

NOVEMBER 1979

TIMES CHRONOLOGICAL



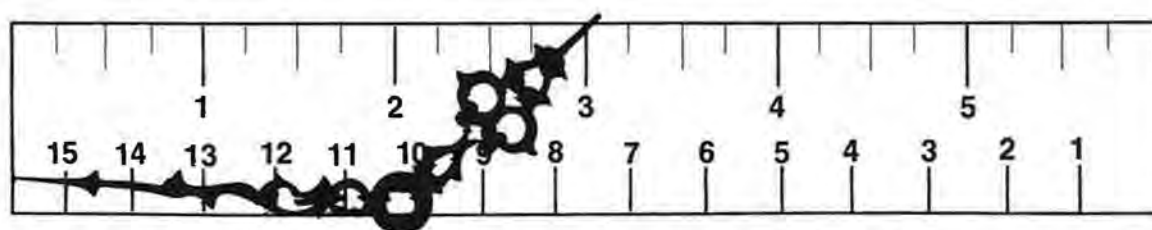


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OFFICIAL PUBLICATION OF THE AMERICAN WATCHMAKERS INSTITUTE

VOLUME 3, NUMBER 11

NOVEMBER, 1979



New Series

A new series by Marshall Richmond on the basics of Jewelry Repair is introduced in this issue.

20

About the Cover
Colorfull autumn leaves find a cold resting place. Readers uncover a possible cover cover-up.

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Course a Success

AWI's first-ever Residence Course For the Repair Of Solid State Watches a success. More are being planned.

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A Zodiacal Clock

Editorial

"Mr. Chairman! I make a motion that the annual dues for membership in the American Watchmakers Institute be raised to \$100."

"Directors, a motion has been made by Mr. Worthit. Do I have a second?"

"I second the motion, Mr. Chairman."

"Thank you, Prof. Fessional. Open for discussion. Yes, Mr. Rouser."

"I seen it all. Back in them good ol' days it was heaven, but not anymore. Ya can't get any good money ta do your work anymore. Why I can't even growl at a customer anymore without them growlin' back. See these holes in my pants? And youz guys are chargin' too much at thirty bucks!"

"Thank you, Mr. Rouser. Yes, Mr. Withit."

"Mr. Chairman, I have just been making some computations on my LCD handy pocket calculator. This is a wonderful instrument that I would never be without. It has a constant key and stores information and . . ."

"Please keep to the motion at hand, Mr. Withit."

"Sorry, Mr. Chairman. I just wanted to pass on the information that just the inflationary trend since the mid 60's would have our annual dues at forty dollars per year."

"Mr. Chairman! Can that be right?"

"I've just changed batteries!"

"Please, ladies and gentlemen. We must maintain decorum. Mr. Loggic is recognized by the chair."

"I have looked into some other non-union, professional organizations to check on their annual dues structures and their services. For example: Press editors, \$70.00; Printers and Lithographers, \$260.00; Funeral Directors, \$30.00 PLUS a graduated per capita assessment; Teachers, \$41.00 on the national level, but over \$100.00 on the state level. In my opinion, none of these organizations offers the benefits that we receive from AWI. Why would someone belong to one of these more costly organizations? 'Because it is considered the mark of professionalism.' AWI also offers the mark of professionalism and with tangible professional services: the hot line, technical bulletins, certification, employment services, film and slide programs, bench seminars, and a monthly magazine. We don't want to lose any of these benefits."

"Well said, Mr. Loggic. Ms. Peg Wood?"

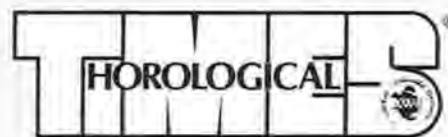
"If we are to attain the goals that progressive people set for themselves, we must have a central organization to properly and quickly give us answers. We have that now, but how long will we be able to continue without all the services which AWI provides for us? The inflationary spiral is accelerating and will certainly affect our Institute. Our own abilities will not carry us through without an organization in touch with manufacturers and suppliers to get the feel of trends in the market today. Frankly, I think the dues should be \$200.00 per year."

"You tell 'em, honey. I like a woman with a lotta spunk."

"You're out of order, Mr. Huggem. Ms. Wood has the floor. Did you intend to amend the motion, Ms. Wood?"

"No sir. I'm finished."

"If there is no more discussion, I call for a vote on the motion as it stands. Excuse me, Mr. Worthit. Will you wake Mr. Rouser so that he can vote?"



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—53811	Tweezer, small hobby, 3½"	1.50/.60ea
—53863	Hobby tweezer for stones, stamps etc., 4½"	4.60/1.45ea
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—8X-154	16s 7J O.F. chrome case	35.00/32.00
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The President's Message

By Leslie L. Smith, CMW, CEWS

Nominating Committee Is Now Accepting Recommendations

Every year, the president of AWI appoints a nominating committee which ultimately determines the destiny of this organization. The nominating committee is charged with the responsibility of carefully selecting the people who will become the board of directors and, in turn, the effectiveness of this board is what determines the kind of organization you will have.

Mr. James H. Broughton, whom you all know, has been appointed chairman of the nominating committee for the coming year. I know of no one better qualified for this job. He and his committee will carefully evaluate every person recommended for nomination and you can be assured of having the best possible slate in the spring election.

In order for the committee to do the best job possible, I am asking you to recommend to this committee anyone whom you feel has the qualifications to serve on the board of directors of AWI.

Carefully consider persons who have the necessary knowledge, time, and interest in this work. We must have people willing to give of their time and talents for the betterment of this organization. Talent alone will not suffice. We must have people who will put aside their personal aims and work for the benefit of AWI.

The committee is accepting recommendations now and would appreciate receiving yours as soon as possible. Please send a complete resume and current picture of anyone you wish to recommend to: Mr. James H. Broughton, 4363 Monterey Court, Columbus, OH 43207.

Leslie L. Smith

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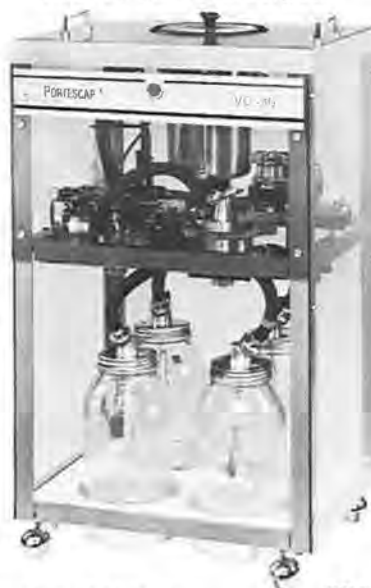
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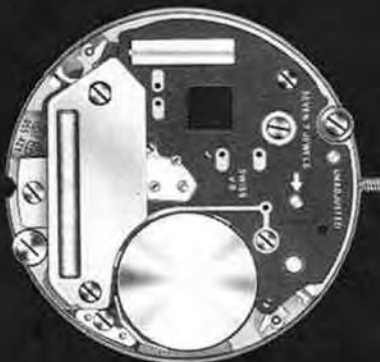
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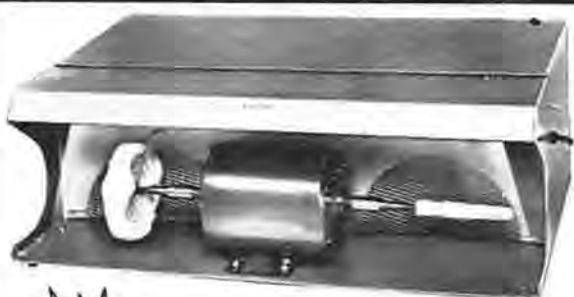


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Our Readers Write

WE HAVE A LONG WAY TO GO!

As a relative newcomer to AWI, I consider that *Horological Times* continues to improve steadily and I can use at least one of the beautiful covers as a basis for an acrylic painting. I offer my congratulations and, if I may, a suggestion regarding printing layout.

I do find it irritating when almost every article is needlessly chopped up throughout the magazine. After I've finally located the continuations and read the whole article, I have to leaf back to find out where the next tale starts. "Technically Watches," (Aug. 1979) for example, goes from page 19 to page 39 and then to page 61 when it would be just as easy to make page 19 all article and page 39 all ads, for these pages are both split down the middle. Page 61 is almost all article and could just as easily be page 20.

Continuity may not be possible in every article of course, but if it could be made the rule instead of the exception, I am sure reader appreciation would be much enhanced.

John Plewes
Carp, Ontario

Editor's note—The Horological Times, in regard to design, has come a long way in a short time. We feel, though, that there is much room for improvement as you have indicated in your letter. The production staff is working on ways to better insure continuity of the articles. Hopefully, future issues will display these efforts.

PLEASE SEND IT BY AIR

I have just received the May (!) issue of *Horological Times*. Would it be possible for me to pay for extra postage to have the magazine posted by air each month? I do enjoy your magazine and its wonderful features.

J. R. Laurent
Hastings, New Zealand

Editor's note—You sure can!

(Continued on page 10)

Citizen unwraps a quartz timer that does it all for under \$1200.*



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Our Readers Write *(Continued from page 8)*

The Case of The Horological Times Cover Cover-Up!

I recently received a copy of the September issue of the *Horological Times* and was generally impressed with the quality of the articles.

I do, however, challenge your description of the cover. I agree that it is a beautiful late summer scene, but I hardly consider Yosemite Valley in California to be the "foothills of the Rocky Mountains". I believe that the photo was shot from the floor of the valley with Half Dome in the background.

This in no way detracts from the excellent articles in the magazine, but in the interest of

keeping your publication totally honest I feel that you should be aware of this error.

Paul J. Reinman
Dayton, OH

The cover picture of the September, 1979 issue is not of the Rocky Mountains as indicated by the caption on page 2. The cover shows a view of Half Dome in Yosemite National Park in the Sierra Nevada Mountains of California. As a Californian, I feel this is a pertinent distinction.

Louis A. Biagi
Oakland, CA



Editor's reply—You have just read two of the many letters we have received regarding an apparent discription misrepresentation of our September 1979 cover. We could respond by saying that we are "sorry for this error" or "regret any confusion caused by this blunder." (We could also say, "Why doesn't the H.T. send us to California periodically—just to make sure things like this don't get in the magazine!?") You might say that our many readers have uncovered a cover-up; a deceptive move on the part of this magazine to make its readers think they're viewing something that they are not. All of this said, you have probably figured out that we were, of course, just testing you! We're glad you're keeping an eye on our covers!

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Scholastically Speaking

by Joseph Rugole, CMW

Chairman, Research and Education Council

Presenting Curriculum Improvements

In the last issue, I wrote about the importance of Advisory Committees and their contributions to watchmaking schools. Among other things, I expressed my views on the curriculum and its basic requirements. I consider curriculum problems to be one of our foremost concerns and worthy of further exploration.

There was a time when REC discussed the possibility of developing a core curriculum and a number of people put considerable effort into it. A basic curriculum was developed and presented at one of the annual meetings by William O. Smith Jr. Copies of it were given to every member school. Whether anybody was able to use any of the information or not is not known to me. I cannot recall any follow-up on the subject either. It would be nice to have a basic core curriculum in every member school, but I doubt very much that this is practical. We all operate under such diverse conditions that in most cases the curriculum would have to be altered in order to make it applicable. Even so, if at least one school has been helped by it, it was well worth doing.

If I were to rank the conditions which are essential to operating a good watchmaking school, I would place them in this order: 1. Good teachers 2. Proper facilities 3. Strong curriculum. I have ranked the curriculum third mainly because a good teacher is also able to produce a good curriculum, but he does not have exclusive say about the facilities.

Most of us have to operate on restricted budgets. Any major alteration requiring substantial capital outlay is

seldom approved without a struggle. Changes in curriculum often require changes in physical facilities. The curriculum and the facilities are easier to plan by establishing long range objectives. I am sure that most of us have requested certain improvements in our shops at one time or another only to experience a let-down when the request was denied. It is surprising how often such requests are improperly presented to the administration. I should know for I have been guilty of it myself.

It is possible, however, to attend to the problem by outlining a course of action based on documented facts. The program of change should be initiated by analyzing the existing situation, i.e., the potential of existing facilities and existing curriculum. The weaknesses of the program should be pointed out and areas of short-term improvements clearly established. The more serious changes should be planned for one, two, and three years in the future. The essential equipment should be listed and its necessity justified by appropriate changes in the curriculum.

If the package can be sold to the chairman of the department, he will do his best to arrange the necessary financing of the project. Those who think these procedures will not work for them should take a look around at other departments. Most likely they had to fight for improvements in the same way.

Tempus fugit!

Nationally Known Jeweler Speaks at Gemology Graduation

Successful jewelers need to apply their knowledge, be dedicated to their profession, and be leaders with creative ideas, Ernest Moody of Tulsa, OK, past vice-president of the Retail Jewelers of America, told August graduates of Paris Texas College's gemology program. Nineteen students representing twelve states graduated in this, the fourth class to complete the three-month intensive gemology program.

Moody, who completed special jewelry management courses at the New York University School of Business, now operates four jewelry stores in

Tulsa with over 50 employees and annual sales at three million dollars.

Paul Clayton, chairman of the Division of Horology, Jewelry Technology and Gemology, introduced the guest speaker who told graduates that he was in Paris to talk to them as a "fellow jeweler" and not as an expert. He encouraged the graduates to continue learning by attending seminars, conventions and trade shows, and gave them some innovative ideas for successful jewelry sales.

In closing, Moody urged the graduates to be like watches: "Open-faced, pure gold, quietly busy, and full of good works."

Graduates of the program were

Elaine Adelstein of Dallas, TX; Michael L. Bleckley of Paris, TX; DeAnn Callaway of Amarillo, TX; Katherine A. Demma of Schaumburg, IL; Sheri Franklin of Kent, OH; Jo Anne Gilreath of Las Vegas, NV; Donald L. Harness of Garden City, KS; Glenn Hirsch of Joplin, MO; James Holmes of Jasper, TX; Jean Laughlin of Jacksonville, FL; David Love of Salt Lake City, UT.

Also graduating were Wayne Luck of Rochester, MN; Dennis Marsden of Idaho Falls, ID; Donna Poye of Weatherford, TX; Robert Ratliff of Amarillo, TX; Kara Saylor of Ponca City, OK; John D. Weiss of Superior, NE; Virginia H. Winston of Lufkin, TX; and Janet Winder of Brookfield, IL.

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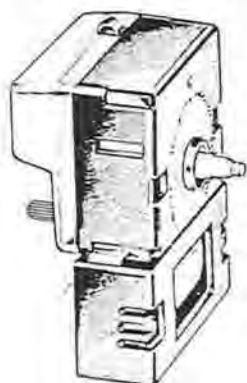
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AFFILIATE

Watchmaking...

This column is about Anthony Casciato. Anthony, 29, is a watchmaker and a member of AWI and the Watchmakers Association of Pennsylvania. He lives in Coraopolis, PA, a small town on the Ohio River near Pittsburgh. He graduated from the Chicago School of Watchmaking with A's and B's, and has had about 10 years of bench experience. This is not an unusual biography, except that Anthony has had a rare form of Muscular Dystrophy known as Amytonia Congenita since birth and the only parts of his body he can move are his fingers.

Watchmaking is a career suited to many types of handicapped people—particularly those sustaining loss of mobility—but Anthony's case reflects a special effort to overcome almost impossible odds. He does not consider himself disabled—just handicapped, and is determined to earn his own way in life. He is blessed with a fine mind and has developed many techniques and aids to compensate for his lack of arm and body movement. I have seen him at work and his dexterity and skill are amazing. His arms must be placed in position for him, but then, except for jobs requiring strength or mobility, he is on his own. His mother, Mary, and his father, Peter, as well as the other members of his family, are his arms and legs when needed. His mother has learned to open, close, clean and polish cases, and to operate his cleaning machine. He has a delicate touch, but little strength in his fingers. When faced with a stubborn screw, he rotates the screwdriver with his teeth! In other tasks, too, his mouth is his only way of applying force.

He has had help along the way. Jim Ross, a watchmaker friend (also from Coraopolis) sat with him for many an hour in the early days, encouraging him and helping him over the rough spots. Anthony has not stopped learning, either. He is currently taking a course in jewelry retailing from GIA.

Anthony's story also involves the value of watchmakers associations. Like many handicapped people, he didn't get out of his home often to mix with people. He heard about the Watchmakers Association of Pennsylvania and joined it about two years ago. For some time, his only contact with the association was the telephone. In the past several months, however, he has attended monthly meetings, the annual convention and banquet, and the watchmakers association picnic. He has been well-accepted as a fellow watchmaker by the members. He has been able to add more

CHAPTER COLUMN

By Robert F. Bishop

....His Career

accounts and establish better prices for his work through the help of the Association.

One problem Anthony has had—and I am sure other handicapped watchmakers have had—is that some accounts expect him to work for less money because he is handicapped, i.e., needs the work, and therefore should accept whatever is offered. This is obviously wrong, and the Pennsylvania Association was helpful in encouraging him to demand the price his labors deserved.

If you or your Association know of watchmakers, members or not, in similar situations, do make the extra effort—help them, encourage them, accept them—and you will find that your own handicaps of apathy and indifference will disappear.



NEW JERSEY

Anne Louise Brackbill, technical service manager for Citizen Watch Company, quickly dispelled any notion that her role in this predominately male industry is mere tokenism when she spoke at the September meeting of New Jersey Watchmakers' Association. She fielded members' questions with sound answers to their technical difficulties and frank responses to their complaints.

Above all, this company representative stressed her ready availability to help with any problems the watchmaker may have in repairing the Citizen watch.

After listening to her slide lecture and gaining an appreciation

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that their calls will be answered by an experienced technician who can give practical advice, there is every reason to think Jersey members will in the future avail themselves of this phone-in service.

A set of Citizen watch technical manuals was presented to the Association Library by the speaker. There were also a number of doorprizes supplied by the company, including a test meter for electronic watches.

This slide lecture by Anne Louise Brackbill served as an introduction for the Citizen bench course given for New Jersey members in October at the Howard Johnson in Clark, New Jersey.

NORTH CAROLINA

The Cape Fear Guild held a dinner meeting in Fayetteville with approximately 15 present. Afterwards they had a slide presentation on "Antique Repair Equipment," obtained from AWI.

