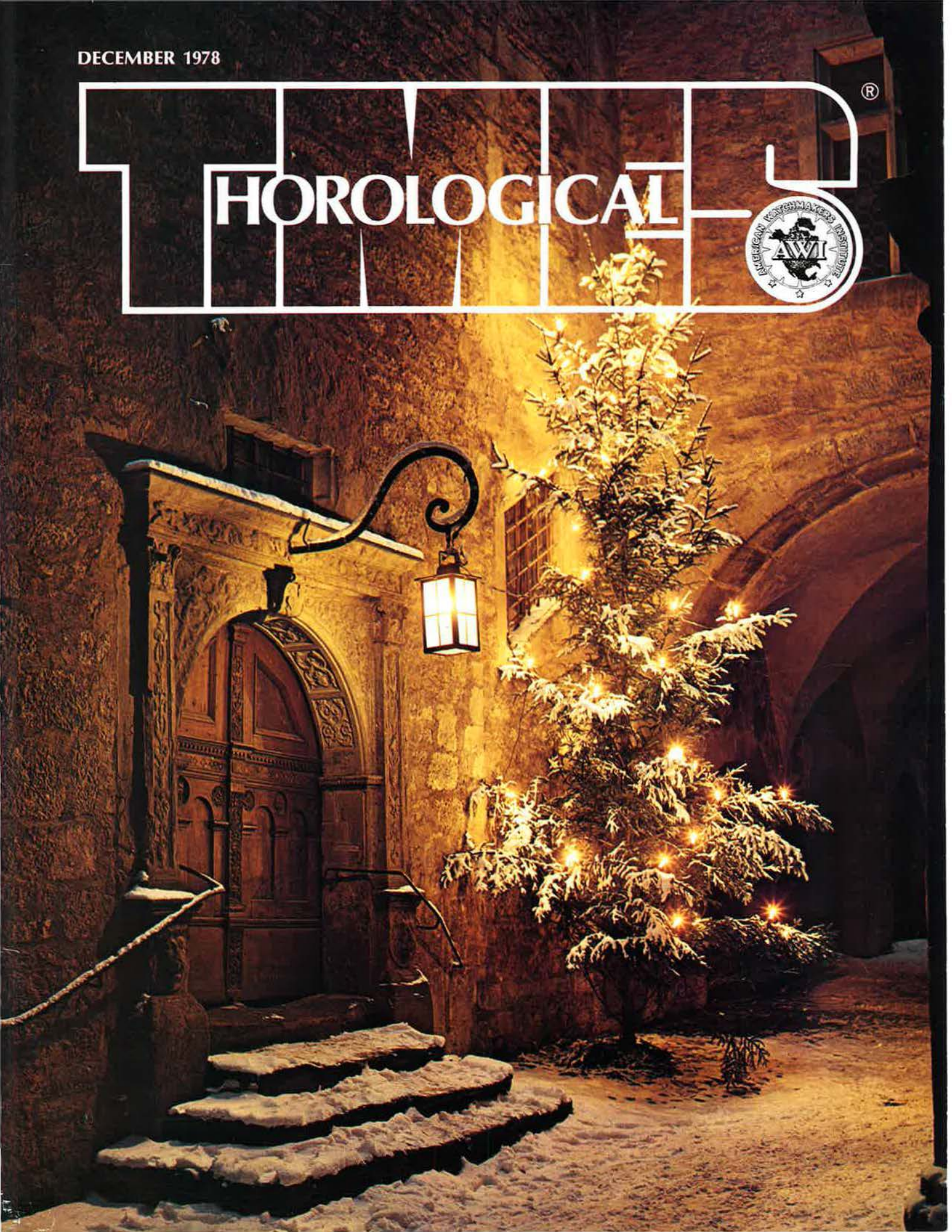
DECEMBER 1978

TIMES HOROLOGICAL

AMERICAN WATCHMAKERS INSTITUTE AWI



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HOROLOGICAL TIMES

OFFICIAL PUBLICATION OF THE AMERICAN WATCHMAKERS INSTITUTE

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Editorial

To All...

A Joyous Holiday Season!

from

THE STAFF
AWI CENTRAL

About the Cover

OUR DECEMBER COVER PORTRAYS THE FESTIVE MOOD OF THE SEASON.

HOROLOGICAL TIMES®

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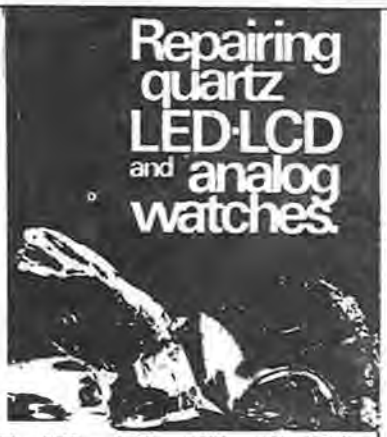

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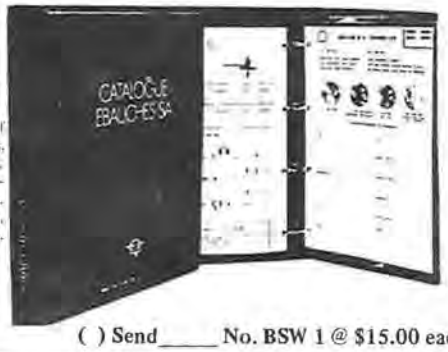

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The Presidents' Message

BY ORVILLE R. HAGANS, CMW, CMC

This last month of 1978 marks completion of another year of progress for AWI, 18 years, 6 months of steady growth and attainment by your Institute. The world of scientific and technological advancement demands us to keep abreast of times if we are to survive and it is through your Institute that today our profession, as a whole, is better informed on all phases of horology, business administration and most important, fellowship and respect for those within our profession.

The old tradition and practice of keeping unto ourselves and confinement to the so-called "144 square inches" is rapidly disappearing and we are moving to realistic living and working in an accelerated world of progress.

As we acquire knowledge and training in the new technical advances in horology, we must not lose sight of the art, science and history of our predecessors, as the inventors and developers of fine craftsmanship in the past contributed much to our profession. Knowing about our forefathers of the profession and industry can be a great asset to you in your business. You have a very good source for horological books, the AWI lending library–why not use it? You may find reading and learning about the past fascinating and enjoyable, as well as profitable.

But back to your Institute and your investment, which has made it possible to keep abreast of modern technology.

Have you ever given serious thought about the willing sacrifices of our members who devote time to conduct your Institute's affairs, especially those men who conduct your seminars? Six men, W. Biederman, Jim Broughton, Gerald Jaeger, Robert Nelson, Harold Opp, and Leslie Smith, who are our seminar instructors, all either own their own business or are employed full time. All of these men are mechanics, desirous and willing to give their time and money toward helping you to improve your skills and knowledge.

Your *Horological Times* publication, now completing its second year, is giving you valuable technical assistance and keeping you up to date in association activities. The writers in *HT* are endeavoring to give you the best of their knowledge. The staff is to be complimented for giving us an outstanding publication.

Last, but not least, we have our Executive Secretary, Milton Stevens, and Administrative Director, Michael Danner, and office personnel who are responsible for handling all business of AWI. They too are to be complimented for the orderly conduct of our affairs.

At the close of this year the office informed me that we had increased our dues notices over 400, which was membership increase this year.

With the rising cost of everything, plus additional costly programs being prepared for you, our dues have been increased $5.00. I am positive that members can understand and will send in your checks promptly.

1979 promises to be a banner year, with more instructors, more outstanding writers, and benefits.

In closing my remarks, I hope each of us will make a personal pledge to bring one new member into AWI for 1979. I again pledge my complete cooperation and wish you all a happy holiday and good health and prosperity in the New Year.

Orville R. Hagans

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AWI NEWS

By Milton C. Stevens

As 1978 draws to a close, there is a number of topics I want to discuss in this year-end article. This will be a potpourri of thoughts, observations and reflections of 1978 as well as a look at 1979.

1978 has been a good year for most watchmakers. AWI has also enjoyed another good year marked by continued growth in membership and expansion of services to the industry. We are presently processing annual dues which reflect a modest increase of $5.00 which was forced upon us by continued rising prices. While attending a Citizen bench course in Elizabethtown, Kentucky, I was approached by a member during coffee break who raised the subject of increased dues. You can imagine my surprise and pleasure when he said, "I'd even pay a hundred." We certainly hope inflation never forces a hundred dollar annual dues structure upon us, but it surely was gratifying to hear this member's expression of support in this way. Just a note of interest before I leave this subject. As a teacher, my professional dues are $158.00 per year and my benefits and services in no way come close to the benefits and services AWI offers its members.

The strides of progress AWI has made over the years have not come about by chance or good fortune. The progress is a result of good planning, dedication and sound business management. In my mind, the main reason AWI has achieved the measure of success it has is due to the competency of the individuals who served on the AWI Board of Directors. The Board has always given careful consideration and support to each move that has advanced AWI along the road.

Soon it will be time for the Nominating Committee to prepare a slate of candidates to fill five Board of Director seats. In fact, the Committee has about 60 days in which to make its selections. The Nominating Committee would welcome your help in the selection process. If you can recommend a person who may be a potential candidate for the AWI Board, please send this information to Nominations for the Board Committee Chairman, Les Smith, at AWI Central, Box 11011, Cincinnati, Ohio 45211. When recommending prospective candidates to the Committe, be sure to include information about the individuals's experience as a watchmaker, present occupation, leadership ability, integrity and professional ethics, as well as personal data. Also be sure that this individual has the willingness and ability to give the time necessary to serve on the Board. The Committee will welcome and carefully consider each suggestion.

We hope that during the past year you have noticed the improvement in our ability to respond to requests for service and information. The business operation of the office in general has improved to the point where service and requests have been dispensed in a proper and timely manner. This is due to the addition of our full-time Administrative Director, Mike Danner. A number of you have met Mike personally, others have talked with him on the phone—hundreds have had indirect contact with him as a result of the many bench courses he has handled so ably since beginning his AWI duties last January. Mike is to be commended for the way he has taken hold during his first year with AWI and for the efficient job he has done.

Members who regularly read the Horological Times cannot help but notice the improvement in the quality of composition, layout, and printing of the magazine in recent issues. These improvements reflect the work of our new Managing Editor, Tom Herman. Tom has brought to the Horological Times the professional touch which has made a fine magazine even better. We are pleased that he chose to join the AWI staff. Few people realized that he has been working in the background offering advice and suggestions as this office was developing the HT format. Now that certain production aspects of the magazine have been improved, we expect to witness the addition of more articles for the mechanical watchmaker during 1979. Since Tom is now on the Horological Times staff full-time, he will assume more responsibility for the production of the magazine effective January 1. He will work very closely with our very able Associate Editor, Patricia Borger.

Hal Herman, the man who presided over the birth of HT, will remain active with the magazine, but in a more specialized role. Only a few of us who were close to the operation can appreciate the many hours of devotion and dedication Hal gave to the development of this outstanding magazine.

During 1978 we saw the completion of our long awaited Certified Electronic Watch Specialists examination. We anticipate a great of activity in this area of certification in 1979. Now, as more watchmakers become proficient at the repair of electronic and solid state watches, they will want to be able to make their expertise known to the public. What better way is there than to prove your ability by successfully completing comprehensive testing by an independent agency such as the AWI. Complete details can be obtained from AWI Central.

1978 has been an exciting year. We have taken steps to insure competent management of AWI and its publication for many years to come by the hiring of Mike Danner and Tom Herman. Their youth and enthusiasm are welcomed and complement the more experienced administrators who will still be around but in a less active role. We believe this is a perfect blend of youth and experience which will insure continued growth for the American Watchmakers Institute.

Please accept our sincere wishes for a good holiday season and for a healthy and prosperous New Year!

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Inside the Clock Shop

with James L. Tigner

CMC

Part 4—Making a New Pallet (Conclusion)

In his *Clock and Watch Escapements,* W.J. Gazeley describes how the lathe slide rest can be used in polishing the several acting faces of the Graham dead beat pallet. To conclude our current series, we will take Mr. Gazeley's basic idea and see what we can come up with to speed the final stages of grinding and polishing required in making a new pallet, and to raise their precision to a higher level.

Because of specialty work I do from time to time, I have two slide rests, one a rack and pinion lever operated type, and the other the more common lead screw kind operated by a crank. I use them both in this particular job, but the lead screw slide rest alone would have served very nicely.

Figure 1 shows the rack and pinion slide rest set-up for grinding a dead beat pallet. You will notice that two flat plates have been screwed to the top slide, which provides a resting platform for the pallet at approximately the center height of the lathe. For my set-up I used a 1/4-in. and a 3/8-in. plate, but each person's requirements will differ, one plate probably being adequate for most needs.

These plates should be low carbon steel for ease in sawing, filing, and drilling, and should be precision ground to insure a platform square with the lathe bed. They are available in all thicknesses and widths, usually in 24-in. lengths at industrial supply houses, or can be ordered by them. Although Campbell's catalog (Springfield, Ohio) doesn't list such items, the company can probably supply them.

By locating the two filister head screws either on the right hand or the forward side of the platform (depending on the direction of the T-slots in the top slide), most workpieces can be held on the platform without interference from projecting screw heads. However, recessing the heads will clear the entire platform for a greater range of work. For the man who doesn't have a counterbore to handle this job, successively larger twist drills, as will be explained later, will make a satisfactory substitute.

The vertical post seen toward the rear left hand corner of the platform (Figure 1) is the head of a pin, whose diameter has been turned for a close, sliding fit with the pallet arbor hole. The shank of the pin closely fits all of the smaller holes visible around the post. Any number of these holes (3/32-in. diameter) can be drilled through the top plate as needed, to accommodate different operations and different size pallets. Pins must be turned up with heads to match each individual pallet arbor hole, but with shanks all of the same 3/32-in. diameter.

Some means must be adopted to insure the uprightness of the holes with the plate. This is customarily accomplished with the aid of a drill press, a power hand drill supported in a stand, or a lathe fitted up with a drill plate.

Figure 1.

If none of this equipment is available, try DeCarle's method for hand drilling, as described in his *Practical Clock Repairing.*

In addition to keeping the holes upright, we should try to drill them as round as possible, not triangular-shaped as twist drills have a tendency to do. This isn't to be precisely fussy over the making of a simple accessory, but to help us in achieving the fine tolerance essential in most precision tools, however simple.

A good way to avoid out-of-round holes and drifted centers is first to center punch the spot to be drilled and then to start the hole with a double end center drill, as depicted in the lower half of Figure 2. Pay no attention to the tool in the upper half; we'll get to that later.

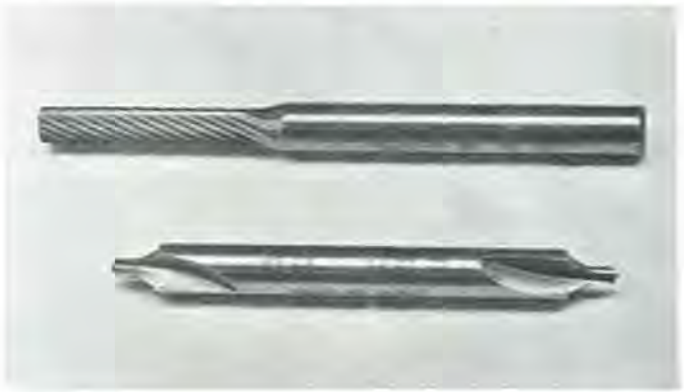

Figure 2.

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Tom M. Hyltin

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These drills are carried by Campbell's, or any other industrial supply house. If only one size is to be bought, I would choose the #1, with a 1/8-in. body and a 3/64-in. drill point. Drill the hole to the full depth of the point, and follow it up with a 1/16-in. twist drill all the way through the plate. Keep enlarging the hole with twist drills in 1/32-in. steps until the desired size is reached, finishing with a 1/64-in. step if necessary. Of course, in this particular job a 3/32-in. hole is as large as we want to go. The counterboring we spoke of earlier is done by increasing the drill sizes in the same way, by increments of 1/32-in., and drilling to the required depth.

Figure 3 shows a 2-in., medium grit, India stone (aluminum oxide), as used to square up and shorten in just a few seconds the impulse face of the entry pallet. The longitudinal slide is adjusted to bring the outline of the impulse angle, which we traced last month from the old pallet, exactly parallel with the face of the stone. With the lathe running at high speed and the left hand holding the pallet firmly down on the table and lightly against the wheel, the right hand moves the cross slide lever rapidly back and forth, which reduces the riding effect on the pallet face.

From this you can see why I prefer a lever action type of slide rest for this particular job. Nonetheless, a satisfactory job can be done with a lead screw slide by turning the crank back and forth as rapidly as possible. An even better one can be done by removing the lead screw, which frees the cross slide for rapid movements back and forth by hand.

In Figure 4 we see the impulse face of the exit pallet being rough ground in the same way. Figure 5 shows the locking face of the entry pallet being ground to a true concentric curve. Here the operation is a little different. Both slides are adjusted to bring the dead face lightly in contact with the wheel, and then both hands are used to hold the pallet firmly

Figure 3.

down while at the same time rotating it back and forth on the pin, passing the full length of the locking face across the stone in each direction.

Figure 6 pictures the exit pallet being dressed in the same way. Care must be taken not to disturb the setting of the longitudinal slide, so that both arms of the pallet will be ground the same length.

Stones of the sort shown in the photos are not readily available in the desired grits and diameters. Even if they were, a diamond dressing tool would be needed to true up their faces from time to time. Precision work cannot be done with unevenly worn wheels running out of truth.

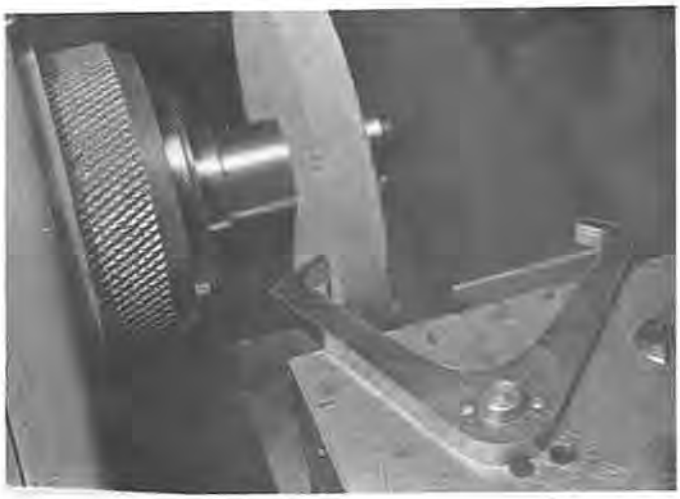


Figure 4.

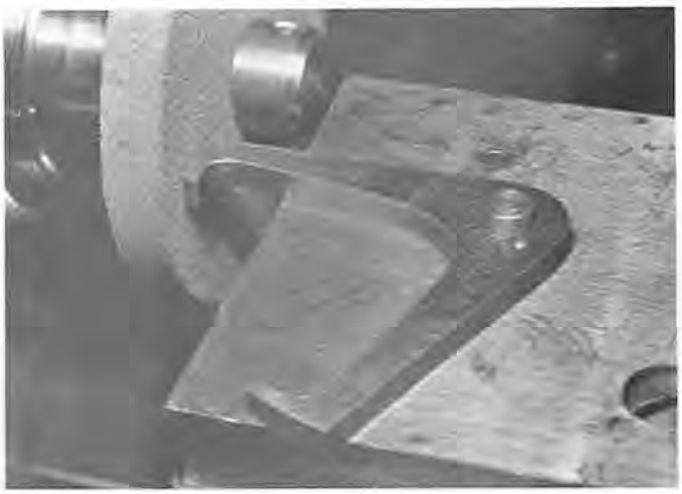


Figure 5.

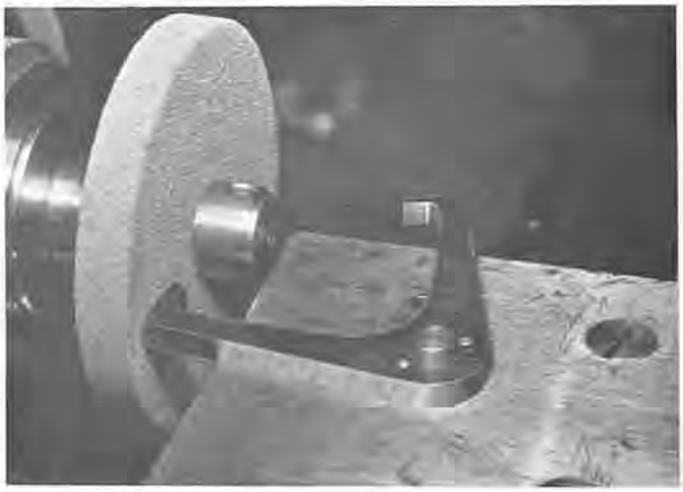


Figure 6.

