lecturers in the business as well as take advantage of one of the most modern, well-equipped labs in the country. There were plenty of modern, up-to-date timing machines for all the students to practice with, as well as evaluate for their future needs. Witschi Electronics AG, of Buren, Switzerland, donated a Witschi Professional to AWI for our members to use and become familiar with while attending Project Extend classes. This was hand delivered by Tony Voight of Witschi USA on the day of the ribbon-cutting ceremonies at AWI's new headquarters. John Hager of Vibrograf USA also loaned AWI a new timer to the US market—the Greiner V-401. Other timers were the Witschi High Tech and Watch Expert as well as the Vibrograf UPG 1000 and UPG 2000. With the Triaxial Video Camera and monitor, all students were able to take full advantage of the time they spent in the new training center.

The only Project Extend class scheduled for September, Quartz III, still has openings. The instructor for this course is Alice Carpenter, CMW, CMEW. If you have been contemplating becoming certified in electronic watch repair, now is the time to go for it. Mrs. Carpenter spends the first part of the week reviewing and answering questions in order to prepare you for the exam. During the last half of the week, Mrs. Carpenter monitors the CMEW examination for all the participants. Certification is not only important for the professionals in our trade, but is also meaningful to the customers you service.

We have three classes scheduled for October. The first one will be Watch III; I will be the instructor. In this class the students will learn the steps necessary for vibrating hairsprings. The steps include how to choose the proper spring, collecting the spring, vibrating, and finally, pinning the stud in the proper position. This is all done on a Unitas 6497, 17 ligne movement. Towards the end of the week, I will move on to overcoils. AWI will supply railroad-grade pocket watches so the student can practice adjusting the overcoil for isochronism, plus learn and practice dynamic poising as to time the watch for position adjustments. Hairspring Vibrating is scheduled for October 9-13 and there is still space available.

The second class is Watch IV, Complicated Watches, and is scheduled for October 16-20. The term *complicated* is sometimes mistaken when referring to this course. This course is about calendar mechanisms and automatic winding mechanisms, not

Chronographs. I will take the students through several common and not so common mechanisms. We will have hands-on instruction as to how to service these mechanisms as well as how to properly repair badly worn automatic devices. If time permits, we will also service a mechanical stop watch. If you have had problems with comebacks on either vintage or modern mechanisms of this type, I'm sure we can remedy this during class. This class also has space available.

October 23-27 is when Ron DeCorte, CMW, teaches Watch V, Pocket Watch Restoration. Mr. DeCorte has recently returned from Switzerland, where he spent the summer working. Mr. DeCorte requests that each student bring to the class a pocket watch that they would like to have restored. After registering for this course, each student will be contacted by Mr. DeCorte so the nature of the restoration can be known. This enables Mr. DeCorte to be properly prepared by class time. There are still a few spaces available for this class as well.

For more information regarding Project Extend courses, contact AWI Central. Remember the ELM Trust has educational grants available for students in need of assistance for attending Project Extend.

Bench Courses

Mr. Roy Hovey kicks off the first of three phases of the lathe courses in Tucson, Arizona, September 15-18. This is in conjunction with the Arizona Watchmakers, Clockmakers and Jewelers Guild. Mechanical Watch Repair is also scheduled there during the same weekend. Contact AWI Central for more information.

The following bench courses have open registration:

Course	Location	Dates
Advance Quartz Watch Repair	Minneapolis, MN	Sept. 9 & 10
Cuckoo Clock Repair	Seattle, WA	Sept. 16 & 17
Intro. to Quartz Watch Repair	Boston, MA	Sept. 16 & 17
400-Day Clock Repair	Richmond, VA	Sept. 23 & 24
Cuckoo Clock Repair	Boston, MA	Oct. 21 & 22

Robert Bishop, CMEW, FAWI, has been invited to teach "Smart Watches" in Effingham, Illinois, on October 6 for the Central Illinois Watchmakers. Roy Hovey and John Nagel have been invited to give programs for the Minnesota Clockmakers Guild on October 20-23.

For more details concerning any of the Bench Courses or Affiliate Chapter programs, contact AWI Central.



Education Update



Photo 1. Mr. Simonin demonstrates to (LtoR): Mitch Velkas, Louis Burwinkel, Tamera Houk, Dan Fenwick, Mortiz Elsaesser, Dave Chandler, George Jakowczuk, and Steven Speech.



Photo 2. Dave Chandler gets a closer look.



Photo 3. (LtoR): Instructor Antoine Simonin, Mitch Velkas, Chris Wiles, Bill Burnley, Louis Burwinkel, Steven Speech, Tamera Houk, Dan Fenwick, Mortiz Elsaesser, Susan Packer, Dave Chandler, George Jakowczuk, and Richard Redman.

WOSTEP Report

Antoine Simonin, Director of WOSTEP, was the first to present a course in AWI's new Marvin E. Whitney Training Center at the new headquarters facility in Harrison, Ohio. Simonin's course, "Precision Timing," was filled to capacity during the week of July 9-13.

The *WOSTEP Happenings*, a biannual publication, announces new openings for WOSTEP courses.



Participants in the second WOSTEP course of 1994. From left to right: G. Burton, GB (complicated course); R. Rao, USA; M. Appel, USA; J. Gröhn, Finland; S. Churchill, GB; A. Bak, Denmark; T. Groenefeld, Holland; R. Doherty, GB; M. Pieters, Holland; Y. Chrysanthou, Cyprus; S. Hale, GB (complicated course); B. von Wyl, Instructor; A. Simonin, Director. Kneeling at the front: H. Wideberg, Instructor; V. Lopes, Portugal (complicated course); R. Frêne, President.

"Until recently, WOSTEP was known to have a two-year waiting list and this situation became difficult for a lot of people. Our plans to enlarge the WOSTEP premises will mean that we will be able to accept more students and next year is open for new enrollments. Thank you for spreading the word around or enrolling yourself for one of our courses."

