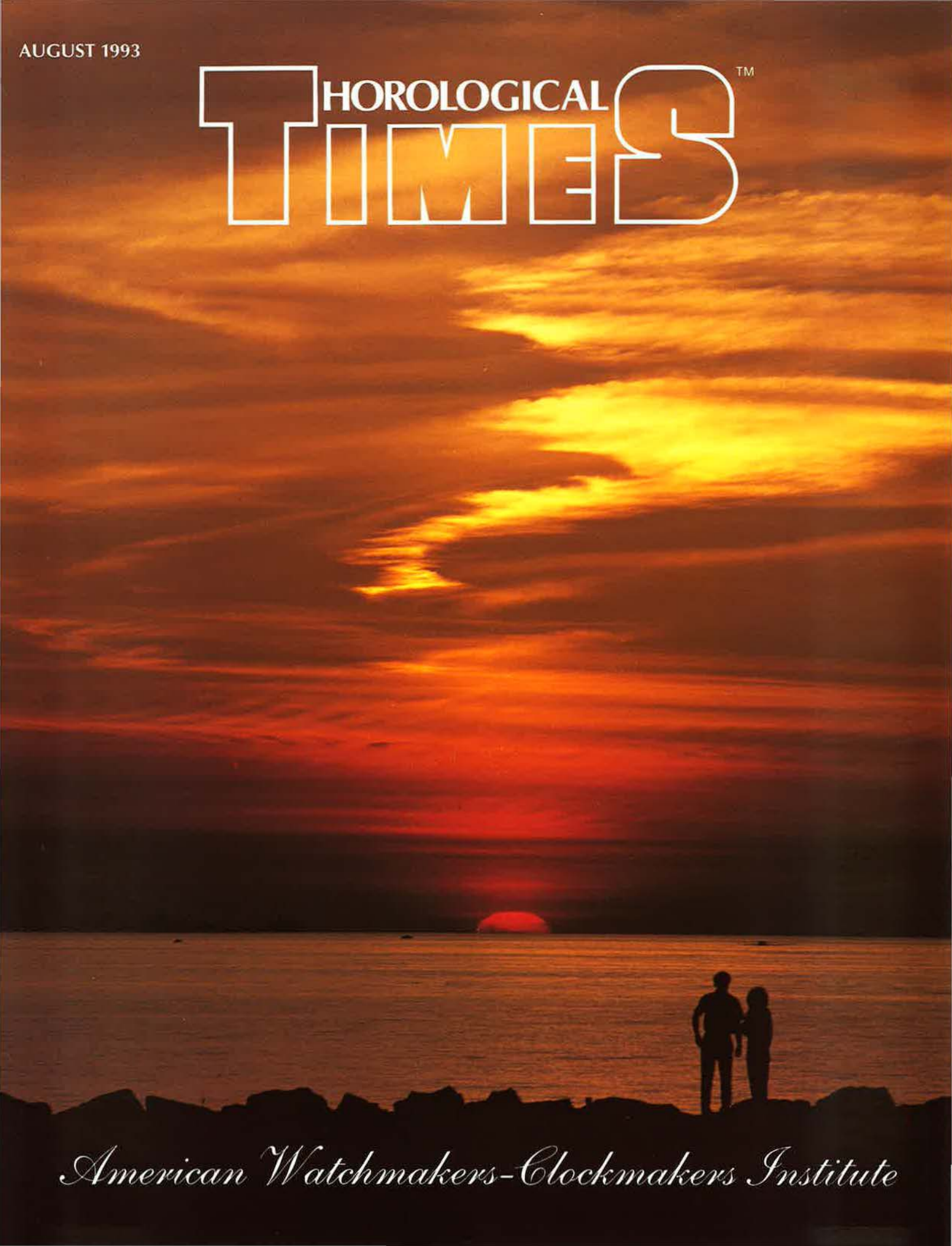
AUGUST 1993

HOROLOGICAL TIMES™



American Watchmakers-Clockmakers Institute

QUARTZ WATCH CROWNS

WATERPROOF AND DUSTPROOF – Two Assortments to Fill Most of Your Needs!

NO. 24 DUSTPROOF CROWNS FOR QUARTZ WATCHES

COMPLETE ASSORTMENT FOR ALL QUARTZ WATCHES •TAPS 10–11–12 •

• DIAMETERS 2.75MM, 3.0MM, 3.25MM, 3.50MM • YELLOW & WHITE GOLD FILLED • FIRST QUALITY •

BOTTLE	DIAMETER	TAP	COLOR	BOTTLE	DIAMETER	TAP	COLOR
1	2.75mm	10	YGF	13	3.25mm	10	YGF
2	2.75mm	11	YGF	14	3.25mm	11	YGF
3	2.75mm	12	YGF	15	3.25mm	12	YGF
4	2.75mm	10	WGF	16	3.25mm	10	WGF
5	2.75mm	11	WGF	17	3.25mm	11	WGF
6	2.75mm	12	WGF	18	3.25mm	12	WGF
7	3.0mm	10	YGF	19	3.50mm	10	YGF
8	3.0mm	11	YGF	20	3.50mm	11	YGF
9	3.0mm	12	YGF	21	3.50mm	12	YGF
10	3.0mm	10	WGF	22	3.50mm	10	WGF
11	3.0mm	11	WGF	23	3.50mm	11	WGF
12	3.0mm	12	WGF	24	3.50mm	12	WGF

48 CROWNS — REFILLS AVAILABLE

Assortment #24 $44.00
Assortment of 24 white & yellow gold-filled crowns for all ladies and gents quartz analog watches. Taps 10–11–12. Diameters 2.75, 3.0, 3.25 & 3.50mm.

Assortment #25 $44.00
Assortment of 24 white & yellow gold-filled crowns including blue jewel crowns. Will cover most ladies and gents quartz analaog watches tap sizes 10–11–12. Diameters 3.0, 3.5 & 4.0mm. Newer tube opening 1.60mm and 2.0mm.

FREE! Case parts catalog with purchase of any assortment on this page. Thousands of up-to-date listings for Seiko, Pulsar, Lorus & Lasalle.

Case No.	Crystal	Crown	Stem	Case No.	Crystal	Crown	Stem	Case No.	Crystal	Crown	Stem
1100-0030	180R05AN	45R09N	351110	1100-4300	RE3A25AN	45D01N	351110	1100-5589	RE4N97AN	45D01N	351110
1100-0039	180R09AN	45R09N	351110	1100-4309	RE3N25AN	45D01N	351110	1100-5590	SA9N63AN	45D01N	351110
1100-0450	130R03AN	50005N	351110	1100-4580	ES1N495N	45D01N	351110	1100-5599	SA9N63AN	45D01N	351110
1100-0459	130R03AN	50005N		1100-4600	SA3N335N	50005N	351110	1100-5600	SA1N09AN	45D01N	351110
1100-0540	140R07AC	45R09N	351110	1100-4798	RE3N71AN	45D01N	351110	1100-5610	SA9N17AN	45D51N	351110
1100-0549	140R07AC	45R09N	351110	1100-4800	SA4N25AN	45D01N		1100-5620	SA9N17AN	45D51N	351110



WATERPROOF CASE TUBES FOR QUARTZ WATCHES



Assortment of 144 tubes, 12 each of 12 sizes. Includes the smaller size tube diameter used on many new quartz watches.

#4012B $25.50

NEW WATERPROOF QUARTZ CROWN ASSORTMENT

*** Yellow & White * Tap 10–11–12 * 36 Pieces ***

Standard 'O' Ring and Japanese style (with gasket on post) in most popular assorted taps. Refills available.



#5170
$35.95

Esslinger & Co.
1165 Medallion Drive, St. Paul, Minnesota 55120
Nat: 800-328-0205; Inquiries – Info: 612-452-7180
Fax: 612-452-4298; Toll Free Fax: 800-548-9304

VOLUME 17, NUMBER 8 AUGUST 1993

HOROLOGICAL TIMES™

Official Publication of the American Watchmakers-Clockmakers Institute

Wes Door **2** **PRESIDENT'S MESSAGE**

Henry B. Fried **4** **QUESTIONS & ANSWERS**
Henry Meylan Golay Pocket Watch

Fred S. Burckhardt **8** **ROCK QUARRY**
Cold vs Homey:
Which Do You Prefer?

David A. Christianson **10** **TIMELOCKS**
The Argentinian Rench
Timelock Movement

Marshall F. Richmond **16** **PICKLE BARREL**
Jewelry Crafting and Repair
Watch Case Repairs Using Hard Solder

Archie B. Perkins **20** **TECHNICALLY WATCHES**
Antique Watch Restoration
Part LXXXXII

Ron DeCorte **26** **MAKING A MINUTE SNAIL AND QUARTER SNAIL ASSEMBLY FOR A MINUTE REPEATER**
Part 1

Wes Door **32** **SHOP TALK**
Adjusting Watch Band Lengths, Part 1

J.M. Huckabee **34** **AS A CLOCKMAKER TURNS**
Features of the Watchmakers Lathe That Aid a Clockmaker

HOROLOGICAL TIMES (ISSNO145-9546) is published monthly and copyrighted by the American Watchmakers Institute, 3700 Harrison Avenue, Cincinnati, Ohio 45211, 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*, P.O. Box 11011, Cincinnati, Ohio 45211.

OFFICE HOURS: Monday through Friday 8:00 AM to 4:00 PM (Eastern Standard Time). Closed on all national holidays. PHONE (513) 661-3838, AWI HOTLINE: (513) 661-4636 (24-hour recording), FAX (513) 661-3131.

3-Part Series on a Minute Repeater Begins

26



Highlights of AWI Annual Meeting

37-40

Henry B. Fried Horological Tour

42-43

DEPARTMENTS

News in the Trade/New Products/6
Ask Huck/30
AWI Bench Courses/Project Extend/33
Material Search Network/41
Association News/41
Classified Ads/44
Dates to Remember/48
Advertisers' Index/48

HOROLOGICAL TIMES™

EXECUTIVE AND EDITORIAL OFFICES

AWI Central
P.O. Box 11011
3700 Harrison Avenue
Cincinnati, OH 45211
Telephone: (513) 661-3838
Fax: (513) 661-3131
AWI Technical Hotline: (513) 661-4636

Milton C. Stevens: *Editor*
Regina Stenger: *Associate Editor*
Donna Baas: *Production Director*
Harold J. Herman: *Senior Technical Editor*

Margie M. Brater: *Circulation Manager*
Nancy Wellmann: *Business Manager*
Mary Sansalone: *Seminar Coordinator*

TECHNICAL EDITORS

Robert F. Bishop
James H. Broughton
Fred S. Burckhardt
David A. Christianson
Charles Cleves
Joe Crooks
Wes Door
Henry B. Fried
J.M. Huckabee
John P. Kenyon
John A. Nagle
Archie B. Perkins
Robert D. Porter
Marshall F. Richmond
Marvin E. Whitney

AWI OFFICERS

Wes Door, CMW: *President*
Joseph L. Cerullo, CMW, CMC: *First Vice President*
Charles Cleves: *Second Vice President*
Fred S. Burckhardt: *Secretary*
Marvin E. Whitney, CMW, CMC, FAWI: *Treasurer*

AWI DIRECTORS

Robert F. Bishop, CMEW, FAWI
James H. Broughton, CMEW, FAWI
Alice B. Carpenter, CMW, CMEW
Gerhard Hutter, CMW
Gerald G. Jaeger, CMW, CMEW, FAWI
Benjamin Matz, CMW
John A. Nagle
Robert A. Nelson, CMW, CMEW, FAWI
Marshall F. Richmond, CMW
James E. Williams, CC

Greg Hostetter, CC: *Affiliate Chapter Director*
Tony Knorr: *Research & Education Council Director*
Alice B. Carpenter, CMW, CMEW: *Immediate Past President*

Milton C. Stevens, FAWI: *Executive Secretary*
James Lubic: *Technical & Educational Services Manager*
David LaFleche: *General Manager*
Henry B. Fried, CMW, CMC, FAWI: *Technical Director*

Reprinting and reproduction is prohibited without written permission from the American Watchmakers-Clockmakers Institute. Copyright©1993 by the American Watchmakers-Clockmakers Institute.

★ FELLOWS ★
OF THE AMERICAN WATCHMAKERS INSTITUTE

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

* Deceased

President's Message



Last year at this time I wrote my first "President's Message." I started by saying "As your new President it is my duty and pleasure to write this column . . ." This year, since I have been re-elected for a second term, I guess I could start with this same sentence. (Guess I just did!) I would like to say that I appreciate the confidence you, as members, and the Board of Directors have placed in me. I hope to live up to your expectations.

We have some *new blood* in our organization this year. You will notice these new names as you look at the left column of this page. Believe me, they are all worthy of their new positions. We have a fine horological family and they are as willing to help as are the older members.

Possibly you were among those who attended the American Watchmakers-Clockmakers Institute's annual Board meeting in June. You *were* invited. I don't know the head count, but it seemed like we had more members in attendance than the year before. Joe Thompson, Editor of *Modern Jeweler*, was one of the very impressive speakers. He spoke about our watch industry with appropriate history of the past, a lot of good information on the present, and even touched on the future. Another highlight was a tour to AWI Central which afforded the opportunity for members to see the museum. A tour was also conducted at Project Extend which is the advanced school for AWI members. To quote an old cliché, "A good time was had by all." This good time was also shared by those spouses who took a boat cruise.

During the Affiliate Chapter meeting (Friday), delegates exchanged ideas and information and presented various proposals for delegate and Board consideration. These proposals came from various state guilds. The proposals were discussed and re-written if necessary. Those approved by the delegates were presented to the Board of Directors for consideration. On Saturday the Board met and discussed all proposals and voted on them. The Affiliate Chapter delegates are expected to sit in on this meeting and are encouraged to comment during the discussion periods.

Maybe we will see you there next year.

Wes Door

ON THE FRONT: Sunset on Lake Erie, from Sturgeon Point in Derby, NY. Slide by Mark Krueger, Hamburg, NY.



RARE OPPORTUNITY

by J.D. Olson

A.W.I. #22128

He walked into the room and it was a clock collectors dream. Everywhere he looked, there were clocks. Old clocks, old-old clocks, some not so old, but rare, some old and rare. Some large, some small. But all of them were clocks, and wonderful. And there it was. Sitting on a special stand, right in the middle of all those other beautiful clocks. "That's it, That's the one I want!" he exclaimed. "Oh Yes" was the reply. "That one is not for sale. That's a limited edition Atmos," he continued, "I purchased it back in 1984 for only $2,950.00, but I understand it is worth about $6,000.00 today." This proud owner seemed to glow as he continued to explain about his prize. "You see, only 750 were set aside for North America. There is only one of these marvelous 150th Anniversary Atmos Clocks for every 341,000 people in the United States. There are about 36,000 registered clock collectors in the U.S. And over 35,000 of these collectors will never be able to own one of these clocks. "It runs on air!" Boasted the proud owner. "No way!" replied the visitor. "Oh yes!" was the quick response. "A temperature change of 1°f lets the Atmos store enough energy for 48 hours. It's called the "Atmos" for "Atmosphere." According to the maker, the energy it takes to light one 15 watt bulb, would be enough to keep 60 million Atmos mechanisms in motion."

"Each revolution of the pendulum takes a full sixty seconds. The glass dome is hand blown, And every piece of brass is plated with 24K gold." At this point the visitor can only say "Wow!" "But there's more," exclaims the owner, "according to it's manufacturer, e[illegible]tmos began as ten pounds of brass, steel, glass, gold and jewels. There were over 2,000 steps in [illegible]y were done by hand. It required eight months of patient effort by approximately thirty Swiss c[illegible]ny of whom had college degrees in their specialities."

By now the visitor is convinced h[illegible]is clock, but the proud owner is just as sure that he will keep it. "It's NOT for sale."

LAST OPPORTUNITY to own one of these beauties for only $2,600! This offer expires August 30, 1993--no exceptions!

In 1928 an engineer by th[illegible] Reutter devised the first Atmos. A clock that incorporate[illegible]s feature doing away with the need for manual windin[illegible]ll the power it needs from minute fluctuations in ro[illegible]re. It has been made in Le Sentier since 1930 and has[illegible]l of Swiss watchmaking skill.

In 1984 to mark t[illegible]150th anniversary, the company introduced a limited edition reproduction of the original Atmos. The few that were made for North America were all sold out several years ago.

I have a few of these beautiful pieces of Horological history. They are still in their original, factory sealed cartons, just as they were received from the Swiss factory in 1984. I plan to keep a **clock** for myself, and have made the rest available to my friends and fellow members of the A.W.I., for a very special price of only $2,600.00, shipping included. I accept Master Card and Visa, so for your 150th Anniversary Limited Edition Atmos, contact J.D. Olson at 1011 Valley River Way in Eugene, Oregon 97401 or phone (503) 344-3445 to take advantage of this rare opportunity.



13-1/2" HIGH 8-1/2" WIDE

Questions & Answers



Henry Meylan Golay Pocket Watch

HENRY B. FRIED
CMW, CMC, FAWI, FBHI, ★FNAWCC

Q Enclosed please find several photos of an old Swiss bar pocket watch that I have in for repair. The case is marked: "18K, CS," and has a capitol G inside a frame:



The cuvette is marked "Hy Meylan Golay a Geneve N#3172 Echappement A Ancre Levée et Dix Trous Rubis." The movement is approximately 15-1/4 lignes (35mm), 19 jewels, lever escapement, and is marked under the dial "3172 II MG 27."

Could you tell me something about the maker(s) of this watch?

Jon Horton
Okmulgee, OK

A *I am enclosing photocopies from two different sources, both French, to help in identifying your watch. One view is of a movement of the 1850 period, which was taken from the new book recently reviewed in the H.T. The other is from Tardy's dictionary of French makers.*

The views are virtually identical to your photos, yet from French sources. According to Chapiro (La Montres Francaise), the movement was made either in Besancon (France) or in Switzerland--possibly LeLocle where many watches of the Lepine calibre were produced. Tardy's reproductions are from the tableaus taken from the Horological School in Paris, now on display at the Parisian Museum, "Science et Metiers."

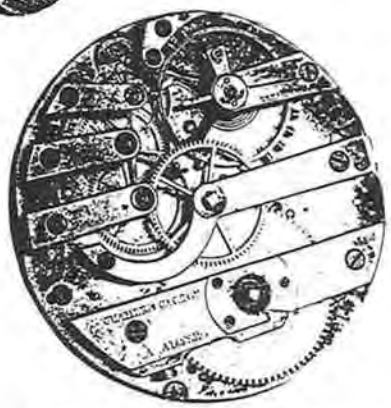
Hy (Henry) Meylan Golay of Geneve also had offices in London. The movement appears more likely to be a French ebauche and finished by the Golay firm. It dates from the mid-19th century. The French terms "Echappement a Ancre Levée et Trous Rubis" denote that it contains the lever escapement and three jewels. The photos aren't clear enough to comment on the 19 jewels you mention, but that many jewels in a watch (if up-jeweled) is unusual; these types contained seldom more than 11 jewels.

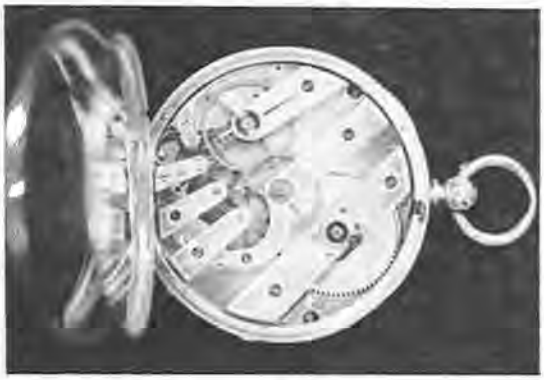
Henry B. Fried.



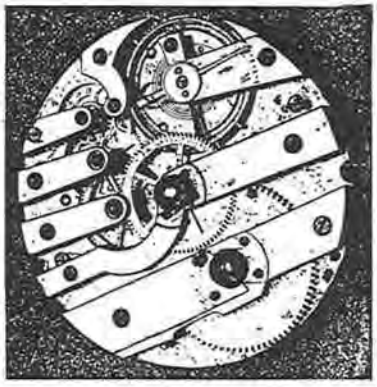




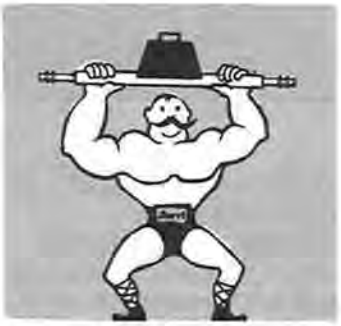








Borel World's Strongest SPRING BAR



The BOREL 100% Stainless Steel Spring Bar is the world's strongest spring bar. It guarantees peace of mind three ways:

- The body and tips are far stronger than others. Very important on the new thin styles.
- The spring is heavy duty, exerting far more holding pressure.
- It keeps its strength because it is immune to corrosion.

100% STAINLESS STEEL

The Borel Spring Bar System No. 267 features 40 dozen Borel Stainless Steel Spring Bars in four types: Double Shoulder, Double Flange, Thin and Special (for buckles in metal bands). They're put up in a professional cabinet with 24 jumbo size bottles. An intregrated chart gives full description of contents, plus bottle position.

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



Spring Bar Asst. 267/40 $55

DOUBLE SHOULDER
1/4
5/16
3/8
7/16
1/2
9/16
5/8
11/16
3/4
13/16
7/8

DOUBLE FLANGE
5/8
11/16
3/4
13/16
7/8

THIN 1.5mm
1/2
9/16
5/8
11/16
3/4
13/16
7/8

SPECIAL BUCKLE No. 20
5/8

New Ultra-Thin Stainless Steel SPRING BAR





ULTRA-THIN STAINLESS STEEL
1/4
5/16
3/8
7/16
1/2
9/16
5/8
11/16
3/4
13/16
7/8

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

Replaces many of the Seiko type spring bars. Refills available.

MK-800/72 $11.95



BOREL-TEC Curving Gun, only. . .
SBCG $22.95



NOW...YOU CAN ALWAYS HAVE THE RIGHT "CURVED" SPRING BAR, TOO!

Just use the BOREL-TEC Spring Bar Curving Gun. Pick out the right straight Borel spring bar, place it in the curving gun and pull the trigger. You're in business. No need to stock curved spring bars.

Order the BOREL-TEC Spring Bar Curving Gun and the Borel #267 Stainless Steel Spring Bar Assortment, as described above. A $74.95 value.

And pay only $65.00

Borel

Jules Borel & Co.
1110 Grand Avenue
Kansas City, MO 64106

Order Desk 800/776-6858
Order FAX 800/776-6862
Office 816/421-6110

Borel

News in the Trade/New Products

HUMANITARIAN RELIEF AGENCY SEEKING HELP FROM HOROLOGISTS

Since 1990, Doctors of the World (DOW), a medical and humanitarian relief agency, has been recruiting healthcare professionals to participate in domestic and international medical relief programs. DOW is a private, nonprofit, charitable organization associated with the French-based Médecins du Monde (MDM).

Doctors of the World is appealing to members of AWI for donations of **working, non-battery-operated watches with sweep second hands**. These watches are desperately needed by newly trained health promoters as part of their medical kits they are equipped with to carry out their humanitarian work, with current emphasis on a new project in El Salvador.

The El Salvador project was adopted from MDM by DOW in 1992, the year in which El Salvador's 12-year civil war was brought to an end with the signing of the peace accords. The country, the smallest and most densely populated in Central America, is now experiencing a political, economic, and social rebirth as the Salvadoran people rebuild it from the foundations up in a new spirit of reconciliation and cooperation.

DOW is participating in this rebuilding by bringing healthcare and training to the 30,000 inhabitants of the province of Morazán. Doctor Lanny Smith is working with Salvadoran nationals from a broad range of organizations to establish clinics and train health promoters in the rural communities of this mountainous region. Motivation and enthusiasm are strong, but equipment and funding are lacking.