Most repairmen will probably find it more convenient to turn up a set of three 2-in. discs from 1/16-in. flat, low carbon, precision ground, steel stock, afterwards covering both sides of each disc with abrasive paper or cloth, so that one disc will be for fast cutting, another for smoothing, and still another for polishing. Figure 7 illustrates one such disc in use.

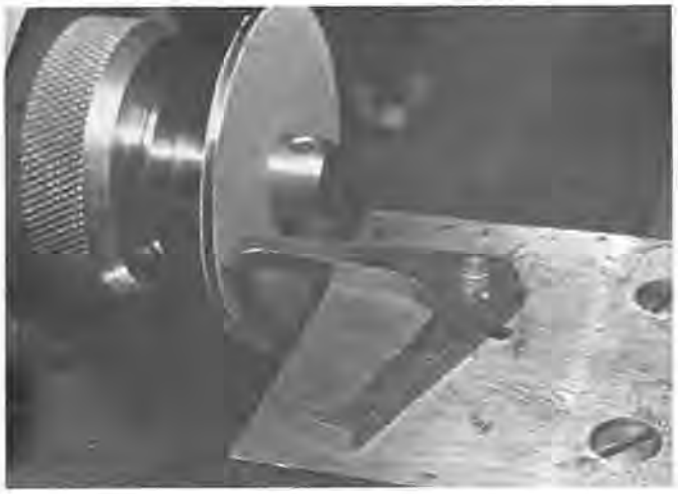


Figure 7.

My preference in abrasives for this work is Lightning Metalite Cloth (aluminum oxide) in grit 150 for fast removal of steel, 400 for smoothing, and 600 for polishing. Metalite Cloth is more expensive than abrasive paper, but it lasts much longer.

However, Metalite Cloth in 600 grit is hard to come by. If you can't find it, emery polishing paper in grit 4/0 will do very well for the polishing disc. In fact, if you prefer abrasive paper to cloth, grits 150 and 400 in Adalox or Aloxite paper (both aluminum oxide) will be satisfactory for the roughing and smoothing discs respectively. They just won't last quite as long.

Any good, free flowing cement that will adhere to metal is all right for bonding the abrasives to the discs. I have used both Testor's Household Cement (not plastic) and quick setting epoxy for the job, and apply it just to the outer areas of the disc, not all over, which makes it easier to remove the worn out abrasives when the time comes. Testor's is solvent in acetone or nail polish remover, and is easier to remove than epoxy, which is solvent in nothing, and must be scraped off or heat removed.

After the abrasives have beeen cemented to both sides of a disc, place the assembly between flat surfaces and weight it down to prevent wrinkles or distortions. When dry, trim first with scissors and then with a razor blade. The hole in the abrasives can first be punched out, and then trimmed clear with a rat-tail file.

A special holding device for these discs can be turned up from drill rod, and the end threaded and fitted with a washer and nut. In use the fixture is gripped in a collet. If you own a WW type lathe and don't want to bother making a device of this sort, or wonder whether it will run true, W.W. Derbyshire, Inc., 265 Bear Hill Road, Waltham, Massachusetts 02154, can give you a quotation on an arbor chuck of the kind shown in the photos. One with a 1/4-in. arbor will just fit the hole in your discs when finished with a 1/4-in. drill.

But let's get back to the actual making of a pallet. We have ground the two impulse faces and the two outside curved faces. It now remains to grind the two inside curved faces. Mr. Gazeley shows a drawing of a lap polishing these surfaces, using the edge of the lap which is shaped to the curve of the pallets.

I have tried this method, and frankly, do not like it. Since the grinding and polishing is done by the edge of the lap, the pallets turn out hollow ground instead of flat. Further-

(continued on page 42)

Questions and Answers

by Henry B. Fried

CMW CMC FBHI

FRENCH CLOCK

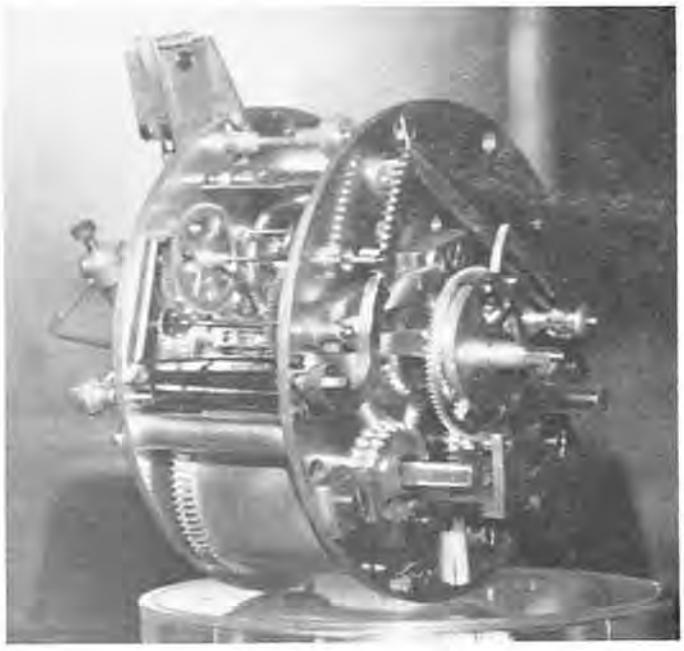
Q. Please find enclosed pictures of a French clock that is in our store for repair. The customer would like information about the age, possible maker, and what the crown of the clock may have looked like. The escapement is Brocot and dead beat. I could not find any inscriptions or scratchings of names, dates, or places on any portion of the clock or case that would help except for the three digit number on the rear plate and the one digit number on the front plate just above the rack pivot. If you can supply any of the information needed from the scanty information supplied, it would certainly be appreciated.

Another problem: can you suggest the names and business addresses of any persons qualified to restore a wag on the wall which is missing an hour wheel, verge, pendulum (rod and bob) and a few teeth from the count wheel? The plates of the clock are wood as are the count wheel, cannon pinion, intermediate wheel and most of the arbors in the clock. The main time and strike wheels are all brass mounted with wood.

Thank you for your help.

Cameron C. Spicknall
Elmira, New York

A. Your clock is of the 1880+ period. The movement is a standard French mass-produced eight-day or 14-day hour-half-hour rack striking clock with Brocot suspension and regulation. The numbers on the back of the movement indicate the serial production series and at the lowest part of the movement the number of pouces to the pendulum length. In your case, 4/8, the pouce (French) was equal to 27.07 in. or about 5 1/8 in. The French clock movement was so standardized in design that it is difficult to know just who made these. Large makers were Japy Freres, Jacot, Marti, L'Epee, etc. Without any stamping on them, it would be difficult to



Tick Tock Talk

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know which of the very many makers produced your movement. Cases were made by founders who produced a great many varieties and qualities. Japy, Marti, and Jacot marked and stamped their movements. Yours, it must be decided, wasn't made by these three at least.

Repairs to your wag-on-the wall (German) clock are extensive and would have to be carried out by someone willing to make all the gears to them and their missing parts. Suggest you contact Ken Leeseberg, Ken-Way, Inc., 311 Chestnut St., Addison, Illinois 60101. This is NOT a recommendation. I only pass this on as I've read his advertisement for such services. AWI does not assume any responsibility arising from submitting these names nor involvement of any type. Also check the AWI Sources book for others who would do these repairs.

Great Western

Q. We have a customer who has a Great Western pocket watch. This watch is 18 size, 9 jewels, mvt. #145-30. The case is a double coin silver, case #G8726.

Could you please give us some information on this watch—who made it, how old it is, and if by any chance we could obtain any parts? Thank you.

Rees William
Cynthiana, Kentucky

A. The Great Western Watch Company was a Swiss imitation of American pocket watch styles and marked to obtain the great favor that American-made watches had during the 1870 period. This was soon outlawed by federal legislation. However, many such watches had pictures of railroads or, like the exact same watch marked "Great Eastern," had the immense steam ship of that day on the dial in a black and white drawing into the porcelain dial. The quality of the watch itself was rather poor. As for the jewels, I would check these as those I've seen often only had train jewels on the upper plate, the dial plate being bare of the escapement or train jewels. Parts, of course, are impossible to obtain. Even in those days, parts for Swiss watches never fitted as they do today or did the American-made parts for domestic watches.

Paul Breguette

Q. Can you furnish us with information as to what basic manufacturers' movements are used for Paul Breguette?

There is no manufacturer's symbol or number on their movements. We presently have a 16-17 ligne pocket model—set bridge compares with AS 1052-58-67-69, but staff has smaller pivots and the roller does not fit. Would appreciate your assistance.

The Watch Shop, Inc.
Louisville, Kentucky

A. Paul Breguette is the top line of the Kay Jewelers who have been taken over, or incorporated, I think, into the Zale chain. They used all types of movements, but finished very well. Most likely the 16 ligne movement is a Schild but the escapement parts are a bit better finished than the regular run of standard replacements for this model. I would suggest that you try to obtain the staff, etc., from Zale's in Dallas, Texas at 3000 Diamond Park Drive, Dallas 75247.

Hebdomas

Q. I would like information on a watch that is listed in a book I acquired, *Clocks and Watches, Horological Historical Timepieces,* by E.J. Tyler. It gives only a vague description of the watch.

The watch is an 8-day Hebdomas 8 jours in a blued steel case with the escapement on the front of the watch visible through the glass, with the dial smaller than usual and the mainspring barrel the whole diameter of the case. On the barrel is "Gold Medal Award" Expositions, Milan and Brussells 1906.

I believe there is one of these watches in a private collection of a Mr. B. Hutchinson. I would like to know if this watch is rare and where I could find out the value of it.

Stephen Padnuk
New Castle, Pennsylvania

A. The Hebdomas Watch Company used the product of the Schild Freres. It is still being made and sold by the Arnex Time Corp, 48 West 48th Street, New York, New York 10036. The stampings on the oversized barrel still appear on the current models. It is interesting but not rare at all. I have a few of the older ones and one or two newer ones in my collection as interesting but not rare timepieces. The prices of the old ones are less than what they can be bought new. Some rarer ones, with calendar mechanism, do fetch a bit more. Sorry, but strict AWI policy forbids rendering appraisal services.

Rack Lever

Q. I have a watch in my shop for repair, and would appreciate any information you might be able to provide me about it.

It is 48 mm in diameter, key wound, fusee. The name Robert Roskell, Liverpool, is on the plate. Serial number is 23004. It appears to be in very good condition, with no broken parts. Most likely, a good careful cleaning will put it in good running order.

A couple of novel features which I've never seen are on this watch. One is that there is no roller jewel. There is a steel pinion on the balance staff which engages the pallet lever. The second is attached to the escape wheel and revolves once every 15 seconds. The watch has a beat of 14,400.

I don't expect an appraisal, but would appreciate a hint whether this piece has any value as an antique, and perhaps the approximate age of the watch.

Clifford E. Messner
Jackson, Michigan

A. I am quite familiar with your watch. If you will look in this writer's book, The Watch Escapement, *you will see a drawing of it. The drawing was made from one of three such watches in my collection. The watch dates from the 1820-30 period. Roskell was a foremost user of these together with another maker, Litherland, both from Liverpool. The watch is called a "rack lever" after the rack (of teeth) on the lever*

of the ancre. This allowed a very wide balance arc, although it also had the detraction of providing an escapement error since the balance was never detached from it as in present-day lever escapements. The watch was dead beat, had or needed no "draw" and of course, never overbanked.

Old Lubricant Removal

I have a customer's 0 size Elgin pocket watch that he put something like WD-40 in to lubricate it. The only thing wrong is that I cannot get the WD-40 out of the works and case by cleaning in the solutions I have. Can you suggest a way to get them both clean, especially the movement? I have tried both watch and clock cleaning solutions and they don't work.

Any suggestions will be deeply appreciated.

Ivan A. Ronjoin
Crescent City, California

A. WD 40 is a silicone-based product and, of course, shouldn't have been used on that watch. However, once in a while some inspired amateur like your customer puts something on a watch that appears to be a lubricant without saying the magic words as he is sprinkling and anointing the poor timepiece (no one yet has really discovered what the magic words are). The results are a hard, resinous substance that defies removal.

In such cases, most often, the chemical methylene chloride or a good paint remover will do the job. Freson also has some good effects as has chloroform. These dissolve plasticized surfaces and should do the job for you. Just be careful about getting the paint remover on your skin, as it is caustic. After that neutralize it with (the watch!) with warm water and then all you worry about is removing the water.

Best of luck.

Stripping

Q. I would like to know what acid or chemicals are necessary in stripping gold.

James T. Buterbauch
Lebanon, Tennessee

A.Enclosed you will find a photocopy of the book page dealing with stripping of gold plating. The book is Jewelers Workshop Practices *by L.L. Linick and not available. In it on page 147 he lists the method by which the gold plating may be stripped from its base, using the reverse plating process, with the article being the anode and cathodes of stainless steel or graphite in 1 gallon of water, 5 oz. of sodium cyanide, 3 oz. of potassium-ferrocyanide and ½ oz. of glycerine. It is then precipitated by zinc moss or by ferrous sulfate. Note the details not covered here.*

When submitting a question to Henry Fried, please enclose a self-addressed stamped envelope. Thank you.

□

THE SHIP'S CHRONOMETER © 1978

by Marvin E. Whitney
CMC CMW

REASSEMBLING AND SETTING UP THE MAINSPRING

There are two schools of thought as to how the fusee chain should be installed and the mainspring set up. On the Hamilton the chain was carefully wound into the fusee, except for the last turn before the fusee was positioned in the movement. Care was exercised so there was no side pressure on the links while the chain was being handled.

In this method after the fusee and barrel are in place and the barrel bridge secured, the train is blocked by lowering the train blocking screw between the arms of the fourth wheel. On those instruments not fitted with a blocking screw, loop a piece of soft brass wire through the fourth wheel and secure it to the nearest pillar or thread a short piece of brass wire stock through the fourth wheel and let it come to rest against the pillar. Then oil all of the pivots.

Next the ratchet wheel is fitted down over the square of the barrel arbor and the pawl and pawl spring (Hamilton's terminology), the click and click spring are installed. Hamilton utilizes a cover plate which fits over these respective parts. Then place the dust shield over the fusee arbor.

The fusee chain is then hooked onto the barrel and the barrel is wound about one turn. With a brass hammer, lightly tap the barrel hook home (Figure 1), after which a key is fitted over the square of the fusee arbor and turned, winding the remainder of the chain onto the fusee, checking the operation of the winding stop bar.

To set up the mainspring, place the let down key over the square of the barrel arbor and wind the mainspring fully. Then with a pair of tweezers, disengage the click from the ratchet wheel and let the mainspring down approximately one quarter turn.

The other method is to hook the chain onto the barrel and fusee after the movement has been assembled. The barrel ratchet wheel is fitted down over its arbor and the click is screwed into position, but not too tightly.

Fit the let down key over the barrel arbor and while holding the instrument on edge, hook the barrel hook end onto the barrel and wind the chain on it to within about five or six inches of its total length. Now turn the fusee until the chain hooking pin is opposite the barrel and hook the chain to the pin, making sure the chain is on the inside of the pillars. If the chronometer is fitted with a cross-over or reverse type of fusee, make certain the chain is on the barrel and fusee side of the center wheel arbor.

Continue to wind the barrel until the chain is tight. Then with a brass hammer, lightly tap the fusee hook home into the barrel hole. With a piece of sharpened pegwood, arrange the chain on the barrel so the spaces between the coils are about equal. See Figure 2. A small amount of oil may be

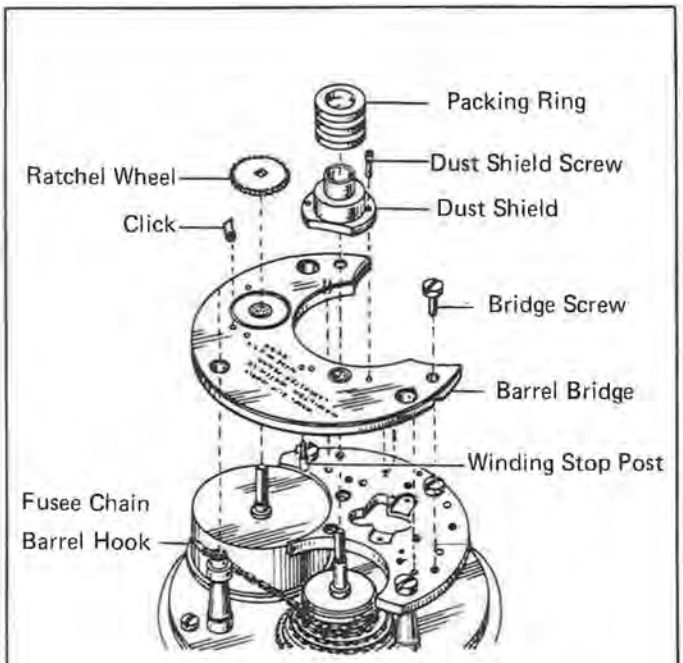


Figure 1. Barrel bridge and ratchet assembly.

Figure 2. Arranging chain on barrel.

seen oozing out of the chain onto the barrel. There is no need of being concerned, for this small amount will remain in place and help keep the chain oiled.

Replace the inverted movement in the bowl and turn the barrel arbor, which may in turn cause the fusee to rotate. When the fusee comes to a stop, continue to turn the arbor about one-half or three-quarters of a turn or if the ratchet wheel has a reference dot, turn until the dot is opposite the click, then tighten up the click screw. The mainspring is "set up."

The reason for setting up is to equalize the pull of the mainspring. Many chronometer makers use the adjusting rod to obtain the correct amount.

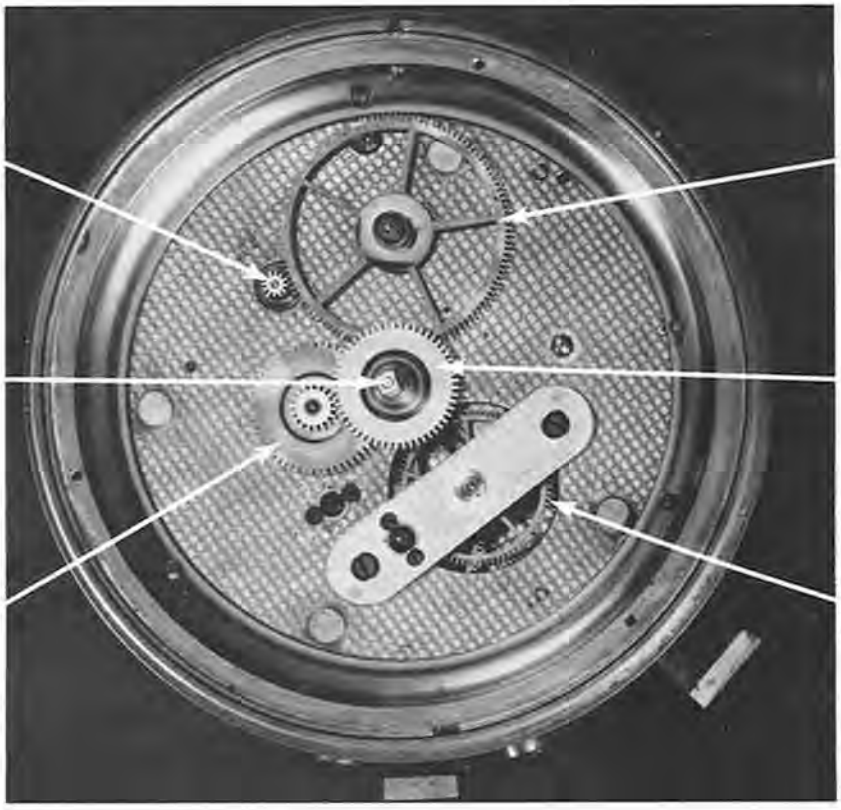
The adjusting rod is a long rod with a chuck type square similar to that on a tap wrench or large pin vise, having a square opening large enough to fit securely on the square of the fusee. On this rod, which is approximately 10 to 15 in. in length, is a sliding weight held in place by a tension spring or set screw.