Course	Duration	Dates
Refresher course	20 weeks	Feb.-June 1996
		July-Nov. 1996
Course on complicated watches	20 weeks	Jan.-May 1996
		Aug.-Nov. 1996
Watchmakers lathe course	10 weeks	October 1995
		January 1996
		April 1996
Train the Trainer	4 days	Oct. 9-12, 1995
Train the Trainer	4 days	English Nov. 27-30, 1995 French



DEDICATION OF NEW AWI HEADQUARTERS

The long awaited dedication of AWI's new headquarters building took place on June 23, 1995.

One of the highlights was the dedication of the Henry B. Fried Clock Tower. The plaque on the tower reads: In recognition of Henry B. Fried's contributions to Horology and Humanity.

The project was funded by Dr. Fred and Isabel Beeler of Kalamazoo, Michigan. Dr. Beeler was a watchmaking student of Henry Fried in the 1940s. This association developed into a warm friendship that lasted over the years. Mrs. Beeler said she felt this would be a fitting tribute to a man who meant so much to them and to others.

The clock tower was designed by AWI President, Joseph Cerullo. The movement was manufactured by E. Howard Clock Company, Boston, Massachusetts in 1924. It was originally installed in the Rockville Center High School in Long Island, New York and was located for AWI by Cerullo. The movement has been completely restored by Joseph Cerullo and his committee. Final linkage to the hands is currently being engineered by Lloyd Larish, AWI member and nationally recognized clock tower expert from Minnesota.

Photos A, B, C, D, E, and F, record the events of the clock tower dedication. Photos A and F show the clock movement. Photo B shows Mrs. Beeler as she unveils the plaque of dedication. Photo C shows Henry Fried commenting on the clock tower and reminiscing about how he came to know Dr. Fred and Isabel Beeler. Photos D and E show the tower before and after the unveiling.

After the clock tower dedication, attention was focused on the new AWI Headquarters Building. In photo H, the President of Al Neyer Construction Company presents Milton Stevens with the key to the building. The key is attached to a piece of oak which had been trimmed from the door frame of Mr. Stevens' office.

In Photo J, Mrs. Ann Whitney cuts the ribbon for the new building. Marvin Whitney served as a member of the Building Committee and made many of the decisions that resulted in the final design. His untimely death shortly before the completion prevented him from seeing the results of his work. Mrs. Whitney stated that she knew Marvin was at her side as she cut the ribbon.

After the ribbon cutting, Milt Stevens used the key to open the new building and invited the approximately 300 assembled guests inside (see Photo I). Eagerly awaiting this opportunity along with the other assembled guests were (LtoR): J.M. Huckabee and Mrs. J.M. (Gladys) Huckabee from Austin, Texas; Jim Door and Mrs. Wes (Betty) Door from Kennewick, Washington (see Photo L).

Inside the building shows Mrs. Whitney as she views the plaque identifying the education wing as the Marvin E. Whitney Training Center (see Photo K).

All of the other photos show guests as they had their first look at the Orville R. Hagans Time Display which is the focal point of the new headquarters building (see Photos on this page). The collection is part of the AWI ELM Charitable Trust's Collection. The Trustees, their wives, and volunteers were responsible for arranging the display.

In addition to the Time Display, the building houses the two Marvin E. Whitney training rooms, a complete video studio, the Henry B. Fried Research Library, a multi-purpose conference/reception room and the office suite with ample storage space.

The building is positioned on a 3.5 acre lot at 701 Enterprise Drive, Harrison, Ohio, a small community located on the west side of Cincinnati, Ohio (see Photo G). Members seeking a tour of the Time Display are requested to contact AWI Central at least a day or two in advance for an appointment. Due to the security system, arrangements must be made to disarm the system at the designated time of your arrival. The office is open weekdays from 8:00 A.M. to 4:00 P.M. Visits can be scheduled for these hours.

Photos by: Wes Door, Aaron Rennert, and Joe Biggs.





PHOTOS BY:
WES DOOR
AARON RENNERT
JOE BIGGS



11



12



13



14



15



16



35TH ANNIVERSARY AWARDS BANQUET

Special entertainment was provided to mark the 35th anniversary awards banquet. Photos 1, 2, 4, and 5 show Maxwell The Magician as he entertained the attendees. You will note that in Photo 1, Ewell Hartman is about to lose his shirt.

Dr. George Daniels was an honored guest and spoke at the banquet (see Photo 3). He brought greetings from the British Horological Institute, a sterling tray from the Worshipful Company of Clockmakers, and a parchment from the Stockholm Watchmakers Guild, Stockholm, Sweden sending greetings on the occasion of AWI's opening of its new headquarters. In addition, Dr. Daniels presented two books to the Henry B. Fried Research Library.

Retiring directors, Chuck McKinney, Fred Burckhardt, and Gerald Jaeger were presented plaques noting their service to AWI (see Photo 6).

The Annual Affiliate Chapter Achievement Award was established in 1980. It is awarded to that chapter who best exemplifies service to the members, to the community, and to the profession. The decision is based primarily on the content of the Annual Report Form submitted. Judging is done by an especially appointed committee of Affiliate Chapter delegates. This year the Maryland Chapter won the award. Photo 7 shows their delegates accepting the award.

M.R. "Buddy" Carpenter and Fred Burckhardt are all smiles as they seem to be enjoying their dance (see Photo 8). The truth is, both are trustees of the ELM Trust and are thinking of the dollars contributed to the Trust to entice them to dance.

Photo 9 shows the directors of the Class of '95 who were just sworn in to commence their terms as Directors of the Institute. (LtoR): Greg Hostetter, Charles Cleves, Ewell Hartman, Marshall Richmond, Toby Witherspoon, and Jack Kurdzionak. Witherspoon and Kurdzionak are, respectively, Research and Education Council Director and Affiliate Chapter Director.

Everyone attending the banquet automatically contributed \$10 to the ELM Trust and received an opportunity to win one of the gold Horology Medallions which was created especially for the Trust. Photo 10 shows Calvin Sustachek, the lucky winner claiming his prize.