Other equipment on DOW's wish list includes: microscopes, a radiograph, an electrocardiograph, and a four-wheel-drive vehicle with a large seating capacity.

DOW would like to thank those readers of AWI for their generosity in addressing their request. For further information, contact: **Linda Chen, (212) 529-1556.** Watches may be sent to: **Doctors of the World--El Salvador Project, 625 Broadway, 2nd Floor, New York, NY 10012.**

NEW FINDINGS CATALOG FROM TWIN CITY SUPPLY

Twin City Supply has announced the publication of their new expanded Findings Catalog. This full-size, easy-to-use catalog has a full range of gold settings and findings, and it is available free of charge.

All items are backed by a full inventory and can be shipped overnight by Twin City's special cost-savings program.

To receive your free catalog, call: **(800) 328-6009**, or fax **(800) 328-6001.**

EURO TOOL'S EASY CLOSE CASE CLOSER

The new Euro Tool Easy Close offers a convenient option to standard closers. The Easy Close features nylon dies so that the bezel and back cannot be scratched. The watch goes in face-down, allowing the repairperson to see the back being closed.

Die sizes range from 16 to 36 mm to cover every watch. The nylon dies snap on and off quickly and easily. The Easy Close design makes misalignment impossible, and the screw-down closure action is gradual and steady. This means that consistent pressure is assured, which lessens the likelihood of damage.

For a Euro Tool distributor near you, call **(800) 552-3131.**



FLORIDA DISCOUNT JEWELRY ACQUIRES ON TIME SUPPLIES

Florida Discount Jewelry has acquired On Time Supplies, formerly of New Jersey and Texas. They will be moved to Florida and operated as a division of Florida Discount Jewelry. Their address is: **1180 Solana Ave., Winter Park, FL 32789; (407) 629-6906; fax (407) 645-0707; orders (800) 323-6091.**

THE LONGITUDE SYMPOSIUM

A major international event for those interested in scientific instruments, clock-making, maritime history, geography, map-making, and the history of technology will take place at Harvard University November 4-6, 1993. "The Longitude Symposium," organized by Harvard's Collection of Historical Scientific Instruments in conjunction with the National Association of Watch and Clock Collectors, will commemorate the 300th anniversary of the birth of John Harrison, inventor of the marine chronometer. Harrison's timekeepers, for which he eventually won a £20,000 prize offered by Britain's Parliament in 1713, made possible the first absolute determination of longitude at sea. Thirteen noted authorities from five different countries will lecture on the context, history, and impact of Harrison's invention, its predecessor methodologies, and its successor instruments. Associated events include an exhibition of clocks, watches, and other instruments, a reception at Harvard's Fogg Art Museum, and a banquet with guest speaker Alistair Cooke.

Information about registration, special airfares, and lodging can be obtained from: **The Longitude Symposium, Harvard University, Science Center B6, Cambridge, MA 02138; (617) 495-2779; fax (617) 495-3344.**

JIDA ELECTS McCAW'S GERALD WILSON PRESIDENT

Gerald A. Wilson, president of the William S. McCaw Company in Toledo, Ohio, has been elected and installed as president of the Jewelry Industry Distributors Association (JIDA). JIDA is a nonprofit trade association organized to promote wholesale business in the jewelry industry.

Wilson bought into the McCaw Company soon after graduating from the University of Toledo, and took over his retiring father's duties. In 1984, he was elected to JIDA's board of directors, and was elected as an officer in 1986.

SCREWS FOR QUARTZ WATCHES FROM NEWALL

This assortment contains 240 pieces organized in 10 bottles. They are separated by type for circuits, coils, bridges, set lever springs, etc. It's a real timesaver!

For more information, contact your watch material distributor or call for the one nearest you: **(800) 621-6296.**



ROUND MINERAL GLASS CRYSTAL

HIGH TEMPERED WITH POLISHED AND BEVELED EDGE, THICKNESS: 0.8mm FOR LDS & 1.0mm FOR GTS
SIZES: 12.0mm, 12.1mm TO 36.0mm



CRYSTAL ASSORTMENT:

XTL-100:
100/PC CONTAINS ONE EACH OF MOST POPULAR SIZES FROM 12.0mm TO 36.0mm . . . **FOR ONLY $58.00**



XTL-200:
200/PC ASSORTMENT CONTAINS ONE OF EACH FROM 14.0mm TO 33.9mm . . . **FOR ONLY $99.00**

N E W!

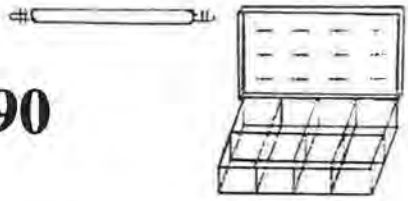
THICK CRYSTAL 2.0mm
SIZES: 25.0, 25.5 TO 32.0mm

These crystals are ideal for Japanese Diver Watches

ASK YOUR DEALER FOR SMEA TEMPERED CRYSTAL

SPRING BAR ASSORTMENT

SP-201:
500 pcs of double flange spring bars, with 1.5mm diameter. All popular sizes, 10 . . . 20mm, and packaged in convenient clear plastic box, with a listing of sizes.
FOR ONLY
$17.90



CROWN ASSORTMENT

CR-301:
100 pieces of (tap 10) crown assortment. Four different designs, 2 sizes, and all in gold color. Suitable for Swiss and Hong Kong watches. With listing of inside and outside diameters.
FOR ONLY
$15.90



SMEA CALL (800) 536-7632 FOR YOUR NEAREST DEALER AND FOR A FREE SAMPLE

ROCK QUARRY et tu



Cold vs. Homey: Which Do *You* Prefer?

FRED S. BURCKHARDT

Well, they've done it again. This is the fifth time our bank has changed its name. Now it's just a branch of the second largest bank in the state. To tell you the truth, I liked it a lot better when we first started doing business with it about 30 years ago. Not only that, I don't much care for a business that changes its name every time the season changes. It makes me wonder how come this new outfit is taking over? Did the other people do something wrong? Is my money not safe? How good is this *new* bunch going to do? Let's face it, I work hard for my money, and I don't care for some Ding Dong messing around with it. I wish it would have stayed like it was years ago . . .

Back then the bank was much smaller, but a heck of a lot friendlier. Every time you walked in, people would say hello and call you by name. If you needed to make a loan, all you had to do was call and everything would be ready for you when you got there. Nowadays, they act like they're doing you a favor if you want to leave your money.

The other week I went to put something in the safety deposit box. I handed the young man my key and told him my box number because the numbers have been worn off for years. He couldn't find my card and wanted to know how long I've had the box. I told him, "Before you were born." He wasn't too happy with my answer, and he finally found the card, which had been misfiled. He mentioned that I should get a new key, and I told him I would appreciate it if he would get me one, but he was quick to answer that he could only give me the name and address of the place as I would have to get it myself. When I left, I told him I appreciated his good service.

It wasn't but a few days later when the bank statement arrived. In the envelope was a brochure telling of all the new types of accounts that that were now available and all the other new services that were being offered. At the end, it told about how much they wanted to be of service and wanted their customers to think of them as the friendly bank. It was signed by the president.

I got on the phone to call this joker and tell him that I didn't think his stinking service was so great. After dialing the number, guess what I heard? "If you know the extension number and have a touch dial phone, enter that number when I say now."

Here I am, sitting like an idiot with my finger poised, ready to hit the numbers, when I realized that I didn't even know them. I hung up and then dialed again, having to listen to the whole message again, when the voice finally said, "If you don't know the extension, please hold and the operator will give you the department and extension number" . . . I don't know about *your* bank, but this sucker has about 50 departments. After going through the whole list, she never mentioned the Big Mahoff's number.

If you're lucky, sometimes these fancy phones will tell you to hold and an operator will come on the line to assist you. This one just said, "Thank you for calling your friendly bank. We take pride in our service!" I was just about ready to write and tell them what they can do with their friendly service, but I thought it wouldn't be very dignified.

The airline that I often patronize used to give good service--that is, until they installed one of these phone deals that doesn't let you talk to a real person! Now I only get a recording. I used to be able to call and find out the terminal and gate number for my flight departure. It never took more than a couple of minutes. This new "Phone From Hell" is much better--it only took 12 minutes to get the same information.

Come to think of it, the in-flight service of this same airline has declined a little, too. Now instead of serving a meal on a tray, the stewardess throws a stale sandwich in a brown bag.

After thinking about some of these large conglomerates that own many of the banks and stores, I wonder if they ever think about the "old days" when service was truly Number One and you could actually talk to a *real live person* (!) when you had a problem. There was something about it that gave you a homey feeling instead of the cold feeling you get when talking to a recording.

Thank goodness a small shop like mine can still talk face to face with customers, get to know them, and even answer the phone when they call. This is why many of the smaller businesses are still doing a good business and some of the larger ones are crying the blues. Don't ever kid yourself; many peoople still prefer doing business with an outfit that still offers personal service, and they're willing to pay a little extra for it. Big isn't always better!

Now I have to call the phone company about one of the new answering machines so I won't have to talk on the phone anymore.

❑

Philippe Dufour to Present Complicated Watch Course for AWI

Master Watchmaker Philippe Dufour will be a guest instructor for the American Watchmakers-Clockmakers Institute in October.

by Ron DeCorte, CMW

Philippe Dufour, one of the world's foremost authorities on the design and construction of watches with many complications, will present a special five-day course at AWI's Project Extend Education Center, Cincinnati, Ohio, October 25-29, 1993.

Mr. Dufour resides in the village of LeSentier, located in the famous Valley De Joux of Switzerland. Mr. Dufour uses old machines which he finds in workshops that are closing down and combines their use with such modern equipment as an optical comparator which he uses to compare parts he makes with his original shop drawings. Dufour's specialty is the grande sonnerie, a repeater which strikes both quarters and minutes.

Mr. Dufour is responsible for designing and fabricating one of the most complicated wristwatches ever made. This watch is a minute repeater with grande and petite sonnerie. For those who may not be familiar with this type of watch, a brief description is in order.

In addition to a push button activated minute repeater mechanism, this watch also houses a grande and petite sonnerie mechanism. The minute repeater portion of the watch will strike the time of day to the closest minute upon demand, and is activated by a push button located in the middle of the winding crown. This arrangement is different from most minute repeater mechanisms in that you do not have to slide a lever along the side of the watch in order to wind and activate the repeater. The sonnerie portion of the watch is controlled by two small slides (switches) located to either side of the crown. One of the slides chooses between silence or strike, and the other between grande or petite strike. When strike is selected, the watch will automatically strike the hours and quarters for the grande setting or just the hours for the petite setting.



Philippe Dufour

COURTESY: REVUE SWITZERLAND: 12/1990

Mr. Dufour has also fabricated the above-mentioned watch in pocket watch size, and recently designed and built the prototypes of an instantaneous perpetual calendar for the firm of Daniel Roth.

The course that Mr. Dufour presents during his visit to Cincinnati will include the following: theory, minute repeaters, clock (sonnerie) watches, and the instantaneous perpetual calendar. The practical (hands on) portion of the course will involve his techniques for making, finishing, and polishing, the small parts necessary in high-grade watchmaking or restoration.

As you can see from the preceding outline, Mr. Dufour is extremely well qualified in the subjects that he will address during his week-long course. I have visited his shop in Valley De Joux on several occasions, and can say that the work that Mr. Dufour produces is of the very highest quality.

It is my recommendation that any aspiring or journeyman watchmaker who wishes to upgrade his or her skills should contact AWI if they are interested in having AWI schedule another course with Mr. Dufour some time in the future. ❑



Right: minute repeater with grande and petite sonnerie made by Philippe Dufour.

Timelocks

The Argentinian Rench Timelock Movement

In Collaboration with Walter Bruggeman, CPL (Watchmaker & Timelock Specialist)



David A. Christianson
CMW, FBHI
Copyright ©1993

The foreign influence on current timelocks in this country can be represented by these three timelock movements:

1. The German Kromer
2. The Japanese Kumahara
3. The Argentinian Rench

These three movements (Figure 1) may be thought of as a "family" only because of the similarity of their Swiss manufactured platform escapements. None of these movements are very popular, but they do represent the influence of various nations on the United States' Safe and Vault Industry.

KROMER

The German Kromer movement is little used and now obsolete. The Kromer was designed in the style of the Yale "S" type movement (Figure 2), but will not interchange.

KUMAHARA

The Japanese Kumahara (Figure 3) movement (circa 1978) is quite popular in the western United States, but virtually unknown elsewhere in the country. Although it is quite similar to the Yale "S" type movement, also, it too will not interchange.

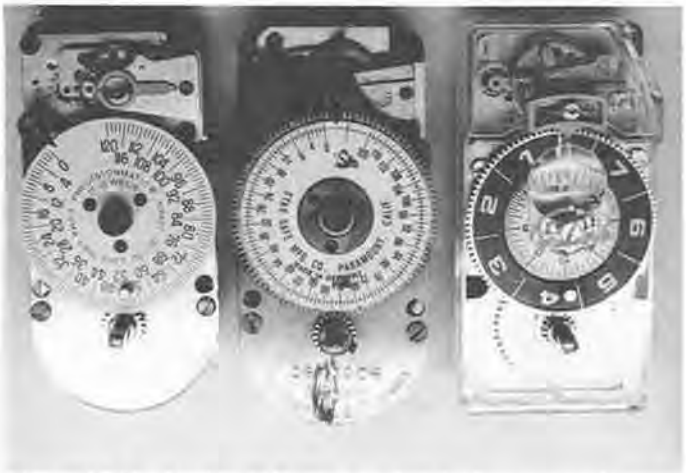


Figure 1. The foreign influence on timelock movements, from the left: the Japanese Kumahara, the German Kromer, and the Argentinian Rench.

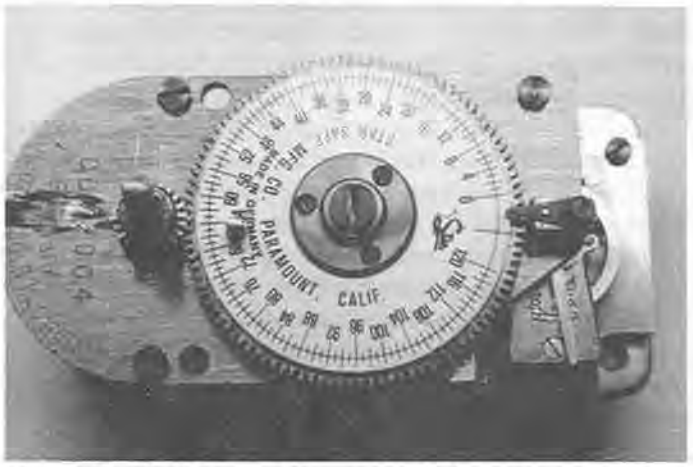


Figure 2a. The German Kromer timelock movement, little used and now obsolete, designed on the Yale "S" style.

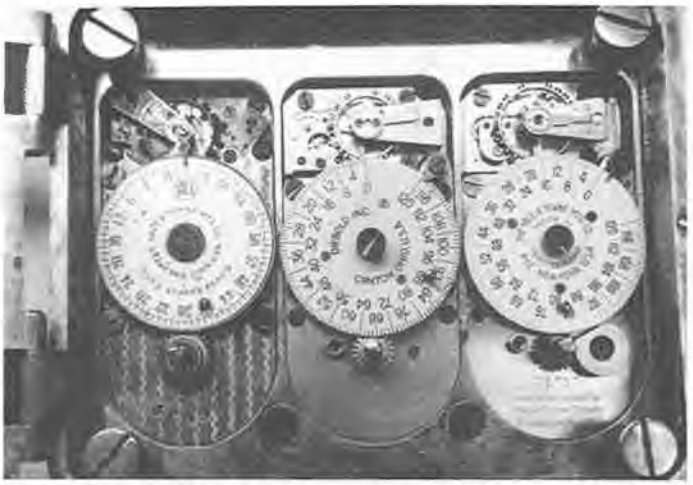


Figure 2b. The Yale "S" type movement represented in this timelock case by (L to R) E. Howard, Seth Thomas, and St. Blaise of Switzerland.

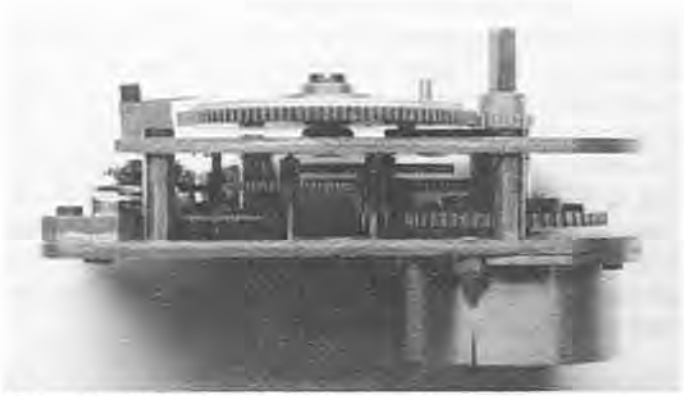


Figure 2c. Side view of the German Kromer movement.

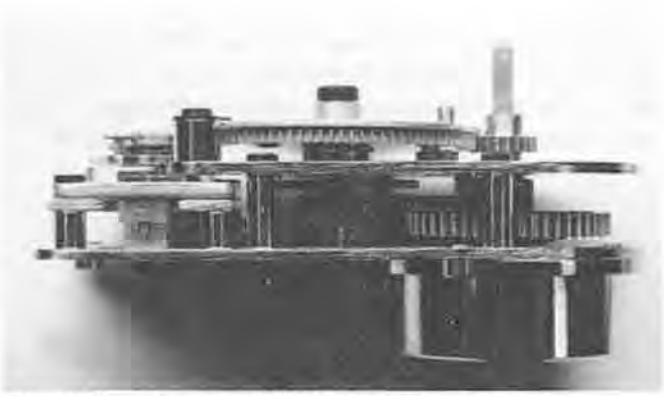


Figure 3b. Side view of the Kumahara movement.

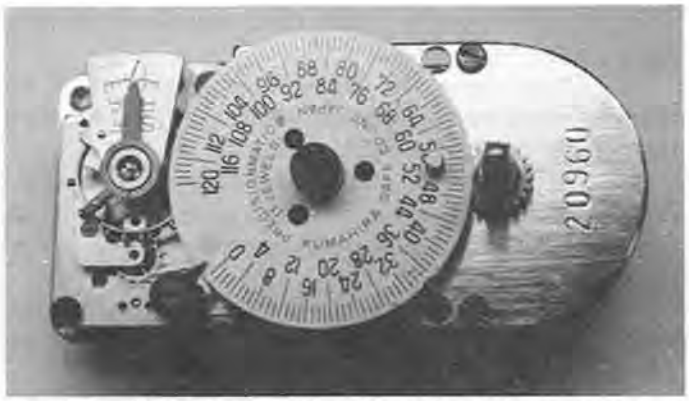


Figure 3a. The Japanese Kumahara timelock movement, circa 1978, and quite popular in the western United States.



Figure 4. The Rench timelock movement from Argentina, circa 1989; virtually unknown in the United States, but with the potential for great popularity in the next few years.

Twin City Supply

The "old fashioned" material house, with the latest in modern watchmakers' technology.

- Factory authorized vendor of Rolex watch material.
- Complete stock of Genuine Swiss and Asian watch parts.
- Quartz movements at value prices.
- Watchmakers' tools and supplies.
- Full service crystal department.
- Experienced specialists in antique and quartz parts, bands and band parts.
- 24 hour TOLL FREE phone or fax ordering.
- Inexpensive Federal Express Overnight program.

Celebrating our ninety-second year of serving the watchmaker.

TC SI TWINCO

TWIN CITY SUPPLY

Mpls: 612/545-2725 Fax: 612/545-4715
6150 Wayzata Blvd., Minneapolis, MN 55416-1239
USA: 800/328-6009 FAX: 800/328-6001

RENCH

The Rench movement (Figure 4), circa 1989, is virtually unknown in the United States, but is quite popular in South America. Yet, because it is relatively inexpensive, it may become quite popular in the next few years.



Figure 5. The resettable main wheel assembly in the Rench movement allowing the movement to be easily reset if accidentally overwound; also known as a "backwindable".



Figure 6a. Current Sargent & Greenleaf timelock.

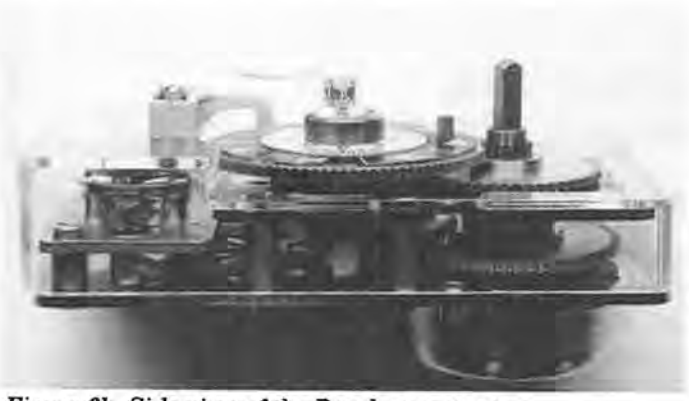


Figure 6b. Side view of the Rench movement.

The Rench is a resettable (or backwindable) movement and represents a radical departure in timelock technology. In Figure 5 you'll notice that the reset mechanism is part of the main wheel rather than being a part of the second and third wheels as in the Swiss Sonceboz and Rehlor movements that we looked at in the April 1992 issue of *Horological Times*, pages 10-15. Interestingly enough, the Rench is built to the same dimensions as the Sonceboz and Rehlor movements that are used by Sargent and Greenleaf timelocks, like the Series 6300 shown in Figure 6.

DISASSEMBLY (Figure 7)

1. Remove the center dial screw which holds the plastic magnifier in place.

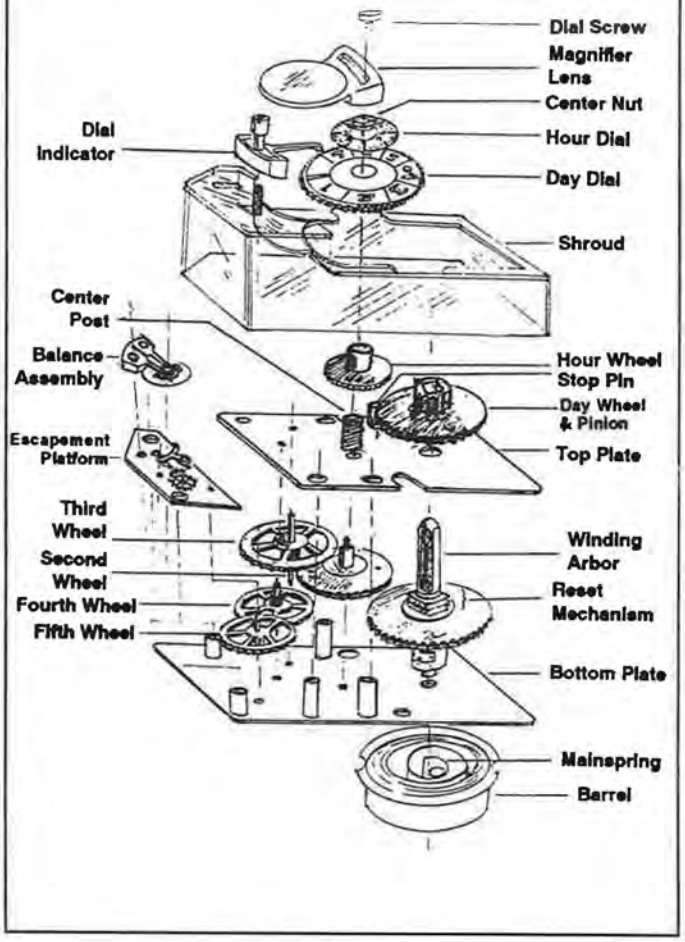
2. Remove the plastic dial indicator by removing its retaining screw.