To adjust the fusee to the mainspring, remove the third or fourth wheel by removing the bar bridge from the pillar plate. See Figure 3. This is done in order to make the adjustment easier and to avoid the risk of breaking the escape wheel pivots. If the chronometer is not designed for the removal of either wheel, great care must be taken so as not to break the escape pivots. On movements with a separate upper escape wheel bridge, the escape wheel need not be positioned until after the mainspring is set up. Hence, there is no need to remove the third or fourth wheel.

The jaws of the adjusting rod are attached tightly onto the square of the fusee so that it will not slip off. See Figure 4. The chronometer is then wound by rotating the rod, checking to see that the chain lies in the grooves until all of the chain is on the fusee and the stop works prevent further winding.

Hold the movement on edge and slide the weight along the rod until a point is reached at which the weight counter balances the force of the mainspring so the whole rests in equilibrium when left to itself. Turn the rod backwards one turn at a time and if equilibrium is maintained (i.e., the weights are lifted by the same amount on each turn, throughout each turn), the fusee is well adjusted. The train is allowed to run during the test. A word of caution–be extremely careful when the weights pass the halfway mark, as the rod

Figure 3. Bar bridge and dial train.



may fly over and give you a painful rap on the knuckles, or a blow to the face.

If the pull is less or the weights seem to be top heavy for the lower coils of the mainspring, set the spring up one or two teeth. Conversely, if the pull is too much, the spring tension is too much and the mainspring must be let down a tooth or two, and so on, until the pull is equal. Occasionally the equalization of pull cannot be obtained due to a set mainspring or the length is incorrect.

In the old days when mainsprings were easily obtained, such a spring would be replaced. Today it is not easy to find suitable replacements, so be careful about replacing the original mainspring even though it is not perfect, unless broken. Should this be the case, just set the spring up to a point where you achieve the best results.

Some repairmen choose not to use the adjusting rod and set the mainspring up by checking the motion of the balance, the motion being anywhere from one to one and one-half turns. They will check the motion of the balance when the chronometer was fully wound and again when the instrument was near run down to determine if the mainspring was set up too much or not enough. In most cases the mainspring is of sufficient length so that when it is set up, there is still a reserve of unwound spring when the chronometer is fully wound and when the mainspring is near run down or near the lower end of the fusee. In other words, there is a reserve at both ends, with only the middle portion being used.

If the motion of the balance falls off when the chronometer nears run down, it would indicate that the mainspring should be set up more, possibly another quarter turn or so. Should the motion be too great when fully wound, back off or unwind the mainspring about a quarter or a half turn. Thus, by checking the motion and setting up or backing off the power of the mainspring, equalization of power is achieved.

After setting up the mainspring on the Hamilton, turn the movement over and while supporting the upper center wheel bushing on a small hollow flat face stump, install the cannon pinion. Check the friction by placing the minute hand in place and turning in a counterclockwise direction, increasing or decreasing the friction in the same manner as you would on a watch or clock. On chronometers other than the Hamilton, there is no need for supporting the upper center wheel when replacing the cannon pinion since the pivot is not fitted into a bushing.

Remove the minute hand and install the minute wheel, hour wheel and winding indicator wheel. See Figure 3.

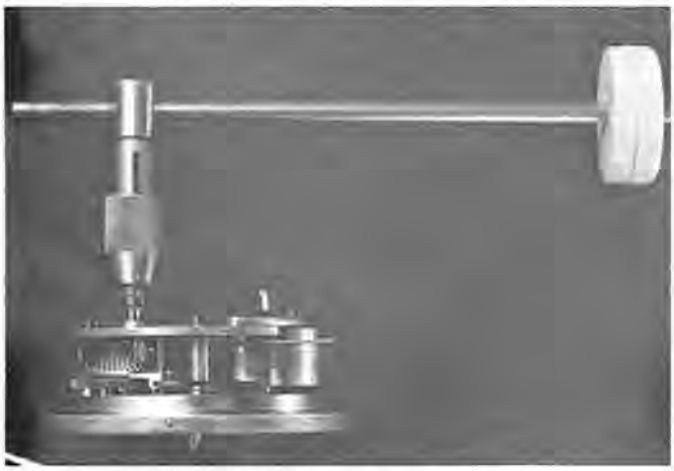


Figure 4. Adjusting rod attached to fusee.

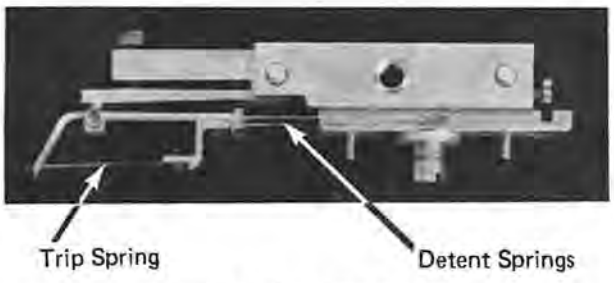


Figure 5. Hamilton detent.

Place the dial in position and while holding the dial in place with watch tissue, turn the movement over. Insert and fasten the four dial screws which enter through the movement ring into the underside of the dial. Dials on some movements may be held in place by top dial screws or tapered pins.

Turn the movement over and replace in the bowl. Then install the winding indicator hand with pointer on the "UP" and line with a small hollow flat face punch. Next position the hour and minute hand. Installing the hour hand at either 3 or 9 and the minute hand at 12 makes for easy alignment and placement of the second hand later on.

Now replace the chronometer in its bowl, train side up. On chronometers designed with a separate upper escape wheel bridge, install the escape wheel and carefully lower the bridge and secure it. Check the end shake of the escape wheel which should be 0.001 to 0.003 in. *Do not* oil the escape wheel teeth.

Before replacing the detent, check the tightness of all screws, the uprightness of the locking jewel and the straightness of the detent and trip spring. Next check the spring's action of the detent spring. On the Hamilton it was done by hanging a 0.077 gram weight on the locking jewel which should create an opening of approximately 0.005 in. between the detent spring and the stop button. If an adjustment is necessary, carefully bend the detent springs (the two thin ribbons, see Figure 5) until the proper adjustment is obtained, making certain that the locking jewel has not been thrown out of upright in the process.

To determine the spring action of the English type of detent, a one penny weight was hung from the locking jewel which should deflect it approximately 0.25 in.

If weights are not available, the test for a too strong a spring is done with the power removed, while power is necessary to test for a weak spring. Either the escape wheel is removed or the train is blocked so the escape wheel is not resting against the locking jewel. With the detent and balance assembly in place, the force of the balance resting against the trip spring should cause the detent to move away from an unlocking position half the amount required to unlock it. If the balance remains in this position, the detent is not too strong. However, if the detent forces the balance back against the strength of the hairspring, then the detent is too strong.

To determine if the detent spring is too weak, put a little power on the train. If the spring buckles or becomes slightly twisted when the escape wheel tooth comes in contact with the locking jewel, or if the detent fails to return soon enough after unlocking to lock the next oncoming tooth, it is too weak.

Next observe the action of the trip spring. A very slight force should be required for flexing. This spring should be set so that it does not fly back violently. It should lie flat and rest lightly on the horn or abutment arm.

Before placing the detent assembly in the movement, check to see that the contact face of the stop button is coincident with the detent seat on the detent support block, as

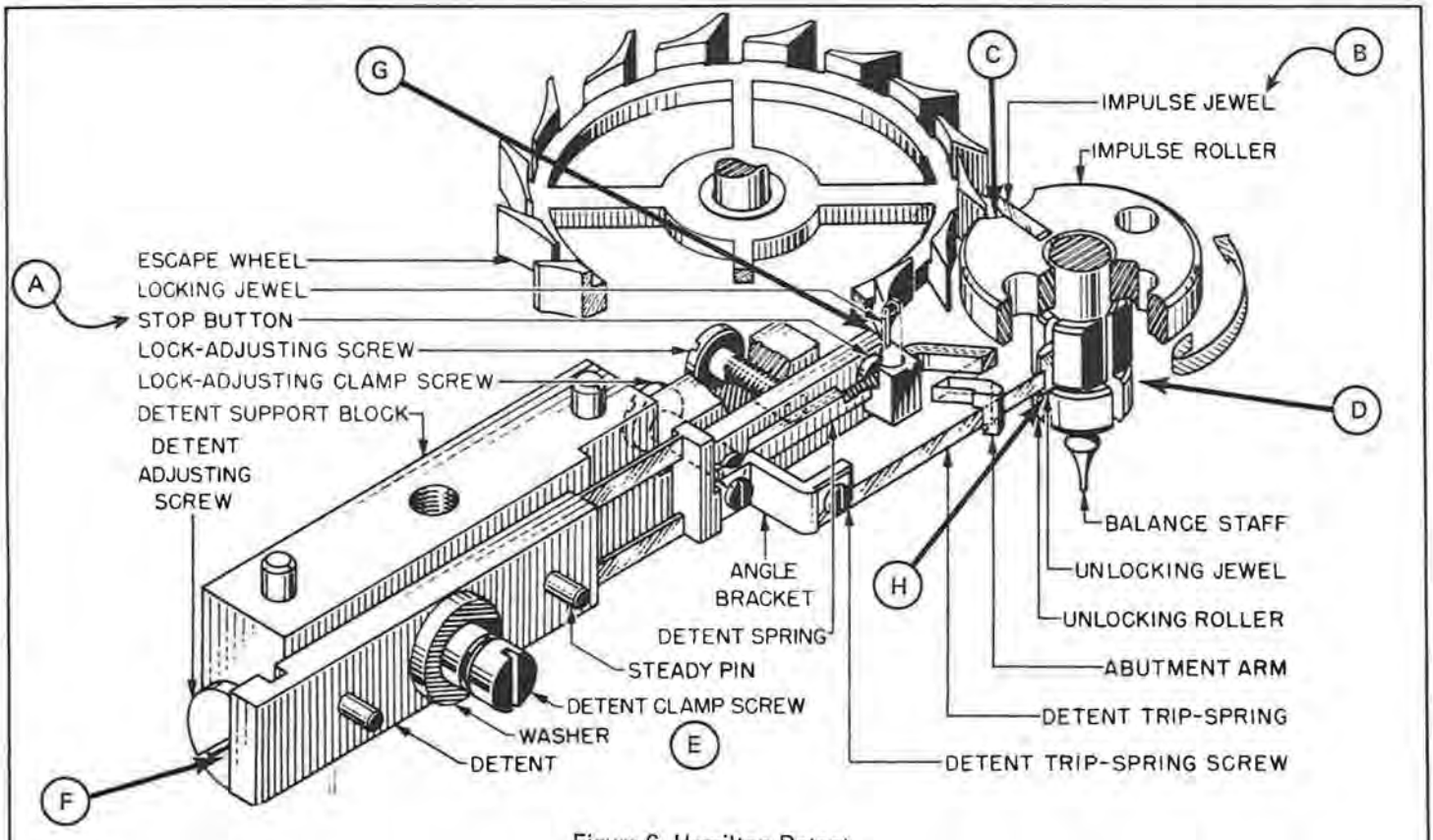


Figure 6. Hamilton Detent.

this relationship is intended to establish the nominal position of the locking jewel. Accomplish the adjustment by means of the lock adjusting screw, holding it securely with the lock adjusting clamp screw. See Figure 6, *A*.

Grasp the detent support block with a pair of tweezers and carefully insert it in under the upper train bridge, next to the escape wheel. Bring it up against the bridge, guiding the steady pins into their respective holes. Then insert the detent support block screw from the top of the bridge and tighten.

Next install the balance assembly and then carefully lower the balance bridge into place. Making sure that the staff pivots freely, enter the jewel hole while guiding the balance staff with tweezers. While holding the balance bridge in position with the fingers, insert and tighten the balance bridge screw, making certain that the end shake of the staff is sufficient before tightening the balance bridge screw. After the balance bridge screw is tightened, again check the balance staff end shake, which should be 0.001 to 0.002 in. Do not oil either the impulse or unlocking jewels.

Carefully rotate the balance until the hairspring stud is near the edge of the balance bridge. Lift the stud into place and secure. On the Hamilton the stud fits on the underside of the balance bridge so start the hairspring stud screw in its hole before lifting the stud in position. Then remove the blocking device.

Check the height of the escape wheel on the impulse jewel, *B* in Figure 6. The escape wheel should be high enough to clear the detent, but should be centered on the impulse jewel, with an equal portion of jewel above and below the escape wheel. If the escape wheel is not centered with the use of a staking tool stump and punch, drive the escape wheel hub up or down a small amount on its arbor.

Slowly rotate the balance wheel back and forth, checking to see that each escape wheel tooth is striking the face of the impulse jewel. See *C* in Figure 6. The teeth should not contact the edge of the jewel or roller or at any time enter the small portion of the roller crescent behind the impulse jewel. Should this occur, grasp the unlocking roller with a pair of brass-lined pliers and turn slightly in a direction so as to decrease the angular distance between the impulse and unlocking jewel. See *D* in Figure 6. Increase the angular distance if the drop is too great and decrease it when the escape wheel tooth fails to contact the impulse jewel.

Some Hamiltons will still be found to have the one-piece roller. If this is the case, a slight variation in drop can be achieved by reshaping the end of the trip spring, but the amount of reshaping should be limited so that the appearance of the spring is not appreciably altered.

Following are instructions for adjusting the Hamilton detent escapement. With the detent clamp screw loosened (*E* in Figure 6) enough to permit relative sliding between the detent and support block, turn the detent adjusting screw (*F* in Figure 6) to bring the locking jewel into a location where it will lock the escape wheel in a position establishing approximately equal clearance between the periphery of the roller and both escape teeth spanning the roller. Maintain the adjustment by tightening the detent clamp screw. Check for the specified lock between the escape teeth and the locking jewel, *G* in Figure 6 (approximately one-third the width of the locking jewel), and if further adjustment is necessary, make it by the lock adjusting screw, securing the position again by the lock adjusting clamp screw. If necessary, readjust the clearance between the roller and the escape teeth or equality. The clearance of the leaving tooth with the roller may be made slightly greater than that on the other side to compensate for the recoil of the escape wheel. Alternate these two adjustments until the specified conditions are attained. After each change, tighten the particular clamp screw to hold the position established. Observe clearances between impulse jewel and escape wheel teeth, and if excessive, push the impulse jewel radially outward to gain a greater impulse engagement, but do not let the clearances be dangerously reduced.

Ascertain that the mutual penetration of unlocking jewel and trip spring (*H* in Figure 6) is of such magnitude that the movement required for complete release of the detent is at least two times and not more than three times the movement required to unlock the detent. For the most effective gauging of this action, observe the widening space between the stop button and the locking jewel pipe while turning the balance slowly in a counterclockwise direction. If necessary, rectify this action by either moving the unlocking jewel in its slot or altering the length of the trip spring, but in any case do not permit the clearance between the detent and the path of the jewel to become less than 0.005 in. *Do not* use the detent adjusting screw to correct this action.

Check the safety function of the roller to definitely eliminate the possibility of "skipping." Skipping is the passage of one tooth or more of the escape wheel beyond the locking jewel immediately following impulse. To test for this, turn the balance wheel slowly counterclockwise to unlock the escape wheel. When the escape tooth drops on the impulse jewel, reverse the direction of rotation of the balance wheel to permit the escape tooth to pass over the tip of the jewel into the small portion of the passing hollow behind the impulse jewel. At this point, again turn the balance wheel counterclockwise to permit the escape tooth drop from the hollow. Upon release, the tooth immediately ahead of the one just released from the hollow of the roller must be arrested by the locking jewel. Failure of this action to take place can usually be attributed to late release of the detent by the unlocking jewel. The correction generally applicable is reduction of the penetration between the trip spring and the unlocking jewel. Other causes may be insufficient lock or insufficient initial tension on the detent spring.

Next month, we will cover the adjustment of the trip spring, putting the chronometer in beat, and a final check before placing on test. □

Essence of Clock Repair

by Sean C. "Pat" Monk
CMW

Part XXXIX

THE ANSONIA LONG-DROPPED OCTAGON HOUR STRIKE (THE SCHOOL CLOCK)

This clock is closely related in many ways to the Seth Thomas clock described in Part XXXVII. However, in spite of the similarity, the concern of our writing is to make the aspiring clock student aware of the general functioning of the several wire locking and unlocking hooks, locking and unlocking pins, and the function of the count hook. In addition, it is important to remember that in all striking clocks there occurs a mechanical action called a warning before the actual strike occurs. If we briefly describe the striking operations of several of these closely related mechanisms, we feel that the student will be able to grasp the functions by virtue of our repetition.

Also, the purpose of our writings on various clocks, our "essence," is to blend some history into each piece. History without mechanics does not invite the curious. Conversely, mechanics without history is an invitation to destruction of the history. In brief, we shall be more careful about our restoration work and much happier with our end results, if we are concerned with the history of each piece.

Historically, the Ansonia long-dropped (or long-drop) Octagon is one of the most sought after clocks by present collectors. The fact that many of us remember its familiar face in the schoolroom and listened with impatience to its striking hours, is just a sentimental reason we have for wanting one. They travelled the world over and were almost as popular in Europe and other places abroad as they became in their homeland, the U.S.A.

Primarily, they were put out by the Ansonia Clock Company who began making clocks in 1849. Our particular sample, shown in Figure 1, is marked as patented June 13, 1882. It is an eight-day clock (most of them were and many ran longer), hour-strike only. The hour strike only seems to be an indication that schoolrooms, primarily, were the subject for their destiny. For who wanted confusing half hours struck in between the lonely hours? Neither watchful teacher, nor restless student, we are sure.

In removing the movement from the case, it is necessary to remove the suspension spring and rod at the same time. This is because these components are suspended, independently, on the back of the clock case. Failure to do this will cause bending, or more serious damage, to the thin brass crutch arm attached to the pallet arbor.

The going train is standard in nature, consisting of a main wheel or great wheel (carrying mainspring, click and ratchet), second, third, and escape wheel. The pallet, or anchor, is of the thin strip steel, recoil type, meshing with a 42-teeth escape wheel. There exists a peculiarity here which is both a phenomenon and a disadvantage. The phenomenon

Figure 1.

is that the escape wheel carries the second hand, as may be observed in Figure 2, where we show the second hand in position on the escape wheel arbor. The disadvantage lies in the necessity for the escape wheel to have a large amount of closely related teeth, in order to obtain the 60-second rotation of this wheel. The arc of motion of the pendulum is thereby greatly reduced. As a result, the pendulum must be very closely in beat, with a very minimal amount of existing frictional forces, or the clock will be subject to stoppage. If set up properly, however, it is extremely accurate to within a few seconds per day. In this respect we might mention that, once again, the longer the pendulum the greater the accuracy and in this case our point is proven. The "long drop" of our case provides for a 1 in. suspension spring attached to a steel rod pendulum wire of 10½ in., plus a brass-hooked attached wooden pendulum rod measuring another 8½ in. from the hooking axis to the center of gravity of the bob. The latter is of heavy cast iron, painted gold on the face to give a significant brass effect.

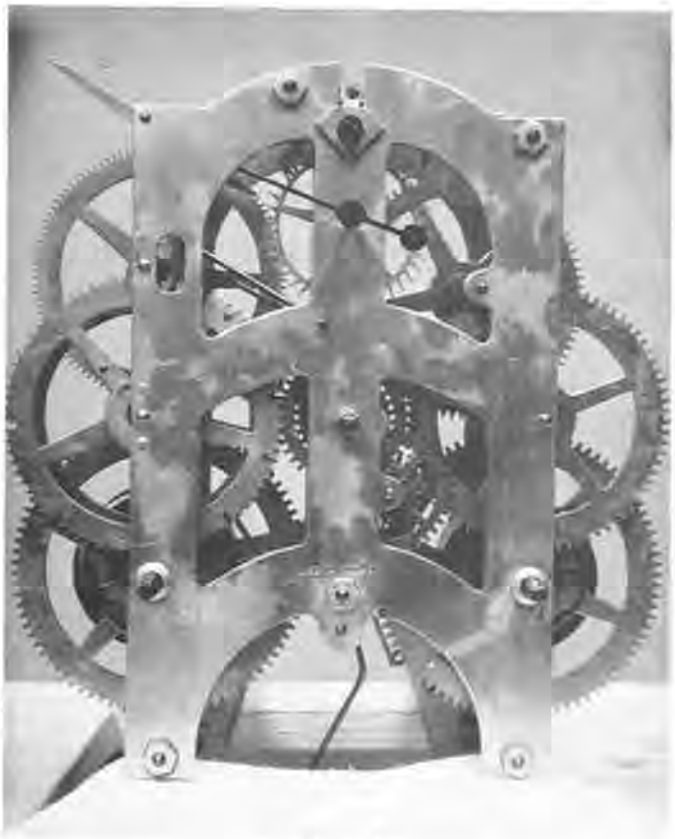


Figure 2.