The Henry C. Frystak-Donald J. DeWolfe Award is sponsored by the Watchmakers Association of New Jersey. The award is given to the individual who, within a calendar year, makes the highest score over 90% on AWI's CMEW Examination. Photo 11 shows Henry Frystak and John Sokol accepting the award from Awards Chairman, Glenn Gardner. The winner was Bernard G. Koontz of Carlisle, Pennsylvania.

Jon W. Horton, Tulsa, Oklahoma, won the Dick Lange Award for the individual making the highest score on an AWI CMW Examination within a calendar year. This award is sponsored by the Watchmakers Association of Ohio and the award was accepted by the Ohio delegate. There is no photo.

The AWI ELM Trust Battery Competition again generated a spirit of rivalry and enthusiasm among the chapter delegates as they awaited the results of the battery "weigh-in." Proceeds from the sale of the used batteries are utilized for the benefit of the Trust's Student Loan Fund. The remaining photos show the various delegates as they receive their ribbons of recognition for their participation in the competition. (See photos 12-17.)

17



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

The series of "Random Clock Talks" videotapes listed below are available for loan to AWI members from the AWI Audio Visual Library. The tapes vary in viewing time from 1.25 to 2.00 hours and are available in the VHS format. A service charge of \$5.00 each is to accompany requests to borrow a tape; only one tape is loaned at a time. The service charge covers AWI's production and shipping costs. Tapes should be returned to AWI within 7 days after receipt, insured for \$30.00. Please order tapes by number along with your name, address, and \$5.00 service charge. Send to: **AWI Audio Visual Library, 701 Enterprise Dr., Harrison, OH 45030.**

TAPE 1: Approximately 2 hours

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

TAPE 2: Approximately 2 hours

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

TAPE 3: Approximately 2 hours

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

TAPE 4: Approximately 1.50 hours

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

TAPE 5: Approximately 2 hours

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

TAPE 6: Approximately 1.75 hours

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

TAPE 7: Approximately 1.75 hours

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

TAPE 8: Approximately 2 hours

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

TAPE 9: Approximately 1.75 hours

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

TAPE 10: Approximately 1.50 hours

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

TAPE 11: Approximately 2 hours

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

TAPE 12: Approximately 2 hours

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

TAPE 13: Approximately 2 hours

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

TAPE 14: Approximately 2 hours

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

TAPE 15: Approximately 2 hours

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

TAPE 16: Approximately 1.50 hours

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

TAPE 17: Approximately 1.75 hours

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

TAPE 18: Approximately 1.75 hours

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

TAPE 19: Approximately 2 hours

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

TAPE 20: Approximately 2 hours

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

TAPE 21: Approximately 2 hours

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

TAPE 22: Approximately 2 hours

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

TAPE 23: Approximately 2 hours

SUBJECT MATTER: Pivot and bushing problems and their repair.

TAPE 24: Approximately 2 hours

Not available at this time.

TAPE 25: Approximately 2 hours

SUBJECT MATTER: Clock mainspring and barrel work.

TAPE 26: Approximately 2 hours

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

TAPE 27: Approximately 2 hours

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

TAPES 28 & 29

Not available at this time.

TAPES 30-34: Approximately 2 hours each

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

TAPES 35 & 36: Approximately 2 hours each

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

TAPE 37: Approximately 2 hours

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

JUST OFF THE PRESS!

**A NEW BOOK FROM
J.M. HUCKABEE**

The Top 300 Trade Secrets of a Master Clockmaker

The material in this 111-page book covers essentially all of the more difficult tasks encountered in the restoration of older American clocks. Each step is given in such detail that journeymen and students alike can enrich their skills as "with the master's touch". Most of this work can be readily adapted to other clocks encountered in our craft. The guideline for this work is to create instructional material that is easy to read, well illustrated, and time-efficient in use. Tools used are those economically available and within the bounds of the earning ability within the clockmaking trade. A large portion of the jobs are those which many workmen send to a specialty shop. Each task is broken down into a series of simple operations. None are hypothetical in nature, and all are presented in a logical series of events. Commonplace jobs are not included. For example, no mention is made of cleaning, lubrication, and the multitude of minor adjustments. Those items are covered in a variety of good literature available to our trade. No claim is made as to the methods being "the only way". However, a claim is made to technical excellence, easy to achieve, time and cost efficiency, and the ability to withstand the most critical review by those skilled in the art. The origin of these skills is a consolidation of formal training, technical literature, and association with numerous masters in our trade. This has been enhanced by a half century of experience in the clockmaking and machine tool industry. It is my sincere desire that you will be able to add some new ideas to your personal skills.

\$21.00 postpaid

The Ship's Chronometer

by

Marvin E. Whitney

CMW, CMC, FAWI

First published in 1985, this 1991 revised and updated edition is a comprehensive treatise on ship's chronometers. There are 499 pages of scholarly research, profusely illustrated with photos, charts, and original, easy-to-understand drawings. A must for the practical watchmaker and for every serious student of these remarkable timepieces. Printed on glossy, heavy stock quality paper. Written by Marvin E. Whitney, author of the popular book *Military Timepieces*.

\$75.00 postpaid

ORDER FORM

I'd like to purchase:

_____ *The Top 300 Trade Secrets
of a Master Clockmaker* - **\$21.00**

_____ *The Ship's Chronometer* - **\$75.00**

Name _____

Address _____

City _____

State _____ Zip _____

Phone _____

Check MasterCard Visa

Credit card # _____

Expiration date _____

Signature _____

Detach & mail to:

AWI CENTRAL

701 ENTERPRISE DRIVE

HARRISON, OH 45030

PHONE (513) 367-9800

FAX (513) 367-1414

CLASSIFIED ADS

REGULATIONS AND RATES

Ads are payable in advance \$.75 per word, \$.80 per word in **bold type**. Classified display ads are \$30.00 per column inch, 2-1/4" wide. Ads are not commissionable or discountable. The publisher reserves the right to edit all copy. Price lists of services will not be accepted. Confidential ads are \$5.00 additional for postage and handling. The first of the month is issue date. Copy must be received 30 days in advance (e.g. November issue closes for copy on October 1st).