3. Remove the dial retaining nut using an adjustable spanner or a pair of needle nose pliers to span the notches on the threaded dial post.

4. Remove the 2 dials and hour wheel by slipping them off the dial post; you may have to put a slight torque on the winding arbor to relieve gear pressure on the dial.

5. Remove the two shroud screws that hold the clear plastic shroud (or dust cover) and remove this cover from the movement (Figure 8).

Figure 7



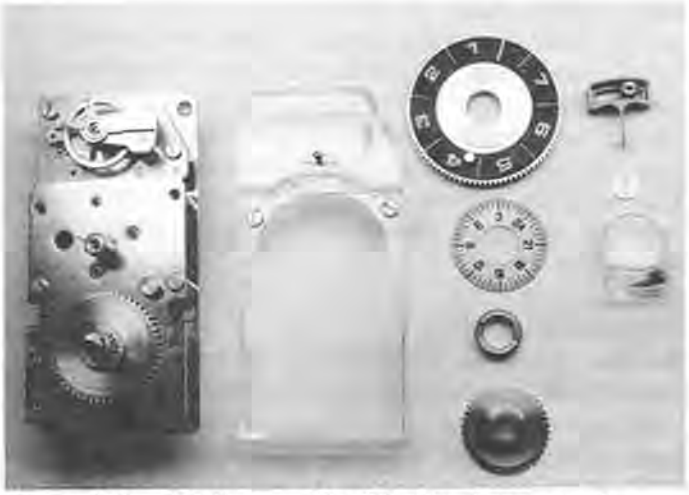


Figure 8. Partial disassembly of the Rench movement.

6. Loosen the platform escapement mounting screws one-half turn each.

7. Hold back the main train of wheels with a clip or a piece of Rodico® wedged between the **3rd** and **4th** wheels. NOTE: The upper pivot of the 5th wheel turns in a pivot hole in the escapement platform. Blocking the train at this point may cause damage to this unsupported wheel when the platform is removed.

8. Remove escapement platform and remove the 5th wheel.

9. With a bench key putting back pressure on the winding arbor, remove the clip or Rodico blocking the train, and let the train run down slowly, controlling the speed with the winding key.

10. Remove the mainspring barrel by removing its two retaining screws, twisting the winding arbor clockwise to unhook the mainspring's inner terminal.

11. Remove the day wheel and pinion by pulling it from the winding arbor; it may be a snug fit. If it doesn't come off easily . . .

12. . . . remove the upper train wheel bridge by removing its two retaining screws (Figure 9).

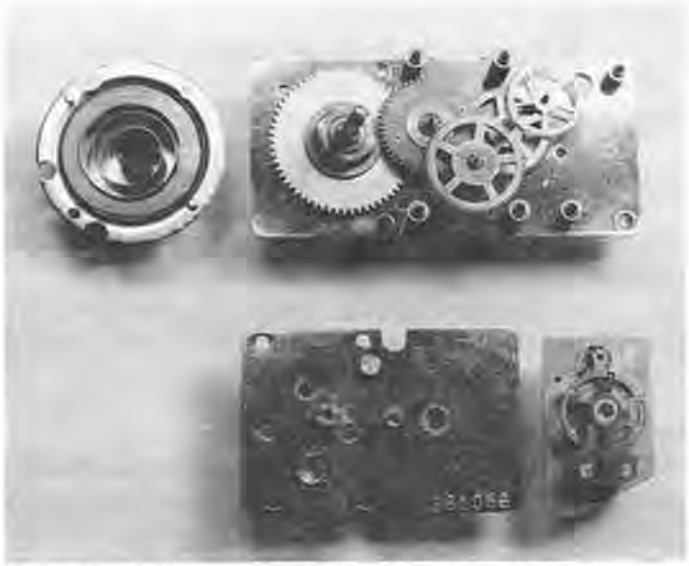


Figure 9. Platform escapement, top plate, and mainspring barrel removed.

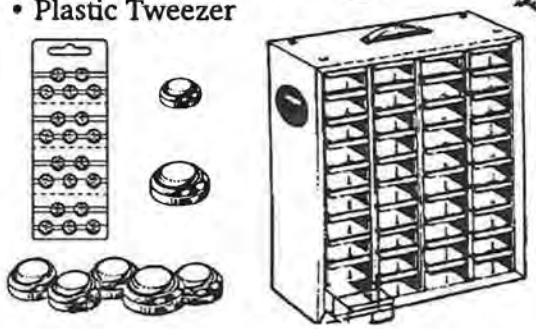
Livesay's Inc.

Wholesale Jeweler & Watchmaker Supplies
456 West Columbus Drive
Tampa, Florida 33602-1200

BATTERY START-UP KIT

- 196 Assorted Most Popular Batteries
- 60 Drawer Storage Cabinet With Labels
- Battery Cross-Reference Guide
- Battery Size Checker
- Plastic Tweezer

NEW!



#BAT-196 **$99.84**

L-G MASTER CASE OPENER FOR WATERPROOF CASES

Opens any size or shape case - knurled, polygon, with any number of slots, notched or holes. Tight, non-slip grip will not scratch. Cover can be left in wrench, ready for replacing. Complete with 4 sets of interchangeable jaw pins.

#CO-600

$49.00



893

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



Figure 10. Main wheel showing the resettable clutch assembly along with the double pawl ratchet wheel on the second wheel.

13. If the day wheel and pinion didn't come off the arbor easily (Step 11), remove it now by holding the bridge in one hand and gently tapping the upper end of the winding arbor with a brass hammer and the wheel will come off.

14. Remove the balance from the platform for cleaning.

CLEANING

Unless the timelock is exceptionally dirty or very old, the mainspring need NOT be removed from the barrel. Completely disassemble this movement and clean the movement using standard acceptable watch cleaning procedures. DO NOT use One Step® or any lubrication that is part of the final rinse. DO NOT clean the platform escapement in the same solutions as are used for the plates and train wheels. The solutions for the platform escapement should be fresh and not contaminated.

As long as the clean and rinse solutions are clean, changed frequently, and are not too contaminated, there is no reason why the main wheel/clutch assembly cannot be cleaned along with the rest of the movement. Regardless, this clutch assembly should NEVER be dismantled.

The escapements using a shock-protecting system such as Incabloc® and Incaflex® may not need to be disassembled and cleaned by hand. But this is a judgement call. Some, such as myself, prefer to take the extra time to disassemble the cap and hole jewels, dip in One Dip®, peg, and then hand oil. I find that more often than not a film of dried oil remains even after ultrasonic cleaning. This can cause difficulties in bringing the movement into proper regulation, along with accelerated pivot wear. However, many fine craftsmen have found that this is not necessary and, unless the movement is excessively dirty overall, the balance jewel assemblies do not need to be disassembled and cleaned separately.

REASSEMBLY

Reassembly is quite straightforward and will not present any surprises. A quality watch lubricant should be used on the balance jewels; escape wheel teeth should be lightly oiled with watch lubricant also. The pallet fork pivots need not be lubricated. The rest of the train should be lubricated with a light clock oil and the mainspring lubed with a light clock mainspring grease. Lubricate the ratchet wheel clicks, but DO NOT lubricate the pressure spring on the main wheel (reset assembly).

RESERVE POWER

Reserve power is that amount of extra power that remains on the mainspring after the timelock movement has come to a complete stop (reached zero hours setting). One might call it a "pre-wind" on the mainspring that remains in reserve while the movement is at rest.

The purpose of reserve power (required for all timelock movements) is two-fold:

1. It allows the movement to start running as soon as the user starts to wind it.

2. It provides the exact power needed to sustain the unlocking mechanism of the timelock as the movement approaches zero hours. The strain placed on the timelock movement by the timelock mechanism during unlocking is tremendous and it requires additional mainspring reserve power to keep the movement running during the unlocking cycle of the timelock. This unlocking cycle can last up to three hours depending on the timelock mechanism used.

RESERVE POWER APPLICATION

1. With the movement fully assembled and lubricated, but with the hour and day dials removed, wind the mainspring 3-1/2 full turns.

2. Replace the hour wheel on the center post, enmeshing it with the intermediate day wheel.

3. Replace the plastic movement shroud (cover).

4. Replace the day wheel with its day dial, placing it on the center post with its locking pin located as close as possible to the stop pin on the movement plate.

5. Replace the hour dial with its 21-hour mark (which is also its "0" hour indicator) lined up with the "0 day" mark on the day dial (Figure 11).

6. Replace the center retaining nut, holding the hour dial in position so it will not slip out of alignment.

7. Replace the plastic time indicator arm, aligning it with the zero hour/zero day mark on the dials, and snug it into position with its retaining screw.

8. Replace the plastic magnifying lens, positioning it over the indicator arm and hold it into position with its retaining screw.

TESTING THE MOVEMENT

Wind the dial to four hours. The movement should start on its own and run down to "zero" time as indicated by the dial, whereupon it will stop running when the dial pin engages the stop pin on the movement plate.

While the movement is running, check its rate

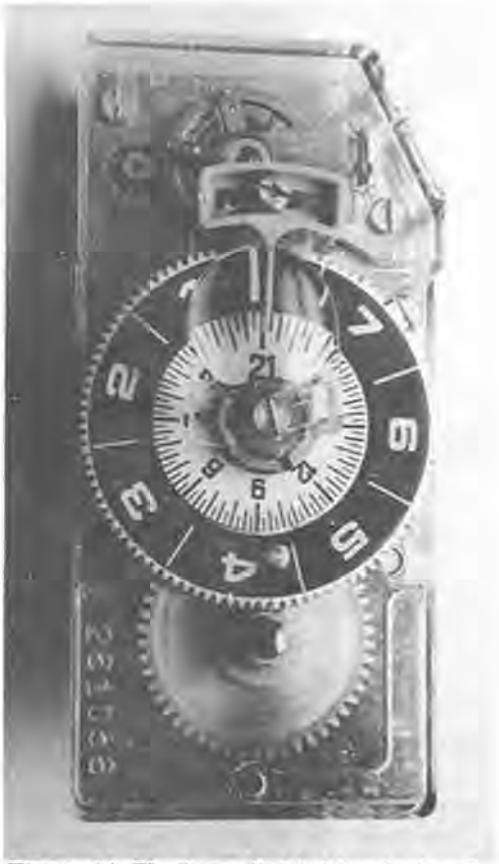


Figure 11. The hour dial (white ring) and the day ring (black ring) aligned to indicate "zero hour".

on your timing machine. If needed, rate can be adjusted as with any pocket watch by moving the regulator arm of the balance assembly, accessing it through an opening in the plastic shroud or cover.

If the movement doesn't self-start, check alignment of the roller jewel, pallet arbor, escape arbor (i.e., see that the balance assembly is in "beat"). If the movement doesn't run down, you have a mechanical problem such as worn pivot holes, lubrication, bent pivots, foreign matter, etc. as in any watch.

TO REMOVE AN OVERWIND

If any of the movements in a timelock are accidentally wound further than the desired opening time, the vault will open later than wanted. If this is going to be a problem, this overwind condition must be removed BEFORE the vault door is locked up for the night. To remove an overwind on the resettable-style movement, simply "backwind" the winding arbor (reset the movement) below the desired opening time and then rewind to the proper opening time. ❑

Are You Using Your

AWI Identification Mark?

If Not, You Should Be!

Join The Winning Vibrograf Team...

For Unsurpassed Water-Resistant Testing of Quartz & Mechanical Watches...

Serving The Watchmaker For Over 50 Years



CEP-10
Uses air pressure and water. Tests to 330 feet. Shows location of leak via air bubbles. No water enters watch case.



WPV-350
Digital electronic version of basic leak controller. No water used. Easy to use. Fast 20 second test.



WPC-300
Programmable. Automatic dry tester. Air pressure test to 330 feet. Used and recommended by most watch companies.



LC-1
Self-contained, basic model leak controller. Dry vacuum tester. Uses no water.Safe for all watches. Simple one minute test.

Today's watchmaker, repair shop and jewelry store should all have a dependable water-resistant tester in their place of business. And, they're safe and easy to use too.

MODELS FOR EVERY BUDGET!

*** THREE PAYMENT PLAN WITH APPROVED CREDIT**

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

Pickle Barrel

Jewelry Crafting & Repair



MARSHALL F. RICHMOND
CMW

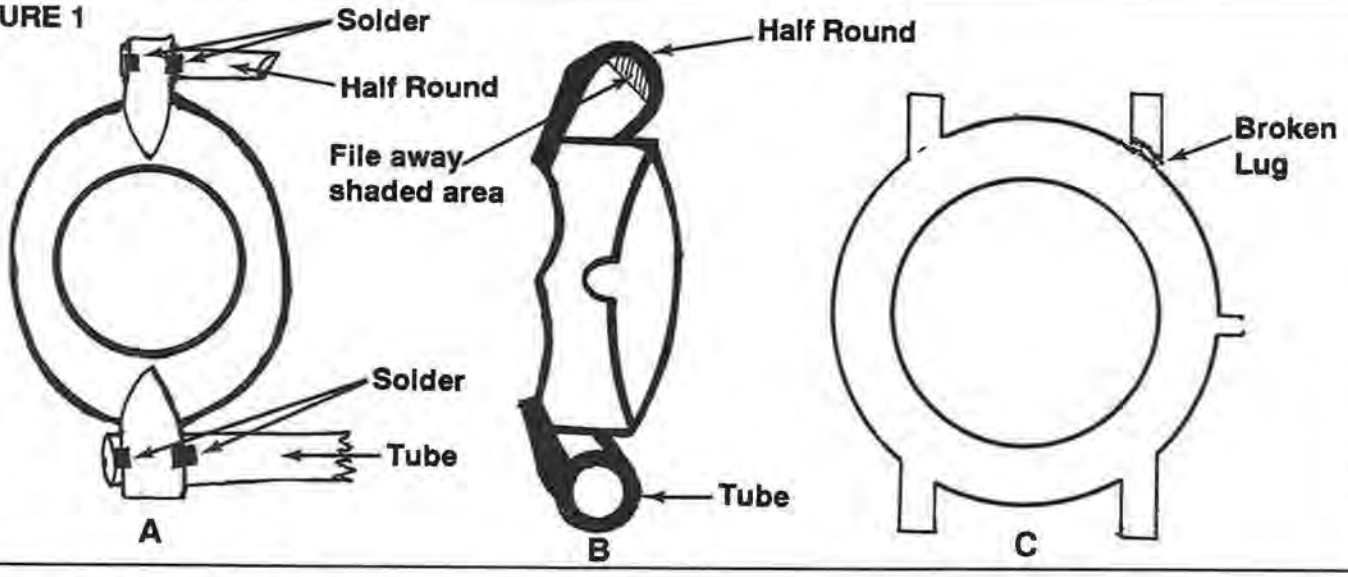
Watch Case Repairs Using Hard Solder

There are countless styles and types of watch cases. Prior to 1940 most of the better watch cases were made of karat gold, gold-filled, and rolled gold plate. The inexpensive watches usually were cased in nickel silver or German silver. These were the same metal which is an alloy of primarily nickel, but actually no silver in the alloy. Other inexpensive cases were made of a base metal and nickel, silver, or gold electroplated. Most of these metals could be hard soldered with gold or silver solder. There were some inexpensive cases made of pewter alloys which could not be hard soldered, but could be soft soldered although they did not have enough value to make it practical to repair them. The same applied to aluminum or aluminum alloy cases that could not be repaired with any kind of solder.

The early water-resistant cases were made of a base metal that was chrome or rhodium plated. These cases were vulnerable to perspiration. As soon as the plating would wear through, the perspiration and body secretions would eat away the lugs where the spring bars fastened and also around the screw back (which even then were often made of stainless steel). As it was not practical to repair these inexpensive cases, there were new cases available to fit most popular movements at an affordable cost.

The better cases (gold-filled and rolled gold plate) were also vulnerable to perspiration when the plating wore off, although they would usually last much longer than the electroplated, pewter, or aluminum cases. The karat gold cases are almost completely immune to corrosion from perspiration or body secretions. Any repairs they usually need are because of an accident (bends or dents) or normal wear of the lugs, especially where the spring bars attach in lug type men's or ladies' watches or the loop ends of ladies' watches where the band attaches. Where cord bands are used, these loops rarely if ever show wear, but when metal bands are attached these loops can wear rapidly. Whether in karat gold, gold-filled, or rolled gold-plated cases, these worn loops can be repaired in several different ways. These repairs require the use of hard solder. If it is a yellow metal being repaired, use yellow-gold solder; if white

FIGURE 1



metal is being repaired, use white gold solder. The flux needed on any metal that is non-ferrous can be a regular jewelers flux, such as Batterns® or any other similar flux. However, if the metal is ferrous (stainless steel) it will require a special flux such as Aircosil®.

LOOP END REPAIRS ON LADIES' CASES

Loop end repairs on ladies' cases were very much in demand at one time, and even today there is still a need for the skill required to make these repairs. The starting point in making these repairs is to remove the case back and movement, the band and crystal. The leaves the case and lugs which should be cleaned. I usually start by boiling in pickle, then I use the ultrasonic cleaner using a soap and ammonia jewelry cleaner. If all the dirt is not removed, when heat is applied after fluxing, the dirt will kill the flux and solder will not flow.

Figure 1 shows a ladies' case bezel with a loop on each end. The lower end on 1-A shows a tube fitted to be soldered, and the top end shows a piece of half-round fitted to be soldered in the worn portion of the loop. Figure 1-B shows the case bezel from a side view after soldering is done. There are several ways of repairing these, and often the method to use depends on the degree of wear. Karat gold, gold-filled, or brass and nickel silver heavy wall tubing can be used. Any would make a substantial repair, but on a solid karat gold case only karat gold tubing should be used. Gold-filled cases can be repaired with gold-filled tubing, and if the gold is worn through badly throughout the case, using brass or nickel (depending on whether a white or yellow case) would not be considered unethical since the metal would be of equal quality as the worn case. The easy way to do this is to take a piece of tubing (tubing is available in 3-inch lengths); the correct diameter for the opening in the case lug. 9H is about the correct diameter which is 3.0mm outside diameter.

Next take a smooth, round, tapered broach or any tapered, smooth, round tool and round the hole, twisting as you push the tool into the lug, rounding and stretching it until the tubing will go through with some force and make a tight fit. Just push the tubing into the lug until the one end is just flush. Next dip the case and protruding tube in a solution of boric acid and alcohol, ignite, and burn off the alcohol. This will give the watch case a protective coating of boric acid which will protect the case from oxidizing (turning black) from the heat which must be applied to gold solder the tube to the lug. Next flux the tube and lug where you want the solder to flow and heat until the flux turns white. (See Figure 1A, lower portion.) Apply a small piece of solder with the flux brush or a solder pick to the tubing just where it enters the lug. Apply heat carefully until the solder flows, then move the flame of the torch to the other side of the lug which will pull the solder through, making a complete solder joint. If both lugs have to

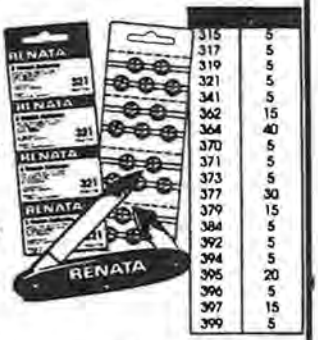
R.CO Inc. JEWELRY SUPPLY & DISTRIBUTION CENTER

Battery Type #	Tear Strip "TS"	Volume Strip "VS"	Battery Type #	Tear Strip "TS"	Volume Strip "VS"
301	$0.550		381	$0.450	
303	$0.688		384	$0.300	$0.285
309	$0.650		386	$0.462	
313	$0.538		389	$0.388	
315	$0.600	$0.570	390	$0.450	
317	$0.650	$0.618	391	$0.363	
319	$0.463	$0.439	392	$0.250	$0.238
321	$0.413	$0.391	393	$0.413	
323	$0.613		394	$0.438	$0.415
325	$0.450		395	$0.375	$0.356
329	$0.613		396	$0.400	$0.380
335	$0.863		397	$0.375	$0.356
339	$1.288		399	$0.388	$0.368
341	$1.013	$0.963	18	$1.485	
343	$0.400				
344	$0.675		Watch & Clock		
346	$1.050		314/SR716SW		$0.976
350	$0.838		337/SR416SW		$1.780
354	$0.613		372/SR916W		$1.040
357	$0.625		376/SR626W		$0.610
361	$0.363		387		$0.750
362	$0.375	$0.356	388		$0.750
364	$0.310	$0.296	MR8504		$6.201
365	$0.763				
366	$0.700		Lithium		
370	$0.375	$0.356	BR2020		$1.280
371	$0.375	$0.356	CR1025		$1.320
373	$0.538	$0.511	CR1216		$1.270
377	$0.400	$0.380	CR2012		$0.900
379	$0.463	$0.439	CR2325		$0.860

THE ABOVE IS ONLY A PARTIAL LISTING OF AVAILABLE BATTERIES. CALL FOR A FREE COMPLETE BATTERY PRICE LIST.

RENATA SWISS MADE

Propack



Order **RENATA**'s specially priced assortment of "200" popular batteries for only **$79.95** and receive **RENATA**'s Watch Battery Size Selector, Plastic Tweezers and Cross Reference Guide FREE. Buy now and also receive a ***FREE*** Swiss Quality pocket knife with a special watch case opening blade.

R.CO Inc. JEWELRY SUPPLY & DISTRIBUTION CENTER

2707 MT. RUSHMORE ROAD
RAPID CITY, SD 57701
PHONE: (605) 343-2226 * FAX: (605) 343-8653
TOLL FREE: (800) 658-3361

be replaced or repaired do not quench the job in water or pickling solution for it will remove the protective coating of boric acid, but let cool on the bench heat pad and saw off the protruding tubing flush with the side of the lug. Repeat the procedure on the other lug, and when both have been soldered, use a needle file to finish the sides and ends. Then soak or boil in pickling solution using Sparex® or a 10% hot or 20% cool of sulphuric acid.

Another method that works well is to gold solder a piece of half-round in the worn part of the lug. Old ring shanks are half-round and will fit into the worn part of the loop lug. (See Figure 1-A and 1-B.) Since old ring shanks are tapered, if straightened there will be a place that fits the worn spot. I usually use the third hand tool to hold the old piece of ring shank in a vertical position, then hang the bezel by the worn lug which will usually position this about perfect for soldering. The work should be prepared the same as the other method by pre-cleaning and coating with boric acid. When the setup is complete, place the solder with the flux brush or solder pick (see Figure 1-A, top), then apply the heat until the solder flows. After the solder flows, the half-round can be sawed off on each side of the lug, leaving a flat place on the inside of the lug (see Figure 1-B, top shaded areas). The sides can be finished with a flat needle file and the shaded area inside the lug can be rounded using a tapered round needle file or using a rotating bur in the flex shaft tool. After the soldering is done on both ends and the pickling solution has removed the protective coating, the outside of the case can be further cleaned by using a bronze brush wheel on the polishing motor while still wet which will remove any remaining foreign matter, leaving a burnish finish. Go over the ends again, making sure the shapes are neat looking, uniform, and sturdy. Then proceed with the polishing with tripoli and rouge using brush bristle wheels and cotton buff wheels.

When finishing worn gold-filled cases, often where the gold is worn through to the base metal it can be polished. If the base metal is the same color as the gold-filled (yellow or white), it can be polished so the wear is hardly noticeable, but in a few days the base metal will probably tarnish showing the wear once more. This finish can be prolonged by waxing the surface, then rubbing it out after the wax dries hard.