The striking train, which can be observed on the left side, Figure 2, consists of its own main wheel (with spring, click and ratchet) which meshes, via its pinion, with the hammer (pin) wheel. On the same arbor, but not fixed permanently to it, is the count wheel. This count wheel is the large wheel, left center in Figure 2, the count hook residing in one of the deep slots cut into the rim of the wheel. The count wheel has 78 teeth, with a series of teeth from one to twelve, the latter being separated by 12 deep cut slots. The latter are for the fall off and locking of the count hook at the completion of each complete hour strike. If we look at the movement, physically, Figures 3 and 4, it will be seen that the count wheel (while free to rotate on its axis) is slightly frictioned by a brass friction plate set between it and the inside of the front plate. This small amount of friction is very necessary to ensure clean droppage of the count hook into the teeth on the count wheel. This is a point we have mentioned before, but must re-emphasize, as its extreme looseness can promote erratic striking. Conversely, if the friction on this wheel is too tight, the strike mechanism will bind up.

The hammer wheel, as mentioned, via its pinion, meshes directly with the main wheel (or great wheel) which supplies the power to the strike train. The hammer wheel itself cannot be observed in Figure 2 as it resides immediately behind the count wheel, on the same axis. However, the hammer wheel is permanently secured to its axis (arbor) and thereby becomes the second strike train wheel. The hammer wheel, which has a series of brass hammer pins set around its near perimeter (between it and the count wheel) is also responsible (when released by the action of the warning wheel) for the actual and physical striking. This is achieved by its physical kicking of the hammer tail the correct number of kicks.

The warning wheel, via its pinion, is meshed directly with the hammer wheel. It is the last of three wheels in the simple strike train and is meshed directly with the strike fan (or fly), the latter controlling the striking speed. On its inside brass boss and permanently attached to it, is a brass locking cam. We have described something similar in a previous article. However, we shall dwell again on it because it is virtually duofunctional: (1) together with its warning set on its rim, it controls the warning, and (2) together with the warning pin and locking hook (which is normally at rest close to the slot in the locking cam), it plays an important role in limiting the hour strike.

There are several other factors involved in the limiting of the hour strike. If we hold the movement in our hands and peer beween the plates, we will observe a short steel unlocking pin (or tail) on the center arbor and bent at a right angle. As the minute hand moves close to the hour position, this short tail moves against a brass locking-unlocking plate and moves it upwards, freeing a steel unlocking hook. If we look down into the movement again, we will observe that this unlocking hook is permanently secured to a heavy steel arbor situated between the plates above and slightly to the left of the center arbor.

Further examination will show us that this unlocking hook is not alone on this steel arbor. What else is on it and therefore turns with it when it is set free? Look again and you will see that there are three other steel levers (hooks) on this arbor, all of which must be set free from something when the unlocking hook is moved initially through the action of the unlocking pin (tail) on the center arbor. What are these three hooks? They are the locking hook (which we have mentioned), the warning hook (which normally rests against the warning

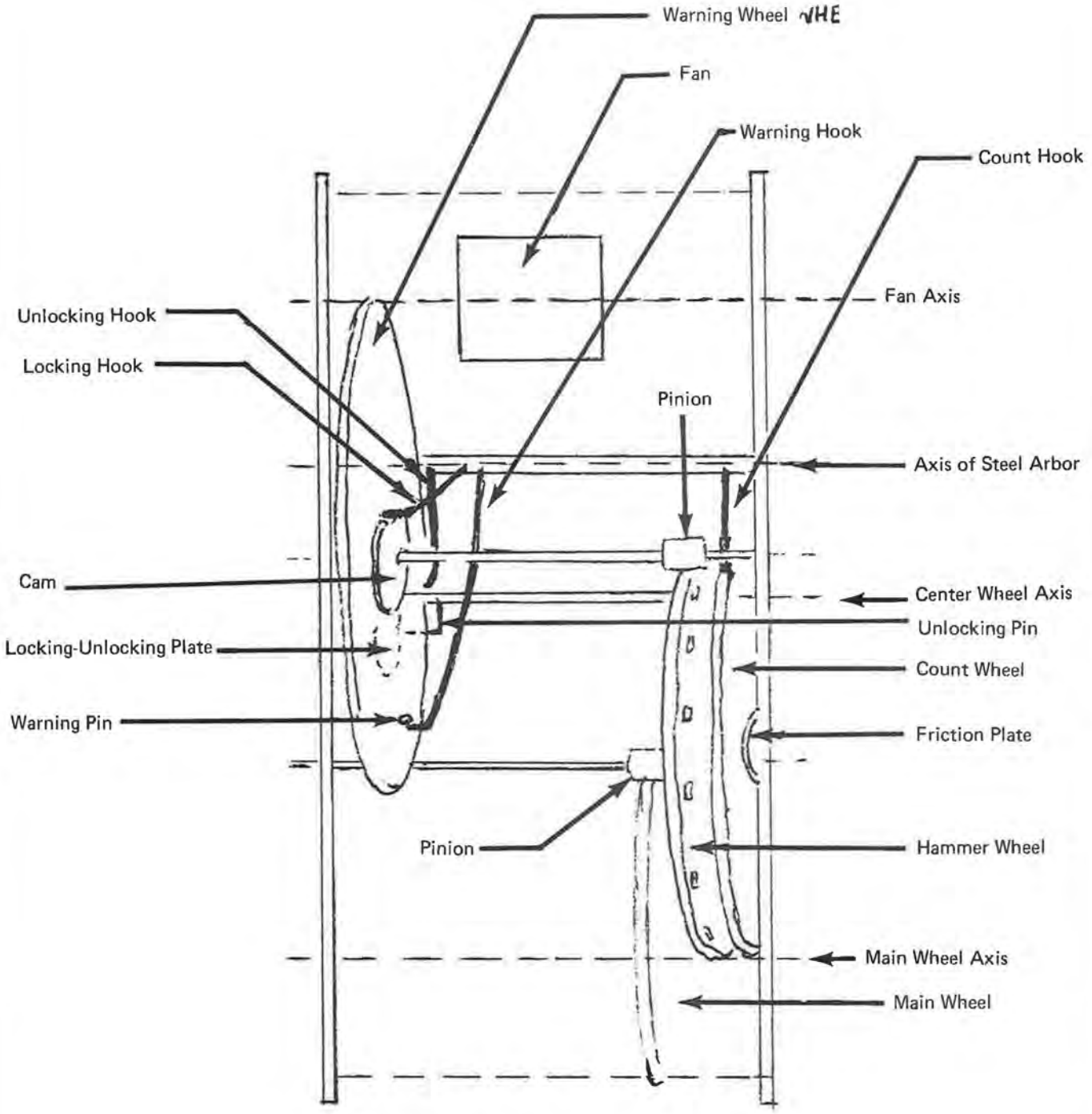


Figure 4. Hook System in Strike Mechanism.

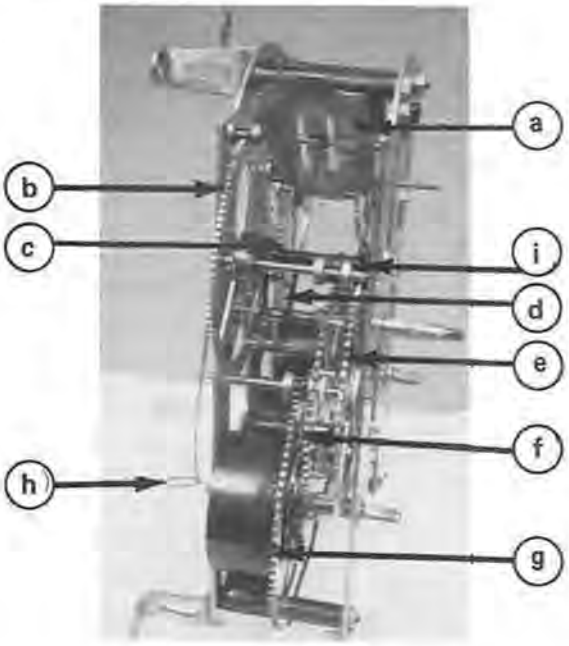


Figure 3.

pin on the warning wheel) and the count hook (normally residing in one of the deep slots in the count wheel).

As the steel arbor with the four steel wire hooks is moved, as just described, the locking hook moves out if its cam on the warning wheel, temporarily releasing the warning wheel, until prevented from further movement by the position of the unlocking hook in its brass locking-unlocking plate. The warning has now been completed.

When the minute hand reaches the hour, the unlocking pin (or tail) on the center arbor reaches its zenith, finally dropping back into a locked position in the toe of the brass locking-unlocking plate. In the meantime, however, the steel arbor with the four hooks attached has also been allowed to move a little more. The count hook, together with the locking hook (against the locking cam) and the warning hook (against the warning wheel warning pin) are now completely free. The clock continues to strike until the count hook falls into the next appropriate long slot in the count wheel. When this occurs the warning hook falls and arrests the brass warning pin on the warning wheel. This completes the cycle.

A word of warning: many owners of such old clocks, especially if they are new owners, or just getting it back from your shop for the first time, will compain about the noise of the warning. It must be carefully explained to them that this is a natural noise, provided that the warning wheel and its fan (fly) have been properly lubricated. It might also be advisable to explain that the warning merely prepares the clock for striking. In other words, it holds the strike train in an arrest position until the minute hand is lifted to its high point for striking to occur on the hour. The warning wheel makes approximately one half turn before the strike is executed.

A word of interest: the glass panels on our subject clock are not the originals. However, we might point out that this type of clock (as most clock buffs are aware) is called a regulator. The original lower glass tablets were either painted or decaled, with the word "regulator." Why? Because it was immediately behind this sign on the glass panel that the regulator (adjusting nut below the pendulum bob) exists. And, as far as we know, this is the only reason why they are called regulators. □

In the Spotlight

by Orville R. Hagans

CMW CMC FBHI

BRITAIN'S HISTORIC CHURCH CLOCKS

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

One of the most celebrated church clocks in England is that at St. Dunstan's, Fleet Street, immortalized by Dickens in *The Chimes.* Fortunately, the old clock survived the aerial blitz of London, although its canopy has been on fire.

It still keeps excellent time, in spite of bombing in the vicinity. Figures of King Lud and his two sons still stand in the porch.

The oldest clocks in Britain are to be found in the churches. As far as can be traced, the first clocks to be used in the country were set up in its ancient cathedrals, and a few of them are still ticking away, although 500 years old, remarkable tribute to the genius of medieval craftsmen.

One of these venerable timepieces was restored just before the war in Durham Cathedral. It is one of the most interesting of old ecclesiastical clocks, although its history does not go back so far as that of a few others. Probably its career has been more checkered than any. Originally set up by Prior Castell (1494-1519) on the east side of the Rood Screen in the nave, it was removed at the Reformation. When the Rites of Durham were completed in 1593 it was "betwixt the Chapter House and the Te Deum Wyndowe," that is, at the end of the south transept.

It is a huge clock, 40 feet high, with three dials showing the day, month, and age of the moon. During the seventeenth century, 3,000 Scottish prisoners burned the stalls and much of the woodwork of the cathedral, which suffered like many other churches at the time of the Puritan ascendency. Cromwell housed the prisoners there after Dunbar and it is said that they spared the clock because of the thistle which stands above the dials. But during the middle of the last century, it fell a victim to the pious hands of the Dean and Chapter, for the clockcase was taken down as being "of inferior workmanship."

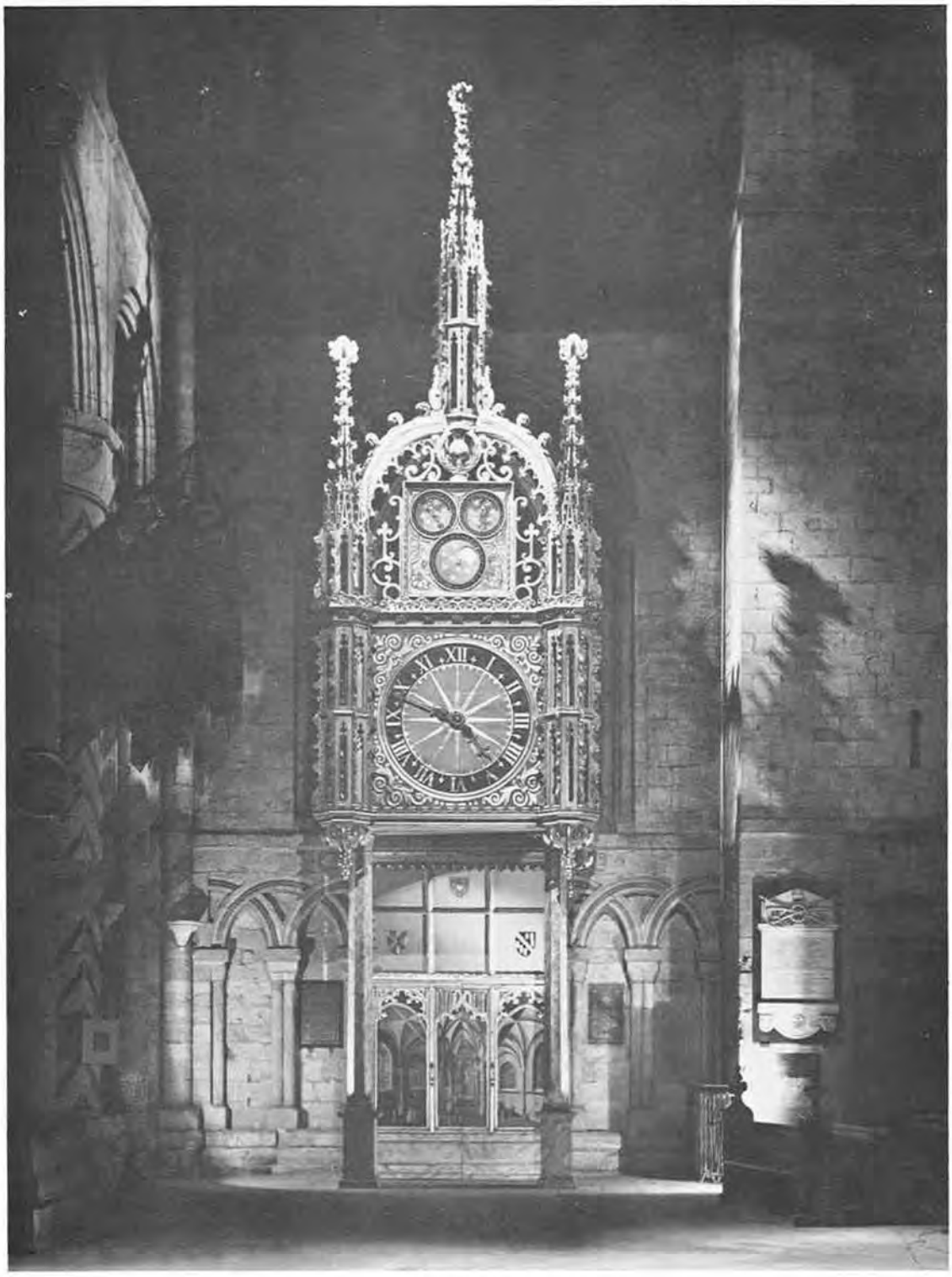
Some of the wood was dumped in the crypt, more passed into private hands, and some even found its way to the chapel of the Farne Islands, associated with Grace Darling. For two years, Dean Alington collected the fragments which have turned up in the most extraordinary places. He discovered one behind a sofa in a Northumberland house, and found other pieces in the university libraries. The woodwork was cleaned, revealing all the beauty of the old colors, red, blue, green, silver, and gold, and the rest has been carefully remade, and the whole restored, making a magnificent piece of early painted woodwork which is probably without parallel in England.

As has been suggested, clocks have been associated with the churches from the earliest times. Clocks gradually replaced the sundials, which were found on the walls of the churches in order to tell the people the times of the services. St. Paul's Cathedral is said to have possessed a clock in the thirteenth century, and one was put up in Canterbury Cathedral in 1292. At St. Albans the bell tower or "clock-house" stands alone, having no church attached, and it was remarkable for containing an ancient clock made by an abbot of St. Albans in 1326. This particular clock was said to have been unique, being such as then was "nowhere else in Europe," and showed various movements of the heavenly bodies.

About 1288 the famous Clock-House near Westminster Hall was built and fitted with a clock out of a fine imposed on the Chief Justice of the King's Bench. In the reign of Henry VI, it was considered of such importance that the King gave the keeping of it to William Warby, head of St. Stephen's, together with the payment of sixpence a day from the Exchequer. This clock was probably a very indifferent timekeep (most early clocks had to be corrected periodically with the aid of the sundial), but on account of its antiquity it was allowed to remain until the time of Elizabeth. The ruins of the Clock-House survived until 1715. A few years after the erection of the Westminster clock, in 1310, a monk Wallingford set up another clock in London, and this was reputed to keep accurate time.

Probably the oldest cathedral clock is the one at Salisbury. It dates back to 1386, and not many years ago, its movement was discovered in the central tower, and the reconstructed clock is in the north transept. The clock bears close resemblance to the celebrated Wells Cathedral clock. This comes next in age to the Salisbury clock, and the original works were made in 1392. These are going again now and can be seen in the Science Museum, South Kensington. Glastonbury had a clock very early, and it was reputed to be the work of a monk, Peter Lightfoot. It was removed to Wells Cathedral at the dissolution of the monasteries, and is now in the north transept. This timepiece is now moved by modern mechanism. Dial upon dial tells the passage of sun and moon and month and day and hour. At the striking of the hour, "Jack Blandiver" kicks his bell, and four knights move around as if taking part in a tournament, and at a certain point one of them appears to be almost unhorsed.

This maneuver attracts the interest of many visitors, just as does "Jack Smite-the-Clock," near the organ in Southwold Church, one of the grandest in Suffolk. In the vestry of York Minster are two wooden figures dressed in armor of the



St. Dunstan's Cathedral.

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time of Henry II, which belonged to an ancient clock removed in 1830.

Wimborne Minster, Dorset, famed for its chained library, and for the curfew custom which is still maintained, has a very old mechanism, reputed to be of the fourteenth century. The earth is represented by a globe in the center; and the sun by a disc which travels round the earth once every 24 hours, thus showing the time of day. The moon is represented by a globe also, so fastened to a blue disc that it revolves once during a lunar month. Half of this globe is painted black, the other half is gilded. The age of the moon is shown by the amount of gilded part visible. When the moon is full, the whole is gilded; when the moon is new, the whole is black. The mechanism of this queer "clock" is fixed in the tower above.

Ottery St. Mary, Devonshire, has a very beautiful church, celebrated for its ancient clock. Some authorities put it as early as the fourteenth century, but others are of the opinion that it may be as late as the sixteenth. It is still operated by its ancient works, at any rate. These were made by hand with the help of a compass, and they were put in order a year or two back by a skilled horologist, Mr. J.J. Hall, who added but one pin. In the same country, Exeter Cathedral had a clock as early as 1318. In another part of the country, Gosberton (Lincs) church clock, which is over 200 years old and was considered to be beyond repair, was put in going order in 1936 by Mr. Alfred Minnis, of Spalding, and expert in the history of clockmaking, in his spare time. The clock was afterwards returned to its turret. In the same Fenland area we find the splendid church of St. Margaret's, King's Lynn, which had a clock at least as early as 1376,when the first mention of one is made.

When some years ago a fire broke out in the belfry of the village church of Combe, near Woodstock, Oxfordshire, the bells fell to the ground and the clock was reduced to a twisted mass of old iron, which was presented to the Museum of the History of Science in Oxford, where it underwent restoration. An interesting question has arisen with regard to this clock. It is very much like the fifteenth century clock which long stood in Dover Castle and which is now in the Science Museum, London. Were they both made by the same hand? Combe and Dover are not so remote as distance might suggest, for a number of manors in the Combe district were held by the Barons Arsic seated at Coggos, near Witney, and the fee under which they held their land was that of providing "Watch and Ward" and Dover Castle.

An Oxfordshire blacksmith, it is known, was making clocks in the late sixteenth century and at the beginning of the seventeenth century. If the Dover clock is not so early as is thought, it is possible he made both, for the method of construction is identical, even down to the peculiar and rather puzzling cranking of the arm for carrying the lever that lifted the hammer. For blacksmiths to make clocks was by no means unusual. Richard de Wallingford, mentioned earlier, was the son of a St. Albans blacksmith, and it is possible he made both the St. Albans and the London clocks.