The Coastal Plain Guild met at Wayne Community College in Goldsboro. Two of the Guild members, Joe Sasser and Billy Brewer, who also do casting and jewelry work, presented a program on gold and silver, how to test for gold content, and explanations of gold markings. There followed a



The Golden Triad Guild members at the Seiko Quartz Seminar with Mr. Scott Chou, instructor.

lively discussion on this timely subject.

The Piedmont Crescent Guild met, with 22 present, including Bulova representative Mr. Hilbert Feurstman, who presented new information on the new 5 ligne ladies quartz, and spoke of the changes in Bulova management.

Joe Crooks presented an actual demonstration on a viewer of the microfiche film.

The Triangle Guild held its annual family outing in Cary, North Carolina. This year it was a fish fry, with 44 present. North Carolina Technical Director Buddy Carpenter was present and discussed future plans for a seminar to be put on by Citizen Watch Company. He also brought 100 used movements received through an ad in the *Horological Times* magazine.

The Golden Triad Guild had its annual cook-out in Winston-Salem with 28 present. Mr. Paul Mathis won the \$5 drawing. North Carolina Watchmakers Association President, Mr. Cade Burns, was present and gave a report on the last board of directors meeting, and a report on the AWI Convention. Mr. Jesse Temple reported on the success of the Seiko Quartz seminar held in Winston-Salem on September 8, 9, and 10, with 16 watchmakers present. The instructor was Mr. Scott Chou, Chief Instructor from Seiko.

TEXAS

On September 9th the Texas Watchmakers Association of Houston had a Bar-B-Que Cook-out for members and their families. It was held at the Knights of Columbus Hall from 3-6 P.M. There



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was plenty of good bar-b-que with all the trimmings of a Texas style cook-out. After the meal, names were drawn to receive prizes donated by the Stanley Donahue Co. The Grand Prize was a \$50.00 gift certificate from Sears & Roebuck Co. Everyone won a prize and had a great time.

PENNSYLVANIA

The September 17th meeting of the Delaware Valley Watchmakers Guild was held at the Bala Cynwyd Library in Bala Cynwyd, Pennsylvania.

Tom Lang, a representative of the L&R Manufacturing Company, displayed and demonstrated the latest technology in Ultrasonic watch cleaning machines, quartz timing and testing machines, including the latest innovations. The evening was exceptionally interesting.

The October meeting featured Delaware Valley Watchmakers Guild member, Mike Jenner, President of Media Digital Corporation. Mr. Jenner presented and demonstrated equipment, tools, and other items he sells and services for the Electronic Quartz watch industry.

The Allegheny Guild of Watchmakers held its September meeting on Tuesday, September 11th, in Pittsburgh. The

program for the evening was a slide-tape presentation of AWI.

IDAHO

On September 9th, the Gem State Watchmakers Guild, in conjunction with the Intermountain Retail Jewelers Association Convention, presented a slide presentation on the servicing of Bulova Accutron Tuning Forks.

The Gem State Watchmakers Guild is continually striving to make learning opportunities such as these available to its members.

ILLINOIS

The September meeting of the Central Illinois Watchmakers Association took place in Bloomington at Barney's Fine Foods. The guest speaker was Mr. Will Andrews, curator of the Rockford Clock Museum.

Mr. Andrews, from England, is a noted historian in the clock field and talked about the Rockford Museum as well as his favorite horologists from the past.

NEW YORK

The forty-first Annual Convention of the New York State Watchmakers was

highlighted by a bench course on meters and meter reading. It was conducted by Gerald Jaeger, an instructor for AWI.

The convention, held in Syracuse on September 15 and 16, also included a class on the Digital Explosion, by Jack Schecter, manager of technical services for Seiko; and a class on the Bestfit Microfiche System by Sam Schwartz. Don DeWolfe of Portescap traced the history of time recording machines in a talk on "The Watchmaker Yesterday, Today, and Tomorrow," while Henry Frystak, Accutron and quartz instructor for Bulova, gave a workshop on "New Movements and Modules."

Watchmakers' wives were given a mini-workshop on refinishing clock cases and small antiques. Another highlight of the convention was the banquet entertainment, a Mid-Eastern Belly Dancer, which had been a request of several members for many years.

Nelson Mills of Newburg, who has been a driving force in the state association for many years, was named "New York State Watchmaker of the Year." Honors also went to four 25 year members: Robert Wack, Herman Klos, Edward Schanley, and Lloyd Lembcke. Robert Swann of Rochester was elected president. □

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BENCH TIPS

with Joe Crooks



Adjusting the Snap

By Irving Feld, 2375 East 3rd St., Brooklyn, NY 11223

Every retailer of watches has at one time come across a snap that won't open, or is hard to open, during the sale of a new bracelet watch. Here is a sure-fire tip on how to ease up the snap and eliminate filing, polishing, and re-rhodium plating.

Take a square of watchmaker's paper and fold one end over twice, giving you three layers. Insert this into the snap and close. Pry up and try the snap. If it is still tight, fold over one more layer and try the snap again. Rarely do you have to have more than four layers of paper to loosen a snap.

You will develop a feel for the amount of folds required for a particular snap. If the snap is "too easy," position the cover over the groove at the edge of the bench so that the inside is facing up. Place a "tool" made from a 1/4 inch maple dowel shaped to a cut off blunt rounded chisel point at the center of the cover and strike a medium blow. Adjust to suit the customer. Some people prefer easy opening and some prefer hard.

Using this system, watchmakers can avoid marks caused by pliers and disfiguration caused by filing.

CAMEL HAIR CLEANING!

By Rolland J. Risch, 7630 B El Camino Real, Atascadero, CA 93422

I have found the easiest way to remove foreign deposits from the index and pawl jewels in tuning fork movements is to gently brush them with *one* hair from a camel hair brush.

Be assured this procedure does not equal the results of a good cleaning. However, I do find it advantageous on occasion to gently "sweep" away any deposits interfering with the action of the jewels. Since these jewels are usually free of oil (or are supposed to be), deposits are not as apt to stick and can sometimes be brushed off.

Thanks, Rolland! I'll try this next time I accidentally dump some trash in a customer's index wheel, when all the poor fellow wanted was a new power cell.

Since it is too risky to clean tuning forks in machines, a No. "000" artist's camel hair brush dipped in cleaning solution can safely be used to scrub dirty index jewels without bending the index finger. Follow this with hand-dipping in cleaner, rinsing three times and air drying with your blower. Never hold a tuning fork anywhere except by the part where it fastens to the movement. It is easy to stress a fork if you hold it anywhere else.

An old pair of No. 5 tweezers can be altered to securely hold all kinds of tuning forks through the screw

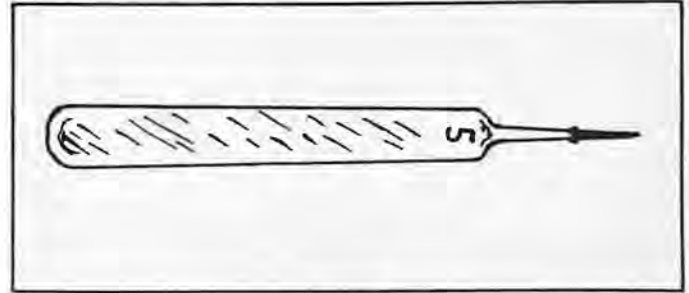


Figure 1

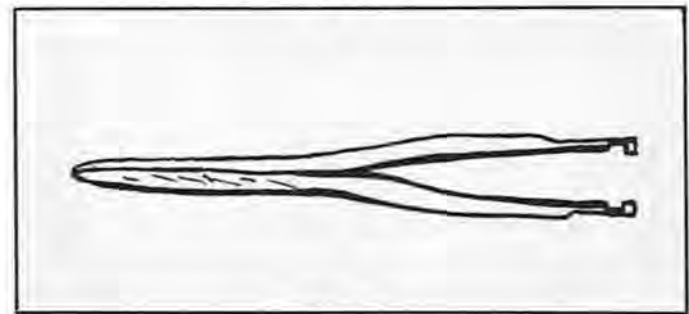


Figure 2

holds. Stick the tweezers through an old 214 fork until they bottom, mark the end that sticks out, draw to a blue and cut off as in Figure 1. File a round notch inside tips with a square file and dress tips smooth with emory paper (Figure 2). After dressing down they will fit all size forks for rigid, safe handling.

RELIEF FOR TIRED EYES

By J.B. Gregory, 108 N. Main St., Newton, NC 28656

Here is a tip I haven't seen in your column and hope it will be helpful to other watchmakers with the same problem.

The old eyes are not what they used to be and after working on 214 Accutrons all day, I find that the pawl and index jewel keep running together with the reflection of the movement from the light bulb, making it hard to properly adjust the jewels to the index wheel.

With a sharp razor blade, I cut a 2 by 3 mm rectangle from a white repair envelope or typing paper and wedge this upright behind the guard screw. The white background cuts out the movement reflection which is a great help when trying to see the jewels clearly.

(J.B. helped demonstrate repairs at the first Accutron Seminar held in North Carolina.)

Send your tips to "Jingle Joe" Crooks, 265 N. Main St., Mooresville, NC 28115.



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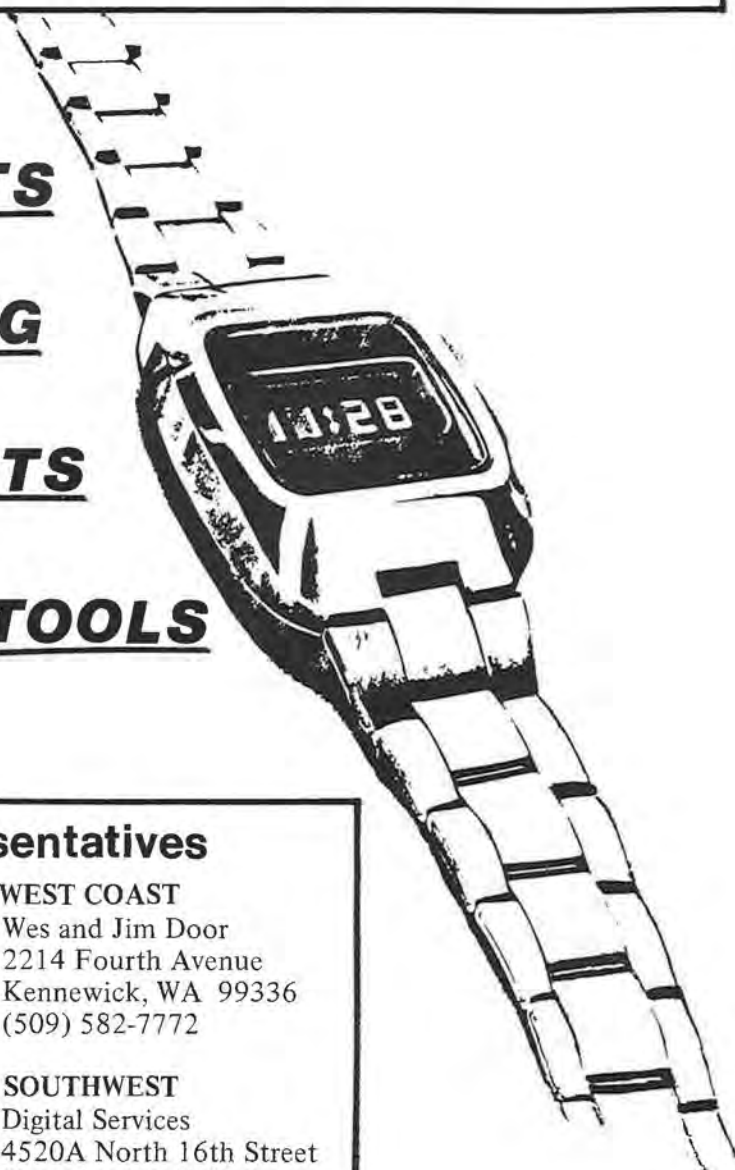
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THE PICKLE BARREL



This month, we are happy to welcome Marshall F. Richmond to our writing staff. While a member of the U.S. Army Corps of Engineers stationed in France during WWII, Marshall became introduced to watchmaking in a rather unusual manner. In his words, "Due to boredom during a stalemate period, I became interested in watchmaking when I found some watchmaking tools and practice watches in a knocked-out piece of German equipment. I worked with these without books or tutoring and by the end of the war, was satisfactorily repairing watches on a limited basis." After the war, Mr. Richmond made the decision to broaden this limited basis and enter the watchmaking and jewelry profession. He trained at the Cunningham School of Horology and subsequently opened a jewelry store in Milan, Indiana. For thirty years, he has been in the business of watch and jewelry repair and jewelry manufacturing. He has served actively in his local Watchmakers Guild and in the Watchmakers Association of Indiana, holding the presidency and many other offices in both organizations. In 1976, he was elected to the board of directors of AWI and held this position until June of 1979. He has also administered and supervised jewelry repair classes for the WAI throughout Indiana.

by Marshall F.
Richmond, CMW

The Basics of Jewelry Repair

This series of articles is being prepared for the already accomplished watchmaker whose skills can be applied to jewelry repair and even to jewelry making; not only in the interest of additional profit, but also to provide better services for the most essential component of our business—our customers.

The information which will follow in the next several months represents that accumulated from a very basic schooling in jewelry repair and thirty years of experience. All of the methods work for me but there may be some faster and better ways to perform the same jobs.

To begin with the basics, most jewelry repair is made with the use of heat and solders, but in some cases glues or adhesives are adequate. In watchmaking we are all well aware of the importance of cleanliness. This is equally important in jewelry repair and the first step after analyzing a jewelry repair job is to clean it.

Fluxes play an important role in jewelry repair. For gold and silver solder (hard solder), a borax base flux is used, and for lead and tin solders (soft solder), use muriatic (hydrochloric) acid and zinc (zinc chloride). For soldering steel or stainless steel with gold or silver solder, use Aircasil flux. Most fluxes can be obtained from any material distributor.

Solders are of many types and will melt at various temperatures; thus easy-flow solders melt at a lower temperature than hard-flow solders. The easy-flow solders are softer than the hard-flow and will not wear as well as the hard-flow types. The preparation of work to be repaired begins with cleaning the item, especially where solder is to be used. The flux merely prevents oxidation when heat is applied, so if dirt is under the flux, it can prevent the solder from flowing on the metal or, if the solder does flow, it can leave the surface with pits. Rings should be cleaned by ultrasonic cleaning, scrubbing, boiling or a combination of any of these methods, particularly if heat is to be applied around stones or ornate work such as filigree. If this is neglected, the heat may cause soap films or body oils that have accumulated on the surfaces to burn, making it nearly impossible to solder or clean them. If sizing is all that has to be done, precleaning is not necessary. The sawing and filing should leave the surface to be soldered clean enough.

(Continued on page 22)



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Following is a list of terms related to jewelry repair and a brief explanation of each:

ANNEALING—To heat red hot and cool, making metals soft and workable.

BURNISHING—Making a metal smooth or shaped by rubbing with a harder, highly polished metal tool.

ENAMELING—Flowing molten colored glass in a recessed design and polishing. A new plastic is now used in many jobs and requires little heat.

FLUXES—Chemicals used to allow metals to fuse together and to prevent oxides from forming.

FINDINGS—Jewelry parts such as heads, bezels, shanks, jump rings, earring posts, etc.

GAS—As used in jewelry work, natural gas, propane, butane, or Prest-O-Lite (acetylene) and oxygen.

PICKLE—A solution of sulphuric acid to remove oxides and/or flux residues from metal after heat has been applied.

POLISHING—Using abrasives to make metals shine with a high luster.

SOLDERING—Adding a metal that melts at a lower temperature than the metal being repaired to join it together with a strong bond. Involves the application of heat.

SHIELDING—Protecting stones, enamel and jewelry parts that could be damaged by heat.

The basics for preparing and beginning work have been explained, but as each repair should be presented in a separate article, we will now continue with the basic steps for finishing the repair. After the solder has been applied and the ring rounded out or the piece of jewelry repaired, the next step is pickling. Either boil the item in a 10% solution of sulphuric acid or immerse it for ten to thirty minutes in a cold, 20% solution. ("Sparex," a prepared solution, can also be used according to instructions on the can.) Rinse in cold water and, while still wet, use a bronze scratch brush rotating wheel which will easily remove any residue and leave a bright (satin) finish. This process removes any oxide or crystalized borax left on the metal by the flux. The next step is filing—a skill at which watchmakers are particularly adept. Any excess solder should be filed away, restoring the article to its original shape. The article should then be polished, first with tripoli and then with a finer abrasive such as rouge. Most watchmakers have a polishing motor, polishing buff wheels and polishing abrasives used in polishing watch cases, and these are adaptable to polishing jewelry as well. After polishing, the article should be cleaned either ultrasonically or by scrubbing in a solution of soap (detergent) and ammonia or a suitable prepared cleaner, in order to remove the residue of the abrasives. Jewelry repair jobs should always be returned to the customer clean, highly polished and looking as new as possible.

If you are completely inexperienced in jewelry repair and soldering, you can practice using low-cost materials such as brass, copper, nickel-silver, and silver solder. Be frugal in purchasing tools and materials until experience teaches you what you will need beyond the tools you already have for the practice of watchmaking. □

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Otto Benesh, CMC

"CLOCK CHATTER"

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Have you ever looked at a pin wheel with deep grooves in the pins and thought, "I wonder if I can get by without putting in new pins?"

What may look like a major operation on the surface is really a very simple and quickly performed procedure. Never leave a scored pin wheel for the next fellow to repair. Remember that he may find out who you are and there could go your reputation.

You say, "A simple and quick job? O.K. prove it!" Prove it? All right. Here is how I go about repinning the wheel.

The first step is to determine whether the pins extend inward or outward from the wheel. See Figure 1. Make a note of their position so that you will not forget when you replace them. There is nothing worse than discovering that they are in backward and will not pick up the hammer tail.

Now make a height gauge which will be the same length as one of the existing pins. This gauge can be made from a piece of brass tubing or a bushing as shown in Figure 2. It will serve as a gauge for length, an aid in cutting the pins, and as a guide when filing the ends of the pins.