LUG REPAIRS ON MEN'S CASES

Lug repairs on men's cases can be made with hard solder in many cases. Figure 1-C shows the bezel of a men's case with a broken lug. Many of these lugs are soldered on with hard solder, and due to a faulty solder joint or possibly rough usage, they break off. If the case is solid karat gold, gold-filled, or even stainless steel, they can be soldered back using hard solder. In case these lugs are bent, care and good judgement must be used in straightening so as not to distort the shape of the case. In case they are cracked, sometimes they can be hard soldered while still on the case which solves the problem of holding and fitting while soldering. If the lug is broken off, to insure a good strong solder joint, the ends where they go together can be filed smooth which will get rid of any pits that may contain dirt and cause a weak joint. The preparation is the same by cleaning and coating the case with boric acid using the alcohol burn-off method previously explained. If you have a steady enough hand, this can be put on by laying the bezel on the bench heat pad and weighing it down so it will not move. Then hold the lug in a pair of locking tweezers and flux the end while heating it. Apply the flux which will immediately turn white. Place a piece of gold solder on the end of the lug where it is fluxed, and heat until the solder flows just enough to make a dome. Heat the bezel in the spot where the lug broke off and flux only the sot where the lug is to be re-attached. Position the lug with the tweezers against the bezel and with a small flame of the torch apply heat to both the bezel and lug. When the solder becomes fluid, put a little pressure on the bezel with the lug which will cause the solder to flow onto the bezel which should make a strong solder joint. If you do not feel steady enough to do this by hand, then you can resort to the third hand tool with which an aligned setup can be made. When the heat is applied and the solder starts to flow, a little pressure applied to the lug will make the lug fit tightly to the bezel.

APPLICATION OF SOLDER WITH HEAT

When applying solder with heat several things should be kept in mind. Both pieces of metal must be making contact with each other as the solder will not flow across a gap, and solder will follow heat. So, if the lug is hotter than the bezel, the solder will not flow from the bezel to the case. When the solder starts to flow on the lug, the heat must be shifted to the case and as it gets hotter than the melted solder on the lug it will immediately flow to the case to make a strong solder joint.

Several years ago a major watch manufacturer marketed a stainless steel case with the lugs silver soldered on. Due to rough usage, many of these lugs were broken off in the solder joint. These can be silver or white gold soldered back on the case by using Aircosil flux which works well with ferrous metals. The method for putting them on is the same as gold or gold-filled cases, except using the Aircosil flux. Aluminum cases with broken lugs or needing repair are not practical to repair, so it would be best if a new case is available and the movement is of a good enough quality to install it in a new case.

FINISHING THE LUG

Finishing the lug is the final step before polishing the case. Any excess solder can be removed with a fine cut needle file, and then the case can be finished and polished. Soaking or boiling in Sparex or pickling solution will remove the boric acid coating. After

rinsing in water and while still wet, it can be first burnished with the bronze wire wheel on the polishing motor then polished with tripoli and rouge or other abrasives that you may prefer. In case a lug is missing, it is not difficult to saw out and file to shape one to match the remaining ones from a matching metal.

DRILLING LUGS

Drilling lugs on men's watch cases is sometimes necessary. When a spring bar has become corroded and breaks off, it can be drilled after center punching the spot to be drilled using a drill size 60, 61, or 62 which will make a suitable size hole. A new lug that has been made and installed should be drilled after installation. The hole must be drilled from between the lugs in most cases because most lug holes are not drilled completely through. The hole should be a little larger than the point of the spring bar so it can enter freely. In some cases the lug holes have become worn and a spring bar will not seat and stay in place. Usually a piece of brass or nickel silver wire can be placed in the worn hole and hard soldered in place. The wire can be sawed off, the inside of the lug filed smooth and then drilled, and the case polished and cleaned. In a previous article the 10 main steps to soldering were listed. These are good to remember and follow in order to do good solder work.

In the next article more case repair will be discussed. ❑

Precision Crystal Cutting Co.

"For All Your Watch Crystal Needs"

SAME DAY SERVICE

SATISFACTION GUARANTEED ON ALL WORK

Suppliers of All Major Crystals

Expert Crystal Cutter With 10 Years Experience

LOWEST Prices in the Country

SHIP TO:
Precision Crystal Cutting
23940 Eureka
Taylor, MI 48180

Reference & Price List On Request

(313) 287-3480

FAX (313) 287-9210 (24 hrs.)



TIME FOR ACCURACY

WITSCHI's waterproof tester — the ALC 2000

Tested in Europe and found to be the most accurate!

- user-friendly — *fully automatic measurement programs*
- flexible – tests **vacuum** and **pressure** — ***vacuum*** *(up to -0.8 bar) and* ***pressure*** *(up to 10 bar), separately or combined*
- programmable — *10 customer specific test programs*
- multi-lingual — *9 language choices: Eng., Fr., Ger., It., Sp., and the 4 Scandinavian languages*
- practical — *automatic locking and release of the pressure chamber*
- fast — *automatic or manual from 10 to 300 sec.*
- future-orientated — *assured by a 16-bit processor*
- able to **print** results — **WITSCHI** *printer (Citizen) or printer with serial interface*

WITSCHI
A SWISS BASED FIRM

WITSCHI ELECTRONICS USA Ltd.
34 E. Henry St., P.O. Box 2, Palmyra, NJ 08065-0002
Tel.: 1-800-882-7977 Fax: 1-609-829-2266

Technically
WATCHES ©1993



Antique Watch Restoration ©1993

Part LXXXXII

Making a Duplex Escape Wheel

ARCHIE B. PERKINS
CMW, FNAWCC, CMBHI
(All rights reserved by the author)

When a duplex escape wheel is too damaged to be repaired, one must set up the equipment and make a replacement wheel. A duplex escape wheel is one of the more complicated wheels to make. This is because the wheel has two sets of teeth and the teeth are very delicate to cut. Another problem with making the duplex escape wheel is that it takes at least three different cutters to cut both the locking teeth and the impulse teeth. There are no cutters available for cutting this wheel; therefore, they must be made up special for the particular wheel. One can make up fine-toothed circular cutters or single-toothed fly cutters for the job. The fine-toothed circular type of cutter is the most desirable but more difficult to make than a fly cutter. A fly cutter works very well for this job if made correctly and used correctly.

Making the Escape Wheel Blank

The escape wheel blank should be made from the hardest free machining brass available. The brass should contain enough lead to make it machine easily. Hard brass turning rod is very satisfactory for the escape wheel. Brass turning rod has about a 3 percent lead content. The diameter of the rod selected should be slightly larger than the outside diameter of the escape wheel being made.

Figure 1 shows how a cutter is used to form the wheel blank. The cutter should be used in a slide rest tool post in order to form true flat surfaces. Holding the cutter by hand is not accurate enough. The cutter used should be shaped so it can be used both for facing and turning diameters without changing the cutter in the slide rest tool post.

First, the diameter and length of the impulse tooth section is turned on the rod. Then, the impulse tooth section is bored out to form the proper thickness of wall for the impulse teeth as shown in Figure 1. Both flat surfaces inside and outside of the impulse tooth wall must be the same depth and turned absolutely flat.

Figure 2 shows how a sharp diamond pointed graver is used to spot a small center prior to drilling a hole in the center of the wheel blank. The hole is needed for centering the blank on a cement brass for cutting the teeth.

Figure 3 shows how the hole is drilled in the center of the blank. The drill can be held in a pin vise and guided with the tailstock spindle or it can be held in a chuck in the

FIGURE 1

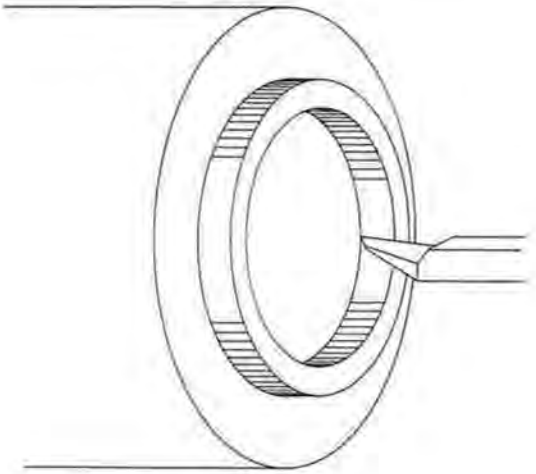


FIGURE 2

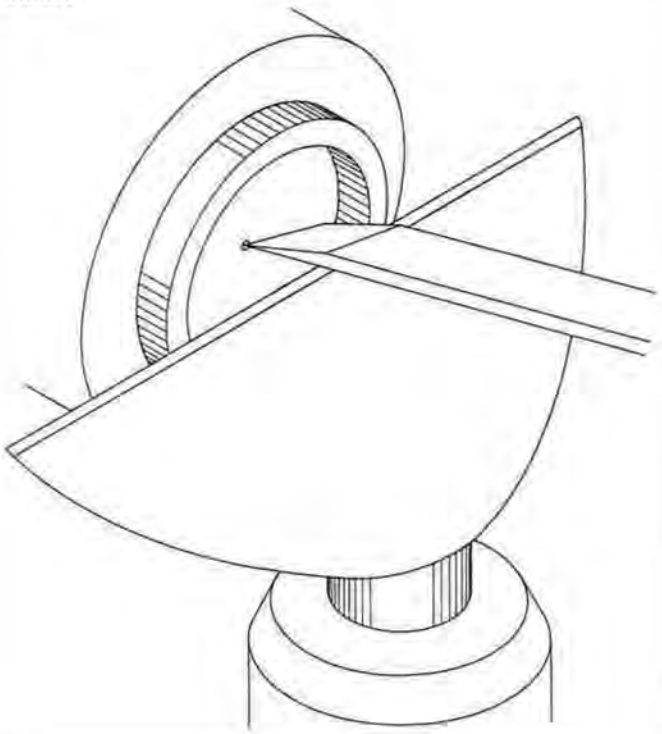


FIGURE 3

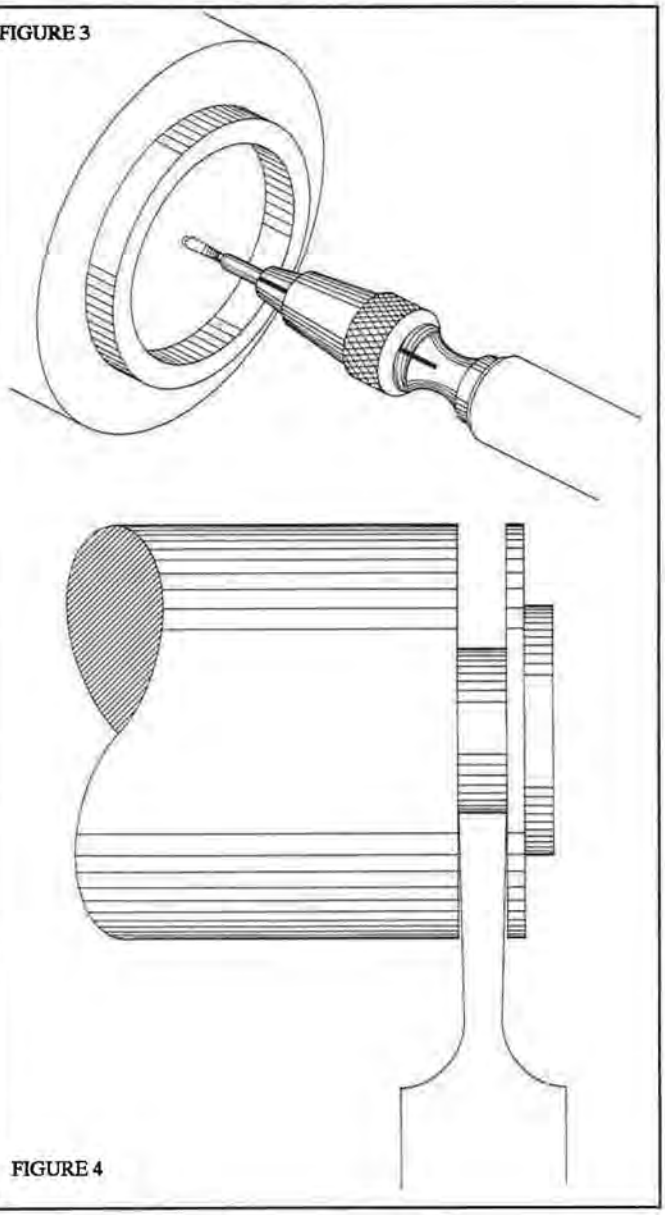


FIGURE 4

spindle of a chuck holding tailstock. It is very important that the hole be exactly on-center. If the hole should be accidentally drilled off-center, then it must be bored out until it is true and on-center. It must be kept in mind that the hole must not be too large to fit on the shoulder of the escape wheel pinion.

After the hole has been drilled in the blank. the blank is removed from the end of the rod. The blank can be sawed off of the rod with a jewelers saw after a groove has been turned around the rod for the saw blade to start in, or a more acceptable method that is shown in Figure 4 can be used. This method uses a cut-off or parting tool to cut the blank from the rod. It is very important that the locking tooth section of the blank be left too thick to allow for facing the bottom of the blank after it has been removed from the rod.

Figure 5 shows the escape wheel blank being faced flat on its bottom side while the blank is chucked true in a step chuck. The blank is chucked by the impulse tooth section of the blank. The cutter is held in the tool post of the slide rest. The thickness of the locking tooth section of the blank is left about .05mm too thick to allow for finishing the bottom of the wheel after the teeth have been cut.

HARD-TO-FIND ITEMS

ARE ONE OF OUR SPECIALITIES BECAUSE: TOTAL CUSTOMER SATISFACTION IS OUR GOAL!!



BUREN BALANCE COMPLETES

Talk about hen's teeth! These things haven't been available for years. Quality Swiss-made Buren balance completes. The factory has been out of business a long time, but we have located some special parts and at special prices!

REGULAR PRICE $75.00, SPECIAL $25.00 EACH!

BUREN 65 (HAMILTON 768)
01-8740D ..... $25.00 ea.
BUREN 1000 (HAMILTON 691)
01-8740H ..... $25.00 ea.
BUREN 1280 (HAMILTON 626)
01-8740L ..... $25.00 ea.

HAMILTON



SHIP CHRONOMETER WINDING KEY

Genuine Hamilton Model 21 Ship Chronometer winding key. **Special price Only $85.00 each! Limited quantities.**

039289 ..... $85.00 ea.

S. LaRose, Inc.

Worldwide Distributors to Horologists

234 Commerce Place, P.O. Box 21208
Greensboro, N.C., 27420,USA
Phone: (919) 275-0462
Fax Number: 1-800-537-4513

FIGURE 5

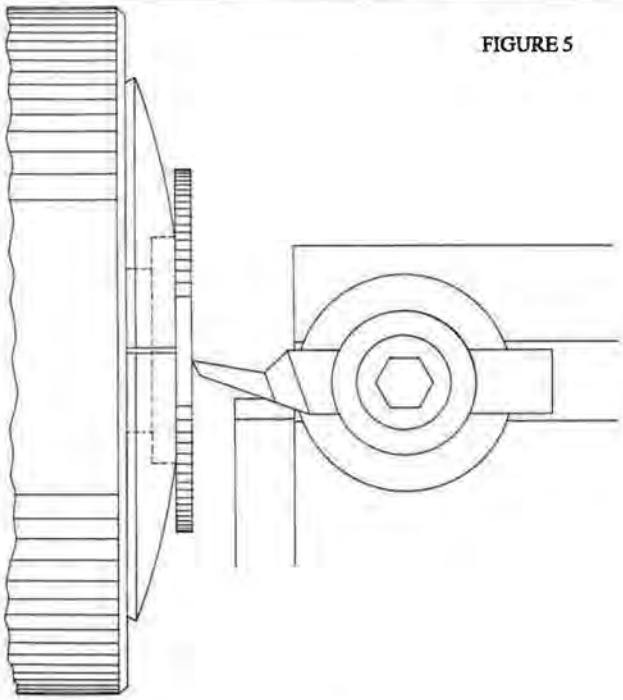


FIGURE 7

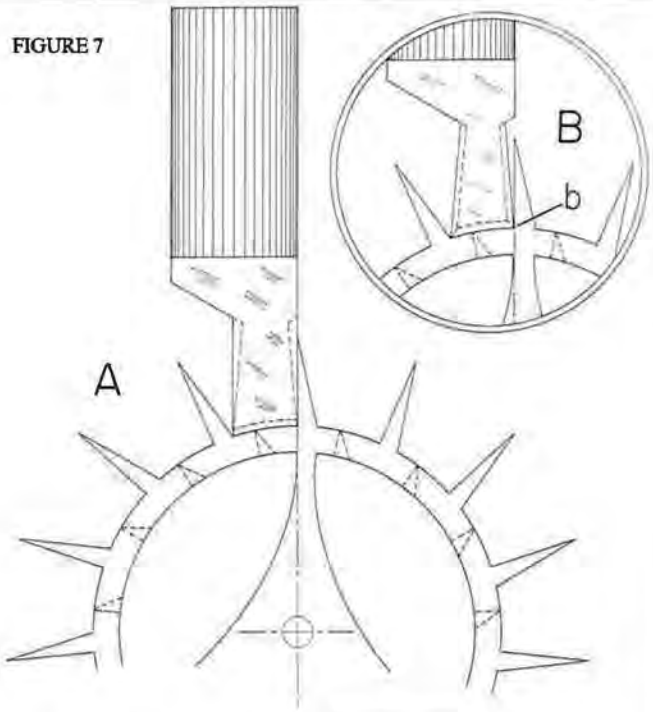


FIGURE 6

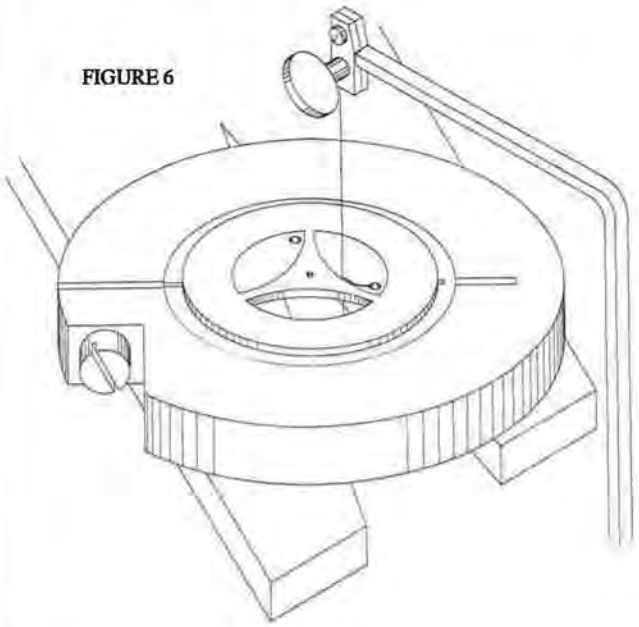
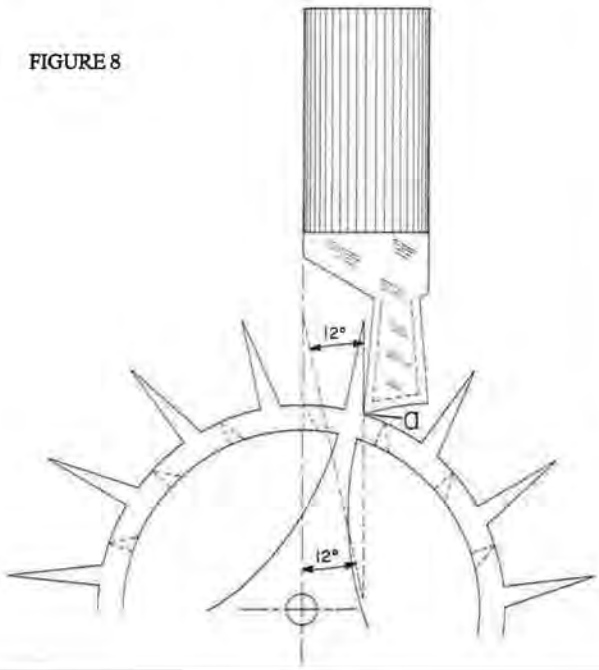


FIGURE 8



After facing the bottom of the blank, one would scribe out the spokes. This can be done by using the old escape wheel as a pattern, or the spokes can be scribed out by using a compass to scribe the circle and a set of radius gauges to use as a pattern when scribing out the shape of the spokes. The scriber should be a fine-pointed needle held in a pin vise. If the old escape wheel is used as a pattern, one must make sure that the escape wheel is centered exactly with the wheel blank during the scribing process.

Next, one would saw out the spokes of the wheel blank. This is shown in Figure 6. One would need to spot centers and drill holes in the corner of each segment of the blank so the saw blade can be inserted for sawing out the segments. The wheel blank is held in a chuck of the wheel holding device. The blank is chucked by the impulse tooth rim. The wheel holding device is supported on a sawing board for sawing out the wheel segments. After the segments have been sawed out, the spokes are cross filed, draw filed, and scraped smooth to finish the blank.

Making a Fly Cutter to Cut the Locking Teeth

When making a fly cutter for cutting the locking teeth, one should use a good space in the old wheel as a pattern to fit the cutter to whenever possible. If there is no sample wheel to use as a pattern, then one would need to take measurements from the watch and make a correct large scale drawing of the needed escape wheel. Then the drawing is reduced to actual size and this reduced drawing is used as a pattern to fit a cutter.

Figure 7 shows how to design a fly cutter for cutting the locking teeth of a duplex escape wheel. In the illustration, the escape wheel is being viewed from its bottom. This is done in order to show the flat face of the fly cutter.

The cutter is made from high carbon water hardening drill rod. The rod is filed to roughly shape the cutter; then, after the cutter has been hardened and tempered, it is ground to exact size and shape. The cutter is hardened and tempered to light straw color. The rough grinding is done on a fine India wheel and the fine finish grinding can be done on a fine hard Arkansas wheel.

The flat face of the cutter should be made at the center of the rod diameter. View A, Figure 7 shows the fitting of the cutter to the space between two good teeth in the sample wheel. The dotted lines show the way the sides and end of the cutter will be relieved when finished. The relief on the sides of the cutter is not made until the end of the cutter is shaped to conform with the curve of the wheel rim. This is so the straight side of the cutter can be placed against the front radial face of the tooth when checking the shape of the end of the cutter. After the end of the cutter has been shaped correctly, the relief is ground on both sides of the cutter.

View B, Figure 7 shows the shape of the finished cutter. The dotted lines show the relief on the cutter. Note that the relief on the cutter allows only the end and two sharp corners at the end to cut the space between two teeth. This condition eliminates most of the strain on the tooth as the space is being cut.

FIGURE 9

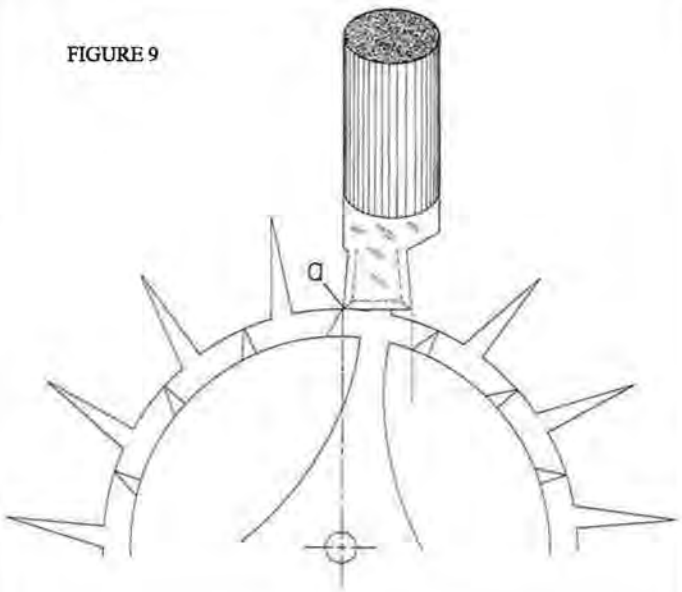


Figure 8 shows how the same cutter is used to cut the angle on the backs of the teeth after the spaces are cut. The use of this cutter will be explained more fully later in this article.