Rye church has a noble mechanism, still in perfect order, although it dates back to the sixteenth century. It was not until June 16, 1657, that Christian Huygens, the Dutch astronomer and mathematician, presented his first "pendulum-clock" to the States-General, but the pendulum in a crude form was in use before that, for Rye church clock has one which hangs down inside the building. It was shortened by about 9 ft when the church was restored. Outside, above the church, are two quarter-boys.

The famous clock of St. Dunstan's Church, Fleet Street, mentioned at the beginning of this article (in the old church where Isaac Walton was a sidesman) was restored as the result of the generosity of the late Lord Rothermere. This clock's early history is associated with the London of Charles II, and it was set up as a thanksgiving for deliverance from the Great Fire, which stopped within a few yards of the church. Thomas Harrys, of Water Lane, Blackfriars, was approached for an idea. There were to be "two figures of men with pole-axes to strike the quarters. I will do one thing more which London shall not know the like; I will make two hands show the hours and minutes without the church, upon a double dial which will be worth your observation, and to my credit."

The clock, as restored, is essentially the same today. A story runs that the Marquess of Hertford used to be taken to see the wonder when a little boy, and he told his nurse on one occasion that he would buy the clock when a man. However, the nurse told him church clocks were not for sale. But the obstruction caused in Fleet Street by people who waited to see the figures strike was such that the authorities asked to have it removed, and when the old church was demolished in 1829 the Marquess purchased the clock and figures of King Lud and his sons for 200 guineas. It is said the news of the passing of the clock and the Jacks caused Charles Lamb to shed tears. These relics of old London rusticated for years within the grounds of St. Dunstan's Villa, Regent's Park. The clock was wound up regularly and the savages received fresh coats of paint, until there came a long period of neglect and a new owner for St. Dunstan's.

The restoration of the clock called for much horological skill, but now the carved figures strike again. Cowper referred to the clock in these lines:

When Labour and Dullness, club in hand,
Like the two figures of St. Dunstan's stand,
Beating alternately, in measured time,
The clock tintinnabulation of rhyme,
Exact and regular the sounds will be,
But such mere quarter strokes are not for me. □

Capping a Center Pinion

by Paul Fisk

The broken hole in the center pinion–is this all human error or should the fault be directed at a flaw in the steel? If we examine Figure 1 closely, we can see that there was a probable flaw in the steel. In any case, there was really no need to break out the hole. This imperfect pinion very likely could have held a pin with no problems.

Figure 1.

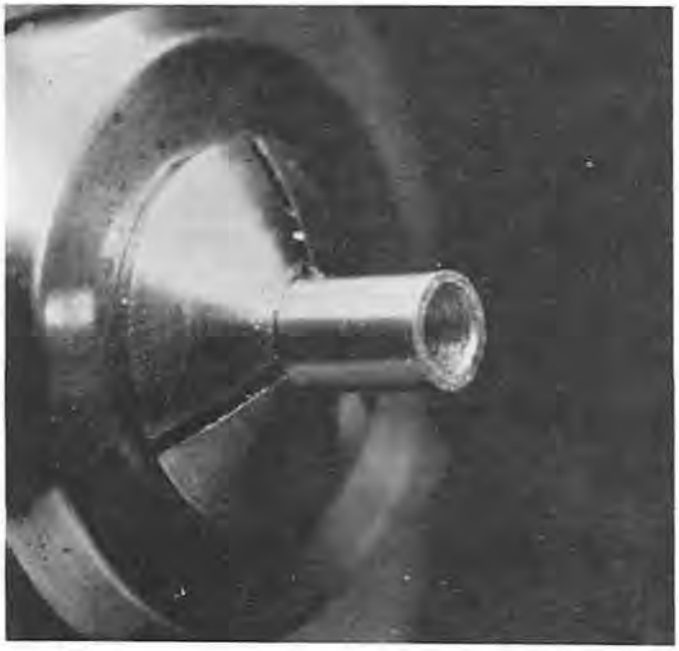


Figure 2.

When removing pins from plate holes, there are times that I wonder if the previous repairman had driven the pins with a 16 pound sledge hammer. In reality, a person can easily squeeze 5 to 10 pounds of pressure with a pair of pliers. Exerting this much pressure on thin-walled holes is asking for trouble.

To remedy our problem, a very respectable job can be done. Cut off the end of the post 2 to 3 mm from the hole. Very likely, some of the temper will have to be drawn. Then mount in the lathe. This, of course, means removing the wheel, unless a cradle arrangement is used with the lathe. I prefer the post mounted in a collet for support. In Figure 2, a hole is drilled for the cap. In Figure 3, a shoulder is turned

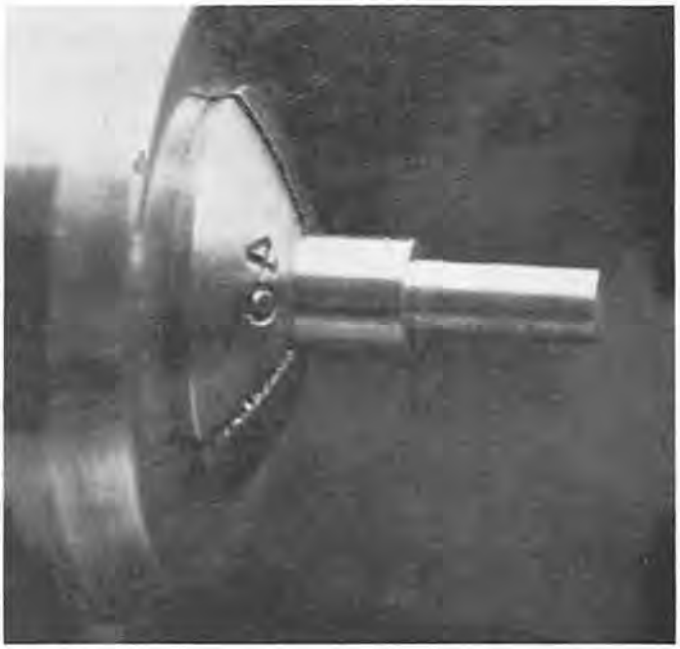


Figure 3.

and tapered very slightly for the plug (using drill rod steel). This is very much the same operation as repivoting. Our cap now in the rough is driven home for a snug fit (Figure 4). From here work the post to a slight taper and polish (Figure 5). And if this is carefully done, only close inspection will detect that we have added to the post.

Now we are back to the pin hole. Use a collet or cradle chuck for support and drill the hole (Figure 6). If a spear head or pivot drill is used, treat it with great respect. Too much pressure will result in a shattered drill.

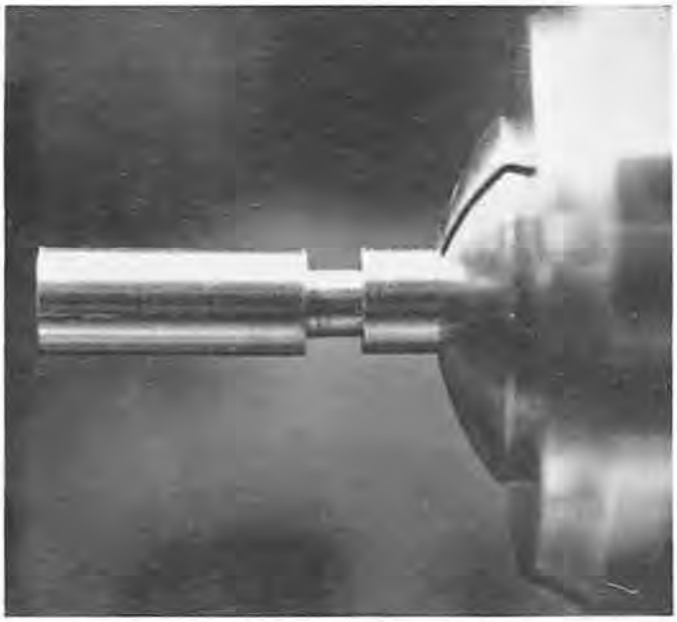
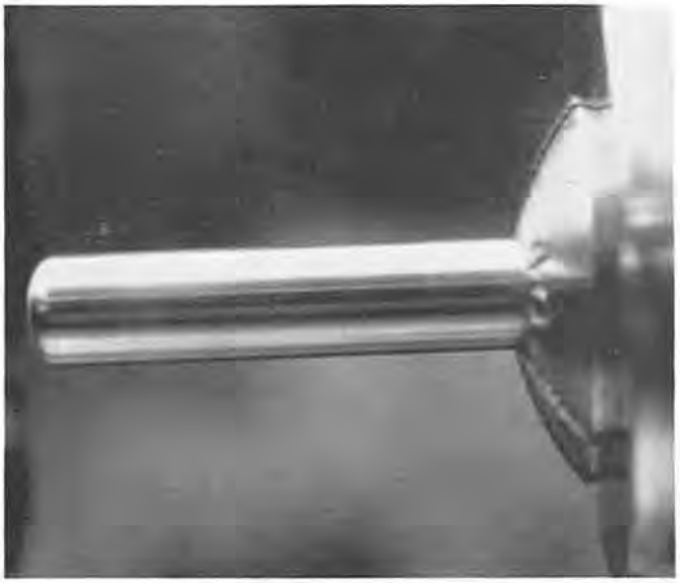


Figure 4.



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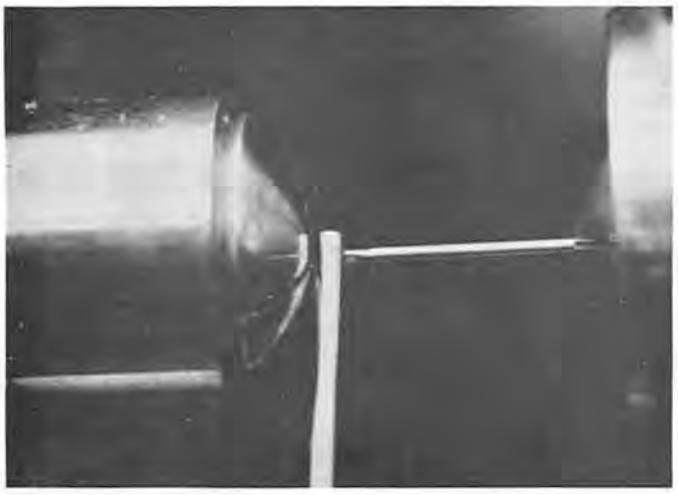


Figure 6.

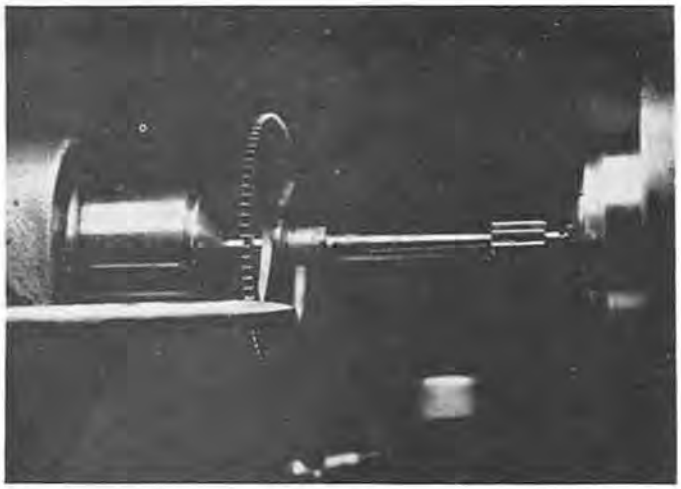


Figure 7.

And finally, the wheel must be remounted. Since this is a French pinion, the wheel is soldered in position. Suspend both pivots so the arbor will turn true (Figure 7). While the solder is hot, turn the lathe moderately slowly and touch the wheel lightly with a blade. It may take a few skillful tries, but the wheel will come true. Now turn off the excess solder. Polish and clean.

The question may arise if there is now sufficient support for the long post. If drill rod steel is used, it should work well—even if left untempered. I cannot count the number of posts and pinions I have capped, but there have been many, with no side effects. □

AFFILIATE CHAPTER COLUMN

by Willard Blakley CMW

This month I will deviate from the usual format to share with you a topic which affects all of us in one way or another—shoplifting. As consumers, we are all forced to pay higher prices to offset the loss of others to shoplifters. As retailers we all know how we are paying for shoplifting, right out of our own pockets. The annual loss from shoplifting is estimated at about $205,000,000,000. A startling figure? I agree.

By being aware of some of the methods currently being used by shoplifters, we can at least put up a line of defense to protect ourselves. There are several kinds of shoplifters: the kleptomaniac, the casual larcenist, the nonprofessional (the nonprofessional is responsible for about 85% of all shoplifting thefts), and the professional. As a retailer, you can be on the alert for several things which may help cut down on your losses.

The coat. A large, loose coat is essential to many of the techniques which follow. Its size makes merchandise which is to be stored under it inconspicuous.

The sling under. This operation is generally used for articles which many of us would not have occasion to stock. Primarily used for large articles or clothing, this technique simply involves articles being quickly folded and slung under the dress or skirt of the "booster" or female shoplifter, where they are held in place between the thighs. The booster then walks to a restroom or secluded place where the merchandise is removed and placed in a shopping bag. In many cases the booster is so adept that little difference in the manner of walking can be observed. I know of one instance where booster actually left a store with a whole ham by using this method!

Boosting pants. These large, silk bloomers with heavy elastic around the waist and legs are worn under a dress. The booster merely crouches, quickly lifts her dress and drops the stolen article into the top of the boosting pants; from there the merchandise simply slides down into the legs. On occasions a male shoplifter may wear boosting pants over his trousers and under a topcoat. An astonishing amount of merchandise may be stolen in this manner.

The umbrella. The lowly umbrella is used for small items, including watches. This innocent-looking tool is usually equipped with a hooked handle so that it may be hung over the arm and carried beneath the level of the counter. The thief merely brushes articles into it. After accumulating several items, the thief leaves the store and empties his take.

The excitement routine. This requires two or more people and relies on one thief to create confusion or excitement sufficient for the partner to steal. One will usually start an argument with a clerk and while the excitement is going on, the other will take the merchandise. Shoplifters have been known to start fires in small stores in order to create confusion to cover their activity. If there are more than two operating, it is likely that two will engage in a violent argument between themselves, while another carries out the theft.

The box. An ordinary cardboard box is wrapped to look like a new purchase. One end of the box can be opened to permit stolen merchandise to be pushed into it. After commiting the theft, the thief carries the box with the open end on the palm of his hand. In other cases the box is wrapped to resemble a gift; a slit is made in the end with a razor blade, permitting the insertion of stolen articles.

The stove pipe. This may be any object which is hollow and cylindrical or which may be rolled into a tube, such as a magazine. The tube is wrapped in paper, one end is sealed, the other end open. Small articles pushed into the open end are prevented from falling out by the sealed end.

The shoelace trick. This method is usually used by young boys and girls or petty thieves. The thief selects a piece of small merchandise, such as jewelry, moves it to the end of the counter and "accidentally" knocks it off on the floor. The thief then bends down on the pretext of tying his shoelace and retrieves the article. If unobserved, he will quickly pocket it; otherwise he will apologize for his clumsiness and return the article to the clerk.

The armpit carrier. Small articles are quickly hidden under the armpit of the usual jacket or coat where they may be carried almost indefinitely.

The sleeve sneak. A common trick of male shoplifters is to palm a small article such as jewelry and quickly slip it up his sleeve. When he places his hand in his pocket, the article slides down into the pocket.

The purse receptacle. The female shoplifter works in the same way that the sleeve sneak does by rolling or slipping articles into her own purse or handbag, which is placed in her shopping bag or grocery cart. People who steal by this means never open their purses at the checkout counter.

Eight story coats. Designed along the lines of hunting jackets, these coats have large pockets or hooks just waiting to be "lined" with your merchandise. Some ideas you might employ to cut down on losses due to shoplifting are to establish observation points in the store, exchange of information on known shoplifters, on the job training ofstore personnel in the detection of shoplifters, and keeping strict records on all serially numbered merchandise. But learning the tricks of the trade is probably one of the best ways to cut down on losses and thereby increase profits.

Finally, we must use caution in our everyday methods of doing work in our departments. I had occasion to be in a large reputable jewelry department recently and was appalled to see over 50 repair envelopes lying out on the display cases

while three sales clerks busily waited on customers on the other side of the department. None of the personnel was on the alert about these jobs. It would have been no problem at all to have just brushed all of them into a large handbag or shopping bag. Be aware, be alert. Don't give a shoplifter the opportunity to put the "five finger discount" on your merchandise, or worse yet, on a repair job.

(Reprinted with permission from the Ohio Police Officer, May 1978.)

CALIFORNIA

Francois R. Girardet, representative of the Watchmakers of Switzerland Information Center, Inc., was guest speaker at the November 12 meeting of the Bay Area Watchmakers Guild. Mr. Girardet answered the question, "What is a good Swiss timepiece?" His presentation also included "an overview of Ebauches," and was accompanied by a slide show and technical sheets.

The Citizen Seminar/Bench Course of October 15 was another successful merging of Guild and manufacturer/distributor efforts. Stan Greenberg, Elefant's Office Manager, aided the BAWG in putting on a well run and reasonably priced bench course. Elefant was also represented by Maurice Berger and Bob DeMasi who kept an eye on the details. These two representatives are known to many of us in the retail operation.

Citizen's representatives were Ray Hiashi, Citizen's technical services manager from Los Angeles, and Gene Kelton, the bench course instructor. For those of you who recognize Gene Kelton's name, he has been active in the AWI. These men presented an informative, interesting, and well organized bench course. Many of the members and guests commented on the quality of this analog quartz bench course. The film, which preceded the course, showed up-to-date Citizen factories around the world which employ a large number of people and the latest mechanization.

The bench course was well attended by some 80 members and guests. Door prizes were given at the lunch, including watches, catalogs, tools and ties.

ARIZONA

At the October 24 meeting of the Central Arizona Horological Guild, Jack Schecter of Seiko was guest speaker. He presented a seminar on "The Digital Explosion," consisting of a film and slide presentation on the evolution of timekeeping through the ages, leading up and including the advent of liquid crystal digital watches. Discussions on the future servicing possibilities of watches completed the program with a question and answer period.

Plans are now being made for the first annual state convention to be held at the Francisco Grande Resort in Casa Grande. Saturday the 19th will be "fun day," with an all-day golf tournament and other outdoor activities. From 1 p.m. vendors and exhibits will be on display in the Patio Room; at 6 p.m. there will be a poolside cocktail party, followed at 7:30 by a dinner dance in the Francisco Room with a prime rib dinner. On Sunday the 20th, all-day meetings will be held, beginning at 10 a.m. with a break at noon for a champagne brunch. At 2 p.m., the educational program will continue. In the meantime, a special program for ladies will be offered, featuring Bowser's Indian Arts and Crafts.

OHIO

Mr. Don Basch, WAO Convention and Meetings Chairman, has announced the following dates and locations for meetings and the 33rd annual convention. In addition to the quarterly board meeting held October 28-29, 1978 at the Marriott Inn in Columbus, others will be held on January 27-28, 1979, also at the Marriott Inn in Columbus, and on April 28-29 at the Marriott Inn in Cleveland. The 33rd annual convention will be held on July 27-28-29, 1979 at the Marriott in Columbus.

Bob Allis, Jerry Wilson, and Jim Broughton of the WAO Seminar Committee have arranged for a full year's activity, commencing with the October 8, 1978 program in Canton, Ohio. Future programs are scheduled for January 21 at the Imperial House in Dayton, featuring the Swiss Quartz Analog, with Bill Biederman, instructor; March 18 in Cambridge, featuring the Bulova Quartz Stepping Motor Model 242, Howard Opp, instructor; and May 6 at the Holiday Inn in Perrysburg, featuring the All Quartz Program–LCD, Bob Nelson, instructor.

NEW YORK

For a change of pace, the Horological Society of New York put aside its technical programs to hear an address on, "Success and Motivation" by Arthur Levine–Personnel Director of Bulova Watch Company.

At the outset some members were skeptical of the importance of the talk. However, Dr. Levine's inspirational message filled with practical application for the individual, soon won over his entire audience.

Mr. Levine distinguished between motivation and manipulation, between temporary motivation (incentives and fear) and permanent (attitudinal) motivation and stressed the importance of planning.