Figure 1



Figure 2

Next, the old pins are removed from the wheel. Many times the old pins are tapered and the direction of the

Repinning the Pin Wheel

taper will be your guide as to whether to punch them out from the front or the back. See Figures 3 and 4.



Figure 3



Figure 4

The new pins should all be of the same size and the easiest way to assure this is to broach out the old holes. This is best accomplished by placing a stop on the broach and, when it contacts the wheel, proceeding to the next hole until they have all been done. See Figure 5. These spacers can be made from bushings, but the proper size bushing must be selected for each stop. Commercial models are available for this purpose, and while they are a bit expensive, they do save time. See Figure 6.



Figure 5



Figure 6

When the holes have all been broached to the same size, select tapered pins to fit the holes leaving about 2.0 to 3.0 mm at the bottom. Set the pins in the wheel snugly. Place the height gauge on a tapered pin (as in Figure 7), and cut it to length with a pair of diagonal nippers. The bottoms should be cut as close to the wheel as possible with the nippers. See Figure 8. When you have cut all the pins they should look like the one shown in Figure 9.



Figure 7



Figure 8

(Continued on page 59)



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Questions and Answers

by Henry B. Fried

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The Molly Stark Saga

Q. I would like to get some information on a Hampden 3/0 size, 7 jewel with a push pin set on the right side of the case. Serial No. of the watch is 1847382. Were very many of these made, and what year was this made? I have been repairing watches for 26 years and this is the first Hampden I have seen with this type of setting mechanism. "Molly Stark, Canton, Ohio" is imprinted on the movement.

I have another question concerning the case of the above-mentioned watch. It is an open face yellow pendant case with the push pin on the right side. The case has two covers in excellent condition. On the top cover inside is imprinted the Dueber shield underlined: SPECIAL 5581707. It does not state anything about the gold content or whether this is a 20 year or 25 year case. The back of the case has a very nice floral engraving.

Please let me know about this watch as soon as possible. I have enclosed a s.a.s.e.

Carl Lindberg
Capitola, CA

A. The Molly Stark 3/0 size push settings were made in large quantities from about 1890 until just beyond the turn of the century. The serialization of your production number would place your watch towards the latter part of such production. A companion piece, or "male" counterpart, to the Molly Stark was the General Stark in lever setting, 16 size hunting.

Mr. Dueber had earlier bought out the Hampden Watch Co. of Springfield, Mass., after many of the watch companies combined to "boycott" his cases. This caused him to go into the watch business and he was quite successful. His success continued until the late 1920's when all of his business was sold to Amtorg, Russia's buying agent, and thus became the seed for the Russian watch industry today. The Dueber shield on your watch case was the regular mark used on most of his watch cases. This shield gives you the metal content. The shield with an anchor denoted that it was gold filled (14K) and good for 25 years. When the same trade mark appeared on solid gold, the karat gold would be stamped in an additional panel above the trade mark "Dueber." The term "Special" denoted the 25 year duration. Silver cases had the metallic content in a panel between the shield and the panel "Dueber."

CHRONOGRAPHS

Q. I have two questions; one concerning an Omega No. 861 chronograph and the other concerning a Heuer (Valjoux 72) chronograph. In the Omega, the hour recorder creeps for about 30 minutes after zero-ing. As for the Valjoux 72, when the chronograph is started, the teeth of the coupling wheel engage the top of the teeth on the heart wheel, stopping the movement. Adjustment of tooth depth is no help. Any assistance you could give me with these two problems would be appreciated.

James R. Hobbs
Milpitas, CA

A. In regard to the "creeping" problem in your Omega 861, in this watch the shoulder of the barrel arbor contains a spring and a driving pinion. The pinion must be free and able to remain locked when zeroed. If the friction spring which supplies tension to it is too stiff or the pinion not free enough, the movement of the barrel may drag along the hour recorder wheel. Check this out.

As for the Valjoux 72, inspect the bushing underneath as it may have too much side or endshake. The minute register wheel and the center sweep wheel and bushing are involved in this case. A bushing that is worn or has too much shake will allow this to go out of alignment.

If these suggestions do not solve your problems, write again and enclose your request—rather detailed with s.a.s.e.—and we'll try again, too.

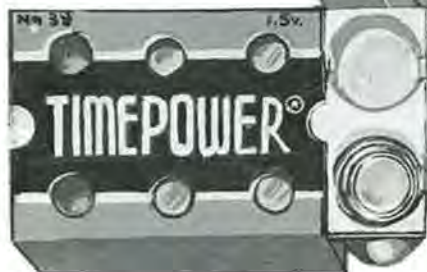
CASE COMPOSITION

Q. In the handling and servicing of old timepieces, several case markings occur quite frequently which I am unable to identify precisely when asked. Can you tell me what the composition is of "platine," "platina," "silveroid," and "silverode?"

(Continued on page 59)

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New Windsor, NY

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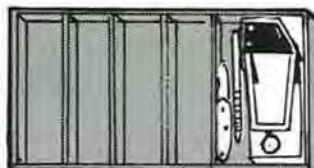
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for one piece case
step for easy fitting



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with smooth polished edge

W MICON
for gauges W 8 to 100

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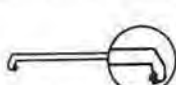
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One of the extra advantages of AWI membership this year will be a free copy of our expanded sources reference book. As I write this article, we are negotiating to purchase the rights to the popular *Clockmakers Buyers Guide*. We expect to be able to combine this guide with AWI's own *Sources*. The result will be one of the most comprehensive buyers' guides ever put together for the horological trade. This new guide will become a valuable tool for every bench worker as it will list sources for hundreds of hard-to-get services and materials. We expect to be able to mail every AWI member their free guide early in 1980.

Since late August, we have been making delivery on our new book, *The Best of J.E. Coleman: Clockmaker*. The advance release of 500 numbered copies of this book was quickly snapped up. We are attempting to fill orders for the regular release within ten working days of the receipt of the order. In my column for September I gave complete details on the Coleman book; additional information has since been published. I can't help but think what a fine Christmas gift this book would make for anyone interested in or engaged in horology. If you agree, please place your order now so we can guarantee delivery for the holidays.

Now that we are well into Fall, we are also well into our busy bench course schedule. Frequently we hear from members who want to know when a bench course will appear in their area. Bench courses will be listed in each issue of *Horological Times*. (You will find them on page 61 of this issue.) Use the convenient information request form

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AWI NEWS

By Milton C. Stevens

to find out about the courses which interest you. If you fail to find a listing near you, contact your local association and ask them to schedule one. If you do not have a local association, and are willing to help AWI arrange a course in your area, please contact me at AWI Central. We have several new bench courses for 1980 as well as some of the more popular ones which were available this year.

The great success of AWI's first Residence Course for the repair of solid state watches has prompted us to schedule another one for the first of February in Orlando, Florida. See the related article on page 46 for details.

The authors of AWI's forthcoming new book entitled *Questions & Answers for the Clockmaking Profession* have completed their work. The manuscript, which has been in the making for five years, is undergoing final proofreading. Dr. Joseph Baier, James Tigner, and Marvin Whitney are the authors of this new book which is expected to be as popular as the earlier book, *Questions & Answers for the Watchmaking Profession*. The Q-A book for clockmakers will be off the press early in 1980.

We are seeking information about firms or individuals who offer unique or hard-to-find specialty services, tools, or supplies for the horological trade. These references will be included in AWI's expanded reference book for the trade which will be published in 1980. The editors of this new guide reserve the right not to publish any referrals which in their opinion are routinely available throughout the industry. We will only publish information on those services or products judged to be difficult to obtain or available on a limited basis.

Please send your suggested listings to: AWI Sources, AWI Central, 3700 Harrison Ave., Cincinnati, OH 45211.

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Irving Tepper Retires From Staff of the Joseph Bulova School of Watchmaking

As always, it was just a matter of time. Irving Tepper, the last of the original instructors remaining at the Joseph Bulova School of Watchmaking located in Woodside, New York, has retired after thirty-five years.

Tep, as he is known to students and staff alike, is a throwback to another era. At one time, he owned three private airplanes and taught engineering for Grumman Aircraft in Long Island, New York. When Bulova called, Tep traded his wings for watches.

Arde Bulova founded the Bulova School in 1944 in appreciation of disabled United States war veterans. He chose Tepper as one of five original instructors. Today, the Bulova School serves the disabled from all walks of life.

During Tepper's thirty-five years at the school, he wore many different hats. In the early years, "research and development" for the Bulova Watch Company took up much of his time. A major breakthrough was Tep's work

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with the Bulova Photo Timer, which recorded the finishes of many amateur athletic events.

Other projects included television advertisement distribution for the Bulova Watch Company, and a ten minute film production on the Hope Diamond for a Bulova chain store account. Aside from these interests, Tepper taught business courses, blueprint reading and sketching, arithmetic, preliminary watchmaking, and gemology at the Bulova School. He saw the school as being "always for the disabled," and has many fond memories of successful past graduates and his dear friend, the late Arde Bulova.

Not one to waste any time, Irving Tepper is already involved in other ventures. He is expanding his antique collection and remaining active as a private investor. Tep's informative articles will continue to appear in the Bulova School newsletter and he will return to the school as a guest lecturer.

Even in retirement, Tep insists, "There isn't enough time in a day!"



Coordinator of Instructors, Frank Shank, congratulates Irving Tepper on his retirement after 35 years of service at the Joseph Bulova School of Watchmaking. James M. Devaney, Director of the school, presents Tepper with a Bulova Accutron watch.

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Thanks to friends and members...

The AWI Museum Continues To GROW



Henry B. Fried: CMW, CMC, FBHI,
Member AWI Museum Committee



Orville R. Hagans: CMW, CMC,
FBHI, Curator, AWI Museum

The AWI Museum is rapidly growing, thanks to our members and friends who graciously donate unusual tools, clocks and watches to the Museum, as well as books and manuscripts to the Library.

Space is our greatest problem. It has become necessary to move large tools and equipment, as well as some smaller tool displays, to the upper floor and we have established a repair section for taking care of Museum pieces only. Mr. Fried and myself devote considerable time to this section.

Mr. Addison H. Harris, member of our Museum Committee, has repaired a number of clocks for the Museum in his own shop in Centerville, Indiana.

We are endeavoring to acquire large, old brass bench lathes to complete our workshop set-up. Perhaps you can help by donating the needed lathes.

The photos show only a small portion of the tools on display. Almost all of the tools are behind glass in order to protect and retain rare pieces.

For those who wish to donate horological items to the Museum or books to the Library, please let us know before shipping what you have.

Remember, all items donated are tax deductible. Items received are appraised and donors receive a letter of acknowledgment with a statement of current market value which can be used in their tax report.

By AWI Museum Curator

Orville R. Hagans, CMW, CMC, FBHI



Complete rounding-up tool

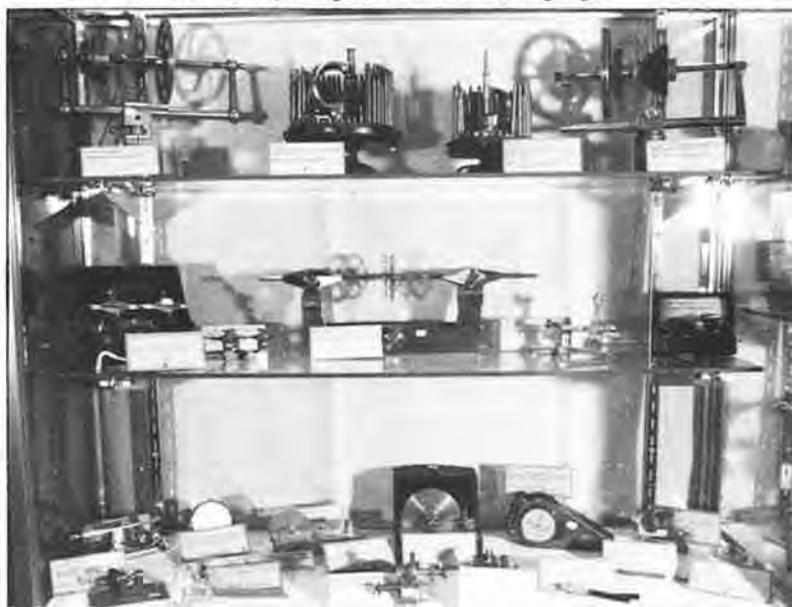


Unusual tools

Close-up of one display section



Broad selection of depthing tools and unusual gauges



We Salute These Museum Donors!

(Listed in Alphabetical Order)

ACCURSO, VINCENT; CINCINNATI, OH: American clock case, iron with MOP inlay, gold painted design, orig. dial, 1860-80. Four Electric clocks, models by Manning-Bowman, United, G.E. Table cuckoo clock, brass painted metal case, German. Singing bird, brass cage, German.

ADAMS, MRS. HENRY M.; SANTA BARBARA CA: Oil painting, portrait of Theo Gribi (1840-1922), first president of the American Horological Society, Chicago, 1892. T. Gribi's Bronze Medal presented by U. S. Centennial Commission, 1876; diploma, Journal Suisse d'Horlogerie, Geneva, 1905; biographical papers and correspondence; 1874-76 diary.

ADERMAN, CLINTON E.; HALLANDALE, FL: Elgin Timer, early model produced by and used in Elgin Watch Co. Mosley Lathe.

ARCHER, DARRELL; MUSKEGON, MI: "Gambling" Clock, Loheide Mfg., St. Louis, MO., 8-day American movt., maker unknown, ca. 1900. Watch movt. by Denton, London, fusee, 1800-20. Waterbury Carriage Clock, repeater, Hr. & 1/2 Hr. strike, orig. carrying case, ca. 1900-10. German Musical Alarm, tincase, Thos. Ernst Haller, ca. 1900. Westclox Paper Weight Clock, 1940-50. Desk Date & Time Stamp Clock, Dorson, Chicago, IL, No. 17418.

ASCHENBACH, KIM; SHEBOYGAN, WI: Robt. H. Ingersoll and Bro. 6s watch, ca. 1909, No. 20384524, black dial.

ASCHENBACH, TODD G.; SHEBOYGAN, WI: Old tin advertisement box, Waltham Horological School, Waltham, Mass.

BAIER, JOSEPH G., PH.D.; PHOENIX, AZ: Two scale models of Water Clocks (Clepsydras) made by donor from drawings by John Muir, naturalist, explorer, and Father of the Natl. Park System.

BERGEY, ORRIN O.; MT. HOREB, WI: New Haven wrist watch, "Brantford" model, ss case, leather band.

BRITTON, HARLEY B.; CINCINNATI, OH: Swiss watch, cylinder escapement, 6J, silver case.

BROUGHTON, JAMES H.; COLUMBUS, OH: Chronometer, WEMPE Chronometerwerke, Hamburg, Germany. Movt. No. 7870, up & down indicator, secs. dial, orig. case. Waltham chronometer, lever escapement, 15J, movt. No. 18141821, up & down indicator, orig. case. Natl. Watch Co. movt., No. 6422, "G.M. Wheeler," 18s, 15J, key wind, ca. 1867. Rockford movt., No. 720, 18s, 9J key wind/set, ca. 1876. American Watch Co. movt., No. 914875, "Lady Washington," 8s, 11J, key wind, ca. 1876. French movt., 20 ligne, 10J, cylinder, key wind/set, gold dial, ca. 1850. Swiss movt., 20 ligne, 15J, key wind/set, lever escapement, engraved metal dial, ca. 1870. H/C Swiss movt. made for Tiffany & Co., Geneva, 18 ligne, 19J, key wind/set, ca. 1870. Patek, London, movt., 16 1/2 ligne, 11J, key wind lever

escapement, ca. 1875. Landoz & Son, London, movt., 20 ligne, 13J, Lepine cal., lever escapement, key wind/set, ca. 1850. G. Weber Co., Switzerland, early case calendar wrist watch, 10 ligne, 15J, "Orator," ca. 1925. Bezel-set, jewellery-seat & bezel cutter, ca. 1890. Early m/spring gauge, Dennison gauge for width & mm for thickness, ca. 1898-1905. Centering tool (Chas. Marsh pat. 1903) with spring loaded centerfinder, used for clock barrel heads, etc. Barkus plastic demonstration parts. Miniature leather bound Gorham Silver advertising book, 1914 calendar.

BURKENMEIR, WILLIAM J.; CINCINNATI, OH: Elgin watch, movt. No. 3689047, 18s, full plate, pendant set, gold engraved case, ca. 1889.

BURNWORTH, LARRY; COLORADO SPRINGS, CO: Cuckoo clock, Hubert Herr, Tribberg, Germany, one-day. Light wood case, color frame & top piece.

CALVERT, HAROLD K.; INDIANAPOLIS, IN: Boettger & Wittig Demagnetizer, Pat. 1902.

CAMPBELL, HARRY N.; MESA, AZ: Arnold Adams Co., London, watch, 15J, anchor escapement, key wind Swiss movt. gold open face case engraved, porc. dial, ca. 1890.

COLEMAN, MS JANET & JACQUELINE; CHAMBLEE, GA: "Negus Marine Clock" from the J. E. Coleman collection. Produced in 1912 by Chelsea Clock Co., 7J, in line lever movt., No. 83822, time only, heavy bronze case.

CORDES, G. W.; HILLSDALE, MI: Hamilton chronometer, complete with outer carrying case. Model 22, No. 2F10490, 21J, up & down indicator. Set of Pyramid case dent removing blocks & stakes, ca. 1900. Jacot pivot burnishing lathe with extra pivot rests, lantern & slot-pivot gauge, bell metal, ca. 1910. Set of watch jewel bezel setting (openers) & bezel burnishers (closers), ca. 1930. Three turns lathes (English and American). Hand operated flywheel used to operate small lathe.

DRAKE, KENNETH E.; AURORA, CO: "Grandmother" Clock, German, 8-day spring wind movement, Westminster & Canterbury chimes, hour strike, ca. 1938. Seth Thomas Course Clock, Mark 2 model, No. 20818, metal case, used in WWII. Herschede mantel clock, electric, pendulum, 24-hour maintaining power, Westminster chimes, Hr. strike, ca. 1915. Seth Thomas Shelf Clock, flat top wood case, half shell columns, 8-day lyre movt., strike, ca. 1866. Hamilton Model 560 movt., 1st cordless electric clock produced Feb., 1959. Hamilton "500" electric watch movt. produced Jan. 1957. Bulova "Accutron" watch movement. Mobier clock pendulum, repro. Staking tool, 103 stakes, 21 stumps, ca. 1895. Rounding-up tool, ca. 1830. Jacot tool for pivot burnishing with box, ca. 1860. Depthing tool with box, ca. 1840. Staking block, ca. 1890. Oil cup, ca. 1900. Alcohol lamp, ca. 1890. Countershaft, ca. 1900.