ROLEX WATCH MATERIAL

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

CALL: S&G INDUSTRIES
TOLL FREE 1-800-942-0047
FAX: 1-800-423-4256

"WE STOCK WHAT WE SELL"

MasterCard VISA

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

NJ: 1-908-469-7200

Hunter Case Tube
Assortment



Have the size you need at your fingertips!
Contains 10 different sizes, 3 pieces of each size
Stock Number PW30, refills always available.
Only $15.50

Newall Manufacturing
For The Distributor Nearest You Call 800-621-6296

FIGURE 10

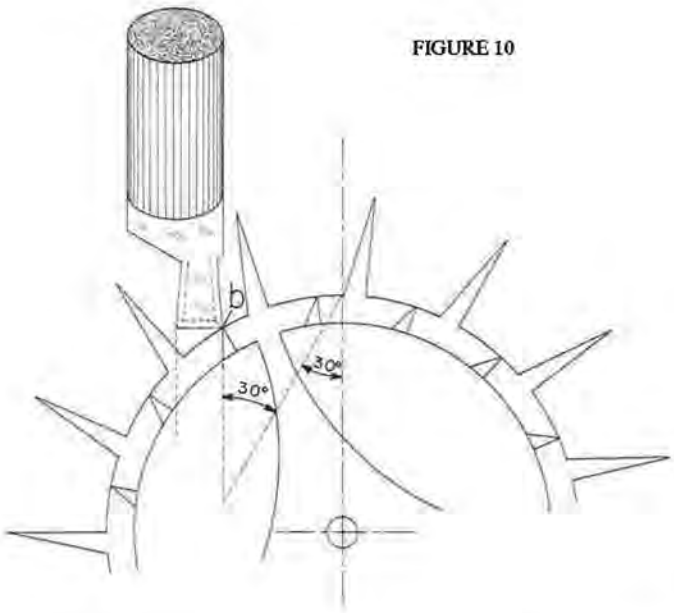
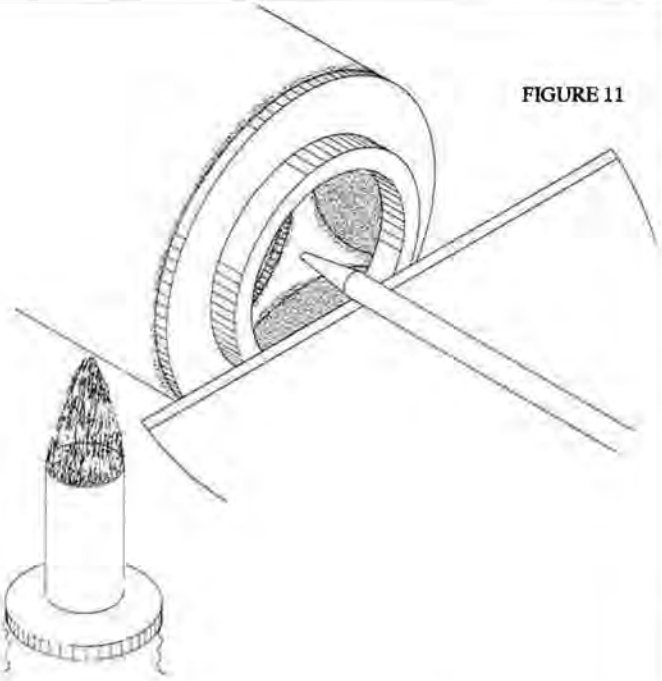


FIGURE 11



Making the Impulse Tooth Cutter

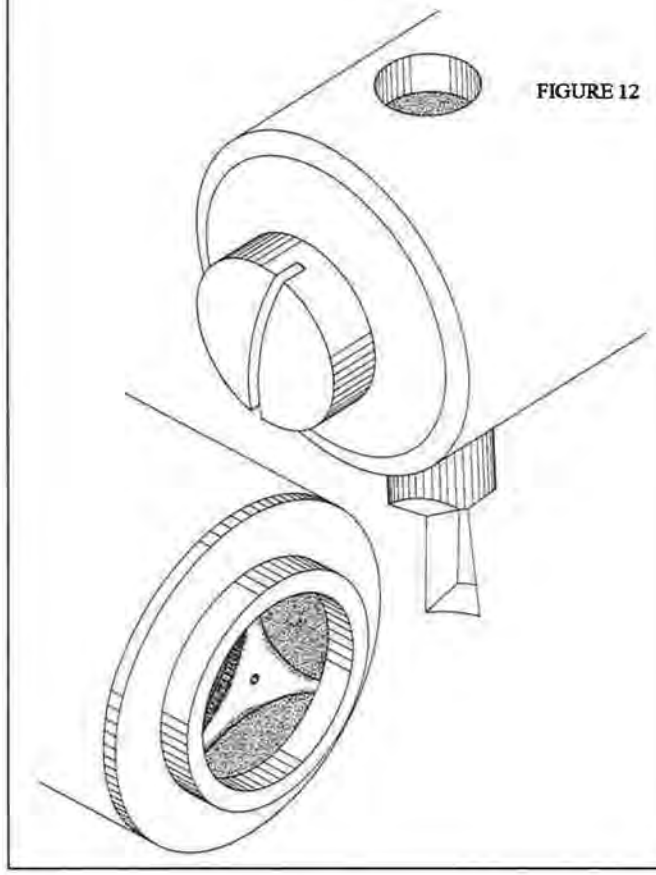
Figure 9 shows one of the cutters used to cut the escape wheel impulse teeth. The cutter is similar to the locking tooth cutter. The cutter is wide enough to cut the total space between two impulse teeth at teach setting.

A second cutter which is shown in Figure 10 is made and used to cut the backs of the impulse teeth. This cutter needs to be more narrow since it goes through the space at an angle to the center of the wheel. This is to avoid cutting into the next tooth. One could use only this narrow cutter to cut both the space and the back of the tooth by using more than one setting when cutting the space between two impulse teeth.

Shellacking Up the Wheel Blank

After the cutters have been made to but both sets of teeth on the duplex escape wheel, the wheel blank is shellacked to a cement brass for cutting the teeth. This is shown being done in Figure 11. The wheel blank is shellacked to the flat face of a cement brass or brass rod which is the same diameter as the wheel blank. Make sure that the end of the cement brass has been faced flat and runs true. Both the end of the cement brass and the wheel blank must be cleaned in denatured alcohol prior to shellacking the wheel to the cement brass. This is to make the shellac adhere to the brass and wheel blank. The cement brass is heated with an alcohol lamp while the brass is turning slowly in the lathe. The shellac is applied liberally to the face of the cement brass as it is heated. Then the wheel blank is applied to the end of the cement brass and held in place with a pointed pegwood in the center hole of the blank as shown. The pegwood is supported on the "T" rest. Continue heating the cement brass as the lathe is turning slowly. When the shellac adheres to the wheel blank, the alcohol flame is withdrawn. Continue to turn the lathe and use the pegwood in the hole in the wheel blank to keep the wheel blank running true in the flat and round until the shellac cools off. The excess shellac should be squeezed through the over the spokes of the wheel blank to help hold the wheel blank more securely to the cement brass. NOTE: The wheel blank must be shellacked to the cement brass as securely as possible to prevent it from loosening up while the teeth are being cut. The diameter of the blank is turned to exact diameter before cutting the teeth.

FIGURE 12



Setting Up the Equipment to Cut the Teeth

Figure 12 shows the relationship between the wheel blank, the cutter, and the cutter arbor prior to cutting the locking teeth on the escape wheel. The fly cutter arbor chuck is used in the spindle of the milling attachment. The milling attachment is attached to the top of the slide rest. The cement brass holding the wheel blank is held in the headstock of the lathe. The spindle of the milling attachment is set at right angles to the headstock spindle as shown. The index plate is mounted on the lathe spindle and the index latch is mounted on the end of the lathe bed.

Selecting the Index Plate

The index plate should be a multiple of the number of teeth in the wheel being made. The wheel being made has 15 teeth; therefore, we will use a 60 index plate. The angular distance between two notches or holes in the index plate would equal 6 degrees.

$$\frac{360 \text{ degrees}}{60 \text{ index}} = 6 \text{ degrees}$$

We would index 4 divisions for each tooth in the escape wheel (4 x 6 = 24 degrees). These positions should be marked with a felt tip pen.

$$\frac{360 \text{ degrees}}{15 \text{ teeth}} = 24 \text{ degrees}$$

Cutting the Locking Teeth

The locking faces of the locking teeth are cut radial. The backs of the locking teeth are cut at a 12 degree angle with the locking faces of the teeth. When making the radial cuts, one would center up the corner "b" of the cutter which cuts the radial faces of the teeth (Figure 7). After this, all of the spaces are cut to the proper depth. The cutter is lowered gradually into the wheel blank in the first space until the correct depth is reached. This depth is compared to the depth on the sample wheel.

After all of the spaces have been cut, the backs of the teeth are cut by resetting the cutter in relation to the first cuts (Figure 8). Since the backs of the teeth are cut at a 12-degree angle, one must index the wheel around 12 degrees and then move the cutter off center that amount before cutting the backs of the teeth. To index the blank 12 degrees, one would index two divisions since each division equals 6 degrees. Next, the cutter is moved off-center until the corner "a" of the cutter is in position to cut the back of the tooth. The cutter is moved off-center in the direction that the wheel was indexed. It is a good idea to set the cutter on one tooth until the tooth has the proper thickness tip before cutting the backs of the other teeth. The tips of the teeth should come almost to a point. If cut too thin at the tips, the teeth are likely to become damaged through usage. The thickness of the locking tooth tips should be about .04mm.

Cutting the Impulse Teeth

The front faces of the impulse teeth are cut radial and the backs of the impulse teeth are cut at a 30-degree angle to the front faces of the teeth. The front faces are midway between the locking faces of the locking teeth. To set the cutter, one would first set the index latch in one of the marked positions on the index plate. Then, the corner "a" of the cutter is centered up with the radial face of the locking tooth which will be located on the center line. The centering is done at the tip of the locking tooth. Next, the wheel is indexed 12 degrees clockwise. This would be two divisions on the index plate. This places the wheel blank in the proper position to cut the spaces for the impulse teeth. This index position can be marked with a different colored felt-tip pen each time the wheel is indexed 4 divisions for cutting a new space (see Figure 9).

To cut the backs of the impulse teeth, please refer to Figure 10. One would now remove the space cutter from the arbor chuck and replace the more narrow cutter for cutting the backs of the impulse teeth. After this, one would set the cutter to the proper position. To set the cutter, one would index the wheel 30 degrees counterclockwise. This would be 5 divisions on the index plate. Next, the cutter is moved off-center enough so corner "b" of the cutter is in position to cut the back of the tooth as shown in Figure 10. The wheel is indexed 4 divisions each time the back of a tooth is cut.

After the wheel has been completed, it should be chucked true for boring out the center hole to fit the shoulder on the pinion. To chuck the wheel, a sink should be cut in the end of a cement brass just large enough to accommodate the diameter of the wheel. Then, the wheel is shellacked into the sink for boring the hole. After the hole has been bored out, the wheel is removed from the cement brass by heating the cement brass. The shellac is removed from the wheel by soaking the wheel in denatured alcohol. After the shellac has been removed, the wheel is staked onto its pinion and the wheel is trued on the pinion.

"Antique Watch Restoration" will continue next month.

❑

PLEASE NOTE

We are trying to locate **Max Favret**. He was an employee of the Elgin Watch Company in the 1950s and possibly into the 1960s.

If you have any information pertaining to Mr. Favret, please contact AWI Central at: **3700 Harrison Avenue, Cincinnati, OH 45211; (513) 661-3838; fax (513) 661-3131.**

--Editor

Your tax-deductible donation of old watch movements (complete or partial) will insure a supply of spare parts for present and future watchmakers who restore and service vintage watches. Send to: **AWI ELM Trust Movement Bank, c/o AWI Central, 3700 Harrison Ave., Cincinnati, OH 45211.**

Making a Minute Snail and Quarter Snail Assembly for a Minute Repeater

Part 1



Ron DeCorte, CMW

INTRODUCTION

The making of a minute and quarter snail assembly will be discussed in a series of three articles, each covering different aspects of the project.

These articles are the result of a watch that recently came into my shop for repair. The owner of the watch said that it always struck the same hour, quarter hour, and minute. Upon removing the dial it was obvious that the minute and quarter snail assembly was missing. I decided to accept the work.

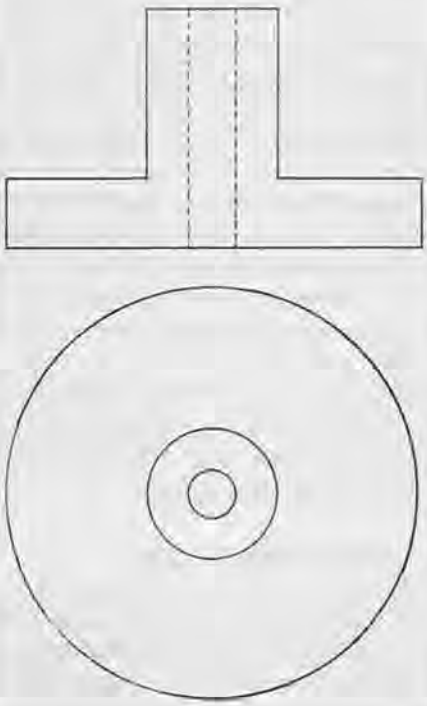
--Ron DeCorte

DIMENSIONS

In order to draw and then fabricate the missing parts, it was necessary to gather critical dimensions from the watch. The minute snail interacts with the minute rack tail and the minute surprise piece interacts with the surprise flirt. The quarter snail interacts with the quarter rack and the hour snail star wheel. As you can already see, these parts are very much at the heart of the minute repeater mechanism. It must be stressed that very careful attention to detail and accuracy be carried out in gathering this information since many hours of work could be lost by inaccurate measurements or lack of detail.

The first dimensions that must be gathered are the radial dimensions from the center of the watch that the minute rack will use to gage the minute strike. The easiest way to get this information is to make a gage as in Figure A. This gage is made of brass and has a hole through the center allowing it to slide over the center wheel shaft (pivot) with a minimum of side play. The small diameter end is a handle for holding in the lathe collet and the large end is made slightly larger than you anticipate the largest diameter of the minute snail to be. The actual dimensions of the gage are totally dependent upon the watch that is being repaired. At this point the large diameter of the gage is reduced in size until the first minute is struck. Also check the position of the minute hammer pawl in relation to the teeth on the minute rack. The tooth of the pawl should fall between the first and second tooth of the minute rack. Record the diameter of the gage and reduce the diameter again until the second minute is struck. Repeat this process through the 14th minute. Note that after the first couple of steps have been determined, a

FIGURE A



pattern should develop in terms of the size of each step. This should make the rest of the steps much easier to determine.

The same process as described above for the minute rack can now be used to determine the steps of the quarter rack.

An alternate method is to make the gage for the minute snail so that it is long enough to reach down into the quarter rack area. As you reduce the size of the gage for the minute calculations you will find that the quarter calculations can be gathered. Don't forget to check the position of the quarter hammer pawls in relation to the quarter rack teeth.

The radius that the minute and quarter rack tails work through is of primary importance. This radius is generally the distance from the center of the watch to the pivot point of the minute and quarter racks and must be measured very accurately.

Since the minute and quarter snail assembly interacts with the hour snail star wheel, this relationship must be taken into account. The quarter snail is directly responsible for the changing of the hour strike. This is accomplished by means of a trip pin or boss on the bottom of the quarter snail interacting with a tooth of the hour star wheel. It is important to note that when the quarter hour is about to change from 4th quarter to 1st, the hour star wheel should have been moved through almost 15 degrees of arc. It should also be noted that the hour star wheel jumper should not move the hour snail to the next hour until the surprise flirt has advanced the minute surprise piece and the quarter snail. In other words, the trip pin or boss on the quarter snail should not change the hour strike until slightly after (1-2 minutes) the minute hand has passed the hour unless acted upon by the surprise flirt. This is VERY important since you do not want the hour strike to change until (and precisely at the moment) the minute and quarter strikes have changed and this is accomplished by the action of the surprise flirt.

The minute and quarter racks, the surprise flirt, and the hour star wheel must be noted in terms of their height and thickness in relation to the watch plate and each other. It is important to note that the plane of operation that the hour rack tail works in must clear the quarter snail when it is operating.

As you can see once again, the action and interaction of the minute and quarter snail assembly with the rest of the strike mechanism is very complex. I strongly recommend that you read Francois LeCoultre's book titled *A Guide to Complicated Watches* and/or any other printed material that you can obtain on the subject of repeaters before attempting this type of work.

Once all of the important dimensions have been gathered, it is time to start the drawings for fabrication.

THE DRAWINGS

The minute snail is the most important part of the minute repeater mechanism and therefore will be the first part drawn. When drawing the minute snail I recommend that you draw it to a scale of at least 20:1. This will enable angular measurements to be taken from the drawing at a later time with a minimum amount of error. The first thing to do is to establish a center, and then draw a circle with a radius equal to the distance from the center of the watch to the pivot point of the minute and quarter racks. Then divide this circle into 60 equal parts. Leaving

LATHES • MILLS • SUPPLIES • METALS



Send $1.00 for catalog containing hundreds of items.

BLUE RIDGE MACHINERY & TOOLS, INC.
800-872-6500
BOX 536-HT • HURRICANE, WV • 25526

PRESSING ISSUES



CRY-905.00

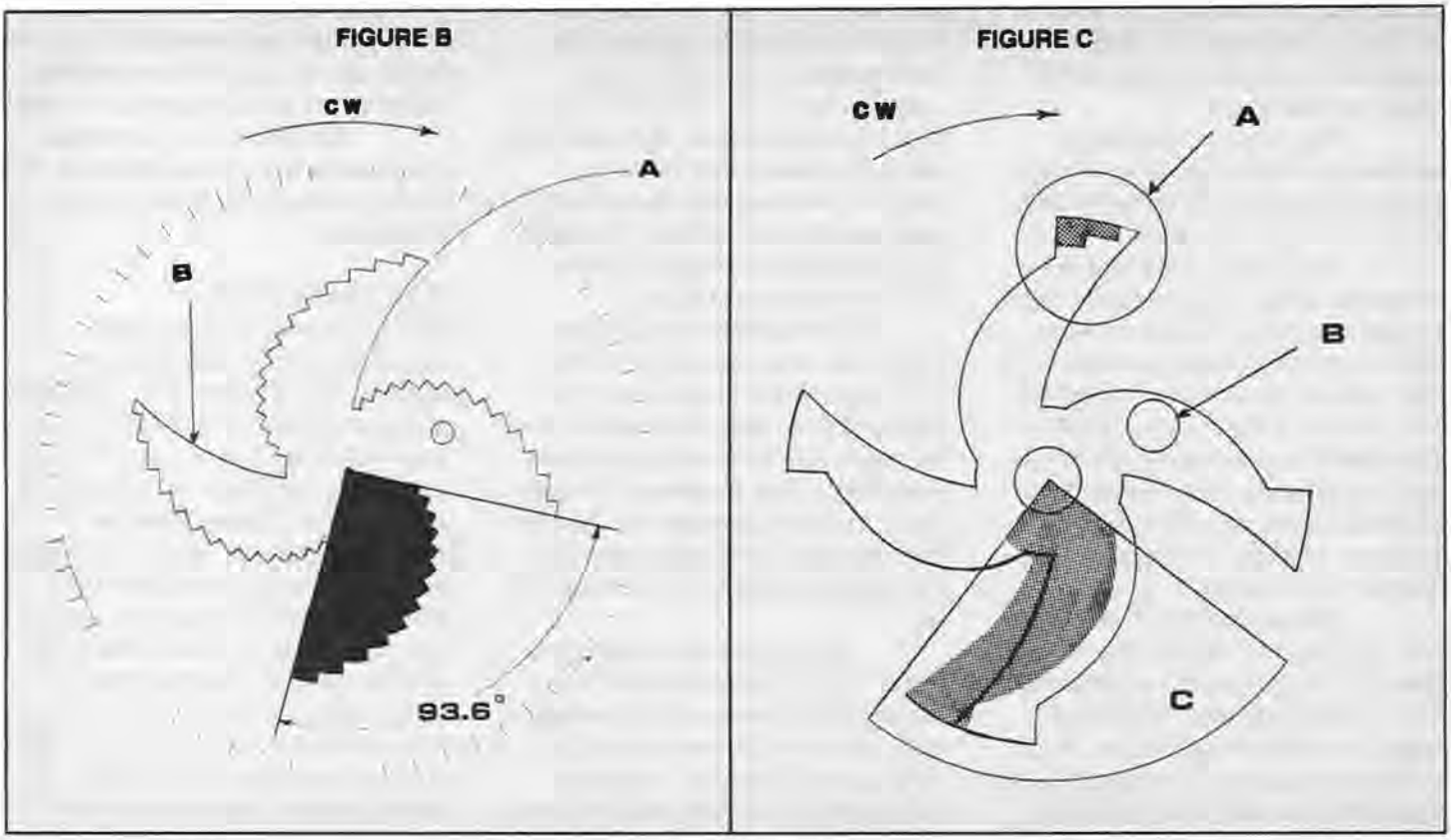
Don't be fooled by imitations. Ours is the only metal body case press with true straight-wall nylon dies in this price range. Features and benefits include:

- Nylon dies which cannot scratch crystals or bezels.
- Assortment of dies to fit all watches.
- Dies snap on and off quickly.
- Watch goes face-down, which makes closing the back easier.

EURO TOOL®

Albert Froidevaux & Sons, USA, Inc.
1-800-552-3131

Only $39.95
From a distributor near you.



the compass set at the same radius, draw arcs from each of the 60 points on the circumference of the circle to the center of the circle. This corresponds to the way that the minute rack tail will intersect the minute snail, and is shown in Figure B as arc A. It is EXTREMELY important that the direction of rotation for the snail and the attitude of attack for the minute rack tail corresponds to the way that the parts will work in the watch. From the center of the circle, draw concentric circles (14 thru 0) with diameters (radii) equal to the diameters of the steps that you have determined for the minute snail. The concentric circles (steps) have now been divided by the arcs of the minute rack tail. Next draw lines originating at the center of the circle(s) to the point of intersection of each step circle and the radii generated from the 60 points on the larger circle. These lines provide a more suitable transition between steps since the tail of the minute rack must make a clean drop from one minute step to the next.

Figure B is the culmination of the above steps. In Figure B note that the back slope at detail B is different than that formed by radius A. This makes the 14th step longer, allowing for the width of the minute rack tail. The length of the 14th step should be approximately the same as the 1st (minute) step. Another detail shown in Figure B are the 13 steps in the shaded area. You will note that the angle formed by these steps in this particular case is equal to 93.6 degrees or 7.2 degrees per step. This is important to note since when making the snail, the work will be rotated through this angle between each step. A small hole will also have to be made in one of the leaves of the snail for a banking pin.

Figure C shows a minute surprise piece. The minute surprise piece should be completely hidden under the minute snail except for the shaded area shown in Figure C at detail A. The only time that this is not true is when it is acted upon by the surprise flirt and it is rotated clockwise from under the minute snail as shown in Figure C at detail C by the shaded area. The amount of rotation is equal to 2 minute steps or in this case 14.4 degrees. The rotation is limited by the banking hole shown in Figure C at detail B. The banking pin that is secured to the minute snail passes through this banking hole in the surprise piece and may even pass further into the path of the quarter snail (more about this later). The size and location of this banking hole must limit the rotation as mentioned above.