Perhaps the most important point made was the necessity for goal planning to achieve life's objectives. This must be done regardless of age, Mr. Levine emphasized. In fact, planning is just as important for the retirees or near-retirees as it is for the young career-seekers.

A very lively question-and -answer period completed a very stimulating evening.

Guest speaker at the November 6 meeting of the HSNY was Mr. Sanford A. Roth, president of ADMI, Inc. The main topic was Evaluation and Testing of Quartz Timepieces, Analog and Digital. In addition to his lecture, Mr. Roth demonstrated new equipment which can test quartz watches quickly and thoroughly and also check the timing.

COLORADO

Colorado Horological Society held its fall meeting in Denver, October 22. Following a short business meeting, Mr. Ray Rennemeyer conducted a clock bench seminar from 9:30 a.m. to 2:00 p.m. with only a short break for lunch.

Mr. Rennemeyer's program covered "General Clock Repair, Estimating Costs and Troubleshooting." He demonstrated what to look for when making estimates of repairs, and methods of doing any needed repairs as economically and rapidly as quality workmanship will permit. In discussing the repairs he actually demonstrated the proper methods, which proved to be extremely comprehensive.

There were 38 taking the course; some brought clocks that had presented a problem for them and these were given individual attention.

To assist the Program Committee in providing bench courses and workshops for future meetings, a questionnaire, covering three categories with various subjects listed, was distributed to members, asking them to indicate subjects in which they had interests and about which they wanted to learn more. The results indicated a special interest in clock repair.

AWI President Orville Hagans announced that as chairman of the Clock Seminar Committee he had selected members for this committee and that work has been started to formulate clock seminars.

Back Row, L to R: Directors: Phil Lombard, Orville R. Hagans, Loren Magnuson, Larry Burnworth, and Roy Nuckols. Front Row: L to R: Officers: Kenneth E. Drake, Secy-Treas., Emery Brittenham, Pres., Ray Rennemeyer, V-Pres. □

New Members

ABOVITZ, Bernard–Southampton, PA
ALEXANDER, Jack L.–Marion, VA
AMBROSE, Michael–Orono, ME
AMERO, Ernest E.–Buhl, ID
BAERJE, Guenther–Glendale, CA
BAKOS, Adam–Maryland Heights, MO
BARKER, Gib E.–Indianapolis, IN
BARNES, Howard D.–Arlington, TX
BASZTYK, William A.–Ajax, Ontario
BENJAMIN, Elijah–Houston, TX
BERRY, Mandeville–Lincoln Park, MI
BLANKENSHIP, G.D.–Gordon, GA
BLASIOLE, Adam C.–Greensburg, PA
BOES, George R., Jr.–Lockport, NY
BOHM, Fred N.–Titusville, FL
BORLAND, Howard E.–Kenosha, WI
BOULON, Charles W.–Columbus, OH
BOWMAN, Jerry E.–LaFollette, TN
BRITTON, Lowell W.–San Luis Obispo, CA
CABALLERO, Ralph–Bronx, NY
CICALESE, Thomas–S. Plainfield, NJ
CLYBURN, Bob, Sr.–Mesquite, TX
DAVIES, Marvin C.–Lithia Springs, GA
DEAN, Charlie L.–Thomson, GA
DEXTER, Jack W., Jr.–West Allis, WI
EDGREN, Howard D.–Portland, OR
ELST, Rick J.–New Berlin, WI
ENGLAND, Mitchel S.–Seymour, IL
FIELD, Dennis E.–Milwaukee, WI
FITTS, Dana–Excelsior, MN
FOTHERINGHAM, D.–Lanigan, Saskatchewan
FRANCO, Tamea–Covington, VA
GAMMONS, Robert D.–Battle Creek, MI
GEUCHERIAN, John–Glendale, CA
GOMEZ, Jose–Woodside, NY
GONZALES, Joe N.–Milwaukee, WI
GOODMAN, Ed–Hampton, VA
GROSS, Joel A.–Meadowbrook, PA
HAFEMANN, Joel D.–Milwaukee, WI
HANNON, Richard W.–Olathe, KS
HARRISON, Chris–Spokane, WA
HINTON, Ralph D.–Westerville, OH
HOSTETLER, Harold H.–Douglas, AZ
JANICEK, Frank J., Jr.–Baltimore, MD
JARVIS, Paul–Evansville, IN
JAWSON, Lanny–Milwaukee, WI
JOHNS, Joyce A.–Lancaster, PA
KEITHLEY, Hamilton E.–Bel Air, MD
KEVITT, Louis–Westwood Village, CA
KIM, Jun-Geun–Daegu, Korea
KLAUS, H. Quentin–Perryville, MO
KLINE, Joseph A.–Woodside, NY
KOTSOUPOULOS, Alkis–New York, NY
KRUMENACHER, Michael D.–Waukesha, WI
LaQUAY, H.J.–Walnut, CA
LEISTIKOW, Janet A.–Milwaukee, WI
LIPPINCOTT, L.D.–Lima, OH
LUTTRELL, Murwin F.–Miami, FL
LYONS, Robert E.–Schodack Landing, NY
MARCOLS, Charles F.–Dayton, NJ
MARQUARDT, Alfred H.–Roselle, NJ
MATTES, Charles W.–Richmond, VA
METZEL, Susan–Champaign, IL
MIDDLETON, Bob–Durand, MI
MORENO, Milton–Elmhurst, NY
MORRIS, William A.–Kentwood, LA
NIDEY, Dale–San Bernardino, CA
NOLAN, Phillip R.–Sydney, Australia
OTERO, Argemiro–Woodside, NY
OTT, George–New Hyde Park, NY
OVERCASH, John M.–Kannapolis, NC
POWER, Brendan–Melbourne, Australia
POWER, W.H.–McAlester, OK
QUILES, Virgilio D.–Bayamon, PR
REIZER, Jack–Hastings, New Zealand
ROBISON, Jerry–Kent, WA
SANFORD, Calvin W.–Abilene, TX
SANTIAGO, Senen C., Jr.–Pewaukee, WI
SCHILLER, Jeff–Flushing, NY
SCHOEN, Herbert N.–Brooklyn, NY
SERNAK, Joseph–Union, NJ
SIDOFF, George J.–Milwaukee, WI
SINGH, Avtar–Alexandria, VA
SKOOG, Chuck–Kansas City, KS
SOKOL, John T.–Staten Island, NY
SONG, Cheon Seup–Kyoung Ki-Do, Korea
STAFFORD, Rex D.–Tucson, AZ
STECK, Joseph–Pittsburgh, PA
STREMMING, Raymond L.–Bicknell, IN
TEAGUE, D.H.–Kingsport, TN
TENNESSEN, Cathy–Milwaukee, WI
TETLEY, W.L.–Hamilton, New Zealand
TRAINA, Sal–Glendale, Queens, NY
TRICARICO, Dennis A.–Brooklyn, NY
VOGEL, Jim M.–Omaha, NE
WADINA, Chris A.–Milwaukee, WI
WHEATON, R.S.–Hamilton, New Zealand
WILLIAMS, Rodric M.–Birmingham, AL
YOUNG, Billy E.–Dallas, TX
YUROW, David–Washington, DC

SCHOLASTICALLY SPEAKING

by Joseph Rugole

Chairman, Research and Education Council

For many of you, the appearance of my name and picture on this page will be a surprise, just as it was for me when the letter came from AWI Central explaining the resignation of Deane L. Jenne and my appointment as Chairman of REC.

Those of us who have attended the meetings and technical seminars of REC have known Deane for quite some time, and among other fine attributes one could say about the man, we all know him as a staunch supporter of AWI and the Research and Education Council. The loss of his services as Chairman will be greatly missed. I sincerely hope that his health will improve sufficiently to allow him to continue with his fine contribution to REC, the AWI and the watchmaking profession.

Although it is hoped that such unfortunate turn of events will not be repeated too often, we must be thankful for the foresight of our immediate past chairman, Gerald Jaeger, who introduced the motion to provide for continuity of leadership in REC by election of a co-chairman. It would have been much easier for me to assume the duties of chairman, had I been better prepared by serving first as vice chairman. Since this was not meant to be, I am expecting much assistance from AWI Central and our able past chairman, Gerald Jaeger. In return, I promise my full dedication to the organization, and an honest attempt to search for better ways to serve our member schools and through them the watchmaking profession.

Tempus fugit.

PARIS JUNIOR COLLEGE DEDICATION EVENTS

"The dedication of this center is a positive commitment to the future of this state," Texas Governor Dolph Briscoe told those gathered for the dedication October 26 of the Mike Rheudasil Learning Center and A.M. and Welma Aikin Regional Archives at Paris Texas Junior College. The new center includes all of the college's learning support services.

In his talk, Governor Briscoe praised Sen. and Mrs. A.M. Aikin, Jr. for their "unparalleled contributions to our state." Because of their efforts, he noted, "we have a better way of life, a better place to live, and a better place to raise our children." Sen. Aikin, a former student of Paris Junior College, is retiring in January as dean of the Texas Senate.

Also speaking at the dedication ceremonies Thursday afternoon was Valleau Wilkie, executive vice-president of the Sid Richardson Foundation in Ft. Worth. He emphasized the importance of providing learning support services for students in addition to classroom instruction.

The center is named for the late Mike Rheudasil, who had the concept of a learning program while he was assistant to the president of PJC before his death in 1970. His father, James Rheudasil of Paris, made remarks at the dedication and noted that the center's services would provide additional learning and success for PJC students. Approximately 1,000 persons attended dedication of the center and of the Aikin Monolith and "Miss Welma's Garden" Thursday.

Including 51,477 square feet and costing approximately $1.5 million, the Rheudasil Center contains counseling services, learning skills laboratories, libraries and instructional development. Also in the center, the Aikin Archives will contain the Aikin papers, a replica of his Senate office and historical research information for a four-county area of Northeast Texas. Paris Junior College became the first Texas junior college to be named a regional historical resource depository by the Texas State Library and Historical Commission.

During morning events, the Aikin Monolith, given by the Texas Public Junior Colleges, and "Miss Welma's Garden," given by the people of Marshall, Texas, and other friends, were dedicated. Dr. Theodore Nicksick, president of the Texas Public Junior College Association, dedicated the Texas red granite monolith, which is 20 feet high and weighs 20 tons. The structure honors Sen. Aikin as the "father of the Texas public junior college movement."

Miss Emma Mae Brotze of Marshall, former president of the Texas State Teachers Association, presented the garden from teachers and retired teachers of Marshall, other friends in Marshall, Harrison County and across the state. The garden honors Mrs. Aikin for her beautification work throughout the state.

Another gift to the Aikins in the Rheudasil Center is a white marble bust of Sen. Aikin given by the P. Gene Roden Sr. family of Paris. The marble for the bust was obtained from White Mountain in Italy where Michelangelo got the marble he used in many of his famous statues.

In Memory

PIERRE "PETE" BOREL
1914-1978

Born in French-speaking Switzerland, Pete Borel immigrated with his parents, the late Mr. and Mrs. Jules Borel, when he was very young (1918). His father started the watch material business that bears his name in Kansas City and sent Pete to Switzerland when he was but 16. He stayed there and completed the four-year course leading to the Swiss Master Watchmaking Degree. Upon his return, Pierre—Pete to all his relatives, friends, co-workers in his business or church endeavors—joined his father's business. Immediately he took charge of engineering the specifications of the Borel crowns, crystals, gaskets, and hands.

At his death he was president of Jules Borel Co. of Kansas City and Miami, president of Borel Group, Inc. of Kansas City, with nationwide distribution of Borel watchmakers' and jewelry supplies; partner in Otto Frei-Jules Borel Co. of Oakland and San Francisco; partner in Borel and Frei, Los Angeles. He was a past president of WMJDA and active in many church groups and known all over the nation and greatly respected.

Pete will be missed by all who have been privileged to know him and to work with him during his more than 40 years of contributing his knowledge and personal concern to the watchmakers of the United States.

Borel GROUP

GOULD COMPANY MAKES PRESENTATION

Two Paris Texas College students, Stanley E. Smith of Saraland, Alabama, and Leonardo Villanueva of Carrizo Springs, Texas, have received tool sets for watch and jewelry repair as memorial gifts from Kenneth Weil, president of the Gould Company of Dallas.

Weil has begun presenting the two tool sets annually to outstanding students selected by the PJC faculty in the Division of Horology, Jewelry Technology and Gemology, according to Paul Clayton, division chairman. The gifts are presented as a memorial to Weil's father-in-law, Jack Gould, who founded the Gould company.

Smith was selected as the outstanding student in jewelry repair, and Villaneuva was named the outstanding watch repair student at the college this year. Weil went to Paris to make the presentations.

The Gould Co., which was founded by the late Jack Gould in 1935, is a supplier of repair parts, tools and equipment for watches and jewelry and a wholesale jewelry distributor for retail stores.

LINDSEY HOPKINS ENROLLS 13 IN WATCH REPAIR CLASS

The Lindsey Hopkins Technical Education Center in Miami, Florida, has a class of 13 students. They are S. Renzetti, H. Deprisco, E. Pomerantz, M. Seide, C. Carey, C. Farmer, F. Cruz, H. Davis, R. White, A. Arbello, V. Blausey, and J. Galloway. The instructor is Walter Renzetti. The class is an 18-month course that takes in all phases of watch repair.

Mr. Renzetti is a member of the REC of the AWI, and has attended most of the programs given yearly. He has been active in the field of watch repair after attending the REC class given by WOSIC at the Diamond Oaks Campus in Cincinnati and getting slides on the Ebauches SA watches. He has given lectures at the Greater Miami Guild in Miami and also the Broward Guild in Fort Lauderdale to update the local jewelers on the new technology and on the servicing of the new quartz watches.

Mr. Jean-Pierre Savary, President of the Watchmakers of Switzerland Information Center in New York provided slides to the schools for their students and use by the neighboring guilds.

WHAT IS YOUR SCHOOL UP TO?

Education is a vital aspect of all industries and trade. This is especially true of the watchmaking, clockmaking, and jewelry trades. The editors of *Horological Times* invite news items from colleges and trade schools. Please let us know what your school is up to.

BENCH TIPS

with Joe Crooks

We have had a number of requests for tips about repairing electronic watches–tools needed for this type of repairs–special tools, not on the market to do a specific job–method to alleviate an electronic problem and how to correct it, etc.

There is no way to answer these questions until we know how much electronic knowledge you have.

The first point I'm trying to get across is that if you don't know how to repair electronic watches, you can do them as much damage as an amateur can to a mechanical watch.

The second point is that sooner than later, electronic watch manufacturers are going to get such a back-up on electronic repairs that they will be glad to print schematics on the circuits of their watches, so that the watchmaker with electronic knowledge can repair them by replacing the components that are defective.

In the February 1976 issue of the North Carolina newsletter, I showed the electronic components and diagrams of symbols used in schematics for electronic circuits, thinking that the manufacturers would soon trust the watchmaker to repair their electronic watches.

These components and diagrams are presented here for your information.

ELECTRONIC COMPONENTS AND DIAGRAMS OF SYMBOLS FOR SCHEMATICS

Cell: An electrochemical unit that converts chemical energy to electrical energy. The schematic symbol is two parallel lines of different length and the *longer* line is on the positive side. The perpendicular lines attached show the direction of the circuit and simply link the various components together.

Battery: Two cells (or more) connected together in series or parallel are called a battery. A battery of two 1.5V cells connected parallel would be 1.5 volts. If connected in series, the electromotive force would be 3 volts. By the law of nature, *electrons* flow from negative to positive charges, and it is electrons which move in the great majority of circuits. *Unfortunately*, it is customarily said *conventional current* flows from positive to negative because Benjamin Franklin's guess as to which way current flows is now known to be wrong. The old custom is still used on schematic symbols.

Ground: This symbol has *three* parallel lines, each one smaller. Note that the shortest line is the direction of ground and does not have a circuit line attached.

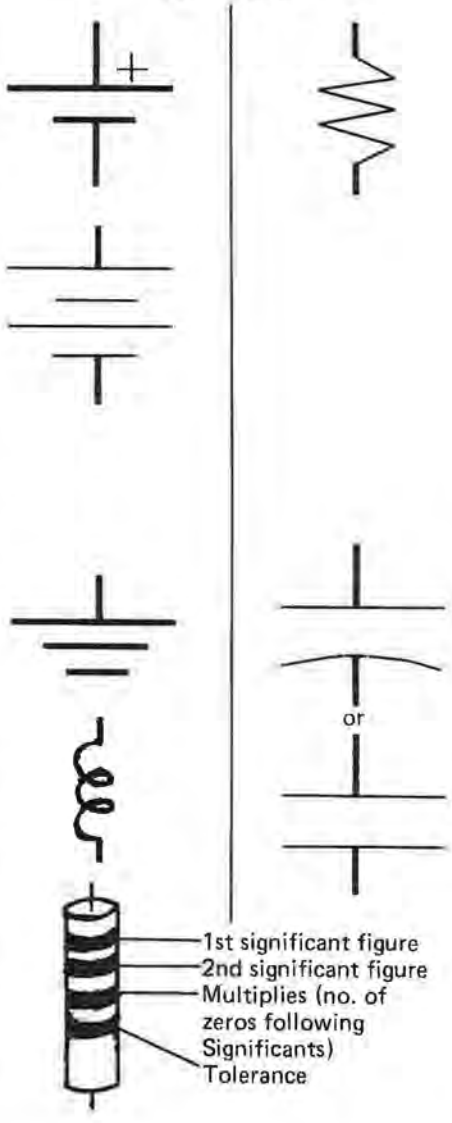
Inductor: A coil of wire that can be in any shape or size. Commonly called a coil. In watches, the electromagnetic effect of a coil imparts "momentum" to electric currents and also "triggers" the transistor, when the magnets of the "motor" generate current on the return cycle across the coil.

Resistor: It impedes or resists the flow of electric current accordingly to its coded resistance. In electric watches the resistor helps the capacitor suppress sparking when the contact is opened, and also with electronic watches helps "refine" a constant flow of current with a minimum amount of drain on the cell. The color code for resistors is:

Black = 0
Brown = 1
Red = 2
*Orange = 3
*Yellow = 4
Green = 5
*Blue = 6
Purple = 7
Gray = 8
White = 9

The tolerance is the fourth band, with
*Gold = 5%
Silver = 10%
No band = 20%

*A resistor color coded orange, blue, yellow and gold would have a resistance value of 360,000 within plus or minus 5% tolerance.

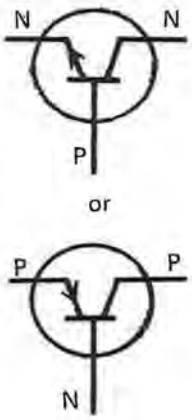


Capacitor: (Commonly called a condenser) always consists of two conducting surfaces separated by some type of insulating material. The capacitor is capable of storing electrical energy. In electric watches the capacitor helps suppress sparking when the contact points are opened and it also recharges from the back surge. It has the ability to compensate for change in voltage in the circuit. If the charge to the capacitor builds up more than the voltage in the cell, the excess stored energy will flow back to the cell. The capacitor, once charged, helps to maintain a constant voltage in the circuit and also increases the life of the cell. *It is important* to replace power cells with correct polarity, or you could burn out the capacitor!

Diode: A *two-terminal* device capable of passing current much more readily in one direction than the other. In electric/electronic watches it allows the current to flow in one direction only, removing the danger of short circuits by back surge when the cell circuit is opened.

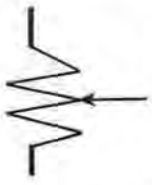
Transistor: A *three-terminal* device consisting of two diodes placed end to end and sharing a common center section. The center section is called the base, the terminal of the symbol with the arrow is called the emitter and the other one is called the collector. When the arrow points away from the base terminal it identifies a NPN transistor and toward the base is a PNP transistor. Like the diode, a transistor helps control the direction of current. It is capable of amplifying very weak signals, turning the current on and off, and performing a wide variety of other functions.

In electronic watches, the transistor is an electronic "escapement," that without sparking, turns the current on and off when the correct polarity is applied to the base.

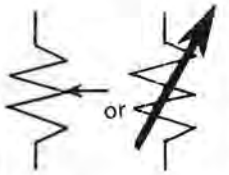


SYMBOLS FOR VARIABLE RESISTORS CAPACITORS AND INDUCTORS

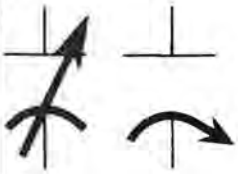
Variable Resistor: The resistance can be changed with an attachment sliding across the resistor. Example: the volume control of a radio is a variable resistor. Note the symbol is the same for a potentiometer.