DUOWE GMB H (EBAUCHES S A), PFORZHEIM, W. GERMANY: Eighteen mechanical watch movements produced by the donor, mounted on wooden artist's palette.

EVANS, LYLE S.; GOLDEN, CO: 2 "LeGant" electric watches, Swiss Landeron Cal 4750 produced for Montgomery Ward by Buren Watch Co., ca. 1958.

FARRELL, JOHN M.; DETROIT, MI: Two AWI Research Medals (Advancement of Art and Science of Microminiaturization), 1961.

FISCHEL, LUDWIG; ISRAEL: Twelve tools of the 1860 period: Pivoting tool in wood box; Lathe attachment; Uprighting tool, brass; Balloon chuck; Drill fixture designed to fit bench vise, bow activated; Two bench turns lathes, brass & steel; Pallet & roller jewel tool; Wheel chuck; Tail stock runner; Rounding-up attachment; Balance roller tool.

FREW, JAMES A.; SOLON, OH: Jeweling tool, complete with box.

FRIED, HENRY B.; FRESH MEADOWS, NY: American clock movt. converted to "Galileo" model, made by H. G. Shaw, Conn., 1959. Verge escapement model, wood, made by H. G. Shaw, Conn., 1959. Seth Thomas Shelf Clock, wood case OG top, split col., made for Canadian market, ca. 1838. Tavannes (Swiss) "Pleiades" watch movt. WWI Nurse's watch, Ribberg, Swiss. Nine small wrist watch movements, Swiss. WWI Capt's wrist watch, Swiss. Seventeen American-made watch movts., 1890-1925 (N.Y. Standard, Waltham, Illinois, Hampden, Elgin). WWI watch made for German A.F., Swiss. Longines ladies pendant watch movt., ca. 1890. Two Wittnauer alarm movts. made for miniature travel clocks. Gruen "Curvex" watch movt. Classic "Big Ben" alarm clock, Watchman's bank clock, American movt., Swiss escapement, ca. 1880. Four "raw" watch movts. (Swiss, German and Japanese.)

FRYSTAK, HENRY; LINDEN, NJ: Japanese Pillar Clock (shaku dokei). late period.

GENERAL MOTORS RESEARCH LABORATORIES; WARREN, MI: Mercer Survey Chronometer, movement No. 14615, made in 1937, original box.

GORDON, BOB & EDRAGENE; YREKA, CA: Small (1 1/2 inch) bench lathe, T. Stark, Waltham, Mass., Pat. 10/10/1858. English turns lathe.

GREENBERG, EPHRAIM; NEW YORK, NY: Large escapement model made by Auguste C. Roze (1812-62) of Paris. Signed "Roze, Ecole Nationale Horlogerie No. 4969."

To Be Continued Next Month

Museum Donors are listed in alphabetical order and will appear in the *HOROLOGICAL TIMES* as space permits.



WATCH ADJUSTMENTS

by Joseph Rugole, CMW

Understanding the basic characteristics of watch oils brings us a little closer to appreciating the importance as well as the delicacy of the operations necessary to achieve good lubrication throughout the watch. However, more information is needed to make the wisest decisions as to what kind of lubricant to use for a particular job, where to apply it, how to apply it, and how much of the lubricant need be applied. There are many opinions on this subject and I would not want to impose my own on any practicing watchmaker. The most I am willing to do is to outline my own methods and provide some explanation as to why certain selections are made. It must be understood that it is not my intention to name any products for the purposes of advertising. The lubricants tried were found to be successful, but this does not mean that other products may not be as good or even better.

Lubricating the winding and setting mechanism is important for its proper functioning, but the selection of lubricants is, in this case, not very critical. Although a high-quality clock oil may be used successfully, a high-quality grease is a much wiser selection. Over the last twenty years, I have found the Moebius white grease to be very good and I have refrained from using anything else. The points of lubrication should be: the stem square, the ratchet teeth on the clutch and winding pinions, the hub of the stem and the channel, the setting lever pin and spring, the point of contact between the clutch lever and the clutch lever spring. The grease should be used sparingly. It is sufficient to just wet the surfaces in contact without creating a visible accumulation of grease. Automatic watches deserve special attention. Since the clutch pinion is forced to ratchet while the watch is being wound automatically, any hindrance to smooth action may be detrimental to positive winding action which would

certainly affect the performance of the watch. It is also advisable to apply a small drop of oil on the intermediate setting wheel post and sometimes on the minute wheel post as well. If the minute wheel is allowed to contact the bottom of the recess with its entire surface, it is then better not to lubricate the post. The adhesion of oil between the two surfaces would produce more friction than would be reduced by lubrication. Calendar mechanisms and other special features should be lubricated at those points where any two metal parts are in contact and under pressure either during normal operation of the watch, or during the time the special feature is in motion. For detailed information, it is best to consult technical bulletins. Closer scrutiny of the bulletins will also disclose that all the points under considerable pressure will be greased and those under less pressure will be oiled. The amount of lubricant applied should be such that spreading through capillary action is minimal. Generally speaking, all greased points should be lubricated sparingly because the evaporation and decomposition of greases is much less than that of oils.

Lubrication of mainsprings is often ignored for various reasons. The usual excuse is saving time. Lack of information is another likely reason. If the basic problems were better understood, I believe that the number of poorly lubricated mainsprings would be greatly reduced. The mainspring is the driving force of the watch mechanism. From the theoretical point of view, this type of driving force is a rather poor selection because the force of the mainspring varies constantly. According to Hooke's law, the tension of the spring is proportional to the angle at which it is bent. This, however, is not the only problem. Since it has to be confined to a barrel, the coils touch one another as well as the top and the bottom of the barrel. The points of contact are the sources of friction so that the unwinding of the mainspring is not as smooth as we would like it to be. Theoretically, the force of the mainspring can be graphically represented as in Figure 1. If there were no friction between the coils and the barrel and between the coils themselves, the curve would conform to Hooke's Law over a very large part of the unwinding. The actual force curve obtained on the Tensionmeter (a specially designed instrument to measure the tension of the mainspring throughout its unwinding sequence), looks somewhat like Figure 2. The change from the uneven release to a close approximation of Figure 1 can be obtained only by proper lubrication.

It has been pointed out elsewhere that the accuracy of a watch depends largely on the constancy of the amplitude of the balance wheel. If the variation of the amplitude is small, the hairspring is able to compensate for it; if it is large, the hairspring cannot do so. The amplitude of the balance wheel depends on the strength of the impulse, and the impulse depends on the amount of force received from the mainspring. It is easy to see that the release of force as shown in Figure 2 could never produce the constancy of amplitude required for good timekeeping. Among other things, the mainspring must be properly lubricated to minimize friction during unwinding and to deliver reasonably constant force to the escapement. The selection of the proper lubricant as well as the method of lubrication are quite important. It is very surprising that one still finds an occasional mainspring lubricated with clock oil. Moebius yellow grease No. 8200/20 is a much better choice. The lubricating properties of it are good and when properly applied there is no spreading through

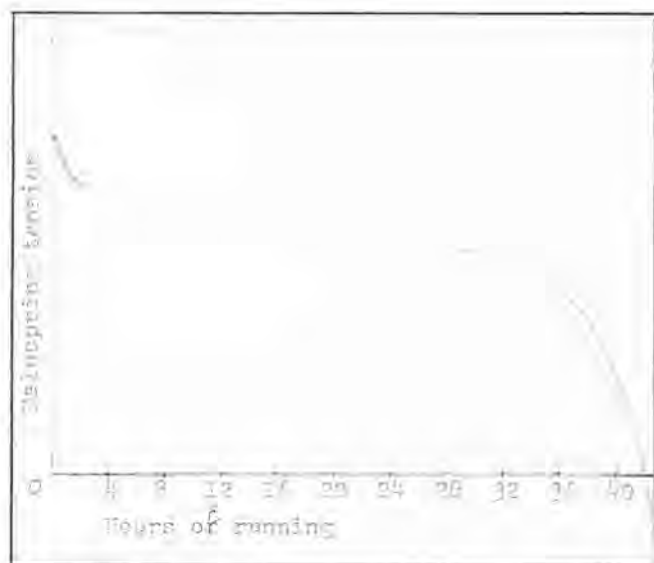


Figure 1. Theoretical power curve as would follow from Hooke's Law

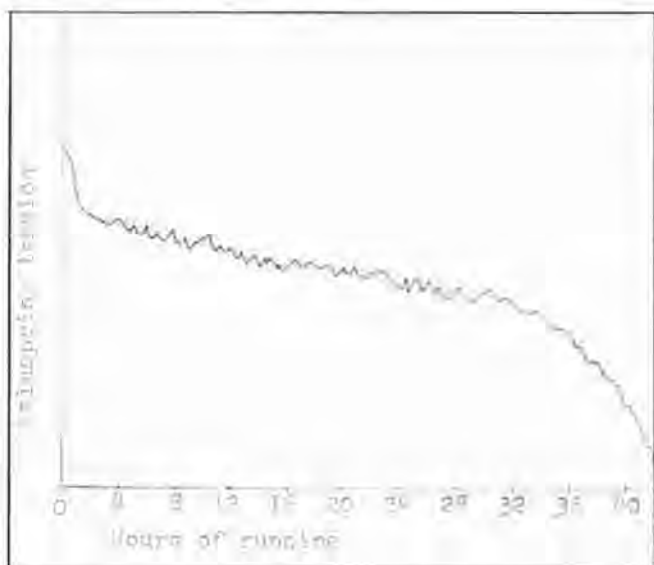


Figure 2. Actual power curve approximation as obtained on the Tensiometer

capillary action. The white grease used for winding and setting can also be used if the yellow is not available.

One of the better methods of application is to wind the clean mainspring into the mainspring winder and lubricate the exposed coils generously while in the winder. When the mainspring is transferred to the barrel, the lubricated coils go to the bottom. During the time of release from the winder the coils spread apart and the grease has a chance to penetrate between them. If the mainspring is removed for inspection, it will be found that it is thoroughly lubricated throughout its length. The whole operation is simple and clean and when properly done, there is no unsightly smudging of the mainspring barrel as is so often found in watches. The upper and lower hole in the barrel should be lubricated with the same grease before the arbor is fitted and the barrel closed.

A number of innovations in mainsprings and in lubricants make the problem of mainspring lubrication a little more complicated. One such innovation is the self-lubricating or greaseless mainspring. The manufacturers of certain alloy mainsprings have developed a method of applying a type of

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dry lubricant directly into the mainspring coil. The surfaces of such mainsprings are very slippery, but unfortunately the laboratory test results are not being duplicated in actual use. After such mainsprings are put in operation, the watches soon stop functioning. When the mainspring power is released, the coils separate with audible snaps which are clear signs of poor lubrication. If such mainsprings are cleaned and lubricated, the watches function normally again without any further corrective measures.

The automatic watch which became very popular after WWII, brought with it a new problem for the watchmaker. The mainspring bridle, the importance of its proper lubrication, and the adjustments necessary for its proper functioning were seldom fully understood. If an automatic watch is to perform as it should, then the mainspring bridle must begin slipping around the barrel wall just before the watch is fully wound up. However, when the bridle stops slipping, the mainspring should be wound for six full turns of the arbor. Such fine adjustments can be achieved only when the mainspring is genuine for that caliber, the barrel wall is not worn, the bridle is smooth and without kinks, and the barrel wall and the mainspring are properly lubricated. Problems arise, however, with the variety of methods used by manufacturers to achieve proper operation of the mainspring bridle. In older automatic watch models, the bridles are separated from the mainspring and are often difficult to adjust for proper slipping. Not all of them are fitted into the barrel in the same way. Felsa Cal. 415, 690, and 1560 have the bridles fitted into the barrel in such a way that the end of the bridle which carries the hook is overlapped by the smooth end. This is just the opposite of all other watches. The bridle fitted as described

creates more friction against the barrel wall. It is easy to miss this feature of Felsa models and fit the bridle in the conventional way. The result will be that it will hold for only about two turns of the barrel before it starts slipping.

A single kink on the bridle makes its operation defective. The bridle will not slip smoothly but will allow the mainspring to be fully wound before it releases. The release is sudden and almost complete. Most often there will be only one or two turns on the mainspring after such release. This is definitely not sufficient force to keep the watch working properly and maintain a high enough amplitude for adequate timekeeping.

The difference between proper and improper functioning of the bridle is often a matter of proper or improper lubricant. Some manufacturers have elected to use a little stronger bridle for their watches after a new and more slippery lubricant was developed. This lubricant is Molybdenum Disulfide, a dark graphite-like powder suspended in oil. Because it is more slippery than the ordinary grease, it protects the barrel walls from abrasion better than grease. However, it does require a stronger bridle to provide proper tension for the mainspring. Those bridles which have to be lubricated with it will not function properly with anything else. Conversely, if a bridle which normally requires ordinary grease is lubricated with Molybdenum Disulfide, it will start slipping much too soon.

To prevent the abrasion of the barrel, the Swiss have developed a method for coating the barrel with Teflon. If the abrasion is reduced, the friction against the barrel wall becomes more constant and the behavior of the bridle more predictable. Teflon-coated barrels require a special

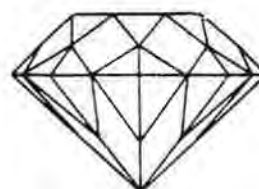
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lubricant because the coefficient of friction between the alloy mainspring and the plastic fiber is different than that between a brass barrel and an alloy mainspring. The special lubricant is "Glysalube A." If any other lubricant is used, the bridge will not slip properly.

The introduction of the so-called "Life Time Lubricated Mainspring" was another attempt to minimize bridge problems. The manufacturers simply lubricated the mainspring with Molybdenum Disulfide and sealed it so that it is difficult to open. The term "Life Time" does not mean forever, but rather a limited time (about 8 to 10 years) after which the complete barrel is replaced. It is also possible to restore the old mainspring and barrel by cleaning thoroughly, correcting any wear damage, and then lubricating again with Molybdenum Disulfide. If any other lubricant is used, the bridge will not slip on time and the watch will be in overmotion as soon as the mainspring is fully wound up.

It is rather ironic that at first there was only one problem with automatic watches, namely the proper fitting and lubrication of the mainspring bridge. From the attempts to solve the initial problem developed several types of barrels requiring different lubricants which created a larger number of different problems. Instead of the problem becoming simplified, it has become more complex.

Lubricating the train is fortunately still a simple operation. With the high-quality synthetic oils now available, the only remaining problems are proper cleansing of the surfaces to be lubricated and the application of the right amount and right kind of lubricant. Moebius brand and other high-quality oils are quite adequate for this purpose. I have been

using Longines No. 125 oil for several years now with equally good results.

The watchmaker may find it difficult to determine how much oil is to be applied to straight shoulder and how much to conical shoulder pivots. Experienced watchmakers can do this just by a quick visual inspection, while students and young watchmakers need some standard for visual comparison. Generally speaking, a straight shoulder pivot is properly lubricated if the oil circle on the flat face jewel spreads to about twice the diameter of the pivot shoulder. See Figure 3. This is rather difficult to see after the watch is assembled, so it is better to observe the drop of oil before it is applied. The smallest oiler usually carries a large enough drop to lubricate a train wheel pivot. I would advise a young watchmaker to apply the oil and then remove the bridge carefully to examine how far the oil has spread. By this method, one can gain the experience necessary to judge the size of the oil drop before it is applied. A life-time habit of careful lubrication can be developed in this way.

Conical shoulder pivots normally require exactly twice the amount of oil as the straight shoulder pivots. This is easier to gauge if one observes the oil circle formed after lubrication. The oil should spread between the jewels sufficiently to form a circle $\frac{2}{3}$ the diameter of the smaller of the two jewels. See Figure 4. It is important that sufficient oil is applied to both straight and conical shoulder pivots to minimize the evaporation and thickening of the oil. The larger the drop of oil, the longer it will remain fresh. Care

(Continued on page 58)

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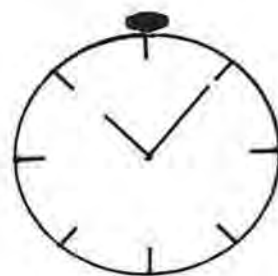
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Technically WATCHES

by Archie B. Perkins, CMW

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Watch Cases and Their Accessories © 1979

Part V

To do major watch case repairs requiring the use of a torch, the watchmaker needs special equipment, supplies, information, and skill.

Torches are made for a particular gas and air combination. For example, torches are made for acetylene and oxygen, natural gas and oxygen, propane and oxygen, or propane and air.

The acetylene and oxygen torch produces the greatest amount of heat and is best for soldering or melting metals where high heat is needed. This torch will produce up to 5850° F., whereas propane and oxygen will produce about 5252° F., and a natural gas and oxygen torch will produce about 5120° F. The propane and air torch produces only about 3497° F. which is considerably less than the other torches, but this is still enough heat to do most soldering jobs. All of the soldering jobs shown in connection with this article were done with a propane and air torch. This is one of the least expensive types of torches. The torch comes with tips in three sizes: One gives a pin point flame for soldering chains and delicate items; another gives a pencil flame for general soldering; and the largest tip gives a brush flame where large areas need to be heated. This torch fits onto a small tank of propane which is not refillable but is very inexpensive to replace. When this torch is burning, natural air is pulled in through some holes that are drilled in the base of the head of the torch.

The torches that use oxygen need a separate oxygen tank with a regulator and gauge, whereas the propane torch used for this article does not need a regulator or gauge. This cuts down on the expense of the torch outfit.