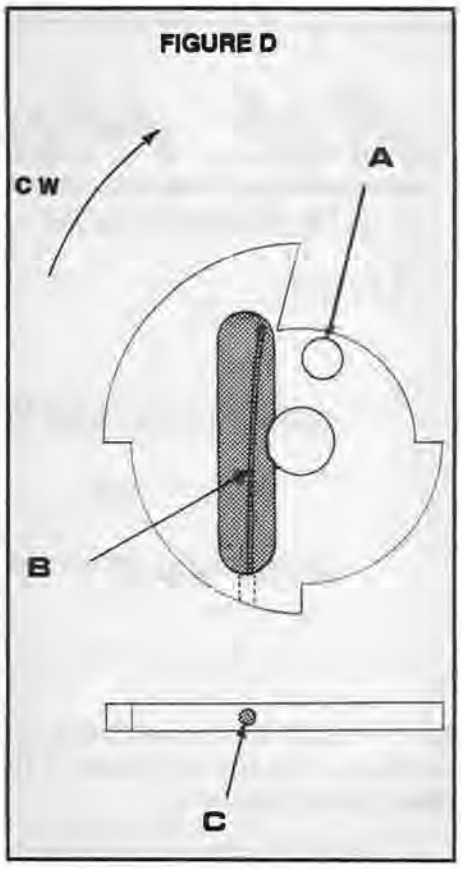
The quarter snail is shown in Figure D. Since the quarter snail and the minute surprise piece act in unison, they must be coupled together either by screws or pins. These coupling devices are not shown in any of the drawings for the sake of clarity, since they can be placed anywhere that is convenient. As you can see, the quarter snail is quite simple in its shape and detail compared to the minute snail. It is basically made up of 4 equal* radii determined by the method described earlier. *Note that the 4th quarter step slightly undercuts the 1st quarter step to allow for the width of the quarter rack tail. The rest of the steps do not need this feature because the tail of the quarter rack steps down to a smaller step. Since the quarter snail and the hour star wheel

interact, it is necessary for the quarter snail to have a trip pin or boss on its underside that will trip the hour star wheel once an hour, at the time that the quarter changes from 4th to 1st. A hole for a pin is shown in Figure D, detail A. The location of this trip pin could be in another radial location in another watch but was required in the location shown in this case. In some watches it will be necessary to make a clearance slot in the quarter snail as shown by the shaded area in Figure D. This area is needed to allow room for a banking spring as shown in Figure D, detail B. The purpose of this spring is to hold the minute surprise piece under the minute snail until it is acted upon by the surprise flirt. The spring works by applying pressure to the extended end of the banking pin that is secured to the minute snail and passes through the minute surprise piece. In some (older) watches this detail is not necessary since the surprise flirt is constantly in contact with the surprise piece, keeping it either under the minute snail or extended as mentioned earlier. A small hole must be drilled through the edge of the quarter snail as shown in Figure D, detail C. This allows the banking spring to be passed into the clearance area provided for it, and pinned in place.

A composite drawing may now be made using the existing drawings of the minute snail, the minute surprise piece, and the quarter snail. If the drawings were made to the same scale, they may be simply laid one on top of the other and viewed with a light source behind them. An elevation or stacked drawing may also be made if it is felt necessary.

In Part 2, I will discuss the special cutters needed and the fabrication of the parts.

❑



WATCH MATERIAL AND SERVICE

- Extensive line of Japanese, Swiss, and American watch materials
- Crystal fitting & cutting
- Replacement movements for repair and retrofitting
- Batteries
- Watch repair trade work
- Accutron service -- Coils available

ALWAYS FAST SERVICE AND THE LOWEST POSSIBLE PRICES

POLLAK WATCH SERVICE, INC.
13910 Cedar Road
Cleveland, Ohio 44118
(216) 932-2500
(800) 878-3185
Fax (216) 831-8649

GENUINE WATCH MATERIALS

TOOLS - FINDINGS - JEWELRY
COMPLETE CRYSTAL DEPT.
SEIKO - PULSAR - LORUS
ROLEX - BULOVA
AMERICAN & SWISS MATERIAL
SERVING THE INDUSTRY SINCE 1913
NO MINIMUM ORDER
EVEREADY & RAY-O-VAC CELLS

WM. S. McCAW CO.
1722 MADISON AVE.
TOLEDO, OHIO 43624
TEL 419-243-3720
OHIO WATTS 800-472-0200
NAT WATTS 800-537-0343

Ask Huck

CLOCKMAKING BITS

By J.M. Huckabee
CMC, FBHI

About . . .



MAKING LANTERN PINIONS

and

REPAIRING BENT ARBORS

Q. Can a lantern pinion be handmade? What problems would I encounter? How do you make this type of pinion?

A. Indeed a lantern pinion can be handmade, and I have made quite a number myself. Several textbooks relate how this is done and indicate the job to be relatively easy. Having been there, I think that is colored with a bit of "street talk."

A well-made lantern pinion is the best of pinions for a clock train, and could be made with ease under favorable conditions.

The method I use is to place the shrouds on the arbor, then do the drilling. If shrouds are drilled first, there is an alignment problem when they are press-fit to the arbor.

My tools are not aptly suited to making this pinion. I hold the arbor in a Boley style 3-slide indexing fixture and power the drill bit in the lathe headstock. The bit must be long, and starting on exact location is the problem. I prepare the shrouds and scribe a circle of correct pitch diameter on the one where the bit enters. Then, via indexing, scribe a radial line for each hole position. A slight prick is made at each line-cross to guide the drill bit. This is not time efficient and is prone to error in measurement of the pitch circle.

In the machine tool industry it would be very easy to drill the shrouds with perfect accuracy. The bit would be fed through a drill bushing or a die plate and could be drilled very quickly. In high quantity production, the shrouds probably would be drilled prior to assembly on the arbor.

Many textbooks tell us that the lantern pinion is the most perfect type for clockwork. My experience in clock building and repairing certainly does verify the statement. Many short pendulum 8-day clocks have a step-up ratio of as much as 5,000 to 1 from great wheel to escape wheel. These trains run remarkably free under nominal conditions.

Having built some clocks with a train ratio in the 3,000-4,000 range with cut pinions really opened my eyes to the quality that can be achieved with the humble lantern pinion.

My lantern pinion construction experience has shown that it is not time efficient to make them in the manner I used. This does not mean you should avoid the job because of my experience. In fact, I have the desire to build an all-lantern pinion clock, and expect to make some tools that will be time efficient for the job.

Possibly the best decision for the repairman is to learn to replace the wires quickly. This is more time efficient than purchasing a new arbor and pinion--the transfer of the wheel requiring more time than replacing the pinion wires.

Q. When an old American clock breaks a mainspring it usually bends the second wheel arbor. This may be in either train. How can this be corrected? Is it necessary to replace the arbor?

A. This damage is the result of spring pressure against the arbor. Clocks with barreled springs act differently. The shock to the train usually tears away barrel teeth, breaks the second wheel pinion or teeth, and possibly several pivots from other arbors. The old American clock can be restored with relative ease.

Inspect the wheel teeth in the great wheel, second wheel and its lantern, and the related pivots. Most of the spring power is spent when the spring meets the second arbor, and being bent is usually the only damage.

This class of clock used mild drawn steel wire for its arbors. The material is not too different from

a common nail in hardness and workability. We are fortunate in that the arbor can be restored in most cases. In fact, I don't even recall when I've had one of these break during straightening. However, this does not mean that it is not necessary to use great caution.

The safest method I know is to make a tool for the job. A hardwood block in about a 4-inch cube is needed. In the end-grain, make a series of saw cuts that will just span the wheel and pinion. Lay the arbor across the slot with the high side up. With a hardwood dowel and hammer, form the arbor downward. A dowel which is a 1/2 inch in diameter and four inches long works great.

I work by trial-and-test until the arbor appears straight. Then hold its pivots between thumb and finger for a spin test. Of course if the pivots are bent, this test is not valid. Observe the arbor, wheel, and pinion during the spin test.

Pivots can be straightened with a smooth-jaw pliers and will need some surface touchup.

An arbor-straightening job only takes 2-3 minutes and is really easy to accomplish. But be advised: This technique is dangerous on clocks with barreled mainsprings and hard arbors! Unless the arbors are annealed, there is a very high probability of breakage.

It's a good practice to observe all of the arbors in the American clocks when you give the train a spin test during repairs. These arbors are soft and easily damaged. While into the movement, it's easy to straighten one or more, and the risk of breakage is almost zero.

Some workmen straighten arbors across the jaws of a vise using a flat-faced punch. As well as this works, it's not as safe as the wood block and dowel technique. And while on the wood block: Drill the block with a variety of hole sizes for working other clock parts. This is not a total substitute for steel blocks, but is an excellent supplement. ❑

If you have any questions, please write: "Ask Huck," c/o Horological Times, P.O. Box 11011, Cincinnati, OH 45211.

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, P.O. Box 11011, Cincinnati, OH 45211.**

Allow 3 weeks for handling and delivery.



Gem City College

Where Time Can Equal Money

- Watchmaking
- Engraving
- Clock Repair
- Jewelry
- Jewelry Store Management

700 State Street

Quincy IL 62301

(217) 222-0391

THE "KRONOGLASS" *. . .A semi-automatic pantograph mineral watch crystal grinding machine.*

FEATURES: **Four (4) diamond grinding wheels**
Water pan with pump
Plus all equipment necessary to reproduce at least 60 finished crystals

With this machine you can reproduce flat or concave mineral watch crystals with a bevel for watches of any shape. The American Perfit Crystal Corp. is the exclusive distributor for this machine considered the finest of its kind available.

Replacement parts are readily available!

Contact your watch material supplier today.

SEE THE VIDEO FIRST



AMERICAN PERFIT CRYSTAL CORP. 653 ELEVENTH AVE. NEW YORK, NY 10036

Shop Talk

Adjusting Watch Band Lengths

PART 1: The Easy Ones First



Wes Door, CMW

Most watch bands are easy to adjust and most adjustments involve the simple removal of a link or two or more. If we need to add length to the band, we would use the same general procedure, except we would need to have the proper matching links.

Today we will discuss the removal of links. First let's do the easy jobs; later we will work on the harder ones.

The Easy Ones First

Look at the band. Decide how the company made the band. Are the links pressed together, soldered, or just closed links? Figure 1A shows a link band. Turn the band over and observe. Are these links soldered? If so, we can cut through the soldered area, remove the link (or links), and re-solder. If this is a 14K or 18K gold band, then the links are probably soldered. If it's gold-filled, the links may or may not be soldered. If the band is plated, the links may not be soldered. Also, do the band links taper? If so, the links will be progressively smaller toward the clasp. So we need to remove the links closest to the clasp. If the links do not taper (as in Figure 1A), then we may choose any spot to start our link removal. How do we count the links to remove? To remove one link, we need to remove one link and one connector. We have three rows across and two rows across in between these. The ones with three across will be called links, and the ones with two across will be called connector links. See Figure 1A again. If the links open up in the center of each link, then our arrow at link #1 is where we start. To remove one link, go to the arrow at #3 (not #2 as this is our connector link).

FIGURE 1

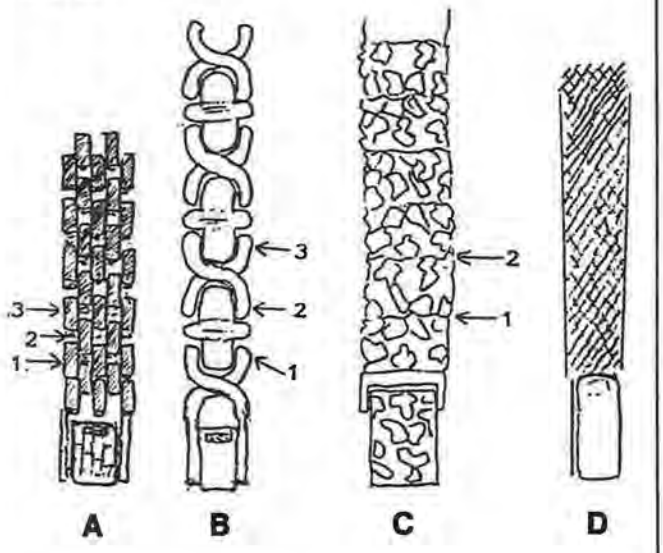


Figure 1B shows a link type again; however, we need to remove a pin (or a screw) that goes through the links shown by the arrow at position 1. A little later we will show how to remove these pins or screws if they are too tight by normal means.

See Figure 1C. To remove one link from this band, we remove pins (or screws) at arrow position 1 and 2. There is no connector on this type of band. It has a male fitting on one end and a female fitting on the other end.

Figure 1D shows a mesh style band, thus no removable links. If this is a gold band it will probably be 14K or 18K. We can cut out and re-solder any amount necessary to refit it to our customer's wrist and then refinish. If the band is plated we should warn our customer that some discoloration may result from our soldering process. Sometimes we can re-electroplate to match the original, but there's no guarantee that this will be possible.

If we are not set up to do this type of work, we may want to recommend returning the watch to the store where it was purchased for service. But first explain that we can repair and adjust *OUR* merchandise.

Generally, lower grade watches take more time to repair. If we charge according to the time it takes, we find ourselves quoting a high price on these cheap watches. The real secret is we must charge according to the time it takes to do the work, not according to the value of the watch.

Case in point--a job to shorten a band on a watch that cost $10.00. Without revealing the price I would charge to shorten this band, I could say it was considerably more than the price paid for this watch. First we need to do a selling job. We must explain to our customer that if they had purchased their watch from us, we would not charge to adjust it. We could do this job while they waited because the bands on the watches we sell are easy to adjust. We also need to explain that one of the reasons they paid so little for their watch was because the band was stamped out and riveted or made in a manner that is difficult to adjust. The company saved money with this low-quality method. They would probably claim they passed this savings on to you, the customer. The band may *LOOK* adjustable, but it probably isn't or it is very hard to adjust. We continue to explain to our customer that we must drill out or cut out some links and make a new pin and rivets or whatever is necessary to re-adjust the band; therefore, our price to do this is *XX* dollars. The important thing is to quote a price *BEFORE* doing the job.

Next month we will actually make a pin and show some special methods to form rivets, etc. for band repairs.

❑

AWI BENCH COURSES 1993

To register for these courses, please send with your request a registration fee of **$35** per instruction day (for AWI members) to:
AWI Central
3700 Harrison Ave., P.O. Box 11011
Cincinnati, OH 45211

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

COURSES & INSTRUCTORS

Advanced Quartz Watch Repair
Robert Bishop, CMEW
Basic Pocket Watch
Alice Carpenter, CMW, CMEW
Introduction to Clock Repair
Buddy Carpenter, CMC, CMEW
Advanced Clock Repair
Roland Iverson, CMC
Repair of the Atmos Clock
Gerald Jaeger, CMW, CMEW, FAWI
Basic Watch Repair
Mechanical Chronographs
James Lubic
Cuckoo Clock Repair
James Williams, CC
400-Day Clock Repair
Striking Clocks
John Nagle
Servicing ETA Quartz Chronographs
James Broughton, CMEW
Cross Slide Lathe Course
Lathe Accessories
Basic Lathe
Roy Hovey
Hairspring Vibrating
Joseph Cerullo, CMW, CMC

AUGUST 1993
15--Basic Pocket Watch--Pittsburgh, PA
21-22--Striking Clocks--Austin, TX
21-22--Repair of the Atmos Clock--Seneca Falls, NY
22--Servicing ETA Quartz Chronographs--Nashville, TN

SEPTEMBER 1993
17-19--Advanced Clock Repair--Des Moines, IA
17-20--Cross Slide Lathe Course--Orange County, CA
18-19--Repair of the Atmos Clock--New Orleans, LA
18-19--Hairspring Vibrating--Pittsburgh, PA
18-19--Cuckoo Clock Repair--Indianapolis, IN
19-20--400-Day Clock Repair--Tucson, AZ
19-20--Mechanical Chronographs--Tucson, AZ

OCTOBER 1993
16-17--Hairspring Vibrating--Denver, CO
22-25--Cross Slide/Arbors & Stems--New York, NY
24--Servicing ETA Quartz Chronographs--Austin, TX
29--Basic Pocket Watch--W. Palm Beach, FL
30-31--Repair of the Atmos Clock--Arlington, TX
30-31--Cuckoo Clock Repair--Minneapolis/St. Paul, MN

NOVEMBER 1993
6-7--Striking Clocks--Salt Lake City, UT
13-14--Hairspring Vibrating--Austin, TX

PROJECT EXTEND CLASSES FOR 1993

Contact AWI Central for the General Information brochure for Project Extend and specific course brochures for classes that interest you.

Aug. 16-21*	**Lathe I** (basic)	**Roy Hovey**
Aug. 23-28*	**Lathe II** (advanced)	**Roy Hovey**
Sept. 13-17	**Watch Case Repair**	**M. Richmond**
Sept. 20-24	**Clock I** (basic)	**James LaChapelle**
Sept. 27-Oct.1	**Clock VI**	**John Nagle**
Oct. 4-8	**Clock II**	**Roland Iverson**
Oct. 11-15	**Clock Case Repair**	**James Williams**
Oct. 18-22	**Clock V** (CMC Prep)	**David Christianson**

*** 6-day class**

As a Clockmaker Turns

Features of the Watchmakers Lathe That Aid a Clockmaker



J.M. Huckabee, CMC, FBHI

Nothing will excite a clockmaker quicker than a watchmakers lathe on a long bed, or one that also includes a well-appointed tailstock. The full-featured tailstock on a long-bed lathe is a joy to the clockmaker's heart! This is one reason that we prefer some versions of the Moseley and Peerless lathes; the beds are an inch or so longer. As the bed exceeds about 13 inches, it is best that two pedestals are used for support. Two pedestals would add rigidity to a short-bed lathe, but is not really easy to use. Remember we must be able to get our right hand under the bed to lock up most types of tool holders and tool rests.

Lathe beds are built in many shapes. For the watch- and clockmaker there is none that is more convenient to use than the Moseley and WW style. These use a cast iron bed that is wide, and with a central slot. Tools are easily attached; the tool base sits well on the wide bed and the bed serves as a storage place for small items used during the job. Now try those thoughts on the round bed of a Geneva style lathe! The same is true to a lesser extent with some of the English-built V-bed lathes.

Look over Figure 1 as an example of a well-appointed, long-bed lathe. This machine is strong, has a 15-inch bed with dual pedestals, collet-holding lever-fed tailstock, two-deck slide rest, multi-bit tool holder, countershaft, and a variable speed motor with speed regulation. The motor maintains whatever speed that was preset. This one will make any workman's eyes sparkle! Will this make you a better craftsman? It will not! It will make some jobs more pleasant and more time-efficient. But never forget--features that are not used are not time-efficient, neither will they yield you a profit.

I had the lathe of Figure 1 custom-built in London about 30 years ago. Some of the features I purchased at that time turned out to be "the vanity of a rich and foolish old man." The features shown here are all useful, but I'm ashamed of some others that have never been productive.

Turn your attention to Figure 2. These tailstocks are very nice. They lock onto the bed easily, have variable friction lock on the runners, lever feed and micrometer feed features. Each is of the collet-holding type, accepting WW style collets and other WW collet-based tools. These also accept a heavy solid-type male-female double-ended runner. I have never found a tailstock function that could not be accomplished with these tools. These features should be kept in mind as you think about a lathe's value.

Figure 3 shows the tailstock with nose cones and a solid runner. The rightmost area of the same illustration

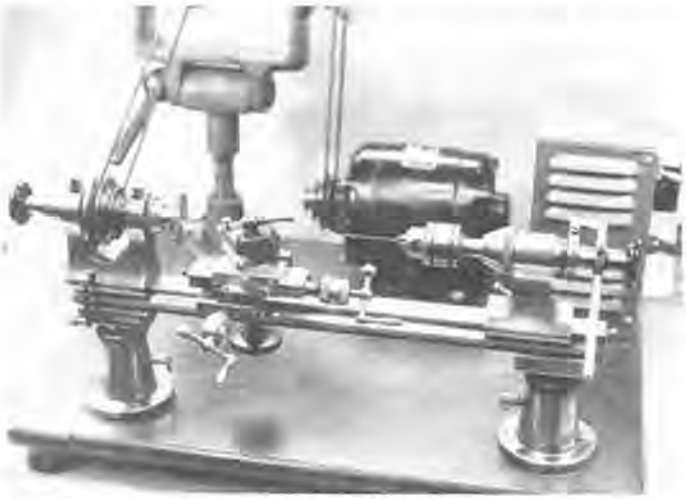


FIGURE 1. A well-appointed watchmakers lathe fitted with dual pedestals and a 15-inch bed.



FIGURE 2. These collet-holding tailstocks are fitted with micrometer feed and lever feed. The drill chuck has a rear collet-stub.



FIGURE 3. Tailstock with a dual-end runner and an accessory collet-holding micrometer feed.



FIGURE 4. Dead-runner tailstock with accessories to convert to a collet-holding, lever-feed function.

shows the collet-holding micrometer barrel, draw-bar, and tool. This is a very fine tailstock accessory.

Inspect Figure 4. We are looking at the rear side of the tailstock. Note the locking lever that secures the device to our lathe bed. The dead runner is held in position by two collets, locked in place by the two cones that are nearby. The collet-holding runner and its draw-bar are shown with the feed lever. By removing the feed lever we can use the runner as a collet-holding pin vise of the best quality.

Now a word about a collet-holding tailstock. You will frequently need a collet of the same size in both headstock and tailstock! This means you will need two of each popularly used collet sizes! The drill chuck is a nice accessory, but it takes extra bed length to use. Most drill chucks do not have a through-hole, and chuck-plus-bit takes up lots of bed length. Where a good selection of collets are available, it may be best to hold a bit in your collet.

Study the lathe in Figure 5. This is a short-bed version of the lathe in Figure 1, built on the same order with all features interchangeable between the two. The escape wheel is between centers and driven by the same accesso-

North Seattle Community College Dedicates George Lewis Memorial Sundial

More than 100 former students, friends, and family attended the dedication of the George Lewis memorial sundial at North Seattle Community College on May 27, 1993.

Located in the courtyard adjacent to the watchmaking classrooms, the sundial stands as a striking tribute to George Lewis who dedicated his life to illuminating the lives of students. The sundial, designed by Gail Sherman and fabricated by Daryl Smith, is constructed with a bronze gnomon which casts a shadow by which latitude and longitude are calculated. The sundial was donated to the college by friends, family, and associates of Lewis.

Lewis, who taught at North Seattle Community College for 18 years, developed the two-year watch and clock technology program. The program, unique in community colleges, provides training in lathework, filing, grinding, tool making, gear cutting, jewelry design, and repair. More than 200 students have completed the program which continues under the direction of Tony Knorr, former Omega agent and owner of Swiss Watch Service in Seattle. ❑



Left: Former students and colleagues of George Lewis pay tribute to his contribution to watch and clock technology at the dedication of the sundial erected in his memory at North Seattle Community College.



Right: Dedicated watch and clock technology instructor, George Lewis inspired his students at North Seattle Community College for 18 years.

ries as described in a previous article. We immediately see that the entire bed length is in use. Possibly a half inch could be gained by relocation of the tailstock runner. The purpose of this illustration is to show how quickly we run out of bed length when clockmaking on the shorter watch lathes.



FIGURE 5. A wheel is supported between centers and driven by the carrier and driver features. This setup is one of the most accurate methods of turning.



FIGURE 6. Rate of cut is controlled by a squeeze-grip on the tailstock. This effects the most delicate control needed with very small drill bits.



FIGURE 7. A collet-holding tailstock is an excellent companion to half-open pivot polishing beds.

Compare the setup of Figures 5 and 6. Here we are almost out of bed length. The drill could be backed out by about one inch as indicated by runner length showing between the chuck and nose cone of the tailstock. Here is where we should hold the bit in a collet rather than a chuck. Note that all tool features are secured to this bed by a shoe. The tip-over tool rest of Figure 5 is mounted on that shoe.