Potentiometer: The word implies it has something to do with the measurement of *potential* or *voltage*. A variable resistor in rotary form is usually called a potentiometer ("pot" in technical slang). It is a circuit of three terminals in which a variable resistance can be calibrated with great precision.



Rheostat: If only two terminals are used, it may be called a rheostat. Note the first diagram does not show a circuit symbol at the bottom and the alternate symbol shows an arrow floating across the diagram. Rheostats can stand more heat than other variable resistors.



Variable capacitor: It can be used to vary the amount of current in a circuit. Example: the tuning dial of a radio is normally connected to a variable capacitor.

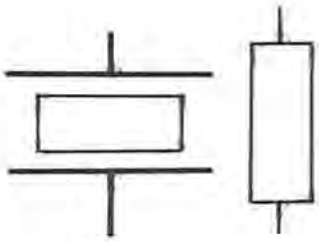
Variable coil: Example: a variable coil can be used in a transformer to change the amount of output voltage with a switch.

The following components and symbols are used in LED, LCD, quartz analog, and alarm watches.

Transformer: Two coils mounted close together so their magnetic fields can interact. It can be used to increase or decrease voltage and transfer signals from one device to another. It can also change AC current to DC current or vice versa.

SYMBOLS FOR COMPONENTS ABLE OF MAKING AN AUDIBLE SOUND

Quartz Crystal: In LCD, LED and analog watches, the quartz crystal is used to stabilize (or divide) frequence to a greater accuracy than the components of the conventional electronic watches. Also, if an *alternating* voltage is applied to a crystal it can be "excited" into vibration or oscillation somewhat like a tuning fork.



Buzzer

Vibrator

Relay

Sounder

Oscillator

Loudspeaker

Our AWI President, Orville R. Hagans, stated, "Electronic watches are here to stay, whether you like it or not. Don't bury your head in the sand, get with it if you plan to stay in this business in the future."

For you watchmakers who want to get in electronic repairs, and have forgotten all you learned in general science in high school, I suggest you obtain a book written by Henry Fried, *The Electronic Watch Repair Manual.* (AWI members can get this book at a reduced cost from AWI Central.)

The next step is to enroll in AWI's new home study course, Micro-Electronics for Horologists. Contact AWI Central for details. Introduction to this new electronic course is on page 28 of the October issue of *Horological Times.*

ZanTech, Inc., one of the leading manufacturers of digital parts and methods of repairs in electronic watches, also has the best supply of equipment and parts to repair electronic watches. Check page 23 of the October issue for their ad.

Now for the advanced electronic watchmakers, I suggest you check page 44 of the October *HT* for bench courses on the latest quartz watches in your location.

If you cannot find a course close enough to suit your local watchmakers' guild, call AWI Central and twist Mike Danner's arm till he sets one up for your group.

In the meantime, send in your electronic tips to Jingle Joe, 265 N. Main Street, Mooresville, NC 28115. We will print them with your name and address. □

INSIDE THE CLOCK SHOP

(continued from page 11)

more, unless the accessory plate is of just the right thickness to support the pallet precisely at the center height of the lathe, the pallet widths will be ground more on one side than on the other. And there are other problems inherent in this sytem, but let's move on to an approach I believe is preferable.

This is illustrated in Figure 8. Here you will see that a different slide rest is being used—one with a lead screw—and that the end of the top slide has been drilled to receive the same pin we have been using. A cylindrical, 3/32-in. diameter, tungsten carbide bur is being utilized to mill the inside curve of the entry pallet. It's the same bur that was earlier referred to in the upper portion of Figure 2. Although more expensive, carbide will far outlast high speed steel.

The cross slide is backed off until the pallet makes light contact with the bur. Both hands are then used to press the pallet firmly against the vertical side of the slide rest, and at the same time rock it back and forth on its pin so that the full length of the pallet's inside curve is brought to bear on the bur in each direction. Keep the pallet moving and do not allow it to dwell at any point.

The lathe is run at a medium high speed and in the usual direction for tuning. This is the safe direction for this particular milling operation, since the cutter tends to push the work away, rather than grab it. But picture what would happen if the pallet were rotated so that the exit pallet was

Figure 8.

moved upward into contact with the bur. Even though the lathe still runs in the same direction, this would now be an unsafe operation, since the bur would very likely grab the exit pallet and yank it upward with the possible breakage of the brittle carbide bur, or other damage. To mill the inside curve of the exit pallet safely, the pallet should be reversed on its pin so that the exit pallet will lie in the same position in which Figure 8 shows the entry pallet. Notice once more how the bur tends to push the pallet away, instead of digging into it, when revolving, as before, in the direction for turning. This, again, is the *safe* way of milling.

Always take light cuts, never heavy ones, and when an inside curve has been milled to the proper dimensions, note the reading on the cross slide micrometer, so that the other pallet can be milled to the same width. With these fast cutting burs it's easy to overcut, especially if the fluting is coarse cut. So, once more, always take *light* cuts.

Small diameter grinding stones, mounted on steel arbors, can also be used for this operation, but they aren't very satisfactory. First of all they usually have to be trued up with a diamond dressing tool. Second, they load up and stop cutting in a few seconds unless kept wet by brushing with kerosene. And third, they have such a small abrasive surface that they wear very quickly.

The burs leave a fairly smooth surface, but an iron lap of about the same diameter as the bur should be used to grind a still smooother surface. Hammel, Riglander sells a useful little assortment of silicon carbide powder in six grits. No. 400, mixed with oil, is about right for this work and will do a faster job than oilstone powder. The final polish is obtained from a boxwood lap turned from a square polishing slip to about the same diameter as the iron lap. For a polishing compound use your favorite polishing powder and oil. Ordinarily, I prefer 4/0 emery paper, but it's difficult to cement to such a small lap, and it's easily ripped off.

My carbide bur was made by Pratt and Whitney, and came from an industrial supply house in Albany, New York. The fluting is medium cut. Nicholson also makes small cylindrical carbide burs, as does Dremel, whose tools are carried by LaRose. And I'm sure there are others who manufacture these small 3/32-in. burs. Burs with 1/8-in. diameters are fine for pallets as large as the one we are making, but they fail to reach far enough into the inside corners of the smaller ones.

In this session we have concerned ourselves strictly with the design and operating procedures of a simply made lathe accessory for grinding and polishing out wear marks in an old dead beat pallet, or for putting the finishing touches on a new one, in a fast, highly accurate manner. The techniques for the final matching of a pallet with its escape wheel were discussed in Part 3 of this series.

It occurs to me that having found fault with Mr. Gazeley's method for lapping the inside curves of the dead beat pallet, this should be an appropriate time for me to acknowledge a boo-boo of my own. It appears on page 38 of the October issue of the *Times*, and I hasten to make the correction, with apologies. The statement was that the impulse received from the entry pallet, as in Figure 1 of that issue, was 4°, which, of course, should have been 2°. Correction of the error necessitates a revision downward of the pendulum's estimated overswing, from about 2° or 3° to about 1½°. To shorten the story, and avoid beating a dead horse, the minimum inside width the case could be without the pendulum's knocking against the sides would be about 12 in. rather than 16, as originally calculated. Sorry!

In closing our series on the Graham escapement, it ought to be said that there are other approaches to its design besides the essentially graphic one that I have followed. For those who are mathematically minded (which I am not), I recommend *George Graham's Classic Escapement*, a brilliantly written 52-page supplement to the NAWCC Bulletin published in the summer of 1973, and authored by Guy D. Aydlett, a retired engineer.

If you would like to write Mr. Aydlett at P.O. Box 7304, Charlottesville, Virginia 22906, I wouldn't be surprised if he can supply you with a copy of his booklet. His puckish humor alone is worth whatever price he may charge you for the pamphlet.

Mr. Aydlett has a talent for uncovering errors that have lain undetected in the standard literature for generations. For example, he explodes the myth of the orthodox dead beat escapement with a 30-tooth wheel and a center distance equal to the wheel's diameter. I blush to recall that in the November session of *The Shop* I naively passed along this myth picked up from the highly respected writings of Mr. F.J. Britten composed some 70 years ago.

Finally, a quote from the first session of *The Shop* conducted two years ago, "When you read something that just doesn't seem to add up, you may be smarter than you think!" □

HIGH SPEED BREEZES

The large clock on the 100-ft tower of Surrey University in Guildford (England) has acquired a reputation for gaining and at times, it is reported to be hours ahead of the time it should show.

The winds that blow across the Surrey hills seem to be the cause of the problem, moving the hands of the six-ft dial; it is usually in windy weather that the problem occurs.

It is believed that the hands are driven by impulses from a master clock. If a gust of wind blows just as the impulse is actuating the mechanism, it can move the hands forward several minutes at a time. As the mechanism embodies a ratchet step-by-step assembly, the wind can advance the hands but cannot put them backwards.

It seems that nobody realized how powerful the wind could be on the Surrey hillside, but now the authorities are looking into the possibility of fitting a more suitable mechanism.

(Reprinted from the Retail Jeweller.)

News In The Trade

THE GOULD COMPANY OFFERS NEW 1979 CATALOG OF JEWELRY AND SUPPLIES

The Gould Company, Dallas, Texas, jewelry wholesaler, is pleased to announce its 44th annual Holiday Catalog of jewelry and supplies, according to company president, Kenneth Weil.

The color-illustrated catalog contains 121 pages of jewelry and jewelry store supplies, and is divided into five sections for easily locating items. Prices on jewelry items are "keystone coded" to enable the retailer to show the book to his customers. Nationwide toll-free telephone numbers are provided for quick ordering.

Rated retail jewelers all over the United States are invited to write for a copy. Requests should be addressed to The Gould Company, 13750 Neutron Road, Dallas, Texas 75240.

WORLD CHAMPIONSHIPS IN GYMNASTICS (STRASBOURG) AND IN ROWING (LAKE KARAPIRO, NEW ZEALAND) TO BE TIMED BY SWISS TIMING

Swiss Timing was entrusted with the official timekeeping operations for the recent World Gymnastics and Rowing Championships.

The Gymnastics meet took place in Strasbourg from October 22 to 29 in a multisport hall seating about 8,000 spectators. Some 440 athletes (240 men and 200 women, from about 30 countries) took part. The competitions received worldwide media coverage on nearly 30 television networks. Swiss Timing committed 3.5 tons of timing equipment and instruments to this event, along with a 6-man team to operate it.

The World Rowing Championships were held on Lake Carapiro in New Zealand. For the first time in its history, New Zealand organized world championships in an Olympic sport.

Some 500 athletes from 30 countries took part in the competitions from October 31 to November 5. Over 30,000 spectators watched the finals, which were covered by many television networks.

Swiss Timing dispatched three professional timekeeping experts who were assisted by locally recruited technicians. Their equipment weighed 1 ton and was valued at some 150,000 Swiss francs.

Siwss Timing is staffed by its three operational partners: Longines, Omega and Heuer. It was established on July 3, 1972, at the behest of the Federation of Swiss Watch Manufacturers and the first two above-mentioned companies to handle timekeeping operations at major international sports meets like the Olympic Games.

The company has up to now met its stated objectives since it has been awarded the timekeeping contract for some 30 high level meets, including the 1976 Olympics in Montreal and Innsbruck and it is now preparing to time the 1980 Games in Moscow and Lake Placid.

NEW PRESIDENT AT COSMO ELECTRONICS

At a meeting of the Directors of Cosmo Electronics, Ltd., Ronald Mark Erenhouse was elected President. He succeeds Rudolph Erenhouse, whose untimely death occurred in September.

Expansion plans, originated earlier this summer, will be expedited, adding to the facilities and Cosmo's already extensive line of battery-operated clock movements.

SEIKO OPENS NEW SERVICE CENTER COMPLEX IN NEW YORK

Seiko Time Corporation has officially opened a modern, new 30,000-square foot complex–housing its New York Service Center, as well as its parts and materials, technical services and computer facilities–on the 14th floor of 555 West 57th St.

The official headquarters of Seiko Time Corporation will continue to be at 640 Fifth Avenue. It houses the company's executive, sales, administrative, merchandising, advertising, and accounting operations.

Seiko's Service Center was previously located at 404 Fifth Avenue, New York City.

GEORGE FORMAN PROMOTED TO BULOVA ADVERTISING MANAGER

George Forman, a native New Yorker, has been promoted to director of advertising and marketing services at Bulova Watch Company, Inc., the 103-year-old American watch company headquartered at Bulova Park.

Mr. Forman , who joined the Bulova advertising staff in 1961, has traveled widely for Bulova throughout the United States, and is a on a first-name basis with literally thousands of American jewelers.

"George Forman is probably the best known advertising executive in the American jewelry industry and has always done an outstanding job for Bulova," said Bulova president R. Mark Bourquin, announcing the promotion. "He works directly with many of our retailers, and is responsible, together with our agency, Doyle Dane Bernbach, for our

George Forman

1978 Fall-Christmas natonal advertising campaign–the largest in Bulova history."

In the jewelry industry, Mr. Forman is also known as a lecturer at the Bulova-New York University course in retail jewelry store management and merchandising, and as a member of the faculty of the Bulova seminar for sons and daughters of jewelry retailers.

He is a member of the Co-Op Advertising Committee of the National Association of Advertisers, has contributed articles to special publications of the Radio Advertising Bureau, and has been a member of the Sales Promotion Executives Association.

On behalf of Bulova, Mr. Forman has received awards for outstanding advertising from *Business Week* magazine, and most recently was informed by *U.S. News & World Report* that, according to a Starch Report on a recent issue of that magazine, a Bulova Accutron Quartz ad was the issue's most effective ad.

Mr. Bourquin noted that Mr. Forman's responsibilities at Bulova, where he has been serving as manager of advertising and sales promotion, have included supervision of retail advertising materials offered to Bulova's 20,000 jewelers and department stores in the United States–the largest network in the jewelry industry–many of whom regularly use these materials as part of Bulova's cooperative advertising program, the largest in the jewelry industry.

Mr. Forman, who resides with his family in Manhattan, studied at the City College of New York, the Pratt Institute and Columbia University. Before joining Bulova, he had served as director of advertising and sales promotion for the Emerson Company's line of TV and radio receivers, and earlier in similar posts at advertising agencies and smaller corporations.

THE CHIPS ARE DOWN

An increase in the production of LCD watches by US digital watch makers has created a shortage of LCD watch "chips" among digital watch component suppliers.

The chips, known technically as C/MOS ("complimentary metal-oxide semiconductor") chips act as frequency dividers, time decoders and display drivers in LCD watch modules.

The shortage is causing delays in deliveries of chips to some medium-sized LCD suppliers. Digital watch parts suppliers such as Motorola, RCA, Intersil and Solid State Scientific report that demand for chips greatly exceeds supply. Some companies quote delivery lead times as long as 20 weeks.

Industry observers cite several factors behind the shortage:

–The emphatic shift in production from LED to LCD watches by electronic watch manufacturers over the past year has sent demand for LCD components soaring. Timex and Texas Instruments (TI) with orders in the multimillions are the largest in a pack of digital makers in the US and the Far East who now need more C/MOS chips.

–The computer industry is competing with the digital watch business for the same semiconductor supplies, thus draining the quantity available for watchmakers.

–C/MOS manufacturers are getting lower than expected production yields. Watch chips are large area parts compared to other semiconductor products and the larger the area, the greater the chance for defects, according to semiconductor officials.

–The LED shakeout of 1977 eliminated marginal digital watch component suppliers. Thus, fewer component suppliers are left to meet the rising demand for LCD chips.

–Furthermore, chastened by their LED experience, those digital parts suppliers who survived are hesitant to boost production based on the relatively sudden demand for parts. They have learned that hot demands can cool quickly in the volatile electronics industry.

Estimates vary as to how long the chip shortage will last. Some observers predict demand will diminish after the Christmas season. Others believe the shortage will continue through 1979.

Reprinted with permission from Jewelers Circular Keystone, October 1978.

BULOVA–BYE BYE LED

Bulova Watch Co. is officially out of the LED watch business.

In the past several months, according to company spokesmen, Bulova has sold all its remaining LED inventory. Bulova halted LED production in late 1977 and sold the inventory piecemeal.

Bulova officials acknowledge there is a market for low-end LED watches, especially with youngsters. Bulova, however, is not in that portion of the market.

Bulova still sells higher-priced LCD watches as well as quartz analog and mechanical pieces.

Reprinted with permission from Jewelers Circular Keystone, October 1978.

HUGHES–BYE BYE LCD

Hughes Aircraft Co. is discontinuing production of liquid crystal displays for watches and clocks. The company reportedly has shut down production of LCDs at its Irvine, California plant.

Sources close to the Hughes operation offered two reasons for the move, according to *Electronic News.* One is that several of Hughes' major customers for LCDs including Timex have begun manufacturing their own LCD components.

Secondly, the Hughes displays lacked multiplexing capabilities needed for non-watch applications.

Hughes began manufacturing LCD components in 1974. Its major competitors in the LCD watch component market today include Beckman Instruments, Motorola, Crystaloid, Hamlin and LXD.

Reprinted with permission from Jewelers Circular Keystone, October 1978.

MATCHING WATCH SERVICING SKILLS TO ELECTRONIC ADVANCEMENTS

The rapid development of watch technology over the past decade has resulted in many watchmakers throughout the world not fully equipped with the complicated knowledge necessary to repair the latest in timepieces.

As a result, Ebauches SA, the world's leading manufacturer of precision watch movements, has undertaken a major training program to keep the world's watchmakers abreast of the latest in electronic technology.

Watchmakers from all parts of the world each year attend the intense electronic watch familiarization courses given by Remy Waechli and two of his highly specialized assistants at the Centre de Formation (Training Centre) d'Ebauches SA at Marin, near Neuchatel in Switzerland.

The overall program of the technical training courses is designed to bring the latest in Swiss technology to the local watch repairer no matter where he lives, and is coordinated and managed by Mr. Andre Chappuis, at the headquarters of Ebauches SA, in Neuchatel.

"In addition to participating in more than 100 watchmaking schools throughout the world, we operate 12 major instruction centers dealing with Ebauches SA products. We also invite one professor per school to Marin every two years in order to completely familiarize them with our movements."

"This is particularly important when we have a new 'family' of calibres ready for introduction into the world markets. In such instances we conduct week-long seminars in Switzerland and in our other training centers in order that watch repairers are fully prepared to provide the service the calibres will require when they are introduced," Mr. Chappuis explained.

Ebauches' technical instruction reaches the watch repairer by one of four routes: the training centers throughout the world, watchmaker instruction centers, professional associations and through the center itself at Marin. The Marin center prepares repair instructions and technical data for the other three methods.

Over 1,500 watch repairers per year attend the courses at Marin and through them, another 8,000 throughout the world receive the training, Mr. Chappuis said.

At the present time, the major emphasis in the training center is on electronic watches. "While we provide assistance in other areas, by far the majority of students come to Marin because they want to know more about the new electronic field of watch repairs."

Marin is equipped with testing machines from every possible source since, "the students want to learn on the same equipment they have back home."

"Only through this constant stream of refresher courses can the Swiss watch industry provide watch repairers with the skills they need in this technological age," Mr. Chappuis added.

NEW PRODUCTS

GIRARD-PERREGAUX ANNOUNCE A NEW RECORD IN QUARTZ WATCH MOVEMENT MINIATURIZATION

Girard-Perregaux are pleased to announce a technological performance: reducing a quartz-piloted analog movement (with dial-and-hands display) down to a mere 13 mm in diameter—including the power cell. Their new GP 520 thus sets a world record in quartz horology. What's more, it also sets a new record for compactness: only 0.3915 cm^3. Nor is the GP 520 a one-of-a-kind achievement, made by hand simply to break a miniaturization record in electronics. On the contrary, it is scheduled for quantity production and corresponds to recent fashion trends prescribing a return to small dimensions in ladies' watches.