HOROLOGICAL TIMES • 701 Enterprise Drive • Harrison, OH 45030
Phone (513) 367-9800 • Fax (513) 367-1414

TRADESMAN

HAMILTON ELECTRIC WATCH REPAIR. Expert, experienced service on all Model 500 and 505 Electric watches. -- *Want to buy* Hamilton Electric parts. Also unusual Hamilton watches, Hamilton advertising and memorabilia. -- Rene Rondeau, P.O. Box 391, Corte Madera, CA 94976. (415) 924-6534, Fax (415) 924-8423.

REPIVOTING - balance staffs, pinions, arbors for wrist and pocket watches. Do not replace original parts, let us repivot to manufacturer standards. Juliusz Dabrowski, J.D. Watchworks Co., 210 Post St., Suite 506, San Francisco, CA 94108; Phone: (415) 397-0310, Fax: (415) 397-0601.



THE ACCUTRON MAN

A "Cracker Jack" when it comes to repairing Accutron watches!

Let me "Spaceview It" according to **Bulova Factory Standards!**

Not anxious to spend money? Then trade in your Model 214 & 218 **junker watches** for **cash credit** against your repair bill!

Why not give me a call and . . .
LET'S TALK ACCUTRONS!

George Frugé
251 Greenwich Avenue
Greenwich, CT 06830
Tel: (203) 661-0056
Fax: (203) 661-0703

CLOCK WHEEL AND PINION CUTTING

Fast service -- Write for free Brochure and price list. Fendleys, 2535 Himes St., Irving, TX 75060. (214) 986-7698.

DIAL REFINISHING CO. FAST SERVICE, FINEST QUALITY, quantity works welcome. Specialize on changing dial feet positions to fit the quartz movement. Send your works to: **KIRK DIAL OF SEATTLE**, 4th & Pike Bldg., Suite 625, Seattle, WA 98101; (206) 623-2452.

ATMOS CLOCK REPAIR

Write or call for details. A Time to Remember, 145 E. Gould St., Nashville, IN 47448; (812) 988-8463 or (800) 267-7756.

TIMING MACHINES -- NEW AND REFURBISHED. Quality Service and Repair. **DON HOLDEN**, Box 56, Penna. Furnace, PA 16865. Call (814) 692-2285.

CLOCK and MUSIC BOX parts, mainsprings, material and tools. Custom made to order or repair of gears, pinions, and parts. Catalog \$3.00. **TANI ENGINEERING**, Box 338, Atwater, OH 44201; (216) 947-2268.

ALVIN KRUTOLOW FOR ROLEX SERVICE

Master Watchmaker, 47 years experience. Awarded technical certificate from Rolex in 1977. Service includes case & bracelet refinishing & waterproofing of case. All watch parts are genuine Rolex. We specialize in the repair of high-grade watches & clocks. Not affiliated with Rolex Watches, Inc. USA. Ask for Alvin or Marcus, (203) 792-4539.

Certified Master Watchmaker

Jonathan Rowe

**Swiss Trained - WOSTEP
REPAIR AND RESTORATION**

From Antique Verge Fusee to Modern Quartz
Case Repair

SPECIALIZING IN CHRONOGRAPHS

TM Services

(Time Master)

1290 Front St., Suite 125, Binghamton, NY 13901
For more info telephone 607-775-3302

ATMOS BY JAEGER-LECOULTRE

Overhauled with a
three-year (3) warranty on all labor
MIKE'S CLOCK CLINIC
1326 Stanford Street
Santa Monica, CA 90404-2502
Established in 1982 & AWI Trained
Please Call (310) 828-6707

CRYSTAL FITTING

Let us take care of all your crystal needs
95% can be done for \$10 . . . Fast
the rest on estimate approval Turnaround

Schohl Crystal Works

208 Barber St. • Spring Lake, MI 49456
Phone 1-800-470-4217 • Fax (616) 842-2198

DIAL REFINISHING



BEFORE AFTER

Quartz Conversions
Diamond Dial Conversions
Emblem & Name Personalization

Write for Brochures
INTERNATIONAL DIAL CO., INC.
58 W. SUGARTREE
P.O. BOX 970
WILMINGTON, OH 45177
(513) 382-4535

CLASSIFIED ADS

ELECTRONIC INSTRUMENT SERVICE

We are Factory Authorized Service for:

- * VIBROGRAF & PORTESCAP
- * TICK-O-PRINT & L&R

We service all makes of ultrasonics, all makes of watch rate recorders, and related equipment. 25 years experience.

JACK PHILLIPS

ELECTRONIC INSTRUMENT SERVICE

757 Lincoln Ave., #26

San Rafael, CA 94901

For Information

Call (415) 453-9266



CUTTERS cycloidal for clock wheels and pinions. Module 0.2 to 1.0. Constant profile producing traditional square bottomed teeth, 104 sizes. Escape cutters: recoil (set of seven sizes), dead beat (set of four sizes). Ratchets 60° and 70°. All cutters made in 8% cobalt M42 High Speed Steel and heat treated under vacuum. Also cutter grinding wheels, Grit and CBN. Send for Information Sheet, prices, and order forms to: P.P. Thornton (Successors), Ltd., Horological Cutter Makers, The Old Bakehouse, Upper Tysoe, Warwickshire, CV35 0TR, England; Telephone 0295-680454, Fax 0295-688176.

THE MORTICIAN NO COMEBACKS

Rolex Certified Master Watchmaker and Atmos Clock Service (factory recommended for over 50 years). Watch wheel repivoting, quartz conversions. Servicing all makes, antiques, high grade, etc. 2-year warranty. J. Small, CMW & Associates; (713) 561-5147.

ACCUTRON REPAIR

Specializing in 214 & 218 Movements

- Quick turnaround time
- Guaranteed to be accurate for 1 year
- Using original parts
- Fully insured by Jewelers Mutual Insurance Co.