Why is the tailstock runner extended an inch in Figure 6? Why not pull the tailstock in closer to the drill-holding chuck? Study the workman's hand carefully. Observe the finger over the nose cone and around the tailstock body. The purpose of this is to control the bit by a "squeeze-grip feed." Never push-feed the tailstock runner; judgement of distance will be poor, as will the feed as your bit breaks through the bottom of its hole. The squeeze-feed will rival the benefits of a lever feed and is so easy to accomplish. When making up new tailstock runners, I prefer a length befitting to my hand size and without a knob.

We have a setup in Figure 7 which also conserves bed length. In this case, a pivot polishing bed is held in a collet. There is about 3/4 inch of runner space unused and almost a half inch of bed space. Compare this to Figure 5 and we will see that a longer arbor could be worked in the lathe.

Let's explore the squeeze-feed in another working mode. In Figure 8 we have a small faceplate in our tailstock with a very small piece held in place by a parallel jaw clamp. Feed control is of vital importance as the bit breaks through its hole bottom. It is in this type of work that the squeeze-feed excels! Now, imagine we hold the drill bit in a headstock collet. We would have ample space for drilling much more cumbersome objects in the short-bed lathe. In essence the workman's methods and skill will offset most complaints about most tools. Remember this old adage--"The one who thinks he can accomplish a task is usually right," and "The workman who thinks he can't, is always right!" ❑

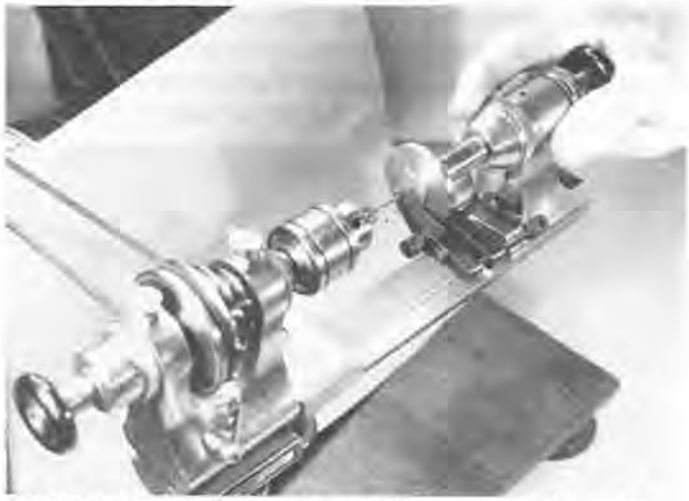


FIGURE 8. A parallel-jaw clamp holds the small piece on a faceplate during drilling. In most applications the small bit will be held in a collet.

AWI's 33rd Annual Board of Directors Meeting a Big Success

Radisson Inn
Greater Cincinnati Airport



Newly elected Directors for a three-year term were installed by Ewell Hartman (left). They are: Joseph Cerullo, Alice Carpenter, James Broughton, Wes Door, and Marvin Whitney.

The AWI Board of Directors held their 33rd annual meeting June 26-27, 1993 at the Radisson Inn Airport, Cincinnati, Ohio. Delegates from the Affiliate Chapters met on Friday, June 25th.

The Board of Directors considered the final reports of all committees and acted on recommendations in the reports. Several important new issues were discussed and acted upon by the Board. They considered:

*A proposal to implement an advanced training watchmaker program at the AWI Education Center in conjunction with Project Extend. This course will have two 10-week sessions in which participants will receive post-graduate training. Because of the advanced nature of the curriculum, this course will in no way be in competition with courses offered by existing schools.

*A proposal to follow very closely a case pending in the Federal courts dealing with the sale of spare parts.

*A proposal to give serious consideration to the acquisition of a larger headquarters facility--one which would place all AWI activities under one roof and have street level access to these facilities.

The delegates from the Affiliate Chapters reported on their activities during the past year and shared program and project ideas. A number of proposals were presented to the delegates; two were presented to the Board for consideration. They were:

1) When listing new members in the *Horological Times*, the listing should be done by states rather than alphabetically. This would make it easier for chapters to contact new AWI members in their area.

2) The Seminars & Workshops Committee attempt to develop additional one-day workshops which fit the format of chapter conventions better than two-day workshops do.

The Board approved both of these proposals, and they will be acted upon accordingly.

During the Saturday evening banquet the retiring Board members were honored for their service to AWI. The retireees were: M.R. Buddy Carpenter, Ewell D. Hartman, William I. Biederman, and Henry Frystak.

Also during the banquet the newly elected directors were installed. Those for a three-year term were:

James H. Broughton
Alice B. Carpenter
Joseph L. Cerullo
Wes Door
Marvin E. Whitney

Installed for a one-year term were: Research & Education Council Chairman/Director **Tony Knorr**, and Affiliate Chapter Chairman/Director **Greg Hostetter.** It should be noted that new Director **James B. Williams** was already in place on the Board, having filled the unexpired term of Robert Macomber who resigned early in the year.

The following officers were elected and installed for fiscal year 1993-94: **Wes Door**, President; **Joseph L. Cerullo**, 1st Vice President; **Charles Cleves**, 2nd Vice President; **Fred S. Burckhardt**, Secretary; **Marvin E. Whitney**, Treasurer.

Next year's annual Board meeting will be held June 25-26, 1994; the Affiliate Chapters will meet June 24, 1994. The Research & Education Council has scheduled its meeting for April, 1994. The AWI Board and Affiliate Chapter meetings will be held at the Commonwealth Hilton, Florence, KY.



Ewell Hartman (far right) after installing the AWI Officers for 1993-94. They are (left to right): Wes Door, President; Joseph Cerullo, 1st Vice President; Charles Cleves, 2nd Vice President; Fred Burckhardt, Secretary; Marvin Whitney, Treasurer.



Retiring Directors receive recognition for their service. Left to right: Buddy Carpenter, Henry Frystak, and Ewell Hartman (absent: William Biederman).



REC Chairman/Director Tony Knorr and Chapter Chairman/Director Greg Hostetter are installed as directors for a 1-year term.

Bishop Receives AWI Fellow Award



Robert F. Bishop received the highest award bestowed by AWI, that of "Fellow AWI," on June 26, 1993. Bishop's wife Wanda was on hand to congratulate her husband for achieving this high honor.

In making the presentation, Awards Chairman Joe Cerullo traced the steps Bob Bishop took to accomplish this honor. Bishop began his watchmaker training at the Western Pennsylvania Horological Institute in Pittsburgh, PA. He was active in the Pennsylvania Watchmakers Associations, and found his way to AWI as a delegate to the AWI Affiliate Chapter meeting. Soon he was elected AWI Chapter Chairman/Director, and eventually became an AWI Director.

During this period, Bob Bishop became involved in presenting traveling workshops for the Institute. His Advanced Quartz program has carried him to almost every corner of the United States, and by popular request he returned to some areas several times.

Robert Bishop served as AWI President from June 1988 to June 1990. During his service, he has earned the respect and admiration of those he has come in contact with.

Williams Attends First Board Meeting as Director

James E. Williams, Cortez, CO, became an AWI Director on December 6, 1992 to replace Robert Macomber who resigned. Mr. Williams had finished 6th in that year's election, and, in accordance with the AWI Constitution, was elevated to the position of Director. Mr. Williams' term will expire in 1994. He attended his first Board meeting as an AWI Director June 26, 1993.



James Williams attended his first meeting as an AWI Director this year.

Affiliate Chapter Achievement Award

This award is presented to the AWI Affiliate Chapter that is judged by their peers as having provided the best service to their members, the horological profession, and the community during the past year. This year's award was won by the Horological Association of Virginia. The HAV was selected after the judging committee reviewed all of the reports of all of the chapters and their oral presentations. C.E. Chick Hardy accepted the award for the HAV.



C.E. "Chick" Hardy (right) accepts the Affiliate Chapter Achievement Award for the Horological Association of Virginia.



Jay B. Schisler (right) receives the New Jersey Award known as Henry Frystak-Donald DeWolfe Award. Henry Frystak (left) presents Jay with the award.

New Jersey Establishes New Award

The Watchmakers Association of New Jersey established a new award known as the Henry Frystak-Donald DeWolfe Award, the purpose of which is to honor one AWI member per year who achieves the highest score on an AWI Certified Master Electronic Watchmaker examination. The combined score of the examinee's written and practical portion of the exam must be 90% or higher to qualify. This year the award went to Jay Schisler of Cincinnati, OH. This award is named in honor of Henry C. Frystak and Donald J. DeWolfe, who,

through their efforts, helped train and certify hundreds of watchmakers in both Accutron and Quartz Watch Repair while serving as instructors for the Bulova Watch Company.

Battery Collection Awards

Members from 31 chapter groups and individuals, including members in British Columbia and Puerto Rico, donated 742 pounds of used watch batteries this year. The proceeds from the sale of these recyclable batteries will go to the AWI Education, Library, and Museum Charitable Trust to be used for student loans and grants.

Ever since the collection of recyclable batteries was suggested by Henry B. Fried, a spirited competition has developed among states and chapters to see who can bring in the most cells during the year. After the weigh-in this year, the various groups were awarded ribbons for their efforts.



Ben Matz accepts the 1st Place Award in AWI's Battery Competition for the Horological Society of New York.



2nd Place in the Battery Competition went to the Arizona Clockmakers & Watchmakers Guild. Thomas White accepts the award.



3rd Place in the Battery Competition went the the Horological Association of Indiana. Here Dale Huntington accepts the award.

Photos below: Other guilds receive recognition for their battery contributions.







Statement from Fred Burckhardt, Chairman
Battery Reclamation Committee

The Trustees are grateful to the individuals in the 31 states, British Columbia, and Puerto Rico who individually and collectively donated 742 pounds of recyclable watch cells to the Trust's student loan fund. The students and Trustees express their sincere thanks!

First Gold
American Horology Medallion Auctioned

During the awards banquet, the first of six 1-ounce 14K gold medallions honoring the American Horologist was auctioned off. After spirited bidding, Josephine Hagans became the successful bidder. She explained that she purchased the coin in memory of her husband, Orville R. Hagans.

Regina Stenger of the AWI staff was introduced prior to the bidding. Ms. Stenger designed the "heads" side of the coin.

Individuals now have an opportunity to bid through silent auction on the remaining five gold coins. *(See instructions on the back cover of this issue and on this month's mailing envelope, or write AWI Central for details.)*

Renata U.S./Kessler Sales, Inc. made these medals available for the benefit of the Trust's student aid fund. Renata still has silver medallions available for sale, from which they share a portion of the proceeds with the ELM Trust student aid fund.



Prior to beginning the auction of the gold horology medallion, Regina Stenger was introduced as one of the medal's designers.



The bidding was spirited as Josephine Hagans signals her winning bid for the American Horologist medallion.

Editor Joseph Thompson is Keynote Speaker at Delegates Meeting June 25, 1993

Joseph Thompson, Editor-in-Chief/ Publishing Director of *Modern Jeweler* magazine, presented a comprehensive analysis of the watch market as it exists today.

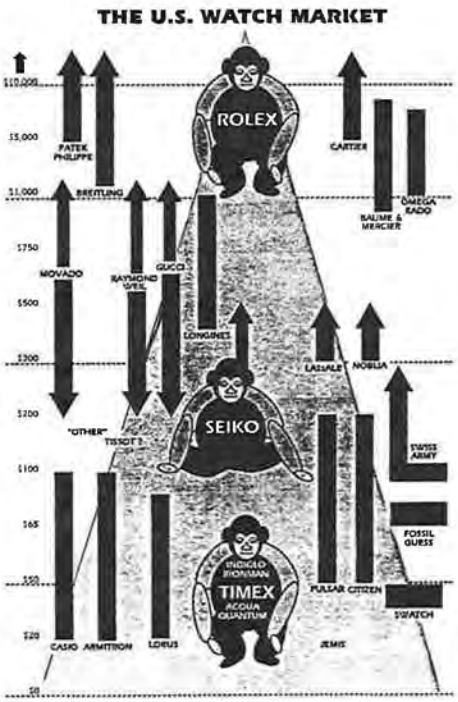
Mr. Thompson, using the graph shown at right, drew upon his many years of observing trends in the watch market to explain the price point positioning that is currently underway in the watch marketplace. Through acquisitions and the development of new brands and alignments with mass marketers, certain companies, particularly in the low and mid-price point arena, are providing stiff competition for traditional leaders who, until recently, were unchallenged.

Some of the new watch products just on the horizon include a receptor watch which will serve as a beeper for the wearer, a watch remote control for controlling the TV or VCR and the satellite watch which currently is available in other countries. Also coming or currently in the marketplace are $10.00 quartz analog watches and deep discounted digital movements from Hong Kong and China for less than $1.00.

Mr. Thompson's presentation was of special interest to the chapter delegates who for the most part are concerned with service rather than sales of timepieces. Actually, repairers become so engrossed in the technical aspects of timepieces that they pay little attention to the manufacturers and marketers of timepieces who, in reality, are the engines that drive the industry.



Joseph Thompson keynotes Chapter Delegates at the Affiliate Chapter meeting on Friday.





One of AWI's early Chapter Chairmen, Gene Kelton (right) confers with current Chairman Joe Cerullo (left).



Delegates Dennis Warner and Jerry Kincaid.



First-time Delegate Gail Sherman from Washington State talks with Directors Tony Knorr (middle) and Robert Nelson (right).



Larry Blanchard and Henry Fried.



Dexter Elliott (left), a long-time AWI supporter, chats with Jerry Jaeger during a break in the meetings.



AWI staff members David LaFleche (left) and Jim Lubic seem relieved that the meetings are over.



Several AWI ladies enjoyed a riverboat cruise on Saturday. *Back row:* Sally Benson, Judy Deutsch; *center:* Elsie Hardy, Kay Kelton, Laura Dowell, Edith Burckhardt, Nancy Danner; *front row:* Kim Danner, Paige Asbrock.

AWI MATERIAL SEARCH NETWORK

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

OO3	Movado 405 complete movement
OO4	Longines 4LL complete movement
PP1	Movado 246 set bridge, part #445/1004
PP2	Seth Thomas 11-44 or 5188 balance staff

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

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. ❑

Association News

FLORIDA



Henry B. Fried was guest speaker at a recent meeting of the Florida State Watchmakers Association in Tampa, FL. Joining Mr. Fried are the officers of the Suncoast Watchmakers Guild. Pictured with Henry Fried (center) are: Victor Hysni, Enoer Hysni, Leonard LeBeau, Mike Smith, Rik Dietel, M. Martin Sarill, and Richard LeBeau.

INDIANA

The Horological Association of Indiana held its Annual Spring Workshop on Sunday, April 25, 1993 at the Best Western, I-70 East and Post Road, Indianapolis, IN. Mark Butterworth presented "Repair or Replace the Hermle Clock Movement;" Gary Neff gave a hands-on demonstration on how to make a clock depthing tool; Jon Alexander presented "Clock Gear Trains and How to Determine Beats Per Minute;" and Dan Fenwick, Technical Director of the Swiss Watch Technical Center, held a full day bench course on the ETA 255.

UPCOMING ASSOCIATION CONVENTIONS & MEETINGS

August 21-22	**Watchmakers Association of Pennsylvania Convention,** Hiram G. Andrews Center, Johnstown, PA.
September 18-19	**Horological Association of Indiana Annual Meeting & Fall Workshop,** Indianapolis Motor Speedway Motel, Indianapolis, IN.
October 1-3	**New York Watchmakers Association Convention,** Holiday Inn, Seneca Falls-Waterloo, NY. AWI Speaker: Fred Burckhardt.
October 8-10	**Illinois State Watchmakers Convention,** Clock Tower Inn, Rockford, IL. AWI Speakers: Alice Carpenter and Buddy Carpenter.
October 29-31	**Florida State Watchmakers Association Convention,** Ramada Hotel Resort, West Palm Beach, FL. AWI Speaker: Ewell Hartman.

20th Annual Henry B. Fried Horological Tour

England, Wales, and Scotland

By Harry Blair

AWI members joining the 20th Annual Henry B. Fried Horological Tour departed JFK International Airport on May 3, 1993.

London was our first stop on the agenda. We arrived at the Houses of Parliament for our trip "inside" the Big Ben clocktower. There are 330+ steps to the top! Big Ben was most impressive and ear shattering at noon.

Our visit to the British Museum included the private inner sanctum in the basement called the student room. There, Richard Good dismantled a Karrusel for us.

We departed for Upton Hall, home of the renowned British Horological Institute. We were met by Geoffrey Evans, secretary of this prestigious organization, for a tour of their private museum.

Our deluxe cruise ship bound for Greenwich departed the Thames river pier. We toured the Old Royal Observatory and its workshop. Our guide was Jonathan Betts, Curator of Horology of the National Maritime Museum.

Our next stop was Soho, the heartland of the theatre district in London. We enjoyed dinner and entertainment at Leoni's Quo Vadis restaurant. Following dinner we walked to the Prince Edward, London's most elegant musical theatre, for the performance of "Crazy for You," the new Gershwin musical which is a Broadway hit.

Early Friday morning, we visited the Bermondsey Market where most of the watch and clock trade dealers meet. We then departed for Hertford House in Manchester Square which houses the Wallace collection. Our guided tour of the West End and its monuments ended at the Sotheby Auction House. A special reception and visit of the exhibit gallery for our group was hosted by Tina Miller, Director of the Clock and Watch Department. A slide presentation was given by George Daniels on his latest watch work--an ultra-complicated wrist masterpiece. Sotheby's invited approximately 30 AHS London area members to meet us. We enjoyed hors d'oeuvres, fine wine, and distinguished horologists from all over Great Britain.

On Saturday morning, May 8th, we visited Portobello Road, a high-class outdoor antique market with some wild shopping and antiquing. We then departed for Belmont and the fabulous Lord Harris Collection of clocks and watches including all the great names of horology: Knibb, Tompion, Fromanteel, Mudge, Breguet, and more! We were guided by Jonathan Betts.

On Sunday we visited ancient Stonehenge for a guided visit of the monument. We continued on to Salisbury, visiting the famous Cathedral with its medieval "clocke" (1386), claimed to be the oldest working clock in England.



Behind the dial of Big Ben

Our next stop was Bath. We toured the city and visited the Roman baths. At Oxford we visited the Science and Technology Museum, Oxford University with its excellent display of timepieces, and did more horological antique shopping.

Our guided tour of Stratford-Upon-Avon included visits to Shakespeare's birthplace, Anne Hathaway's cottage, and Warwick Castle--a superb example of 14th century fortification. In the evening we attended the Shakespeare play "King Lear."

On Wednesday we visited the Wedgewood China Factory and their on-site museum and crafts and antiques shopping area in Stoke-on-Trent. We drove north towards Wales, where we checked in at the Llyndir Hall, a



At left: Big Ben Clockworks



At right: Marybess Grisham and Fanny Kehas in the student room at the British Museum.



Deputy Lord Mayor of Edinburgh entertaining our group.



Scottish Clock Exhibit - Glassite Meeting House

charming country house hotel set on acres of park land just outside of Chester.

We toured the Prescott Museum of Clock and Watchmaking, housed in an attractive 18th century townhouse. We were guided by John Griffith, the museum curator. We visited the Tabley Old School Cuckoo & Musical Clock Collection--an assembly of rare and unique pieces spanning 300 years.

Next, we departed for Lyme Park to examine an outstanding collection of clocks (1680-1800), bequeathed by Sir Frances Legh. An Anglo-American evening reception was held at the Park House, meeting place of the Antiquarian Horological Society/Northern Section. Jim Arnfield, Northern Section Chairman AHS, presided. Alan Treherne and Alan Smith, eminent horologists, spoke to us.

On Saturday, May 15th we toured York, a fantastic beautiful walled medieval city. We moved on to Barnard Castle to visit Bowes Museum, housing a remarkable collection of clocks, paintings, ceramics, and porcelain shown in 13th century rooms.

We toured Edinburgh City Council Chambers and underground buildings dating from the 17th and 18th century and the Magdalen Chapel. The Deputy Lord Provost of Edinburgh (in official kilts) gave us a short historical presentation and was our guide through the underground quarters.

A seminar on Scottish clocks was held at Glasshite house. It was hosted by the AHS Scottish group, illustrating their contribution to horology from the 16th to the 19th century. A representative collection of longcase, bracket, and skeleton clocks spanning 400 years were on display along with some fine complicated examples of present-day Scottish makers, some of whom were present in kilts!

A special invitation was issued to our group to visit the headquarters of the Scotch Malt Whisky Society in Leith, tasting some of the finest, rarest, and most potent whiskies available only to the Society. The making of malt whisky was demonstrated by the Director of the Society. In Perth, the capital of Scotland until 1437, we visited the Perth Museum's fine examples of Scottish longcase clocks, and the historic "Fair Maid's House" featured in Sir Walter Scott's novel.

We departed Perth for Pitlochry, set on the banks of the river Tummel amid fine glen scenery. We visited Blair Castle (13th century), principal residence of the Duke of Atholl, the only person in the UK permitted to retain a private army--the Atholl Highlanders. We heard a bagpipe serenade and visited among rare furniture, porcelain and painting items, and the clock collection consisting of longcase, bracket, mantel, and table types, as well as 18th and 19th century French and English examples of considerable value.

Next on our agenda was Edinburgh, via Stirling and Linlithgow. Our evening dinner was at the New Club. This is a gentleman's club (ladies almost welcomed!) in Princes Street with fine views of Edinburgh Castle and Princes Street Gardens.

We visited Penicuik House, the private residence of Sir John Clark, whose family is related to the famous 19th century mathematician James Clark-Maxwell. The house is a fine example of a "lived-in" 18th century mansion housing a collection of furniture, paintings, and porcelain. Sir John and Lady Clark gave us a tour of the house and its collection of scientific Thomas Mudge (Roman strike) and an "Act of Parliament" clock.

We then departed for Kelso, where we visited the home and workshop of Michael Smith, the National Chairman of the Antiquarian Horological Society. Following the tour of his workshop, Mrs. Smith served us afternoon tea before we headed back to Edinburgh.

A gala farewell dinner was enjoyed by all at "The Witchery by the Castle" which was built in 1595.

1993 Tour Members:

Larry Bernard, San Francisco, CA
Harry & Peggy Blair, Marlboro, NJ
Anne Chenette & Jeff Pomeroy, Minneapolis, MN
Clifton Conn, Pittsburgh, PA
Henry Fried, Larchmont, NY
John Grass, Portola Valley, CA
Irving Greenberg, Austin, TX
Marybess Grisham, Dallas, TX
Evelyn Hosfield, White Bear Lake, MN
Demos & Fanny Kehas, Idaho Falls, ID
George & Frances Kiser, Austin, TX
Bill & Bertha Kroh, Palm Harbor, FL
Roy & Jean Malm, Owatonna, MN
Mancel & Anna Page, Grand Junction, CO
Bob & Lula Porter, Florissant, MO
Sid & Anita Stein, Marlboro, NJ
John Studell, Minneapolis, MN
Paul & Phyllis Wadsworth, Hilton, NY
Joyce Wahler, Palo Alto, CA
Jim Williams, Rochester Hills, MI

Plans for the 1994 Henry B. Fried Horological Tour include the Basel Fair, Switzerland, Germany, and Denmark. It will include such highlights as Strassbourg Cathedral, Tivoli Gardens, and a cruise on the Rhine.

❑

CLASSIFIED ADS

REGULATIONS AND RATES

Ads are payable in advance $.70 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 $4.00 additional for postage and handling. The first of the month is issue date. Copy must be received 30 days in advance (e.g. October issue closes for copy on September 1st).

HOROLOGICAL TIMES, P.O. Box 11011, Cincinnati, OH 45211
Phone (513) 661-3838 Fax (513) 661-3131

TRADESMAN

ENGLISH CLOCKMAKER. I have 39 years experience in restoring French and English carriage clocks. Also making parts for **platform escapements,** staffs, cylinders, pinions, repivoting, etc. **JOHN BARRS,** 3924 S.W. Holden St., Seattle, WA 98136; (206) 935-0596.