The soldering described in this article is called hard soldering and requires that the solder and the article to be soldered be heated to at least a dull cherry red for the solder to melt and for the metals to unite. This temperature will vary depending on the type and grade of the solder. For example, 18 karat gold solder melts at between 1300° and 1450° F.; 14 karat gold solder melts at between 1250° and 1400° F.; 10 karat melts between 1350° and 1400° F.; 8 karat melts at between 1200° and 1400° F.; and low karat solder melts between 1250° and 1300° F. Gold solder comes mainly in yellow and white although it can be obtained in pink. Platinum solders melt between 1100° and 1600° F., depending on the hardness of the solder. The softer the solder, the lower the melting point. Silver solder melts at between 1100° and 1400° F.

Since different karat gold solders have different colors, it is advisable to use the same karat solder as the article being soldered in order to match the colors so the

solder joint doesn't show up differently than the rest of the article. On the other hand, higher karat gold solder has a higher melting point than lower karat solder so if a joint is being soldered close to a previously soldered spot, it is advisable to use a lower karat solder which melts at a low heat to avoid melting the old soldering job. When soldering silver items, silver solder should be used. Platinum solder should be used on platinum items, and white gold solder should be used on white gold items.

When doing hard soldering, certain chemicals and materials are needed for specific purposes. An anti-oxidizer is needed to prevent the article from becoming discolored by the heat of the torch. The anti-oxidizer forms a coating that protects the article. Prepared anti-oxidizers can be purchased at material houses, or a good anti-oxidizer can be made by mixing a thick solution of powdered boric acid and denatured alcohol. This solution is applied to the article to be soldered in the following manner: Stir the solution up well. Then dip the article in the solution. Now remove the article from the solution. Apply a flame to the article to burn the alcohol out of the coating on the article. This leaves a white coating of powdered boric acid which protects the article while soldering. When the article is heated for soldering, the powdered boric acid melts and spreads over the item preventing the surface from being darkened.

Another preparation needed for soldering is a flux. Flux is also an anti-oxidizer. This preparation is applied to the joint being soldered and also to the solder to prevent oxidation. Oxidation is caused by the torch flame. When oxidation occurs in the solder, the solder will just bead up instead of flowing properly. If the joint becomes oxidized, the solder will not flow into the joint and adhere to the metals. The flux coats the solder and metal to protect them from the torch flame and keep the joint clean. Prepared fluxes can be bought at material houses in solution form, or a good flux can be made from lump borax and water. Some lump borax is placed on a borax slate. Water is added, and a mixture is made which is applied to the solder and joint with a borax brush.

Another solution needed to clean the article after it has been soldered is called a pickling solution. Material houses sell a granular dry acid powder that is mixed with water which makes a pickling solution. The article is placed in the solution after the soldering is done in order to remove any oxides left as a result of the heat while soldering. When using boric acid as an anti-oxidizer, if the article is dipped in water while it is still hot after the solder job is completed, the boric acid will shed off the article leaving it fairly clean.

Many times pickling may not be necessary when the article is dipped in water while still hot. Caution: If the article has stones set into it, the stones could be damaged when cooled suddenly by dipping into water.

The watch case repair jobs selected for this article are the types of jobs most commonly encountered by the watchmaker. The first example shown is a damaged hinge on a pocket watch case. Figure 1 shows this damaged hinge. The damage is so great that it is necessary to make a completely new hinge and replace the joint pin with a new one. In replacing this hinge, the first step is to remove the old joint pin. This can be done by driving it out with a punch far enough to get hold of it with a plier and pull it the rest of the way out.

After the joint pin is removed, the cover of the case can be lifted off. To remove the old tubes from the case and the cover, take a piece of steel wire that will fit the hole in the tubes and insert this into the tube. While holding the case with a pair of soldering tweezers, heat the case with the torch near the tube until the solder melts. Then the tube can be pulled off with the wire that is inserted in the tube. See Figure 2. After the tubes are removed, a joint file is used to file the circular grooves in the case and cover where the new tubes will be soldered in for the new hinge. See Figure 3. The result of the filing is shown in Figure 4. This groove must



Figure 1



Figure 2

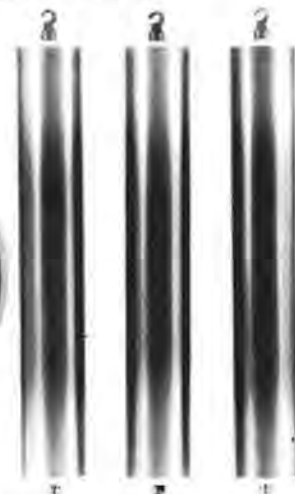


Figure 3

be filed straight in both the case and its cover. Otherwise, the hinge will not be straight and true when the solder job is completed. The filing also cleans the surface for a better soldering job.

The tubes for the hinge should be of the same material as the case. This tubing can usually be bought at a supply house. If tubing cannot be bought, then it can be made from wire by chucking the wire in a lathe and drilling the proper

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size hole to form a tube. The proper lengths can be cut off in the lathe also.

The following procedure is used to solder the tubes into place. The two tubes on the center part of the case are replaced first. Then the single tube on the cover is replaced. First, the case is dipped into the boric acid and alcohol anti-oxidizer solution. Then this is burned off in a flame. Place the tubes into place in the filed groove. Take binding wire and wrap over the tubes around the case as in Figure 5. Be sure the tubes are in their proper positions and properly spaced for the single tube that fits between these two tubes. Check to make sure the tubes are tight in their groove so they won't move during the soldering operation. Now place some flux where the tube touches the groove. This can be done with a small clean camel hair brush. After this has been done, a small piece of the proper quality solder is placed on the tube next to where the tube joins the groove in the case. See View A in Figure 5. Apply flux to the solder also. The same brush used to apply the flux can be used to pick up and apply the solder. Note: Use very little solder because a very thin coating of solder is all that is needed to hold the tube

on the case after it is melted. Too much solder makes a messy job. The ability to judge the correct amount of solder comes with practice.

Now the torch flame is applied to the center part of the case close to one of the tubes as in View B of Figure 5. This prevents the tube from getting too hot and sustaining damage before the case center gets hot enough to be successfully united with the tube through soldering. In order for two pieces of metal to be united by hard soldering, they must both be heated the same amount and heated sufficiently for the solder to flow into the joint and unite the two metals. The center part of the case would need to be heated first as more heat and a longer period of time are required to get it hot enough. The heat from the center part of the case will transfer to the tube and the solder causing the solder to melt and flow in between the tube and the case. It must always be remembered that the solder flows toward the hottest part of the article being soldered; therefore, both parts must be heated the same amount. When the solder flows in around one of the tubes, move the torch flame to the part of the case next to the other tube and solder it on.



Figure 4

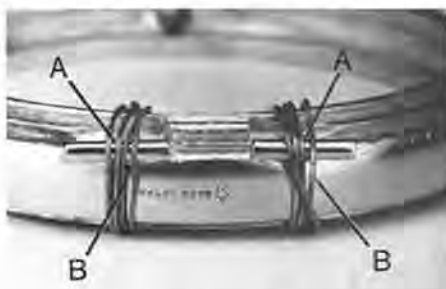


Figure 5

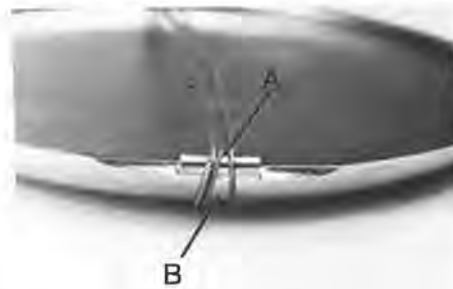


Figure 6

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For this job, use the torch tip that produces a pencil point flame.

Now that the tubes are soldered into place on the center part of the case, the binding wire can be removed. Then place the back of the case in its proper position on the center of the case and make a mark on the cover at the end of each tube. These marks show where the tube for the cover must be located when it is soldered into place on the cover. Now remove the cover and grasp it with soldering tweezers. Dip the cover into the powdered boric acid and alcohol anti-oxidizer solution. Next, burn this off with a flame. Position the tube between the marks made previously. Use binding wire to keep the tube in position for soldering as shown in Figure 6. Next apply the flux where the tube contacts the cover. Then place the solder into position on the tube next to where the tube contacts the cover. See View A in Figure 6. Now take the torch and heat the cover just under the tube until the solder melts and flows in position between the tube and the cover. See View B in Figure 6. As soon as the solder flows in where it belongs, remove the torch at once

to avoid overheating and bubbling the solder. The case now needs to be pickled to remove any scale or discoloration caused by the heat. Sometimes this scale can be removed by brushing the article with a soft wire wheel brush on a taper spindle in the lathe. Also, if the article is dipped into water quickly after the solder has flowed, the scale will be removed.

After the case has been cleaned, the back is snapped on and a joint broach is inserted through the tubes from right to left (facing the back). Then the tubes are broached out to receive a joint pin which will complete the hinge on the case. This is shown in Figure 7. If a good job has been done on the design and construction of the hinge, the back of the case will open only to 90 degrees from its closed position as shown in Figure 8.

Another common watch case repair job is the repair of worn lugs on ladies' watch cases. Figure 9 shows such a worn lug in need of repair. First the part of the lug that joins the case is removed by using a torch to heat the spot where the lug joins the case. Now the remainder of the lug is bent



Figure 7



Figure 8



Figure 9

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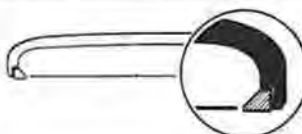
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and filed to receive a piece of tube the same quality as the case. This is shown in Figures 10 and 11.

To solder in the tube, the case is first dipped into the borax and alcohol which is then burned off. Place the tube into position and apply the flux and solder at points A in Figure 11. Then heat with the torch at points B in Figure 11 until the solder melts and flows to the proper place between the tube and the case. Remove the torch flame as soon as the solder flows. Note: The torch tip and flame need to be small for this job because this case doesn't require as much heat as the larger case repaired previously.

Any excess metal at points A in Figure 11 can be removed with a file and emery sticks. Then the case can be pickled if need be. The hole in the tube can be cleaned with a broach so the hole will be smooth.

This is not the only method that can be used to do watch case repairs, but it is a method that has proven successful.

To become proficient in hard soldering and watch case repair, the watchmaker who has not been previously trained should do some soldering exercises on brass sheet and brass wire before attempting soldering on watch cases. To practice hinge work, take a small block of brass and cut a groove in one corner with the joint file. Then select a piece of brass wire that fits this groove. Now practice the hard soldering technique on this. To practice the technique used to replace worn lugs on a lady's watch case, practice hard soldering a brass wire or tube on top of a block of brass. As your technique improves, practice can continue on an old, damaged inexpensive watch case. Do not attempt to repair an expensive watch case until you are very comfortable with the procedure.

Next month buffing and polishing of watch cases will be discussed as well as fitting watch crystals. □



Figure 10



Figure 11



Figure 12

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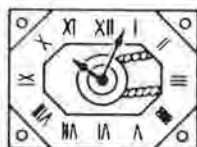
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Essence of Clock Repair[©] 1979

by Sean C. "Pat" Monk

CMW

Part LII



Crown-Verge Mantel Clock With Alarm

Our particular clock is of the 30-hour mantel variety, manufactured by Joseph Stadl of Schemnitz. No date is recorded for this clock, but its antiquity is without dispute as it happens to be of the verge, or crown wheel escapement variety. Moreover, the alarm side of the clock, with a separate small mainspring, is also constructed with a verge for alarm release.

In our diagrammatic sketch (Figure 1) which purports to show the time train only, it will be noted that the enclosed mainspring drives the center wheel (shown out of center so that we can more clearly designate the contrate wheel and the verge). The center wheel carries the cannon pinion which can be seen tensioned by its tension spring (S) and by the minute hand securing pin. The cannon pinion is meshed in the usual manner with the minute wheel as seen in Figure 2, and the minute wheel pinion is meshed with the hour wheel.

First we will examine the alarm mechanism. Attached to the hour wheel is an hour wheel cam (P) or alarm cam. This is frictioned to the hour wheel by a large brass tension washer. Cut into the cam itself is a recessed wedge-shaped slot which is visible in Figure 2 at approximately the 12 o'clock position. Also in Figure 2 may be observed an alarm hook set to the middle right in the photo. The toe of this hook is also represented in Figure 1 as "O." This hook normally resides on the periphery of the hour wheel cam (alarm cam). However, as the hour wheel rotates with the cam, it reaches a point where the toe of the hook falls into the recessed slot. When this occurs, the arbor of the hook also turns allowing a brass locking lever (Y in Figure 3) to fall. This locking lever, which is normally in the "up" position, locks against a brass pin on the alarm crown verge (W in Figure 3). However, when the locking lever falls, the verge pin is freed and allows the crown verge to rotate. This frees the alarm mechanism. The latter, as mentioned, is powered by a separate small alarm spring (V in Figure 3) separately wound from the front. The alarm train continues freely until either its spring is run down, or the alarm setting on the dial is moved. The alarm spring duration, when allowed to run free, is approximately two minutes. The alarm setting, over the hour wheel, can only be reset by repositioning the cam, referred to as the hour wheel cam (P) in Figure 1. The alarm setting dial (which is removed in the photo, but which normally is screwed onto the cam) is graduated from 1-12 and can be preset for correct alarming by rotating it manually until the 12 o'clock setting lines up

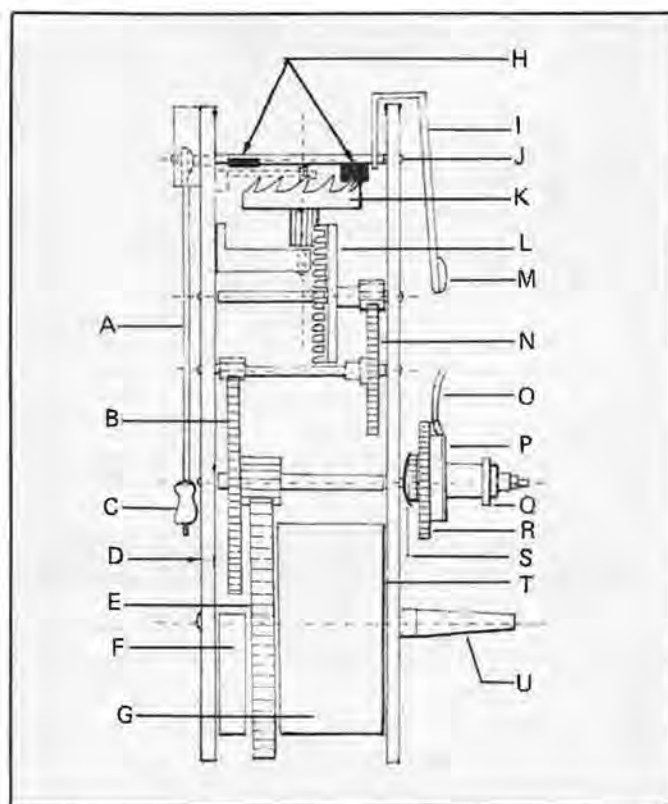


Figure 1. Diagrammatic Sketch: Going Train of Verge Escapement

- | | | | |
|---|---------------------|---|------------------------|
| A | Pendulum Rod | L | Contrate Wheel |
| B | 2nd Wheel | M | Counterpoise |
| C | Pendulum Bob | N | 3rd Wheel |
| D | Rear Plate | O | Alarm Hook |
| E | Mainwheel | P | Hour Wheel Cam |
| F | Ratchet Cover | Q | Alarm Dial Collar |
| G | Mainspring Cover | R | Hour Wheel |
| H | Pallets, or Pads | S | Cannon Pinion |
| I | Counterpoise Arm | T | Tension Spring |
| J | Pallet Arbor | U | Mainspring |
| K | Verge (Crown Wheel) | | Going Train Wind Arbor |

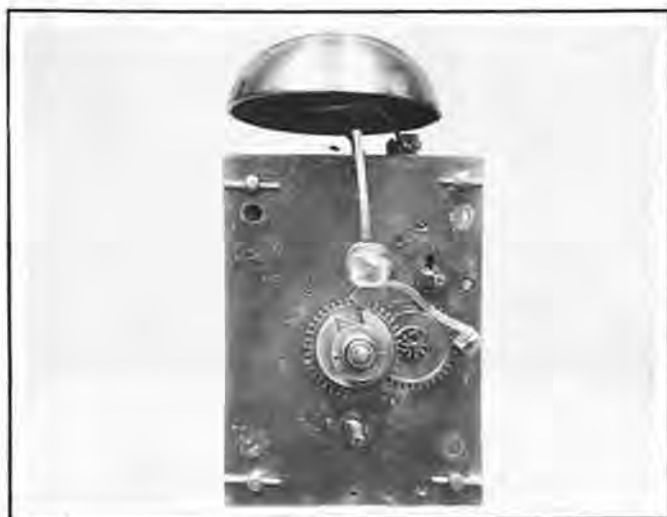


Figure 2

with the prescribed hour or time on the dial proper of the clock.

As mentioned, the freed wheel in the alarm train is the crown verge wheel, the teeth of which engage with a pair of steel pads. The latter are mounted vertically on the rear clock plate. Their action, when the verge is freed, is to oscillate back and forth causing a hammer on the arbor to strike against a bell mounted on the top of the rear plate. This bell can be observed in all photos.