Little Swiss Watch Shop

3529 Chamblee Tucker Road
Atlanta, GA 30341
1-800-418-2345
Information: (404) 939-4511

MURPHY'S CRYSTAL SERVICE

FAST -- QUALITY WORK

- * 24-hour turnaround on most jobs.
- * Complete crystal fitting service for new and old wrist and pocket watches.

CALL OR WRITE FOR PRICE LIST
FAX or PHONE (209) 531-2333
1736 JOEL WAY
CERES, CA 95307

MORBIER & OTHER EUROPEAN CLOCKS

for sale, also Parts and Cases
Theo Burger

3335 Birch St., Palo Alto, CA 94306

Phone (415) 858-3636 Fax (415) 858-3669

RESTORATION & PARTS MANUFACTURING FOR ALL TYPES OF WATCHES & CLOCKS

We restore all types of watches including tuning fork, electronic, quartz, mechanical, antique, high grade, etc. All types of clock restoration and custom watch, clock parts manufacturing including gear cutting, balance staffs all types, stems (regular and oversize), repivoting, etc. Over 35 years experience in watch, clock restoration and parts manufacturing. J.S. Park, CMW, CMEW, member AWI & NAWCC. Satisfaction guaranteed. **WATCHES UNLIMITED**, 222 Century Plaza, Birmingham, AL 35210; Phone (205) 595-2022. Hours: Mon.-Sat. 10-9; Sun. 1-6.

ARE YOU SPENDING TOO MUCH FOR CRYSTALS?? We will make any flat mineral or heavy plastic crystal. One-day turnaround. Call or write for price list. D & H Crystal Co., 708-D Westchester Dr., High Point, NC 27262; phone/fax (910) 889-0148.

POCKET WATCH CASE REPAIR -- Bezels, hinges, springs, dents, etc. **HARRY MAZAR**, Tick-Tock Specialties, 308 N. McLeansboro St., Benton, IL 62812. Phone (618) 439-6995.

CLOCKS: gearcutting, repivoting, jewelery, rebushing. Aircraft clocks. **ROY H. NIEGEL**, CMC, CMW, N31552 Saint Joe Drive, Spirit Lake, Idaho 83869-9544. SASE or CALL (208) 623-4330.

ARTICLES FOR SALE

Watchmakers tools, equipment, material, and supplies, mostly used. Sold by free list, available from Dashto, Tom Mister, 983 Providence Square Shop Center, Virginia Beach, VA 23464; Phone/Fax (804) 495-2471.

CASIO WATCH PARTS

No Minimum Order Required

Kaben Enterprises

3529 Chamblee Tucker Road
Atlanta, GA 30341

Official Casio Distributor

ORDERS (800) 418-2345
INFORMATION (404) 939-4511

HENRY FRIED'S 23rd Horological Tour to France, Switzerland (Basel Fair), Austria & Italy. April 22 - May 8, 1996. \$3,700.00 PP. For brochure call Nick Lerescu at 1-800-262-4284.

MINI QUARTZ MOVEMENTS. Guaranteed lowest prices--as low as \$2.30. Two-year guarantee. Large selection of hands and numerals. Free delivery. SASE or call (704) 333-0221. **HALL CLOCKSHOP**, 1512 Central Ave., Charlotte, NC 28205.

EQUIPMENT: Watch cleaning machines: Bulova VC10, \$695; Marshall 4-jar, \$99.95; Vibrograf Watch Timing Machines: B-200A, \$895; B-200, \$795. Bestfit 1986 microfiche system with viewer, \$250; L&R 430G Ultrasonic Clock Cleaner, \$350. 10 different lathes: \$250 and up. **Send SASE for our 1995 Equipment and Hand Tool List. WATCHES, ETC.**, 5934 NW 39th St., Oklahoma City, OK 73122; (405) 789-2824.

TIMING MACHINES



***TIMETRAX 600 Wrist & Pocket Watch Timer:** Measures & displays watch trains in vibrations per hour, calculates gain or loss in sec/day. Over 40 preprogrammed trains: 7200-36000/hr. Highly stable TCXO timebase. Complete w/watch holder & pickups \$595

***TIMETRAX 400 Clock Timer:** Measures & displays clock trains in vibrations per hour. Extended timing range for 400-day & Atmos clocks. Balance mode aids in setting movement in beat. Complete w/pickup \$395

***TIMETRAX 160 Clock Timer/Beat Amplifier.** Battery powered, portable, direct train readout of beats per hour 100-19999, and new digital balance mode. Complete w/pickup \$159

All units made in USA, 1 yr. warranty, complete with instructions & reference tables. Send 3 stamps for info & our Catalog of Horological Literature & Timing Machines.



Adams Brown Co., Box 1, Cranbury NJ
08512 (609) 655-8269 Fax 655-8102

CLASSIFIED ADS

ARTICLES FOR SALE

FULL SERVICE

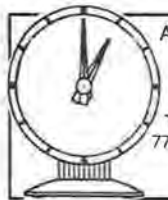
WATCH MATERIAL DISTRIBUTOR
in Hamilton's backyard. Sheely Wholesale Distributors. Call 800-222-2540.

HAMILTON MILITARY MATERIAL. Many parts available for 992B, 4992B, M23, M22 deck watch, M21 marine chronometer, brass hardware for boxes. Robert Ravel Co., Box 32, Devon, PA 19333. Phone (610) 644-4272.

FOR SALE: Complete jewelry & watch repair inventory. Watchmaker retiring. Call (805) 947-2440.

USED WATCH MOVEMENTS. H. HERB & SON, 908 RIVA RIDGE DR., GREAT FALLS, VA 22066; (703) 549-8045.

Vibrograf B-200A, \$650; L&R Varimatic, \$350; lathe; and all service parts for Lemania chronographs & stopwatches. Call Matt Collier, (918) 664-1076.