CLOCK REPAIR
Quality repair or restoration of mechanical clocks. Fast, friendly service. All work guaranteed. Call or send SASE for free price list, (904) 386-5498. Fax available. Jeff Hamilton, 2656 Byron Circle, Tallahassee, FL 32308.

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

CLOCK WHEEL & PINION CUTTING
QUICK SERVICE
SEND FOR PRICE LIST
Jim DuBois 330 Rte 101
Amherst, NH 03031 (603)673-3645

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.

CLOCKS: gearcutting, repivoting, jeweling, rebushing. REPAIRING: timers, aircraft clocks, pocket watches. ROY H. NIEGEL, CMC, CMW, N31552 Saint Joe Drive, Spirit Lake, Idaho 83869. SASE or CALL (208) 623-4330.

SHIP'S CHRONOMETERS OVERHAULED. Also keys, box hardware, etc. I buy chronometers and partial movements. **1 year guarantee on repairs. DEWEY CLARK,** (410) 592-3617.

CUSTOM BALANCE STAFFS cut and fitted for pocket watches and platforms. TASCIONE, 555 Saturn Blvd #123A, San Diego, CA 92154; (619) 491-3893.

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**

CRYSTALS -- FLAT GLASS
Cut and Fitted
Complete Material Supply House
Old & New Material Crystals of all Shapes & Sizes
BALTIMORE HOROLOGICAL & JEWELERS SUPPLIES
5662 Baltimore National Pike Baltimore, MD 21228
(410) 744-6656 Fax (410) 455-9621

CLOCK WHEEL AND PINION CUTTING, RETOOTHING, AND OTHER CUSTOM WORK. Movements overhauled with 2-year guarantee. All work done by a CMC or a CC. Send SASE for price list. HUGH'S CLOCK SHOP, 125 Ganttown Rd., Turnersville, NJ 08012; (609) 228-1539.

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.

THE MORTICIAN
NO COMEBACKS
We correct past mistakes and bury them. Specializing in wheel work, repivoting, making of parts, Atmos clock service for over 50 years, and antique pocket watches. Repeaters, Audemars Piguet, Piaget, Rolex, and Quartz Conversions. All work guaranteed 2 years and done by Joseph Small II, CMW & Associates; (713) 561-5147.

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

CLASSIFIED ADS

FREE ACCUTRON REPAIR

Send 2 **MENS** Accutrons (no basket cases)
Will repair one free and keep the other

CONVERTED 214 SPACE VIEWS — $150

George Hite, 250 Hammond Pond Pky
Chestnut Hill, MA (617)332-7368

SPACE VIEW CONVERSIONS $45

FACTORY-CERTIFIED ROLEX SERVICE

Master Watchmaker, 44 years experience. Certified Rolex specialist. Only genuine materials used. Service includes case & bracelet refinishing & waterproofing of case. High-grade watches & clocks are our specialty. Ask for Alvin or Marcus; (203) 792-4539.

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 $2.00. TANI ENGINEERING, Box 338, Atwater, OH 44201; (216) 947-2268.

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.

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; (919) 889-0148.

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
PHONE (209) 576-8865
2324 WESTMINSTER DR.
MODESTO, CA 95355

ENGLISH CERTIFIED WATCHMAKER Repair, restoration of antique, and modern watches quartz/mechanical. Experienced in CHRONOGRAPHS. Graduate WOSTEP Switzerland. JONATHAN ROWE, Phone (607) 775-3302, c/o Time Master Service Center, 1290 Front St., Suite 125, Binghamton, NY 13901.

REPAIR & RESTORATION of repeaters, fusee, all pocket watches, chronometers, complications, balance staffs made, repivoting, parts made. Free estimates. Fast dependable service. All work guaranteed. Tascione, 555 Saturn Blvd #123A, San Diego, CA 92154; (619) 491-3893.

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

ARTICLES FOR SALE

COMPUTER-AIDED TIMING MACHINE With a touch of the computer keyboard, you can display information on the screen that lets you know just how well your clock or watch is working. Detects fast or slow, in beat or out, and problems with balance wheel or escape wheel. This unit is essential for all repair shops! Free brochure. Write H&S Technical Systems, Inc., Rd. 2, Box 2005, Underhill, VT 05489 or call (802) 899-4324.

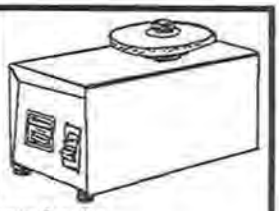
WATCH BANDS: World War II issue canvas military wristwatch bands with stainless buckle marked Elgin. $36 per dozen. Also pigskin bands 5/8" $75 per 100, 1/2" $50 per 100, 5/8" blk. lizard print $75 per 100. **Watches Etc.**, 5934 N.W. 39th, Oklahoma City, OK 73122; (405) 789-2824.

FACTORY REBUILT WATCHMAKERS EQUIPMENT

Watch Timers & Cleaners
Fully Guaranteed

Call or Write
Vibrograf U.S.A. Corp.
504 Cherry Lane
Floral Park, NY 11001
(516) 437-8700

NEW!! Schohl Crystal Grinder



The ultimate mate for the Schohl Crystal Cutting Machine

5-inch diamond wheel grinds quickly without heat or buildup. A light spray of Windex is all that's needed.

Specs: 10" x 5-1/2" base, 7" height
Horizontal 5" diamond wheel, 600 grit
240 R.P.M.
Electrical: 115 volt, 60hz, 1.2 amp.
1/2" hole for arbor in grinding wheel
Weight: Approx. 13 lbs.

2-week trial offer, money back
D/A wheel available separately

(616) 842-6025 or Fax (616) 842-2198

"STAFFING" Lesson 2 Video
by TASCIONE is Ready!

This is the video you've been waiting for. It shows simple methods of removing and replacing riveted, friction, top grooved staffs for pocket and wristwatches and how to safely deal with hairsprings and single and double rollers. We'll use many types of tools including the jewelers lathe to turn off rivets and hubs. Loaded with hints and tips. It's much easier than you think. ORDER NOW! $59.95 + $2.50 P&H. VHS or Beta? TASCIONE, 555 Saturn Blvd. #123A, San Diego, CA 92154.

***Improved '93* 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 new 1992 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

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

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 CLOCK SHOP, 1512 Central Ave., Charlotte, NC 28205.

BE ALL THE CLOCKMAKER YOU CAN BE! Thornton Cutters in stock. KEN LAW, CMC, H.C. 30, Box 825, Prescott, Arizona 86301.

HOT!
Authentic Russian Military Watches
Order one or one thousand.
1-800-437-1272

NOW AVAILABLE

An affordable machine that makes any shape mineral glass watch crystal in minutes in your own shop, for approximately 75¢ each.



Traces the bezel shape directly onto the mineral glass material with a diamond cutting point. Break off and lightly sand or grind, 220 wet sandpaper, available at your local hardware store, works great.

Ask your supplier for the
Schohl Crystal Cutting Machine
or
Call (616) 842-6025 direct

DO YOU OWN A COMPUTER?
If so, we have a tool for you. Our network can link you to watchmakers, jewelers, and clockmakers across the country. You can buy, sell, trade, advertise, send mail, download programs, and more!! Call **TIMELINE** at (919) 756-9290 for information or log-on at (919) 321-4069.

USED WATCHMAKERS TOOLS, EQUIPMENT, MATERIAL, SUPPLIES, WATCHES, MOVEMENTS, AND RELATED ITEMS. Write or call for our latest list. Tom Mister, Herr & Kline, Inc., 1914 Granby St., Norfolk, VA 23517; (804) 623-0714.

MINERAL GLASS CRYSTALS. 75 sizes, 14mm to 32.5mm, $4.75 per dozen. Send SASE for size list. R&D SUPPLY, 1310 Apple Ave., Silver Spring, MD 20910; (301) 588-7296, Fax (301) 495-7312.

ANTIQUE ROLLTOP WATCHMAKERS BENCH, dark wood, excellent condition with roll down locking mechanism, 43-1/4" x 23-3/4". Best offer. (716) 663-0964.

WATCH CRYSTALS: Calibered box of 144 pcs. (24 sizes - 6 pos. each size). *#1* - 20mm to 32.5mm, *#2* - 18mm to 32.5mm, *#3* - 26.5mm to 36mm, *#4* - 12mm to 24mm, *#5* - 22.5 mm to 38mm, **$40.00** per box. Plastic - **$30.00** per box. Ask for full price list. **BROADWAYIMPORTS, INC.,** 1420 Dallas, McAllen, TX 78501. Fax (210) 631-9573.

LEATHER WATCH STRAPS @ $1.00 EACH. ALSO RING GUARDS, SPRING BARS, ETC. FAX/PHONE (516) 933-2143. FOR ORDER FORM WRITE TO FLORO DISTRIBUTOR, 209 FLORAL AVE., PLAINVIEW, NY 11803.

CRYSTALS AND MISCELLANEOUS MATERIALS AND TOOLS. MARIETTA, OHIO. (614) 373-6910.

EQUIPMENT: Vibrograf B-200A, $995; Vibrograf B-200, $895; New Hermes Super Engraver, $1295; New Hermes Engraver, $550; Portescap VC-10, $795; L&R Master 3-jar cleaner, $99.95; Watchmaster Mark II Ultrasonic Cleaner, $595; L&R Ultrasonic Console Model, $395; Bestfit 1986 Microfiche System with Viewer, $395; Vibrograf Quick-Checker 2, $275. **Other watchmaker's, jewelers and engraving equipment available!** Send **SASE** for our equipment and hand tool list. **Watches Etc.,** 5934 NW 39th, Oklahoma City, OK 73122; (405) 789-2824.

POCKET WATCH GLASS CRYSTALS. For prices send SASE to: Crystal Box, Box 682, Short Hills, NJ 07078.

TASCIONE POCKET WATCH REPAIR VIDEO
It really is easy to learn. Avoid costly frustrating mistakes. Over 2-1/2 hours of vivid instruction. AN ABSOLUTE MUST FOR THE BEGINNER. Years of hints and tips. ORDER NOW! $59.95 + $2.50 P&H. VHS or BETA? TASCIONE, 555 Saturn Blvd. #123A, San Diego, CA 92154.

HERMLE MOVEMENTS: Lowest prices in U.S. Factory fresh, 2-year warranty. Butterworth Clock Repair, 1715 Pearlview, Muscatine, IA 52761; 1-800-258-5418.

HIGHEST QUALITY CLOCKMAKING TOOLS
from
J. M. Wild, England
Depthing Tool - Mainspring Winder
Lathe File Rest - Fingerplate Clamp
Milling Spindle - Repivoting Tool/Jacot Drum
Skeleton Clock Kit
Fine Quality Cast Brass Spandrels/Mounts
Michael M. Ambrosino
33-67 165th Street - Flushing, NY 11358
Catalogues $12.00

HERSCHEDE GRANDFATHER CLOCK, Model 250 The Clock, Handcrafted. Call for details (412) 833-1165, if no answer leave message.

SCHOOLS

CITY COLLEGE OF SAN FRANCISCO Watch Repair Training since 1938. New semester begins August 23, 1993 with open enrollment throughout the semester. 106 Bartlett Street, Room 214, San Francisco, CA 94110. To speak with the Instructor: Voice Mail (415) 731-0621. When writing for information: CCSF Watch Repair Instructor, 2425 Yorba Street, San Francisco, CA 94116.

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 REPAIR
BASIC ELECTRONICS
Ideal Housing, Dining, Recreation
NATTS approved, BEOG available

CLASSIFIED ADS

BOOKS

CLOCKMAKERS NEWSLETTER. Subscribe now and receive a free bonus issue. $35.00 per year, 12 issues. PA residents only, add 6% tax. *Clockmakers Newsletter*, 203 John Glenn Ave., Reading, PA 19607.

SITUATIONS WANTED

CERTIFIED WATCHMAKER
25 Years Experience in
Sales & Service of Fine Watches.
Looking for position in
Tampa or Orlando area.
Call Dan (813) 963-5369

WANTED TO BUY

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: Six movement cleaning basket for Zenith Z-105 Champion. Mike Tsou, 4713 Leadenhall Dr., Richmond, VA 23234; (804) 271- 0347.

WANTED

- Watches: Rolex, Patek Philippe, Audemar 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 100th Consecutive Ad

WANTED: Chronograph movements. Will pay: Valjoux 22, 23, 71, 72, $75-$125; Valjoux 72C, $200; Valjoux 730, $150; Valjoux 69, $300; Valjoux 7733, $20; Venus Split 179, $1000; Longines 13ZN, 13.33, $300; Movado 90-95, $250; Universal $150-$300; Ex. Pk. $75; Split Chrono. P.W., $200 up. Will buy parts, cases, dials, and other chronographs. Esembl-O-Graph Books, will pay $175 set. Dean Sarnelle, 25 West Beverley St., Staunton, VA 24401; (703) 885-6064.

WANTED: Unusual American pocket watches/ movements. I buy entire collections, estates, watchmakers' inventories. Over 32 years experience of honest and reliable confidential transactions. **JON HANSON,** Box 5499, Beverly Hills, CA 90210; (310) 826-7778.

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.

RETIRING? I need to buy watchmakers tools and related items. **I will pay your price,** in most cases. Call collect, Tom Mister (800) 446-8094.

Derbyshire Micro Milling Machine Gear & Pinion Cutters and Compound & Milling Attachments for Boley, WW, & Derbyshire. Joseph Small II (713) 561-5147.

HAMILTON ELECTRIC REPAIRMAN seeks parts! Movements, balances, etc. needed. Want anything related to Hamilton Electrics. Rene Rondeau, P.O. Box 391, Corte Madera, CA 94976-0391; (415) 924-6534. FAX (415) 924-8423.

Watches Wanted



We desperately need for our retail customers fine watches by:

Rolex, Patek Phillippe, 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

EARLY HOROLOGICAL TOOLS WANTED. Wheel cutting engines, lathes with orig. wood boxes, fusee engines, early books, rare clocks (especially floor clocks), and related items. Shops bought. Greg McCreight, 1336 Allentown Rd., Lima, OH 45805; (419) 229-4349.

American & European Pocket Watches Wanted. Railroads, Keywinds, Hi-Grade, Rare & Unusual Pocket & Wristwatches Wanted. Need not run. Professional, timely and confidential transactions assured. MAUNDY INTERNATIONAL, P.O. Box 13028-H, Overland Park, Kansas 66212 or call toll free 1-800-235-2866.

BUY • SELL • HIRE

RELOCATE • LEARN • FIND

Classifieds in
Horological Times
help you do what you want to do!

Dates to Remember

AUGUST 1993

15--Basic Pocket Watch Bench Course (AWI); Alice Carpenter, instructor; Pittsburgh, PA.*

21-22--Striking Clocks Bench Course (AWI); John Nagle, instructor; Austin, TX.*

21-22--Repair of the Atmos Clock Bench Course (AWI); Gerald Jaeger, instructor; Seneca Falls, NY.*

21-22--Watchmakers Association of Pennsylvania Convention, Hiram G. Andrews Center, Johnstown, PA. For more information contact George Jones (814) 238-1668.

22--Servicing ETA Quartz Chronographs Bench Course (AWI); James Broughton, instructor; Nashville, TN.*

SEPTEMBER 1993

17-19--Advanced Clock Repair Bench Course (AWI); Roland Iverson, instructor; Des Moines, IA.*

17-20--Cross Slide Lathe Bench Course (AWI); Roy Hovey, instructor; Orange County, CA.*

17-20--Taipei International Jewelry and Timepiece Show, Taipei World Trade Center. For information call (312) 819-7373.

18-19--Repair of the Atmos Clock Bench Course (AWI); Gerald Jaeger, instructor; New Orleans, LA.*

18-19--Hairspring Vibrating Bench Course (AWI); Joseph Cerullo, instructor; Pittsburgh, PA.*

18-19--Cuckoo Clock Repair Bench Course (AWI); James Williams, instructor; Indianapolis, IN.* Held in conjunction with the Horological Association of Indiana Fall Meeting & Workshop.

18-19--Horological Association of Indiana Annual Meeting & Fall Workshop, Indianapolis Motor Speedway Motel, Indianapolis, IN. For more information: Sally Jo Alexander, 208 Alcott Road, Louisville, KY 40207.

19-20--Mechanical Chronographs Bench Course (AWI); James Lubic, instructor; Tucson, AZ.*

19-20--400-Day Clock Repair Bench Course (AWI); John Nagle, instructor; Tucson, AZ.*

OCTOBER 1993

1-3--New York Watchmakers Association Convention, Holiday Inn, Seneca Falls-Waterloo, NY.

8-10--Illinois State Watchmakers Convention; Clock Tower Inn; Rockford, IL. For more information contact: Jack Donovan, 124 North St., Normal, IL 61761.

16-17--Hairspring Vibrating Bench Course (AWI); Joseph Cerullo, instructor; Denver, CO.*

22-25--Cross Slide/Arbors & Stems Bench Course (AWI); Roy Hovey, instructor; New York, NY.*

24--Servicing ETA Quartz Chronographs Bench Course (AWI); James Broughton, instructor; Austin, TX.*

25-29--Minute Repeaters--Clock (Sonnerie) Watches and the Instantaneous Perpetual Calendar, Philippe DuFour, instructor, Project Extend Education Center, Cincinnati, OH.*

29-31--Florida State Watchmakers Association Convention, Ramada Hotel Resort, West Palm Beach, FL.

30-31--Repair of the Atmos Clock Bench Course (AWI); Gerald Jaeger, instructor; Arlington, TX.*

30-31--Cuckoo Clock Repair Bench Course (AWI); James Williams, instructor; Minneapolis/St. Paul, MN.*

NOVEMBER 1993

6-7--Striking Clocks Bench Course (AWI); John Nagle, instructor; Salt Lake City, UT.*

13-14--Hairspring Vibrating Bench Course (AWI); Joseph Cerullo, instructor; Austin, TX.*

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

Ad Index

American Perfit Crystal Co. 31

Blue Ridge Machinery & Tools 27
Borel Co. 5

Cas-Ker Co. ..... inside back cover

Esslinger & Co. ..... inside front cover
Euro Tool 27

Gem City College 31

S. LaRose, Inc. 21
Livesay's, Inc. 13

McCaw Co., Wm. S. 29

Newall Mfg. Co. 23

Olson, J. D. 3

Pollak Watch Material 29
Precision Crystal Cutting Co. 19

RCO, Inc. 17

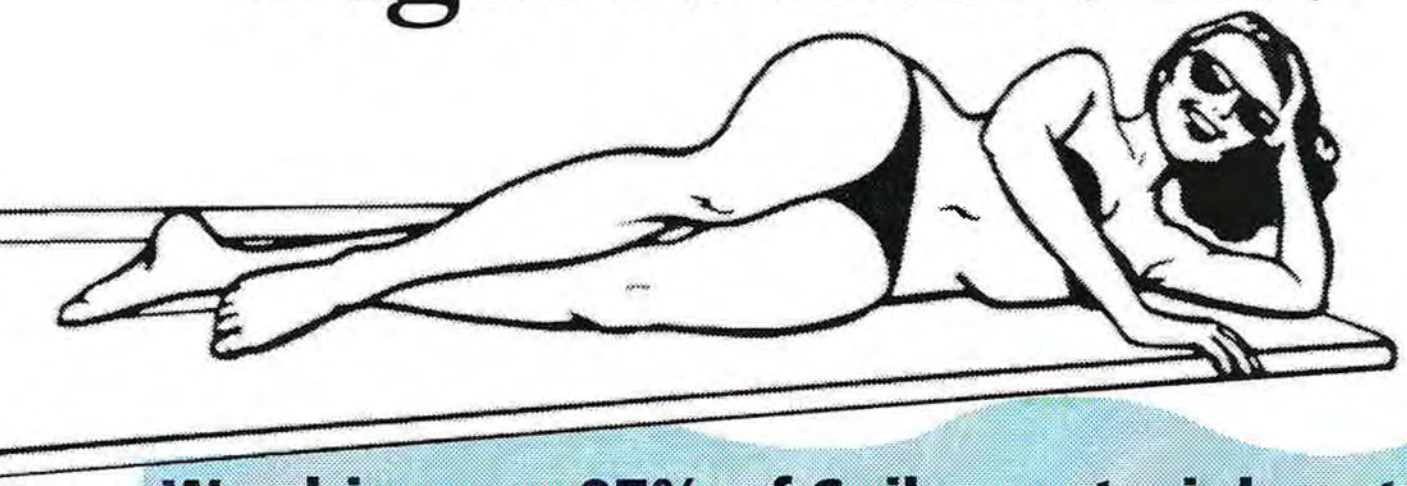
S & G Industries 23
SMEA 7

Twin City Supply Co. 11

Vibrograf USA 15

Witschi Electronics 19

Figures don't lie.



We ship over 97% of Seiko material parts from stock.

We ship over 95% of Seiko crystals from stock.

We ship over 95% of all orders the same day received, and 100% within 24 hours.

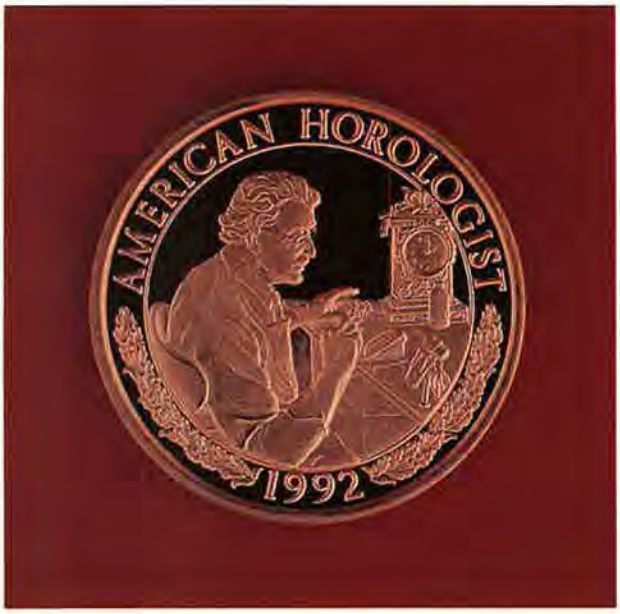
Bands and band parts not included.

For the best service on Seiko, Pulsar and Lorus watch material, call us: 1-800-487-0408.

Cas-KerCo.

Quick and efficient service on all of your material needs.

FAX FREE 1-800-487-5848 CINCINNATI CALL 513/241-7073 FAX 513/241-5848
CAS-KER CO. 2121 SPRING GROVE AVENUE PO BOX 14069 CINCINNATI OH 45250-0069



Silent Auction

This is your opportunity to own this rare 14K gold medallion honoring horology. Hundreds of these American Horologist medals have been sold in silver. **ONLY SIX HAVE BEEN MADE AVAILABLE TO THE PUBLIC IN 1 OZ. 14K GOLD.**

Renata U.S./Kessler Sales, Inc. has made these medals available to the AWI ELM Charitable Trust for auction. The proceeds are to benefit the Trust's Student Aid Fund.

One medallion has already been auctioned. Those remaining will be auctioned on a bi-monthly basis. The final date for bids on this medallion is **October 10, 1993.** Only bids in excess of $550 will be considered.

You may use the form below or a facsimile to make your bid.

To: The AWI ELM Charitable Trust

I wish to bid $_____ for the 1 oz. 14K gold American Horologist Medal. I understand that the bidding for this medal closes October 10, 1993. I also understand that if payment is not made within ten days after notification of a successful bid, the Trustees will consider my bid withdrawn.

Send bids to: American Horologist Medal
AWI ELM Charitable Trust
3700 Harrison Avenue
Cincinnati, Ohio 45211

The Trustees reserve the right to cancel this offer if they so choose.

If the successful bidder, I will pay for the medallion by:

( ) credit card (Visa/MasterCard)
( ) personal check
( ) other _____

Name_____
Address_____
City_____
State_____ Zip _____