Next we will examine the going (time) train. The verge, or crown wheel, represents the escape wheel in most clocks. It may be observed that the teeth of this wheel are long and set well apart which is quite common in these old clocks of European origin. Also, it may be observed that the verge has an odd number of teeth (fifteen in our model). If this were not the case, the verge could not pass the pallets. The position of the pallets must be such that when one pallet is in contact with a verge tooth, the other pallet is positioned between two teeth. The pallets are mounted transversely on their arbor at a 90-degree angle to one another. (See H in Figure 1.) The pendulum is mounted on the pallet arbor (J) and through the rear plate. The pendulum rod (A) is quite short and carries a small adjustable bob (C) for timing. A counterpoise weight (M) is carried on an arm (I) which is set

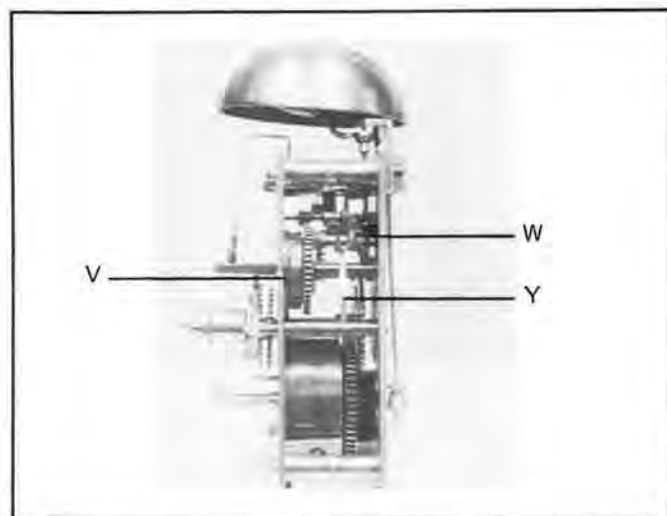


Figure 3

(Continued on page 59)

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AMERICAN WATCHMAKERS INSTITUTE

Highlights of AWI's First 6-Day Course for the Repair of Solid State Watches

The first AWI residence course for the repair of solid state watches was enthusiastically received by the nineteen watchmakers who attended this six-day program. The course, held in Cincinnati, Ohio, attracted watchmakers from as far away as Arizona, Texas and Florida, as well as from a number of surrounding states.

The six-day course was designed for the beginner in solid state watch repair. The course began with an introduction to basic electrical principles, and provided practical instruction and experience in the use of the multimeter as applied to watch repair. Once this skill was mastered, the class focused its attention on the techniques involved in the servicing of the very popular step motor watches. The entire group then handled, examined, and became familiar with the basic components used in solid state watches, learning the function and characteristics of each of the components. Then, as each student completed the assembly of a quality LCD solid state watch, some were required to diagnose and correct malfunctions in their particular module. Once all the watches were functioning

and properly timed, each participant cased the watch and proudly wore it as his own. The class turned its attention to multi-function watches employing the LCD display. The technology used in the design of these watches as well as proper repair techniques were covered in detail.

The final two days of the course were devoted to the use of Zantech equipment especially designed for solid state watch repair. This equipment was used to analyze and isolate problems in various solid state modules. Once the problems were determined, the participants set about making the necessary repairs. The group learned to repair breaks in circuits, replace defective crystals, and repair or replace defective LED and LCD displays. Participants learned the techniques of soldering and unsoldering various solid state components.

Instruction for the six-day workshop was provided by:

Gerald Jaeger—Basic electricity and the use of multimeters.

Les Smith—Principles and repair techniques for step-motor and multi-function LCD watches.

Robert Nelson—Basic components and



Milt Stevens



Bob Nelson

their use and function in solid state watches.

Louis Zanoni—Use of Zantech equipment in the repair of solid state watches.
James Broughton—Facilitator

ANOTHER COURSE PLANNED FOR EARLY 1980

AWI has tentatively scheduled the second six-day solid state course to be held early in February, 1980. It will be held in Orlando, Florida.

Registration will again be limited to twenty. Preference will be given to those who were placed on the standby list from the first course. Members interested in receiving complete details on the February course should address an enquiry to Residence Course, AWI Central, 3700 Harrison Ave., Cincinnati, OH 45211.

Jerry Jaeger

Les Smith



The group listens intently as Lou Zanoni discusses how to isolate a malfunction in solid state watches, then proceeds to discuss the various methods of repair.

Dates To Remember

November

- 3—Watchmakers Association of New Jersey; 40th Anniversary Dinner Dance; Big Stash's; Linden, New Jersey.
- 4—Massachusetts Watchmakers Association, Inc. Annual Ladies Night and Dinner Dance; Alphonse's Powder Mill; Maynard, Massachusetts.
- 4—AWI Bench Course; Kansas City, MO.
- 4—AWI Bench Course; Alexandria, VA.
- 4—AWI Bench Course; Abilene, TX.
- 4—AWI Bench Course; North Carolina.
- 12—Golden Circle Club Meeting; The Warwick Hotel; New York, New York.
- 16-18—International Gem and Jewelry Show; Market Hall; Dallas, Texas.
- 17-18—Mineralogical Society of Southern California 32nd Annual Gem and Mineral Show; Pasadena Center; Pasadena, California.
- 23-25—16th Gem, Mineral, and Jewelry Show; Statler Hilton; New York, New York.

December

- 10—Golden Circle Club Meeting; The Warwick Hotel; New York, New York.

January

- 20—Watchmakers Association of Ohio; Seminar; Best Western Motel; Springfield, Ohio.

20—AWI Bench Course; Springfield, Ohio.

27—Watchmakers Association of Ohio; Quarterly meeting; Marriott Inn; Columbus, Ohio.

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THE SHIP'S CHRONOMETER © 1979

by Marvin E. Whitney
CMC CMW

Navigating (Chronometer) Watch

The various classes of U.S. Navy ships were allotted a certain number of navigational timepieces. Aircraft carriers, battle-ships and heavy cruisers received three ship's chronometers, two or three gimballed navigating watches and three or four non-gimballed navigating watches. Fighting ships (destroyers, through submarines) were allotted one or more chronometers and one or more chronometer watches. Seagoing ships such as supply and repair ships, hospital ships and tenders, and non-seagoing ships such as PT boats, LST's and yard craft were provided with gimballed and/or non-gimballed chronometer watches and, in some instances, a chronometer. Therefore, in many cases, the navigator aboard ship depended solely on a chronometer watch to obtain the Greenwich civil time needed in determining the ship's position from the observation of celestial bodies. Since the accuracy of the navigator's work depended largely upon the accuracy of these watches, they were treated with the same respect and care as a ship's chronometer.

The chronometer watch retained its importance even on ships that carried chronometers, because the larger instrument was not moved about the ship and it was often necessary for the navigator to take observations from various positions on deck. Shortly before taking the observation, the navigator compared his watch with the ship's chronometer. After noting the error, the navigator could go anywhere on the deck to take his observation.

Years ago, in several foreign navies, what the U.S. Navy referred to as a chronometer watch was known as an "assistant" watch or a "compteur." British regulations stated that the practice of taking a ship's chronometer on deck or ashore for the purpose of observations was not allowable: a pocket chronometer or a good pocket watch with a second hand should on these occasions be used as an "assistant." The regulation stated further that the assistant watch should be kept in a small box which, when carried ashore or on deck for the purpose of an observation, should be maintained in a horizontal position and always be carried by hand.

The French naval service regulations stated that every vessel carrying a ship's chronometer should be fur-

nished with a "compteur" for the purpose of comparison. It defined a compteur as a small chronometer fitted in a wooden box without any gimballed suspension and used for "taking sights."

The Navy earlier classified their navigating watches as mounted chronometer watches since they were mounted in chronometer-type gimbals and chronometer watches. In 1948, the Navy changed the terminology and referred to them as Gimballed and Non-gimballed Navigating Watches. See Figure 1. Shortly thereafter, the non-gimballed chronometer watches were withdrawn from service and no longer issued.

The mounted and chronometer watches purchased by the Bureau of Ships for the U.S. Navy had a serial number preceded by an encircled "N" engraved on the bottom or the back of the case. Those purchased by the U.S. Army Transportation Corp had "U.S. Army" engraved on the back and a serial number (actually the movement number—easily discernible because of the prefix i.e., 2F...) engraved on the bottom or back of the case. The Army purchased 500 by contract from Hamilton and also a number from the Bureau of Ships. Those purchased from the Bureau of Ships had the words "Bureau of Ships" and "U.S. Navy" milled off and "U.S. Army" was then engraved on the back.

During World War I and up until World War II, navigating watches were supplied to the U.S. Navy by a number of different watch companies. Most of the mounted movements were made by Elgin, Hamilton, Longines, Waltham and Zenith and in the earlier part of World War II, until Hamilton got into production with their newly designed model 22 movement, many of these same older watches served us well. Elgin used their 16 size lever set 21-jewel free sprung Father Time movement. The Longines movement was their 21/29 model. The Waltham box chronometer was basically their 7-jewel, 8-day automobile and desk clock up-jeweled to 15 and fitted with a larger bi-metallic balance, a winding indicator and decorative top bridges. The Zenith movement was manufactured by the Vail Watch Company. It was basically a 27 ligne, 8-day, 6-jewel, two barrel automobile clock with an up and down winding indicator which



Figure 1. Hamilton Gimballed & Non-gimballed Chronometer Watches in their Respective Mounting Boxes



Figure 3. Hamilton 35 size Non-gimballed Chronometer Watch, Model 22. Same movement used in the Gimballed model. Note Safety Setting Push Pin in Case just to the Right of the Movement Number.

was up-jeweled to 15-jewels to meet U.S. Navy specifications. All of the above movements were mounted in brass bowls and swung in gimbals.

Hamilton designed and made a completely new model (should not be confused with their model 22). It was a 36 size, 21-jewel motor barrel movement with a winding indicator and beautifully finished plates. See Figure 2. It was fitted in a chrome bowl and swung in gimbals. It was wound by a key which was inserted through a hole (covered with a dust shield) in the bottom of the bowl just as one would wind a standard 56-hour ship's chronometer.

Many 18 size watch movements were bought up and fitted in brass gimballed cases. Although they are mounted in gimbals, they are easily distinguishable as they do not have a winding indicator.

The unmounted (later known as non-gimballed) navigating watches were mostly foreign made. Many of them were known on the Continent as pocket chronometers since they were fitted with a chronometer-type escapement. Some were fitted with the regular spring or Earnshaw type of detent while the others were fitted with a pivoted detent. Most of them were fitted in sterling silver cases. These movements were made by a myriad of makers, notably Ditisheim, Hornby, Le Roy, Longines, Nardin, and Roskell.

When the clouds of World War II were forming on the horizon and we were rapidly expanding the size of our



Figure 2. Hamilton 36 size Gimballed Chronometer Watch

Navy, the need for navigating watches was just as great as the need for ships' chronometers. Again, Hamilton rose to the occasion and, as in the case of their masterpiece, the Ship's Chronometer, designed and mass-produced a navigating watch (model 22) whose performance was unsurpassed.

This 35 size, high-quality, 21-jeweled movement is an instrument of great beauty, precision, and endurance. See Figure 3. Anyone owning one of these fine timepieces has every reason to be proud of this possession. As we reflect back on the sudden need for navigational timepieces, we can be equally proud of Hamilton; their engineers, scientists and watchmakers who created and mass-produced not only a superb ship's chronometer—a notable human achievement and technical triumph—but a navigational watch which performed equally well.

Following is a delivery schedule of the first Hamilton Chronometer Watches.

HAMILTON GIMBALED CHRONOMETER WATCHES

Quantity	Unit Price	Year*
2,864	\$92.33	1941
5,667	92.00	1942
2,000	82.50	1942
3,000	82.50	1942
13,531		

The first delivery of two units was received June 13, 1942 with a second delivery of ten units being made on July 25, 1942.

HAMILTON NON-GIMBALED CHRONOMETER WATCHES

Quantity	Unit Price	Year*
2,627	\$73.90	1941
5,153	65.15	1942
2,000	56.50	1942
9,780		

The original delivery of thirty units was received June 7, 1942 with a second delivery of fifteen units being made on July 11, 1942.

* The year engraved on the bottom or back of the case is the date the contract was let.

(Continued on page 57)

THE ROCK QUARRY



Basic Gemology for the Repair Shop



by Fred S. Burckhardt

A Bad Connection

This is the age of specialization. Just think about it for a minute. Everybody specializes in something. Take dentists for example. One specializes in filling teeth; another specializes in pulling teeth. If your teeth are okay but your gums have to come out, another specialist will take care of that. Physicians are the same way, with specialists for every part of the body. Even grocery stores have specialists. The store where we do our shopping has one specialist for bulk sauerkraut and another for packaged sauerkraut. Auto mechanics also specialize. Once I had to go to six different shops before I could find a specialist. And that was just for a new radiator cap!

Specializing is a lucrative occupation and there's no worry about having enough work to do. Others will refer customers to you and you'll have plenty of work, whether you want it or not. However, true specialization is an area in which those of us in the jewelry business have missed out. We do specialize to a certain extent: watchmakers, jewelry repairpersons, stone setters, engravers, etc. But these are really only semi-specialties. I'll tell you what I mean by a specialist. I've given a lot of thought to this and have gone to great expense gathering information about one particular specialty. I'm talking about a JUMP RING SPECIALIST. This is a wide open field. My extensive research has proven that not one specialist is to be found in this profession. This in itself is rather surprising because there awaits a tremendous opportunity for those willing to take advantage of it. All that is needed are some pliers and a few good connections. (Jump ring—connection?)

Now don't go selling all your watchmaking equipment and tools right away because proper training in this specialty shouldn't be overlooked. Just because you are a watchmaker, jeweler, or whatever doesn't mean you can become a jump ring specialist overnight. It takes many months of intensive training to learn how to close and open jump rings properly. If you can sacrifice the time and are able to stand up under the rigorous training that is necessary, you'll stand a good chance of making a go of it.

Jump rings aren't an overnight fad like sun dials or clepsydras. Recently I saw a picture of a ring and bracelet combination from Persia, dating back to 1000 B.C. (I wonder

if this means before Ballou and Cobb?) The rings and bracelet were joined with jump rings BUT three rings were missing—sure proof that either a sloppy job was done attaching the jump rings or the jump rings were of inferior quality. As any good customer will tell you, "They should have lasted longer than that."

Which brings us to the question of why there are no square jump rings. Another untapped market with virtually unlimited possibilities exists in this area of our industry. Just the other day I heard one of the jewelers in the shop say, "Golly gee, I wish I had a square jump ring." Right this minute there are probably thousands of customers all over the country searching for a store that carries square jump rings. Or should they be called "Jump squares?"

Some of you may be wondering why I am so fond of jump rings, so I'll tell you. The first job I ever had in this business was as an errand boy. One day the boss told me I was getting promoted to a bench. At the time this was a big deal, but if I had known what was coming, I would have turned it down and instead would have become a professional errand boy. Anyway, my boss at that time was so tight he wore leather heels on his shoes because rubber gave a little. He didn't believe in buying jump rings. Instead, he gave me a chunk of silver and told me to make some. It was an easy job; roll the metal, pull it through the draw plate, wrap the wire around a steel rod held in a lathe and then saw through the wire. No sweat! Did you ever try to saw through what looked like a very small screen door spring about three feet long? My fingers stayed bloody for about a month. I can still see some scars where the saw blades tore into these hands of a surgeon. They say an artist must experience some pain and suffering before he becomes great—like that guy who cut off his ear. Up until that time he was nothing. After removing his ear he became somebody—a hard-of-hearing artist!

Now you know why I'm so enthused about my new specialty. I already have the proper training and know-how. The rest is easy: Just open the door and watch the customers rush in. If you have any jump ring customers you can't handle, send them to me. In the meantime, I'll start rolling out some metal! □

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A Zodiacal Clock



The Zodiac, that imaginary animated belt which stretches across the heavens in an arc 16 degrees wide, contains the paths of the sun, moon, planets and the twelve signs of the zodiac, i.e., the constellations beginning with Aries the ram, and ending with Pisces, the fishes. It is not surprising that horologists became interested in constructing clockwork mechanisms that would activate the revolutions of these ancient heavenly signs in miniature. The celebrated clock-maker Francois Ducommun of Chaux-de-fonds made the zodiacal clock depicted here in 1797. The tower-like case, 1 ft. 3½ in. high, is made and ornamented in the ormolu style and the signs of the zodiac are mounted on a ring on the battlement which is rotated by the clockwork. The brightly colored enamels which depict the twelve animated forms demonstrate very fine artwork and craftsmanship. The sun, as the major body of the zodiacal belt, is given a place of honor atop the tower. Next to it is the earth with a scale for showing the age of the moon. There is also a four-year calendar operated by the clock mechanism. This wonder clock of the zodiac was sold a few years ago and brought £ 2,100.

HOW TO MEASURE FOR AND MAKE A BARREL COVER

Although this is not an everyday job, from time to time the person at the bench will find it necessary to make a barrel cover. When reassembling a newly repaired and cleaned watch, how often does it happen that the cover on the barrel will not hold tight? It is true that a barrel contractor often does the trick, but in many instances even results thus obtained are not satisfactory and the only alternative is a new cover.

Before beginning work on this cover, inspect the recess in the barrel to make sure it is in good condition. Most likely you will find it rough or worn, which, of course, must be corrected first. This can be done by cementing the barrel on a cement chuck with the recess for the cover facing out. Care must be exercised to get same to run true in the round and flat. Good results can be obtained for this operation by holding a pointed peg wood in the hole for the arbor and on the tee rest. With the lathe running at a fairly good rate of speed, it is then an easy matter to recut the old recess with a graver, tapering slightly inward to insure a snap fit. The cover is then made to fit this new recess.

In measuring for this cover, refer to the accompanying drawing. The first dimension that is needed is the total outside thickness of the barrel or measurement A.



Next we must have the thickness of the lower boss and the barrel arbor, or B plus C respectively. A minus B plus C will give us D, or the upper bearing. The depth of the recess is then measured for the E dimension, and this subtracted from D will give us F, or the height of the boss. To give the barrel arbor endshake, deduct about .03 mm from the height of the boss.

Now that these calculations have been made, we can proceed with the work. Rough out a brass disk large enough

(Continued on page 56)

News In The Trade

1980: A Year of Consolidation for Basle's European Watch, Clock, and Jewelry Fair

After seven consecutive years of fast-paced development, the European Watch, Clock and Jewelry Fair will not be adding more floorspace or announcing a new surge of exhibitors for the 1980 show. After all, even the best organized and managed exhibition needs an occasional breathing spell; time to get its bearings and plan ahead.

From 1973 to 1979, the Fair expanded in size from 42,000 to 70,000 square meters while its exhibitors increased in number from 712 to no less than 1,430—a rise of over 100%.

This pause, decided upon just after the close of the 1979 Fair which marked the end of a major development program, is also justified by the fact that practically everyone who is anyone in the European watch, clock, jewelry, and allied industries has now been accommodated. Seventeen countries are currently represented at the Fair. As of early September 1979, over 95% of all exhibitors had already confirmed their booth reservations for next year's Fair. The remaining 5% are expected to follow shortly. There could be no better vote of confidence in and satisfaction with the European Watch, Clock and Jewelry Fair.