A complete selection of spare parts for the Golden Hour Clock

The Golden Hour Clock Co.
7745 East Redfield Road #500
Scottsdale, AZ 85260
602-483-3711

SCHOHL MACHINE, INC.

CRYSTAL CUTTING TOOL
\$695.00 + S/H



USER FRIENDLY

The machine uses the watch bezel itself to trace & cut a precise pattern on the mineral glass material. You simply break off at the cut, grind & finish the edges. You can make crystals for both men's and ladies' watches in 6-7 minutes at a cost of 50 cents each.

Visa & Mastercard Accepted

208 Barber St., Spring Lake, MI 49456
Phone 1-800-470-4217 Fax (616) 842-2198

CUCKOO CLOCK AND BIRD CAGE BELLOWS MATERIAL

Save time, money, and work re-covering bellows. Easier than replacing. For information, send business-size SASE to:

JANDI GOGGIN
Box 175H, Huntington, NY 11743-0175

NEW FLOOR CLOCKS

Howard Miller and Ridgeway floor clocks, from 50-63% off. Howard Miller wall clocks, up to 53% off. Mel Taylor, A Time to Remember, P.O. Box 1007, Nashville, IN 47448. 1-800-267-7756 or (812) 988-8463.

FOR SALE - Gas-fired Hoover melting furnace, \$300; L&R Varimatic with ultrasonic, serial #99814, \$500; 2 Watchmaster ultrasonic WT mode, serial #7024 8083, \$200 each. (904) 629-5449.

USED EQUIPMENT - Vibrograf and L & R Timing Machines from \$695; Engraving Machines from \$500; wide variety of used watchmakers' and jewelers' tools. Sheely Wholesale Distributors. Call 800-222-2540.

Send \$3.00 for our new clock supply catalog!

Timesavers
Box 12700
Scottsdale, AZ 85267
602-483-3711



BUSINESSES FOR SALE

Wholesale watch material - old & new. Bestfit microfiche system, Bulova and Longines parts. Stems, crowns, crystals, glass, plastic, and hunting case. Owner deceased. Call for info (410) 744-6658, Tuesday - Friday.

Watch/Clock Repair and Engraving Shop. Est. 25 years. Sales: gifts, clocks, awards. Excellent equipment & inventory. Gross six figures & growing steadily. Located on Army base/5-year government contract requires watchmaker on premises. Perfect for watchmaker owner/operator. For serious inquiry please call (520) 458-0076. Business hours 9-5 Mon.-Sat.

BUSINESS OPPORTUNITY

Jewelry booths & office space available for lease at the Newport Jewelry Mart. Whether you are expanding your business or starting a new one, Newport Jewelry Mart has the ideal location. Newport Jewelry Mart is located in a very busy shopping center and high income district near Balboa Island, Newport Beach and Huntington Beach, CA. Booths start at \$750 per month, office space starts at \$200. For more information, please call (714) 650-5855/(714) 642-7828, or (714) 826-0264 after 6 pm and on Sundays.

WATCH & JEWELRY REPAIR BUSINESS OPPORTUNITY

- Operating under license agreement in one of the top 10 U.S. department stores
- Experienced operators in watch and/or jewelry repair preferred but not essential
- Some flexibility to match background and funding limitations but a minimum turnkey option is available
- Interested parties only, fax your background and indicate preferred market area and if you wish to open more than one location. References and financial statements will be a requirement.

FAX (510) 735-7405

SCHOOLS

City College of San Francisco Watch Repair Training since 1938. In order to speak with the Instructor and at the same time register for the class: Voice Mail (415) 731-0621. Open enrollment throughout the semester. 106 Bartlett St., Room 214, San Francisco, CA 94110. When writing for information: CCSF Watch Repair Instructor, 2425 Yorba St., San Francisco, CA 94116.

THE COLLEGE OF INSTRUMENT TECHNOLOGY

Watch and clock repair classes starting now in beautiful Southern California. We are only a half hour away from Hollywood, Disneyland, the beach, surfing, or 2 hours to snow ski. Our trained instructors will get you started on a new career. For more information call (310) 925-1785, or write us at C.I.T., 17156 Bellflower Blvd., Bellflower, CA 90706.

CLASSIFIED ADS

JOSEPH BULOVA SCHOOL

40-24 62nd St. Woodside, NY 11377
Phone (718) 424-2929

Quality Instruction Since 1945

WATCHMAKING
(17 months)

WATCH REPAIR
(9 and 13 months)

JEWELRY DESIGN & REPAIR

Ideal Housing, Dining, Recreation

HELP WANTED

Experienced watch/jewelry repair person needed for Asheville, NC in large retail store. If interested, send resume to: 23123 State Road 7, Suite 200-B, Boca Raton, FL 33428.

BENCH JEWELER NORTH ALABAMA

Looking for an experienced bench jeweler. Some watch repair skills desirable but not necessary. Good personality and desire to cooperate a must. Send resume to: Box HW995, c/o *Horological Times*, 701 Enterprise Dr., Harrison, OH 45030.

Watch repair trade shop is looking for an experienced watch repair person. Benefits include medical and life insurance, paid vacations. Send resume or call: Pollak Watch Service, Inc., 13910 Cedar Rd., Cleveland, OH 44118; (216) 932-2500; (800) 878-3185; Fax (216) 932-2191.

MONEY MONEY MONEY WATCH REPAIR PEOPLE

*Has your salary doubled in the last 3 years?
Are you losing income?*
Up to \$52,000+ per year
Please call (810) 358-9080

WANTED TO BUY

ANYTHING ILLINOIS

Want to buy Illinois wristwatches, dials, movements and cases (complete or parts) in any condition for avid private collector. Please call 800-421-1968, x5520, Fax 714-725-9787 or mail to Fred Friedberg, c/o TAMS, P.O. Box 2068, Tustin, CA 92681-2068.

RETIRING, RETIRED, OR OTHERWISE

Buying watchmakers' large or small accumulations of tools, equipment, etc. Will travel east of the Mississippi.