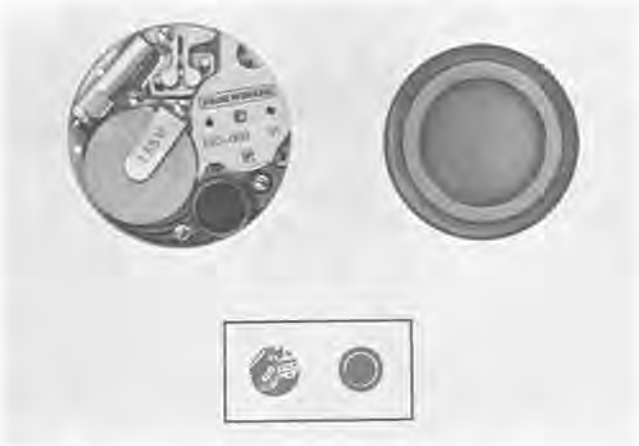
Girard-Perregaux introduced the first ladies' watches fitted with the new GP 520 movement—the world's most compact—at the recent 1978 "Montres et Bijoux de Geneve" Exhibition. As this prestigious Geneva show focuses exclusively on design and fashion, Girard-Perregaux chose not to stress the technological performance involved. But even if visitors to the exhibition failed to note the word "quartz" on the dial, they couldn't fail to be impressed by these watches' small size and very slim case profile—two of the basic trends of 1979 fashions.

It took Girard-Perregaux's 13 years of experience in quartz time technology to achieve this advanced degree of miniaturization. Girard-Perregaux's decision to set up a research laboratory for quartz horology dates from 1966. The company's first quartz-piloted timepieces were master clocks, soon followed by desk clocks. In 1971 the first GP Quartz watches reached market and in 1976 Girard-Perregaux introduced the GP 641 calibre which at the time was the

These three very dainty designs are fitted with Girard-Perregaux's new GP 520 quartz movement—the world's smallest in both volume and diameter. In 18K yellow gold, with or without diamonds; onyx or coral dial.

smallest quartz analog movement in the world (20.5 mm in diameter, 3.70 mm thin, 1.221 cm^3 in volume).

A good yardstick of Girard-Perregaux's success at miniaturization is that the volume of a battery-equipped GP 520 is considerably less than that of a number of standard power cells fitted in various types of quartz watches still on the market. The GP 520's construction reflects a typically horological approach: it is round and is composed of three subassemblies (electronic, motor and mechanical) to speed up and facilitate servicing. By choosing the analog display system for this new calibre, too, the company has reaffirmed its fundamental product policy: a quality watch should show the time by means of hands.



The Girard-Perregaux GP 520 analog quartz movement shown alongside a standard battery. While the latter is slightly smaller in diameter, it is notably thicker. Movement dimensions: Ø 13 mm, thickness: 2.95 mm. Framed: actual size of the movement and the battery.

The basic objectives behind the development of this new movement were extreme compactness, extreme reliability, the simplest possible construction, and, for the wearer, very simple handling. The time-setting system, for example, is a far cry from the complicated procedures all too common with other quartz calibres—just pull out the crown, set the hands as required, then push the crown back in at the time signal. This remarkably simple system also enabled Girard-Perregaux to cut the number of components in the mechanical subassembly.

When quartz watches began coming on the market, some people imagined that making standard, regular quality watches would henceforth merely imply assembling a few components: battery, quartz, circuit and stepping motor . . . . but developments in quartz time since then have clearly demonstrated that, even in this area, differences remain as marked as they ever were with mechanical watches. Girard-Perregaux's GP 520 calibre reflects the company's determination to remain among the leaders in horological technology and quality.

Technical Specifications of the Girard-Perregaux GP 520 movement

Definition and dimensions

Quartz electronic movement, analog display (i.e., with dial and hands)
Quartz frequency: 32,768 Hz
Modular construction: electronic subassembly
motor subassembly
mechanical subassembly
Overall diameter: 13 mm
Total thickness, including power cell: 2.95 mm
Overall volume, including power cell: 0.3216 cm^3 (overall volume for casing-up purposes)

Electronic subassembly

Tuning fork quartz, 32,768 Hz, in a vacuum-sealed capsule
C-MOS integrated circuit, nominal power consumption: 0.5 μA
Frequency adjustment by means of a variable capacitor (trimmer)

Motor subassembly

Stepping motor (Girard-Perregaux patents) receiving one impulse every 30 seconds
Mean power consumption: 0.20 μA
Amplitude 1.50 V
Square impulses of alternating polarity

Mechanical subassembly

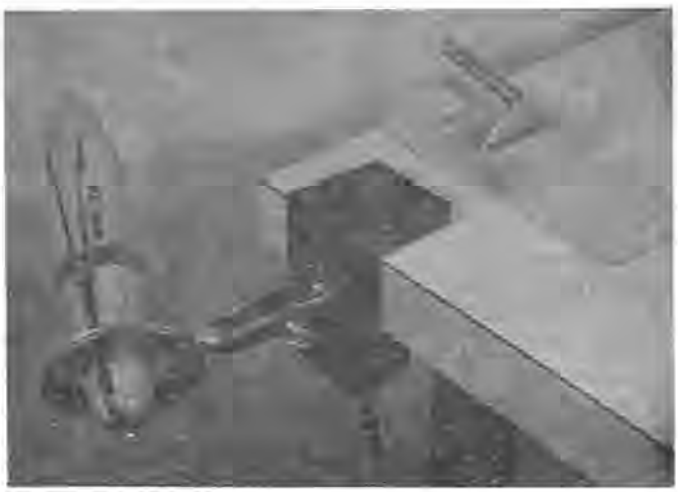
Simplified construction comprising fewer components
Simple time-setting system: pull out the crown, set the hand to the correct minute and press the crown back in at the time signal

Power cell

1.5 V silver oxide power cell
Ø6.80 mm; thickness 2.10 mm, capacity 15 mA/h
The power cell provides the movement with over two years' power reserve.

SWEST ANNOUNCES THE VERSI-VISE

Swest, Inc., in its continuing efforts to provide the jeweler with "a better tool to do a better job" now introduces the Versi-Vise. This ingenious tool is described as the successor to the ring clamp. The unit incorporates a ring clamp but gives leverage and control at the nose of the clamp to relieve fatigue and, more important, allows the clamp to be swiveled in any direction for easy access to any part of the work being held. It is irreplaceable for filing, carving, stone setting, mill-graining, florentining, sawing, shaping, and any activity which



requires positioning and repositioning the work. A thumb screw on the side permits easy removal of the clamp for inspection, polishing, etc. The tool is easily attached to and removed from the workbench with its c-clamp design.

The Versi-Vise also comes with a filing pin attachment which is also easily installed or removed by simple operation of the thumb screw. The top of the tool is an anvil, so that it becomes truly a versatile part of your workbench.

For complete information and price, send for free brochure on the Versi-Vise. Contact Swest, Inc., 10803 Composite Drive, Dallas, Texas 75220, 431 Isom Road, San Antonio, Texas 78216 or 1725 Victory Boulevard, Glendale, California 91201.

HANNA-BARBERA TV CHARACTERS IN NEW PICCO CHILDREN'S WATCH COLLECTION

The most famous of the animated TV characters in the "Funtastic World of Hanna-Barbera"—Fred Flintstone, Pebbles, Bamm-Bamm, Scooby-Doo, and Yogi Bear—will be available shortly in a new collection of children's watches to be manufactured and marketed by Picco, leader in high quality children's character watches.

The watches, all with 7-jewel-lever movements and with the likenesses of the Hanna-Barbera characters on the dials, will be available in eight different styles and six color combinations. Each colorful timepiece will have a sturdy durable plastic case and matching strap—and give a one-year warranty. Each watch will carry a suggested retail price of $17.95.

This marks the first time that the delightful characters of the "Funtastic World of Hanna-Barbera"—comprising the longest running and most successful children's programming in TV history—have been licensed to appear in the US on watches. Picco, which is noted for its extremely successful line of "Betsey Clark" and "Lollipops" watches under exclusive license from Hallmark Cards, Inc., has been granted the sole license for the Hanna-Barbera collection in both the US and Canada.

Hanna-Barbera, the world's largest producer of animated TV series, has dominated Saturday morning television for the past 20 years. Appealing to the 5-12 age group, these are watched by more than 25 million youngsters in the US alone on Saturdays, and by additional millions for Hanna-Barbera prime-time TV specials aired throughout each year. Total worldwide TV viewing of "Funtastic World of Hanna-Barbera" programming exceeds 500 million persons in 80 countries.

To further illustrate the recognition factor of the characters to be shown on the new Picco watches—"Scooby-Doo," now in its 11th year of network programming, has the singular distinction of being the single longest-running network show—live or animated—in TV history. It reaches 40% of all children viewing TV on Saturday mornings.

"Yogi Bear" has been shown continuously around the world for the past 20 years. The program is currently in syndication in more than 50 markets, and "Yogi Bear" has been the host of numerous TV prime-time specials. This season he returns to network TV in "Yogi's Space Race," to be seen on NBC-TV.

"The Flintstones" is the world's longest continuous TV cartoon series—beginning more than 19 years ago. It is the most famous children/adult animated property of all time—with extended runs in prime-time, and currently in syndication in 100 TV markets and 100 daily papers in the US, and the subject of numerous prime-time TV specials.

"We expect our 'Funtastic World of Hanna-Barbera' watch collection to be an instant hit with youngsters," stated Raymond Canova, General Manager of NY-based Picco. "Shipments to jewelers, department stores, card and gift shops, and other jewelry outlets nationally will begin by the end of January," he said.

"We intend to add new Hanna-Barbera characters to the line regularly, and make it one of the most successful children's quality watch collections available," Mr. Canova stated. "Trade and consumer advertising, in-store displays and special promotions are now being planned to support the introduction," the Picco executive said.

□

AWI Bench Courses 1978-79

LEGEND		
Symbol	Course	Usual Instructor
A	Reading Meters	J. Jaeger
C	Citizen	J. Broughton
D	Seiko	L. Smith
E	Intro. Solid State	R. Nelson
F	Bulova SMQ	H. Opp
G	ESA	W. Biederman

PLEASE NOTE THAT THERE ARE NO AWI BENCH COURSES SCHEDULED FOR THE MONTH OF DECEMBER 1978.

DATE	COURSE	LOCATION
January 14, 1979	G	New Jersey
January 14, 1979	D	Ft Lauderdle, FL
January 14, 1979	C	Abilene, TX
January 14, 1979	F	Tallahassee, FL
January 21, 1979	E	Los Angeles, CA
January 21, 1979	G	Dayton, Ohio
January 28, 1979	F	Dallas, TX
February 4, 1979	D	Phoenix, AZ
February11, 1979	F	Jacksonville, FL
February 11, 1979	G	Tucson, AZ
February 12, 1979	G	Albuquerque, NM
February 18, 1979	D	Birmingham, AL
February 18, 1979	C	Sacramento, CA
February 18, 1979	F	Hot Springs, AR
February 25, 1979	E	San Antonio, TX
February 25, 1979	G	Chicago, IL
March 4, 1979	G	Pittsburgh, PA
March 4, 1979	F	Atlanta, GA
March 4, 1979	D	Norfolk, VA
March 11, 1979	E	Richmond, VA
March 11, 1979	C	Decatur, AL
March 11, 1979	G	Washington, DC
March 11, 1979	F	Boise, Idaho
March 18, 1979	F	Cambridge, OH
March 18, 1979	D	Indianapolis, IN
April 1, 1979	F	Pittsburgh, PA
April 1, 1979	E	Omaha, NE
April 1, 1979	C	Orangeburg, SC
April 1, 1979	D	Dallas, TX
April 22, 1979	D	Baltimore, MD
April 22, 1979	C	Minneapolis, MN
April 22, 1979	G	Iowa
April 29, 1979	E	Quincy, IL
May 6, 1979	E	Perryburg, OH
May 6, 1979	D	Portland, OR
May 6, 1979	F	St. Louis, OR
May 6, 1979	C	Boston, MA
May 6, 1979	G	Denver, CO
May 20, 1979	D	Okmulgee, OK
May 20, 1979	F	Kansas City , KS

Additional programs will be scheduled as requests are received and new programs are developed.

Book Review

by Henry B. Fried

The Digital Electronic Watch, by Tom M. Hyltin. New York, Van Nostrand Reinhold Co., 1978. 239 pages, 170 illustrations, hard covers. $19.95.

In reviewing any technical or reference book, one must examine the credentials of its author. This reviewer has read and examined many books on horology distributed by large publishing houses, utilizing their team of efficient writers. Their sentence structure, spelling and grammar are impeccable. Their text indicates that they have done much homework, but despite these niceties, their lack of subject matter depth shows through. One can almost always tell where they've gotten their "facts" or which books they've read by the perpetuation and repetition of myths cited as facts, errors, anachronism in addition to their own intrusive mistakes.

This book, fortunately, is not one of these. Its author, Tom M. Hyltin, is one of America's foremost authorities on digital quartz watches. President of Micro Display Sstems, a digital watch manufacturer of Dallas, Texas and formerly engineer manager at Texas Instruments, he is a recognized expert in the field of microelectronics and consumer electronics. He is the inventor and holder of numerous patents in radar, digital watch technology and other areas of electronic engineering. His articles on digital watches were among the first to appear in the *Horological Times* of the American Watchmakers Institute.

This is the first book on digital watches, and fortunately, it is written as an introduction to these watches, geared to the jeweler who must choose these in buying quantities. Thus, it can serve as a good introduction and orientation to this new technology.

This book is worded in nontechnical terms. Thus, this type of watch's construction, repair, and nomenclature are explained so that the neophyte can readily grasp the ideas of this new horological concept.

The book has ten chapters and two useful appendices, plus a fine reference index. Tom Hyltin, in his opening chapter, recounts the recent birth of the solid state watch, its inventors, the prior technology and experience and other inventions which led to a no-moving parts watch such as the transistor, integrated circuit, light emitting diode, liquid crystal displays, small energy packages. The author also takes us along the path toward microminiaturization until the technology had developed, enabling such a package within the size of two fifty-cent coins. A chart shows the relative cubic centimeter volumes of watch cases of various diameters.

By the end of the first chapter a previously uninitiated reader already is familiar with the history, types, displays, construction of these watches. Basics are explained in simple terms.

Another chapter deals with the quartz oscillator, presenting its advantages, and differences indicated by numerous fine isometric drawings and photographs. Their characteristics, too, are enumerated with comparison charts showing the effects of shock, temperature, age, pressure and the adjustments possible as well as the battery's influence and inherent accuracy.

The various terms such as MOS, C-MOS, IC and others are covered in anther chapter, as well as quality, choice, price consideration and other factors. The engineering considerations required in designing a watch for wear are covered in still another section. Multifunction watches, ideas on how these are programmed for easy to memorize sequence of commands, reliability factors and limitations are recounted here. Watch batteries and even their disposal are discussed together with many illustrations of types and constructions.

The LED display is treated in detail with many clear, large microphotos to illustrate the text. The LED watch and its especially designed module and simplified wiring diagrams show that the repair of these is not impossible and even encouraging when their details are explained as Mr. Hyltin does.

LED watches, displays, and their limitations, visibility, battery drain, module design and their future as a calculator watch are covered as well. Also revealed here is the new programmable watch which allows the wearer to program into the watch numerous reminders during the year such as birthdays, taxes due, medical check-up, and other important dates.

Liquid crystal displays and the LCD watch are covered in detail in easy-to-understand terms with numerous photos and drawings. The author discusses module quality and states "that modules made by a mechanical watch manufacturer look distinctly different from those manufactured by digital watch manufacturers," with illustrations to highlight their differences, tending to favor those made by the traditional watchmakers.

The digital service bench is a fine chapter full of hints, ideas, precautions, equipment lists, tools and testing devices shown and explained. An appendix lists the names and addresses of all U.S. manufacturers of digital watches. A second useful appendix lists the setting directions and battery replacements of all digital watches up to the time the manuscript was transposed into type.

This book is an excellent introduction to digital watches. It is also a fine basis upon which to build towards the servicing and repair of these as well as fine reference to the jeweler for use as a battery replacement guide, setting to time and function reference and as a counter piece for the jeweler and watch salesman in that store in his dealing with the customer.

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DATES TO REMEMBER

JANUARY

2-12—225 First Show, 225 Fifth Avenue, New York, New York.

6-9—Portland Gift Show, Portland Memorial Coliseum, Portland, Oregon.

7-10—Miami Gift Show, Miami International Merchandise Mart, Miami, Florida.

7-11—Atlantic City China & Glass Show, Convention Center, Atlantic City, New Jersey.

10-13—Early Bird Gift & Decorative Accessories Preview, Atlanta Merchandise Mart, Atlanta, Georgia.

13-16—Miami National Antiques Show & Sale, Miami Expo-Center, Miami, Florida.

14-18—Atlanta National Gift Market, Atlanta Merchandise Mart, Atlanta, Georgia.

21-14—Washington Gift Show, Sheraton Park Hotel & Shoreham Americana Hotel, Washington, D.C.

27-28—Watchmakers Association of Ohio, Quarterly Board Meeting, Marriott Inn, Columbus, Ohio.

27-28—American Award Manufacturers Association New York Show; Holiday Inn/Coliseum, New York, New York.

28—Bulova All Quartz Program; Bulova Watch Company; Woodside, New York.

28-31—Charlotte Gift, Jewelry & Housewares Show, Charlotte Merchandise Mart, Charlotte, North Carolina.

28-Feb. 1—Chicago Gift Show, ExpoCenter & McCormick Place, Chicago, Illinois.

31-Feb. 1—JC-K/MGI Sales Management & Motivation Seminar, Atlanta, Georgia.

FEBRUARY

2-3—JC-K/MGI Inentory Management & Control Seminar, Atlanta, Georgia.

4-6—Tampa Gift, Jewelry & Housewares Show, Curtis Hixon Convention Hall, Tampa,Florida.

4-7—Southern Jewelry & Gift Show, Hyatt Regency Atlanta, Atlanta, Georgia.

7-8—JC-K/MGI Financial Management Seminar, New York, New York.

9-10—JC-K/MGI Sales Management & Motivation Seminar, New York, New York.

11-13—Western Spring Jewelry Show, The Showplace, San Francisco, California.

11-14—RJA Spring International Jewelry Trade Show & Conference, Americana & New York Hilton Hotels, New York, New York.

14-15—JC-K/MGI Inventory Management & Control Seminar, Dallas, Texas.

14-23—RJA-NYU, 39th Annual Program in Retail Jewelry Store Management, NYU, New York, New York.

16-17—JC-K/MGI Sales Management & Motivation Seminar, Dallas, Texas.

18-20—Fourth Cleveland Gift Show, Engineering & Scientific Center, Cleveland, Ohio.

18-23—Dallas Spring Gift, Jewelry & Housewares Show, Dallas Market Center, Dallas, Texas.

24-25—Minnesota Retail Jewelers Association 75th Annual Convention & Upper Midwest Jewelers Trade Show, Radisson South Hotel, Bloomington, Minnesota.

25-27—Tenth Wisconsin Gift Show, Red Carpet Expo, Milwaukee, Wisconsin.

25-March 2—New York Gift Show, New York Sheraton Hotel & New York Coliseum, New York, New York.

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Reprint, Kendrick & Davis Co.'s, 1910 catalog section of "Staking Tools & How to Use Them," 100 pages with detailed line drawings, $3.50 copy, postpaid. R & S Company, Box 31, Lebanon, N.J. 03766.

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

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Volume 2, Year 1978

(First number is issue, second number is page.)

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AMERICAN WATCHMAKERS INSTITUTE

3700 Harrison Avenue Cincinnati, Ohio Telephone (513) 661-3838
Mailing address: P. O. Box 11011, Cincinnati, Ohio 45211

October 23, 1978

From: The Membership Committee
American Watchmakers Institute

To: The A.W.I. Family

Subject: Annual Membership Drive

You may recall, the Board of Directors of A.W.I., at the June Convention, approved an Annual Membership Campaign Month. The time selected is from February 15 to March 15 of each year. This is a time when everyone connected with A.W.I. will be asked to make an all out effort to recruit new members. This coordinated effort should result in getting many new members as well as encouraging hesitant members to renew their membership.

You, as a person concerned with the continued growth of A.W.I. and involved with its activities, should begin thinking of ideas to promote this campaign in your area. Start planning now for some type of activity for your association or guild which will bring in watchmakers who are not now members of your local organization or A.W.I.

We are all aware that the stronger A.W.I. becomes, the more services and benefits we receive as members, so we must make this campaign our personal drive for new members. We are also aware that there are many watchmakers around the country who are not members, that we must encourage to become members, for their future success and welfare in the watch repair business.

Let's all become very membership conscious in these next few months and see just how successful we can make this first Annual Membership Drive.

If you need any materials or assistance, please contact me or the A.W.I. office, and we'll be most anxious to work with you.

Best regards,
Les Smith
Les Smith, Chairman
Membership Committee

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