During the early years of the Fair, numerical superiority clearly belonged to watch manufacturers; a reflection of the Fair's Swiss origins, perhaps, or of its situation at the crossroads of the continent's watch industries. Today, however, manufacturing jewelers are definitely the majority and though their booths collectively do not cover as much floorspace as the watchmakers' their exhibits are at least as dazzling.

1980 is a milestone year for the Swiss watch industry: the 50th anniversary of its first, organized collective presence at the Basle Fair. Gathering every spring in Basle, Swiss watch manufacturers developed the continent-wide consciousness and world vision which paved the way for what is today the largest and most powerful international springboard promoting the wares and services provided by Europe's watch, clock and jewelry industries.



A DIGITAL WATCH REPAIR COMPANY IS BORN

The Great American Time Company, Inc., (GATCO) says "It's about time." Digital watch owners have gone too long without being afforded the opportunity to obtain service for their electronic timepieces, according to Barry Hayman, founder and president of GATCO.

GATCO's expertise lies in the repairing of the LED/LCD modules which is not only practical but highly cost effective to the digital watch owner.

Currently they are serving a large number of department and jewelry store chains along with the individual watch owner, as well as being the national service center for Windert Watch Company. They are constantly exploring new ways in which to serve the digital watch owner and retailer.

The Great American Time Company resides at 978 "A" Elm Street in Orange, California. Management of this newly formed company consists of: Barry Hayman, President, in charge of operations; Richard Waldman, Vice

President, in charge of marketing; Linda Armstrong, administrator.

Businesses interested in GATCO's digital watch repair service should contact the company direct. (714) 633-5792.

SEIKO EXPANDS QUARTZ TECHNICAL SEMINARS FOR WATCHMAKERS

Seiko Time Corporation has intensified its highly successful program of technical seminars for watchmakers throughout the United States.

The unique seminar presentation entitled, "The Digital Explosion" is given by Jack Schecter, Seiko's manager of technical services. Utilizing audio-visuals, Schecter traces the evolution of timekeeping through the ages and highlights the development of quartz, particularly LC Digital quartz watches. An educational film on Seiko quartz and a discussion on servicing quartz watches provide in-depth perspectives on the state of quartz technology today and the future possibilities of the industry.

Seiko's Fall seminar program began on Sept. 11 at the Watchmakers Association of Massachusetts conclave in Cambridge; and on Sept. 15 at the New York State Watchmakers Association Annual Convention in Syracuse.

Seiko's upcoming technical seminars this Fall include: Sept. 29-30 at the Minnesota Watchmakers Association Annual Convention, St. Paul; Oct. 18 at the Central California Watchmakers Guild, Fresno; Oct. 21 at the Bay City Watchmakers Guild, San Francisco; and Oct. 27-28 at the Florida State Watchmakers Association Annual Convention, Daytona Beach.

Seiko has long been a pacesetter in developing seminar and workbench programs to continually expand the knowledge and expertise of watchmakers. These courses span all aspects of watch technology, maintenance and repair and have been instrumental in constantly updating watchmakers on new

advances. The company is now scheduling the heaviest calendar of technical seminars in its history for the next 12 months.

SWISS POLICY OF ESTABLISHING WORLD WATCH RECORDS EXPLAINED

In the field of quartz watch movements, the ASUAG group this year has put three products on the market which, at the time of introduction, established world records. The products are:

1. The thinnest quartz analogue watch in the world measuring only 1.98 mm. (In addition there is a collector's model at less than 1.5 mm.)
2. The thinnest liquid crystal display (LCD) watch in the world with a total thickness of less than two millimeters.
3. The smallest quartz analogue movement in the world which measures only 10.5 mm in diameter with a total volume of 215 cubic millimeters.

These three advanced products are the result of close collaboration by four of the major technological companies within the ASUAG group: Ebauches SA and its three main factories; Ebauches Electroniques SA at Marin, ETA SA at Grenchen and Fabrique d'Horlogerie de Fontainemelon (FHF).

Mr. Andre Beyner, deputy general manager of Ebauches SA, recently explained to journalists in Switzerland the reasons behind setting these world records.

"Records are not just accidental spin-offs from the work of technologists. Neither are they developed and produced at the whim of researchers. They fulfill precise objectives and form an integral part of the overall strategy of ASUAG."

Three major aims have been set by ASUAG through the development of these products. The company aims to:

1. Make a place for itself in the forefront of electronic timekeeping and these records bear witness to the complete mastery of all the modern technologies in the field.
2. Benefit from the effects of the positive image achieved through these records on the premise that, in Mr. Beyner's words, "If you can master the big things, the little ones look like chicken feed."
3. Allow other products of the group to gain from the technical expertise gained in developing these innovations, permitting the creation of new materials and new manufacturing processes that allow the



Seiko Los Angeles Office Employees. (See story below.)

qualities of the components to be optimised.

Mr. Beyner cited Formula One motor racing as an analogy, along with the space programs. "The lessons learned in racing or in space find their way into useful applications in everyday life in the form of more advanced consumer products. The same applies to advanced watch technology."

RJA EXPANDS SCHOLARSHIP PROGRAM FOR 1980

Retail Jewelers of America (RJA) has announced new plans for its Third Annual Scholarship Program through which 165 Gemological Institute of America (GIA) scholarships will be offered to employees of RJA's member stores.

The program, initiated in 1978, has now been expanded, according to RJA Chairman Michael D. Roman. "Up until now," Roman comments, "Our scholarship program included only the Diamond Correspondence Course. However, in our effort to encourage ongoing education for members' employees, we are now adding to this program GIA's Correspondence Courses in Colored Stones and Gemstone Identification."

RJA's Education Committee Chairman Ray Goodman (Goodman Jewelers, Indianapolis, Indiana) explained, "An applicant may begin with either the Colored Stones or the Diamond Course. He must, however, have completed both of these in order to qualify for a scholarship for the Gemstone Identification Course. Thus, in addition to expanding the scope of our program,

we will be encouraging and giving additional educational opportunities to previous scholarship winners. RJA feels this will encourage and enable members' employees to continually upgrade their knowledge and thereby increase their productivity to the store operation."

"The reaction to our program has been overwhelming," concludes Roman. "It proves we are filling a widespread need of retailers for an ongoing specialized educational program. RJA's goal is to help its members develop professionalism, pride, and profits in their store operations. Education of employees plays an important role in this goal."

Scholarship distributions will be tied to membership totals within each of RJA's state associations. All requests for applications must be sent from each store to RJA, 1271 Avenue of the Americas, New York, NY 10020. Deadline for completed applications is May 1, 1980.

FIVE YEAR SERVICE AWARDS PRESENTED TO SEIKO LOS ANGELES OFFICE EMPLOYEES

Herb Pagel, (right) general manager of Seiko Time Corporation's Western Regional Distribution Center located in El Segundo, presented lovely Seiko quartz clocks to five employees who have each completed five years of service with the company. They are (left to right) Danny Kawakmi, Hyman Ackereisen, Ted Nojima, Glenn Rebollo and Jean Paramo. The presentations were made at special ceremonies held at the Tower Restaurant in Los Angeles. □

Book Review

by Henry B. Fried

Dixie Clockmakers by James W. Gibbs. 191 pages, 59 figures, 11x8½ in., hard covers with dust jacket. Published by Pelican Publishing Co., June 1979 at \$19.95.

When we read of American clockmakers, we naturally think of the horological industry of New England. We are also aware of Pennsylvania's Dutch, Swiss, and English clock and watchmakers which were recently highlighted by the excellent exhibition of Lancastrian clocks and watches at the National Association of Watch and Clockmakers Museum at Columbia, Pennsylvania. Clocks of New York, New Jersey, Ohio and Vermont have been previously featured.

Few of us have ever given much thought to clocks or watches made below the Mason-Dixon Line, as it is called in the Anglo-American Encyclopedia. This East-West line was run by two English engineers, Charles Mason and Jeremiah Dixon, between 1764 and 1767 for the purpose of settling the disputed boundary between Maryland on one side and Delaware and Pennsylvania on the other. This line was later popularly regarded as dividing the slave holding from non-slave states.

In this new, impressive addition to the library of American horological literature, James W. Gibbs, an important author, has chronicled and recorded the products of clock and watchmakers who worked mainly in Delaware, Virginia, Maryland, North and South Carolina and the nation's capitol city. This is the first in-depth study of clocks from that area. However, the book also covers the horological products of eight other southern states. A list provided in the book includes every known clock and watchmaker in the South through two centuries. It also lists nomenclature used at the time and provides illustrations and contemporary advertisements of individual watch and clockmakers and watch papers.

James W. Gibbs is an experienced researcher and author of four other books on regional watch and clockmakers. He is also a past president of the National Association of Watch and Clock Collectors, a trustee of the American Clock and Watch Museum at Bristol, Connecticut, and a frequent

contributor to various horological publications.

Mr. Gibbs provides his readers with seven chapters, special appendixes for notes to each chapter (instead of footnotes to each page), a bibliography, and a fine index of makers which occupies nine pages and includes about seven hundred names.

Each chapter concerns the horological products of one state or area. Thus, Chapter 1 is about Delaware's clock and watchmakers, dating from the late seventeenth century. Gibbs cites

of Virginia and to Willard's friendship with Thomas Jefferson. Jefferson's detailed instructions for the making of the clock are included, thus revealing the author of the American Constitution as most interested in timepieces and possibly profiting in this area from his visits with France's Breguet.

Like many books on regional clockmakers, this one is spiced with numerous anecdotes on clockmakers and their families, their peculiar histories, fortunes and inventories. Several examples of advertising materials are

"In this new, impressive addition to the library of American horological literature, James W. Gibbs, an important author, has chronicled and recorded the products of clock and watchmakers who worked mainly in Delaware, Virginia, Maryland, North and South Carolina, and the nation's capitol city."

Jonas Alrichs as one of the first in a family of clockmakers. Jonas was born in 1759. Others in his family were Jacob, Joseph, Henry and William. Others, like Chandlee, though originally from Pennsylvania and the North, settled in southern states.

Maryland's references include mention of Anna Maria LeRoy Atkinson as a watch and clockmaker along with her sons and great granddaughter. Many members of the Faris family are listed, as is Benjamin Banneker, the famous Baltimore Negro mathematician and scientist, who also is credited with building a clock.

Other chapters deal with products of the District of Columbia, Virginia, North and South Carolina. In the last formal chapter, "The Balance of Dixieland," Mr. Gibbs covers the makers from Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, Tennessee and West Virginia.

Much attention is given to the Simon Willard clock at the University

included as are occasional accounts of wages, costs and incidental expenses.

Photographs of clocks, watches, and watch papers are included and show exquisitely beautiful cabinetry, dials and hands. Movements, when illustrated, show those made of wood as well as brass, and all are of very superior workmanship.

The famous and much sought after J.P. Stevens watch is discussed, and shown is a rare, Kentucky marine chronometer made just prior to the Civil War.

Late manufacture in West Virginia includes the "No-Key Clock Company" product. This is an electrical, battery-driven mantle clock made in the early 1900's for which patent payment was made with a coal mine.

This is a scholarly work by an experienced researcher and author made available in a beautifully bound edition. As such, it is an important addition to the history of American watch and clockmaking. □

New Products

Universal Geneve Simultaneously Introduces a New Quartz Movement and a New Collection of Extra-Slim Quartz Watches

Universal Geneve has just brought to market a new quartz movement called Caliber 43. Designed and built entirely in its own facilities, the result of a year-long research and development program, the new movement embodies the finest Universal Geneve traditions. Its total thickness does not exceed 2.30 mm. This impressive slimness is the key to the company's extra-slim quartz models which today join its line fitted with either a self-winding mechanical movement (Caliber 66:2.50 mm) or a hand-wound movement (Caliber 42:2.45 mm).

Caliber 43's major technical specifications are as follows:

Time Display: Analog, hours and minutes.
Driving system: Stepping motor, 1 impulse every 10 seconds.

Quartz resonator: Miniature tuning-fork type, 32,768 Hertz.

Jewels: 8.

Casing diameter: 19.40 mm (equivalent to 8 3/4 lines).

Movement height: 2.30 mm.

Power reserve: Over two years with a standard battery.

Its compact dimensions allow it to be used in both ladies' and men's models—a definite advantage for both after-sales servicing operations and rationally streamlined production.

What's more, Universal Geneve is capitalizing on its technological expertise to demonstrate its mastery of contemporary styling. While the company's experts were still putting the finishing touches on Caliber 43, stylists were already designing 30 new ladies' and men's models around it—in 18K gold, in steel and in gold plate. All are, of course, extra-slim styles and most watch-cases feature the "Triple Seal" water-protection system introduced by Universal Geneve at the 1979 Basle Fair. These new models are now available.

A special release will shortly be providing full details on the new Universal Geneve quartz collection.



Caliber 43, Universal Geneve's new quartz movement demonstrating remarkable slimness (only 2.30 mm), is designed for use in both ladies' and men's extra-slim watches.

The Gould Company Offers New, Free Clock Supply Catalog

The Gould Company, national wholesaler of jewelry, watch/clock material, tools, equipment and supplies based in Dallas, Texas, proudly announces a brand new clock supply catalog free for the asking. The catalog is called "Gould's Clock Catalog No. 079."

"This handy book is not just for the serious clock repair persons, but for *everyone* to use as a quick reference guide to clock supply items," stated Kenneth Weil, Gould Company President. Mr. Weil explained that Gould's Catalog No. 079 includes such popular items as keys, hands, glasses, mainsprings, motors and movements.

Call Toll Free for your complimentary copy. Call Nationwide: 800-527-4722; Texas: 800-492-4104, or write The Gould Company, 13750 Neutron Rd., Dallas, Texas 75234.



GT005M

Seiko Introduces New LC Digital Quartz World Timer-Alarm Watch

Seiko has begun marketing a new LC Digital Quartz World Timer-Alarm watch which instantly pinpoints the exact time in major cities around the world.

This extraordinary watch features an alarm which can be set for any time in any of 28 time zones, and a Perpetual Calendar mode pre-programmed through the year 2009. It is available in stainless steel and yellow top/stainless steel versions.

In the time mode, the watch displays "home" time on a 12-hour basis in hours, minutes, seconds, AM/PM, and day/date. Greenwich Mean Time is displayed on a 24-hour basis at the push of a button.

The World Time Mode displays the correct time on a 12-hour basis, minutes, seconds, and day/date for any of the 28 world time zones, moving through time zones by pushing a button.

This sophisticated world timer-alarm model can be set to display "alarm" time in hours, and minutes, any time of day, in any time zone and can also be set to sound hourly.

Portescap Introduces an Electronic Water Resistance Tester for Watches

Portescap's new Water Resistance Tester, Model ATM-FK 1, works without water and thus eliminates the risk of water penetration. This is particularly important for quartz watches which are extremely sensitive to humidity. There is also no need to remove the strap or band when testing.

The principle of operation is based on air pressure within a hermetically sealed chamber. Pressure is applied by means of a foot pump which is supplied with the instrument. The variance of the watch case is measured primarily by the crystal or case back and electronically displayed on the front panel meter indicating "good/bad."

This is by far the most accurate principle of testing the water resistance of watches. Although not new, this method was formerly reserved for expensive production apparatus. Portescap's engineering staff, however, has been able to reduce its cost considerably in order to make this device affordable to any watchmaker.

For complete information, please write to Portescap U.S., 6 Ohio Drive, Lake Success, New York 11042. Phone No. 516-437-8700.



Historic Willard Banjo Clock Reproduced for Discerning Collectors and Enthusiasts

A fine quality, American-made reproduction of Simon Willard's original patented banjo clock is available from Foster S. Campos Clocks of Pembroke, Massachusetts.

Foster Campos' Willard Banjo Clock is an exact replica of American master clockmaker Simon Willard's original patent clock (ca. 1802). Handcrafted with a solid mahogany case and exquisite cross-banded inlay frames, the 34" tall weight-driven time piece is surmounted by a cast, polished brass eagle, and trimmed with side arms and a bezel, also of cast, polished brass.



Decorative glasses and the 7 1/4" dial are all hand painted.

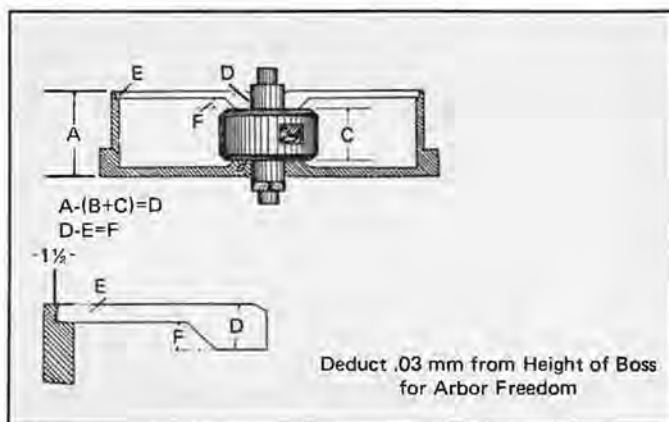
Foster Campos' Willard Banjo Clock is one of a series of fine American clock reproductions, each numbered and dated by the builder. Others in the series include Girandole, lyre, and gold front banjo clocks. Foster Campos is a 1977, 1978, and 1979 gold medal winner of achievement awards for the best reproductions at the National Association of Watch and Clock Collectors Convention.

Foster Campos' Willard Banjo Clock is priced at \$750.00 with delivery from stock to 60 days. Literature is available on request. (Trade inquiries are invited.)

IN THE SPOTLIGHT

(Continued from page 52)

for the cover and slightly thicker than the cover plus the boss. This is then cemented on a cement chuck and faced off flat. The stock is then cut back the amount of the F measurement, leaving the boss slightly smaller than the diameter of the arbor. If care is not taken and this diameter is left larger than the diameter of the arbor, the cover will not stay on when the main spring is wound up. The cover is then cut to size to fit the recess. As a snap fit is desired, the edge should be on a slight taper (about one and one-half degrees). This will leave a rather sharp edge and it is a good idea to round off the edge as shown in the drawing. A slot must now be cut on the edge of the cover for the main spring end. A notch must also be cut so that same may be easily removed. The cover is then ready to be faced off to its thickness. This is done with the barrel cemented on a cement chuck. As before, make sure in the cementing up of the barrel and the recutting of the recess, that it runs true in the round and flat. The cover is then snapped on with the slot for the main spring end directly opposite the one in the barrel and turned down flush with the barrel. With a graver, sink a center and drill a hole slightly smaller than the diameter of the arbor; with a boring tool now bore a hole to fit same. As a precaution, if it is a Swiss watch and the mainspring end does not project through the cover, it is a good practice to mark the cover and barrel so that it can be taken off and replaced in the same position



A—Total Outside Dimension D—Upper Bearing

B—Lower Boss

E—Thickness for Cover or Depth of Recess

C—Width Barrel Arbor

F—Height for Boss

thus eliminating any possibility for it to run out of true.