Ken Waldhorn (810) 399-3067

We pay 97% of market for karat gold scrap (any amount)! Also, buy filings, gold fill, sweeps, silver, platinum! Immediate 24-hour payment return mail! Ship insured/registered mail to: AMERICAN METALS COMPANY, 253 King St., Dept. HT, Charleston, SC 29401. Established 1960. Phone (803) 722-2073.

WANTED: Paying high prices for chronograph and high grade watches, movements, dials, cases, & parts. Dean Sarnelle, 25 W. Beverley St., Staunton, VA 24401, phone & fax (540) 885-6064.

WANTED: Will pay up to \$500 for Rolex Easy Opener. Also need Rolex crystal press and Rolex movements, cases, dials, etc. We also buy watchmakers tools and equipment, pocket watches, and wristwatches. Single items or complete collections. **Watches Etc.**, 5934 N.W. 39th, Oklahoma City, OK 73122; (405) 789-2824.

WANTED: Barkus Hand Model (demonstration) Escapement. W.R. Smith, 7936 Camberley Dr., Powell, TN 37849. Phone (615) 947-9671.

WANTED: Watch Cleaning Machine, VC101, Vacusonic or Vibrasonic, any condition. Call Alan (214) 553-1238.

WANTED

- * Watches: Rolex, Patek Philippe, Audemars Piguet, Vacheron, LeCoultre, IWC, Etc. Also Buying Low Grades--Gold-Filled & Gold (Hamilton, Bulova, Elgin, Gruen, Etc.)
- * Sterling & Plated Trays, Dishes, Service Sets, Etc.
- * Scrap--Gold-Filled, Gold, Silver, Platinum, Watch Batteries (Silver or Mixed)

CALL
TOLL FREE **1-800-426-2344**



Ron Fried, President

**SPECIALTY METALS
REFINING COMPANY**
10 Bay Street
Westport, CT 06880

Members: Better Business Bureau
Jewelers Board of Trade
Our 125th Consecutive Ad

Watches Wanted



We desperately need our retail customers' fine watches by:

Rolex, Patek Philippe, Audemars Piguet, Vacheron & Constantin, Movado, Gubelin, etc.

We are paying top prices for any high quality, unusual or complicated Wrist or Pocket Watches

When You're Ready to Sell a Fine Watch
Call Us Toll Free 1-800-842-8625
In Texas 1-214-902-0664

Always prompt immediate payment!

Wingate's Quality Watches

P.O. Box 59760 • Dallas, TX 75229-1760

WANTED



Levin Depth Micrometer (mm) as shown above, Levin Pin Vise Set (5-piece), JKA Dial Bench Micrometer, Bergeon Pin Type, Jewel Hole Gauge Set. Call collect after 9:00 pm (802) 265-3338, John Young, Vermont.

TO PLACE A CLASSIFIED AD

CALL (513) 367-9800

FAX (513) 367-1414

OR SEND TO:

**HOROLOGICAL TIMES
701 ENTERPRISE DR.
HARRISON, OH 45030**

If you have any ideas to share with the *Horological Times* staff, send your letters to:



AWI Central
701 Enterprise Drive
Harrison, Ohio 45030



1994 INDEX

A complete index for 1994 issues of *Horological Times* will appear in the January, 1995 issue.

HAVING TECHNICAL PROBLEMS?



CALL THE AWI
HOTLINE
(513) 367-7799

Saving your Horological Times?

Announcing

NEW & IMPROVED HT BINDERS!

We have the answer to protecting and organizing your magazines. Our leather-look binder holds 12 issues (one volume). End the frustration of searching for back issues or trying to remember technical details that you just *know* you've read. If you are interested in organization, send a check or money order in the amount of **\$12.00 (postpaid) to: HT Binders, 701 Enterprise Drive, Harrison, Ohio 45030.** (Please allow three weeks for handling and delivery.)

KEY TEST FOR QUARTZ WATCHES

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

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

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

Ad Index

American Perfit Crystal Corp.....	38
Borel	5
Butterworth Clocks	8
Cas-Ker	inside back cover
Clocks	23
DRS	15
Esslinger	inside front cover
ETA SA.....	3
Eveready	7
S. LaRose, Inc.	21
Livesay's, Inc.....	17
McCaw, William S.	35
Newall Mfg.....	39
Plymouth Watch Material	14
S&G Industries	33
ST International Supply	29
Twin City Supply	9
United Tool and Material Co.	33
Vibrograf USA Corp.	31
What-i-use	39
Witschi Electronics.....	27
Zantech	13

You won't believe this

SATISFACTION GUARANTEED OR YOUR MONEY BACK



*Gaskets Available

GENERIC **Sapphire Crystals to fit Rolex**

Made From Pink Sapphire Like The Original

**#300* fits
Rolex 206C
\$32⁴⁵**

**#500* fits
Rolex 295C
\$37⁴⁵**

**#400* fits
Rolex 246C
\$42⁴⁵**

**#200* fits
Rolex 192
\$42⁴⁵**

GENERIC **Crystal Assortment to fit Rolex**

#CKXR12, 12 Crystals \$60

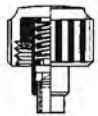
Includes generic replacements for these crystals:

1/Tropic 12, 1/Cyclops 114, 1/Cyclops 116, 2/Cyclops 117,
3/Cyclops 118, 1/Cyclops 129, 2/Cyclops 135, 1/Cyclops 145

We Have MOST Plastic Crystals to fit Rolex



Refills
\$5⁵⁰ea



GENERIC **Crowns to fit Rolex**

#2296 Yellow, #2297 Steel, 6mm..... \$15⁰⁰ea



GENERIC **Case Tubes to fit Rolex**

5.3 & 6.0 mm Includes Gasket \$6⁰⁰ea



GENERIC Clutch Wheel to fit Rolex 2130... \$8⁰⁰ea

GENERIC **Stems to fit Rolex**

1210, 1400, 1570, 3035, 3135 \$5⁰⁰ea

GENERIC **Case Back Gaskets to fit Rolex**

OR325-10, 210-74, 214-64, 292-76, 302-86 \$3⁰⁰ea

GENERIC **Mainsprings to fit Rolex**

1530, 2130, 1570, 2030, 3035, 3135 \$7⁵⁰ea

The Cas-Ker Co. is independant of and is not affiliated with or sponsored by Rolex Watch U.S.A. Inc.
The Rolex warranty does not apply to non-genuine replacement items supplied by Cas-Ker.