Although this may seem like the long way around this job, with a little care good results can be obtained and the complete barrel will be as good as new. □

Correction—Mr. Whitney's article is continued on page 60 of this month's issue. We regret any confusion this may have caused our readers.

WATCH ADJUSTMENTS

(Continued from page 37)

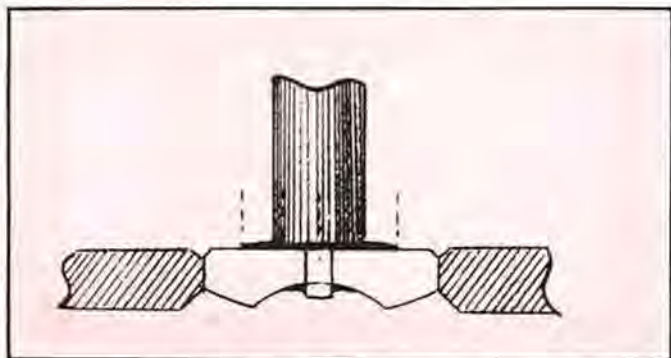


Figure 3. On a straight shoulder pivot the oil should spread on the jewel for two diameters of the pivot shoulder.

must be taken, however, that not too much is applied because it could contact the metal and spread.

Methods of applying the oil to the hole and cap jewel vary from person to person. The method that works successfully for me is to assemble the two jewels before lubricating, then place a drop of oil into the oil well, lead it through the hole to the cap jewel with a fine needle, and then add another drop. When the connection is made between the hole and cap jewel with the initial drop, the second drop does not have to be lead through. A high-quality automatic oiler simplifies the operation. The size of the oil drop can be adjusted according to the size of the jewels, and the fine point of the oiler acts as the lead through.

Incabloc jewels present a small problem in that they cannot be lubricated in the manner described above. The automatic oiler solves this problem, but without one, the jewels should be lubricated in the following manner: One drop of oil is placed on the cap jewel and one on the hole jewel while the jewels are held against the bench top with tweezers. The two jewels are then placed together by bringing the hole jewel over the cap jewel and carefully lowering it until they join. If the setting touches the oil drop of the cap jewel, the oil will move to the side. The jewels must be cleaned again and the process repeated. With a little practice it is possible to lubricate the jewels this way quite successfully.

Lubricating the pallet stones is by far the most difficult task if one considers all the problems that are associated with it. The problems are such that there is no definite solution to any of them. One method of lubrication is preferred only because it produces a slightly better result and not because it eliminates all the problems.

When oil is applied to the pallet stone, it will spread immediately across the flat surfaces. As soon as the escape wheel contacts the locking face, some of the oil is transferred to the escape wheel. As the tooth glides over the impulse face, it pushes some of the oil in front of the locking corner of the tooth and deposits most of it on the side of the jewel adjacent to the let-off corner. The accumulation of oil at this point is not serving any positive purpose. The only thing that can happen is that the oil spreads to the metal parts of the pallet. The consequences of this have already been described. If too much oil is applied, the spreading can also occur on the side of the locking face of the pallet. If the escape wheel is not properly cleaned or if it is not polished, the oil will spread through the escape wheel. If this happens, most of the oil from the pallet stones will be drawn away

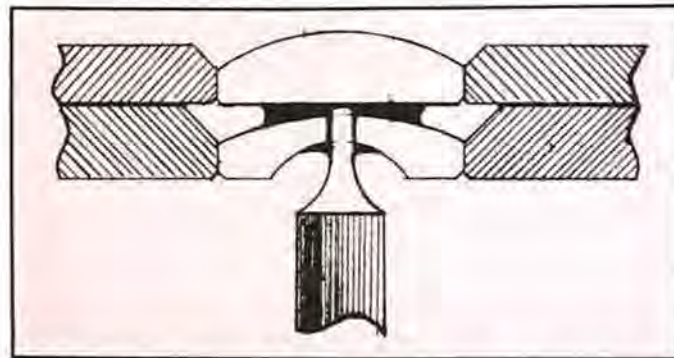


Figure 4. On a conical shoulder pivot the oil should spread between the jewels for $\frac{2}{3}$ the diameter of the smaller jewel.

and the remainder will be so thinly spread over large surfaces that it will evaporate at a very fast rate.

Unfortunately, there is little a watchmaker can do to eliminate these problems. Using a high-quality lubricant and a careful method of lubrication reduces the spreading of oil considerably and prolongs its freshness. The problems associated with lubrication of the pallets are quite different from those of the train. It follows that the lubricant should have different characteristics as well. The best advice I can offer is to use special lubricant for the pallet and not the ordinary train oil.

The method of lubrication also makes a considerable difference. If the main problem is the spreading of oil, then it will make a difference how the oil is applied. Large quantities of oil applied at one spot will definitely cause greater spreading. After experimenting with various methods for some time I finally found two that work quite well. One is used for lubricating the pallets of standard quality watches and the other for watches of better quality.

For standard quality watches the drop of oil carried on the smallest oiler is first reduced in size by applying one side of the oiler to a clean piece of glass or to the fingernail. The remaining drop is then applied to the locking and impulse face by touching the locking corner of that jewel which is not engaged with the escape wheel tooth. The balance wheel must be stopped during lubrication and as soon as the oil is applied, it should be allowed to escape two or three teeth. The process is repeated four or five times until every tooth on the escape wheel carries a small quantity of oil. The idea is to apply small quantities of oil several times and thus reduce the chance of wetting large surfaces. If a small drop is applied on a small surface of the jewel and then picked up by the escape wheel tooth, neither the jewel nor the tooth will have much oil to carry and the spreading will be reduced.

The same method is used to lubricate better quality watches but one additional operation is added. After making sure that every escape wheel tooth carries some oil, the pallet is removed from the watch and rinsed in clean benzene or "One Dip Hairspring Cleaner" to remove all the oil from it. When it is replaced in the watch, the escape wheel will transfer a sufficient amount of oil back to the pallet stones to achieve just the proper lubrication.

There is no doubt in my mind that a proper selection of lubricants and good lubricating practices contribute tremendously toward better time keeping as well as toward longer operation of the watch. □

QUESTIONS AND ANSWERS

(Continued from page 26)

A. There's no telling just what the "Madison Avenue Boys" of yesteryear had in mind when they gave those tricky names to composition metals which resemble silver to the uninitiated.

"Platina" is an old name for platinum. This is derived from the Spanish word meaning "little silver." Silverode or silveroid is a composition made up of copper and nickel for the most part. It resembles "German silver" which is about 50 to 90% copper, 7 to 32% nickel, and some small percentage of zinc. Silveroid and silverode were trade marks of the Keystone Watch Case Company and were discontinued in 1897. Silverode was also a trade mark used by the Philadelphia Watch Case Company and discontinued in 1910.

ESSENCE OF CLOCK REPAIR

(Continued from page 45)

on the pallet arbor opposite the pendulum (A). Power to the verge itself is supplied by the mainspring via the main wheel (E), through the second wheel (B), the third wheel (N) and the contrate wheel (L).

A few final observations on the going verge and the pallets are now in order. Generally speaking, and certainly with the English models, the length of the pallet teeth should be one-third the distance between the teeth when measured from the pallet arbor center to the dropping-off point of a pallet onto a verge tooth. Also, if the pallets are set in too shallow a position, the escapement will not trip. If set too deeply, the teeth will bind, or butt on the pallets and stoppage will occur. Very importantly, the two pallets must be set at a 90-degree angle to one another as mentioned previously. We emphasize this point for the benefit of those aspiring mechanics who may wish to manufacture, or correct, a pallet assembly.

Figure 2 is, of course, the front plate with the dial removed. Figure 3 is the side view showing primarily the alarm train. The small mainspring barrel (V) for this mechanism, together with its protruding wind arbor, is visible to the upper left over the center wheel. The alarm verge (W) may also be observed in this photo to the upper right and just above the

QUARTZ

Q. We are interested in setting up a battery replacement department in our store; no repairs, just battery replacements. Do you know of a comprehensive book that would cover most or all makes of LCD and LED watches?

Gary L. King
Chicago, IL

A. A good book which answers your needs has just been published. The Digital Quartz Watch by Tom Hytlin lists all the makers, batteries, and setting sequences for all watches produced up to most recent times. It can be obtained from either the Jewelers Circular-Keystone Book Department or from the American Watchmakers Institute Book Department. It sells for \$19.95 plus shipping charges. □



Figure 4

alarm mainspring arbor. The brass locking lever referred to in the alarm release is shown as (Y). Figure 4 is a photo composite of our sketch (Figure 1) and shows the going train.

Our thanks, once again, to our mechanic, Dan Castner, for his careful preparation of the clock. □

CLOCK CHATTER

(Continued from page 24)



Figure 9

The bottoms (short ends) are filed flat and to about 0.5 mm in height. When they have all been filed to this length they are hammered flush with the wheel rim. After this has



Figure 10



Figure 11

been done, flip the wheel over and place the height gauge on a pin. File the pin to the gauge height. See Figure 10.

The final step is to round the end. This can be done with a commercial product, an example of which is shown in Figure 11, or you can make your own by filing across

the end of a piece of steel with a triangular file. Four cuts are sufficient and, while hardening is essential, subsequent tempering is not. The finished pins will look like the one in Figure 12.

As for this being done easily and quickly, your time expended to repin a wheel in this manner would be fifteen minutes or less. There goes your best excuse for leaving worn pins!

A tool which I made and which can be used in place of a hammer is a pair of midget "Ignition pliers" with the teeth filed down and a notch filed in one of the jaws. See Figure 13. While a notch in the jaw of pliers is not new or novel, these pliers with their offset handles are capable of exerting far more pressure than those with straight handles.



Figure 12



Figure 13

I made two pliers at the same time, one as pictured and the other with the notch in the opposite jaw. These are also excellent for removing and replacing almost all tapered pins used in clocks. □

THE SHIP'S CHRONOMETER

(Continued from page 49)

On many occasions, the performance record of the 13,531 Hamilton gimbaled and 9,780 non-gimbaled chronometer watches far exceeded the performance of many foreign 56-hour standard spring detent marine chronometers. The majority of these watches tested at the U.S. Naval Observatory rated well under the Navy's mean daily rate tolerance of 2.00 seconds per day.

The excellent performance of these very fine instruments can be attributed to several horological innovations: particularly the unusually long mainspring (60 inches) and the bi-axial thermal expansion balance wheel fitted with a



Figure 4. Hamilton 35 size Movement, Model 22

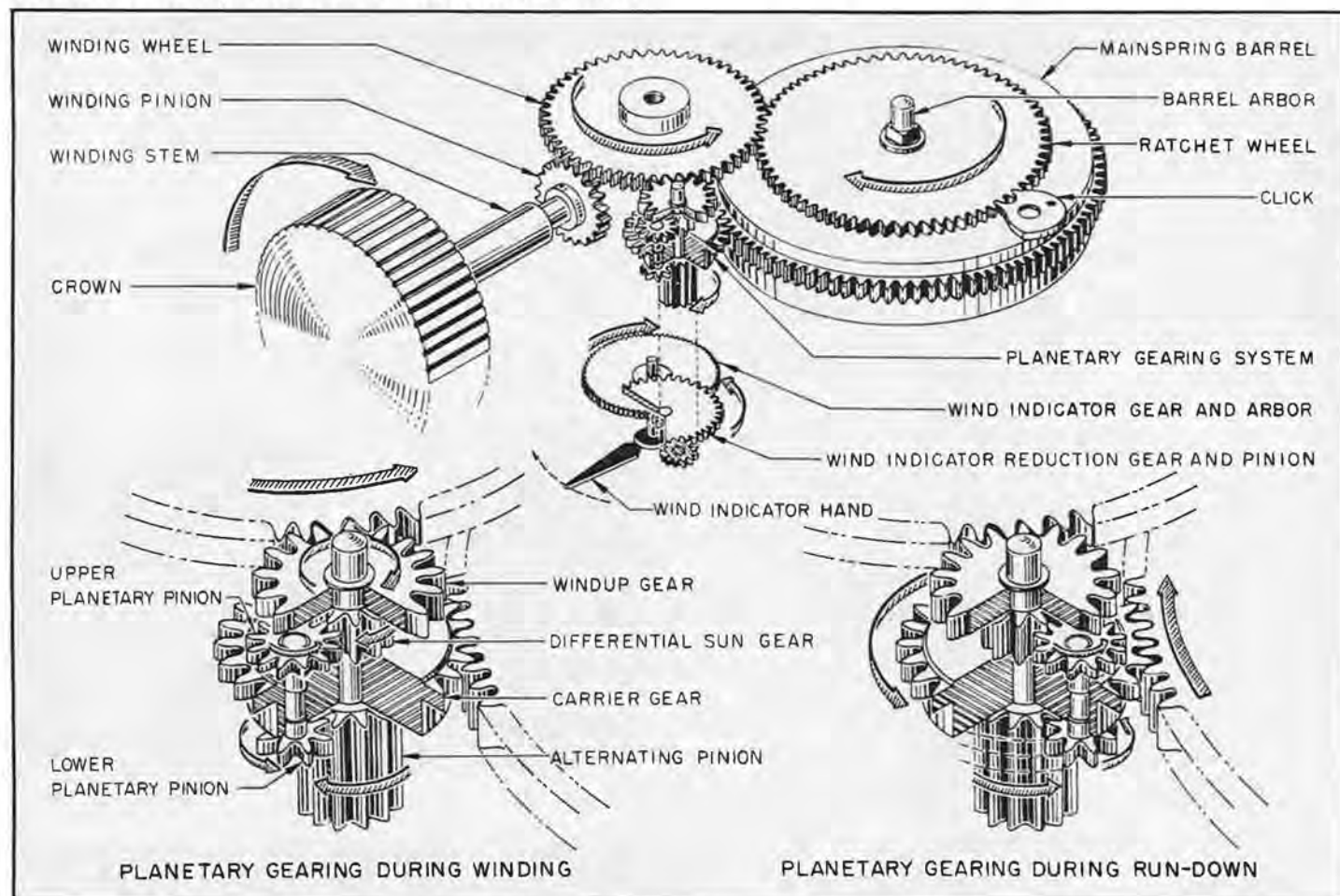


Figure 6. The Winding & Run-Down Cycle of the Planetary Gearing System

Hamilton Elinvar hairspring attached to a counterpoised hairspring collet. This balance wheel was equipped with four chronometer-type timing weights utilized to bring the instrument to time, with the final timing being accomplished by a cam-type micrometric regulator. See Figure 4.

Like the Hamilton ship's chronometer balance, the balance rim is uncut and is made of stainless steel which is not easily magnetized. Being uncut, it too is very rigid and unaffected by centrifugal force. An Invar balance arm, which has a thermal coefficient of expansion of nearly zero, is silver soldered to the stainless steel rim. See Figure 5. Due to this arrangement, the diameter of the balance rim remains nearly the same at the ends of the balance arm irrespective of any changes in temperature. Thus, the moment of inertia remains constant, and there is no gain or loss in time as a result of changes in temperature. The center portion of the rim moves inward with a decrease in temperature and moves outward with an increase—thus assuming a slightly elliptical shape. This arrangement permits the temperature adjustment to be made by moving the balance screws either toward or away from the balance arm.

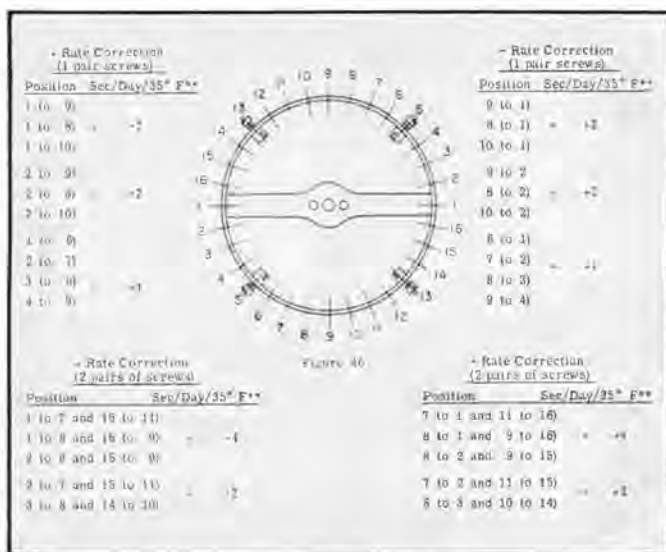


Figure 5. Hamilton 35 size, Model 22 Balance Wheel and Table of Screw Movements for Temperature Compensation

The extra-long mainspring provides a constant driving force to the balance during the 24-hour rundown. In fact, during several tests conducted at the Observatory, it was utterly impossible to detect any drop in the balance motion or change in rate over 48 hours of rundown from full wind. The watch was designed to run 56 hours.

The winding mechanism differs from that of a conventional watch in that it includes a planetary gearing system consisting of a winding gear mounted as a unit with differential sun pinion upon an arbor. This arbor is free to turn (1) a carrier gear, complete with upper and lower planetary pinions; and (2) an alternating pinion. The alternating pinion meshes with the winding indicator gear. The winding indicator hand is mounted on the arbor of the winding indicator gear. See Figure 6.

Next month, more about the Hamilton chronometers.

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BONUS PAID for usable jewelry. Gold, platinum, silver, gold fill scrap, gold and gold fill watch chains, pearls, colored stones, broken/old cut diamonds, watch movements wanted. Capital Premiums, 2210 Welshire Blvd., Suite 110, Santa Monica, CA 90403, (213) 399-7426.

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