Cas-Ker Co.

Call Today 1-800-487-0408

FAX 1-800-487-5848

LOCAL PHONE 513/241-7073 FAX 513/241-5848

2121 SPRING GROVE AVENUE PO BOX 14069 CINCINNATI OH 45250-0069



1995-96 Bench Courses

To register for these courses, please send with your request a registration fee of \$50.00 per instruction day (AWI members) to: **AWI Central, 701 Enterprise Drive, Harrison, OH 45030**. PLEASE NOTE: Registrations are limited and will be selected by the earliest postmarks. You may register by fax if you wish; if so, please include your Visa or MasterCard number, card expiration date, signature, and phone number. All registration fee checks and charges are now processed immediately upon receipt.

FAX (513) 367-1414 • PHONE (513) 367-9800

SEPTEMBER 1995

9-10	Advanced Quartz Watch Repair	Minneapolis, MN
10	Servicing ETA Quartz Chronographs	Albuquerque, NM
15-17	Mechanical Watch Repair	Tucson, AZ*
15-18	Lathe Course (Phase I)	Tucson, AZ*
16-17	Cuckoo Clock Repair	Seattle, WA
16-17	Introduction to Quartz Watch Repair	Boston, MA
23-24	400-Day Clock Repair	Richmond, VA

OCTOBER 1995

6	Servicing the "Smart" Analog Quartz Watch	Effingham, IL*
6-8	Repair of the Bulova Accutron	Oakland, CA
6-9	Lathe Course (Phase II)	Tucson, AZ
8	Servicing ETA Quartz Chronographs	Minneapolis, MN
8	Introduction to the Watchmakers Lathe	Columbus, OH
12-13	Mechanical Chronographs	Houston, TX*
20	Introduction to Watch/Clockmakers Lathe	Minneapolis, MN*
21-22	Cuckoo Clock Repair	Boston, MA
22-23	400-Day Clock Repair	Minneapolis, MN*
28-29	Repair of the Atmos Clock	St. Louis, MO

NOVEMBER 1995

10-12	Mechanical Watch Repair	Dallas/Ft. Worth, TX
10-13	Micro Lathe Operations	Minneapolis, MN
11-12	Striking Clocks	Orlando, FL

JANUARY 1996

26-29	Lathe Course (Phase III)	Tucson, AZ
27-28	400-Day Clock Repair	San Diego, CA
27-28	Cuckoo Clock Repair	Orlando, FL

FEBRUARY 1996

23-26	Lathe Course (Phase I)	Charlotte, NC
24-25	Striking Clocks	Seattle, WA
24-25	Cuckoo Clock Repair	Dallas/Ft. Worth, TX
24-25	Repair of the Atmos Clock	Oakland, CA

MARCH 1996

16-17	Hairspring Vibrating	Kansas City, MO
16-17	Advanced Quartz Watch Repair	Seattle, WA
22-25	Lathe Course (Phase II)	Charlotte, NC
23-24	Repair of the Atmos Clock	Minneapolis, MN

(*) Held in conjunction with a convention

Bench Courses & Instructors

Advanced Clock Repair	Roland Iverson, CMC
Advanced Quartz Watch Repair	Robert Bishop, CMEW, FAWI
Clock Case Repair	James Williams, CC
Cuckoo Clock Repair	James Williams, CC
400-Day Clock Repair	John Nagle
Hairspring Vibrating	Joseph Cerullo, CMW, CMC
Introduction to American Pocket Watches	Alice Carpenter, CMW, CMEW
Introduction to Clock Repair	Buddy Carpenter, CMC, CMEW
Introduction to Quartz Watch Repair	Buddy Carpenter, CMC, CMEW
Mechanical Chronographs	Mark Heist
Mechanical Watch Repair	James Lubic
Micro Lathe Operations	Roy Hovey
Quartz Perpetual Calendar	Remy Waelchli
Repair of the Atmos Clock	Gerald Jaeger, CMW, CMEW, FAWI
Repair of the Bulova Accutron	Henry Frystak, CMW
Servicing ETA Quartz Chronographs	Jeff Broughton
Servicing the "Smart" Analog Quartz Watch	Robert Bishop, CMEW, FAWI
Striking Clocks	John Nagle
Watch/Clockmakers Lathe Course	Roy Hovey

Phase I: Basic Theory, Tools and Accessories for the Watch/Clockmakers Lathe

Phase II: Making Wheels, Function Control Arbors and Lantern Pinions

Phase III: Making Staffs, Jewel Settings for Watches and Marine Chronometers, Turning Between Centers, and the Jacot Tool

Phase IV: Making Wheels/Pinions and Use of the Pivot Polishing Accessory



1995 Project Extend

Project Extend classes are held in AWI's new headquarters in Harrison, OH. To register for these courses, please send with your request a registration fee of \$50.00 per instruction day (AWI members) to: **AWI Central, 701 Enterprise Drive, Harrison, OH 45030**. You may register by fax if you wish; if so, please include your Visa or Mastercard number, card expiration date, signature, and phone number. All registration fee checks and charges are now processed immediately upon receipt.
FAX (513) 367-1414 • PHONE (513) 367-9800

OCTOBER 1995

9-13	Watch III (Hairsprings & Balances)	James Lubic
16-20	Watch IV (Complicated Watches)	James Lubic
23-27	Watch V (Pocket Watch Restoration)	Ron DeCorte
30-Nov. 4	Lathe Course - Phase IV	Roy Hovey

Next month watch for the newly restructured class schedule for Project Extend!