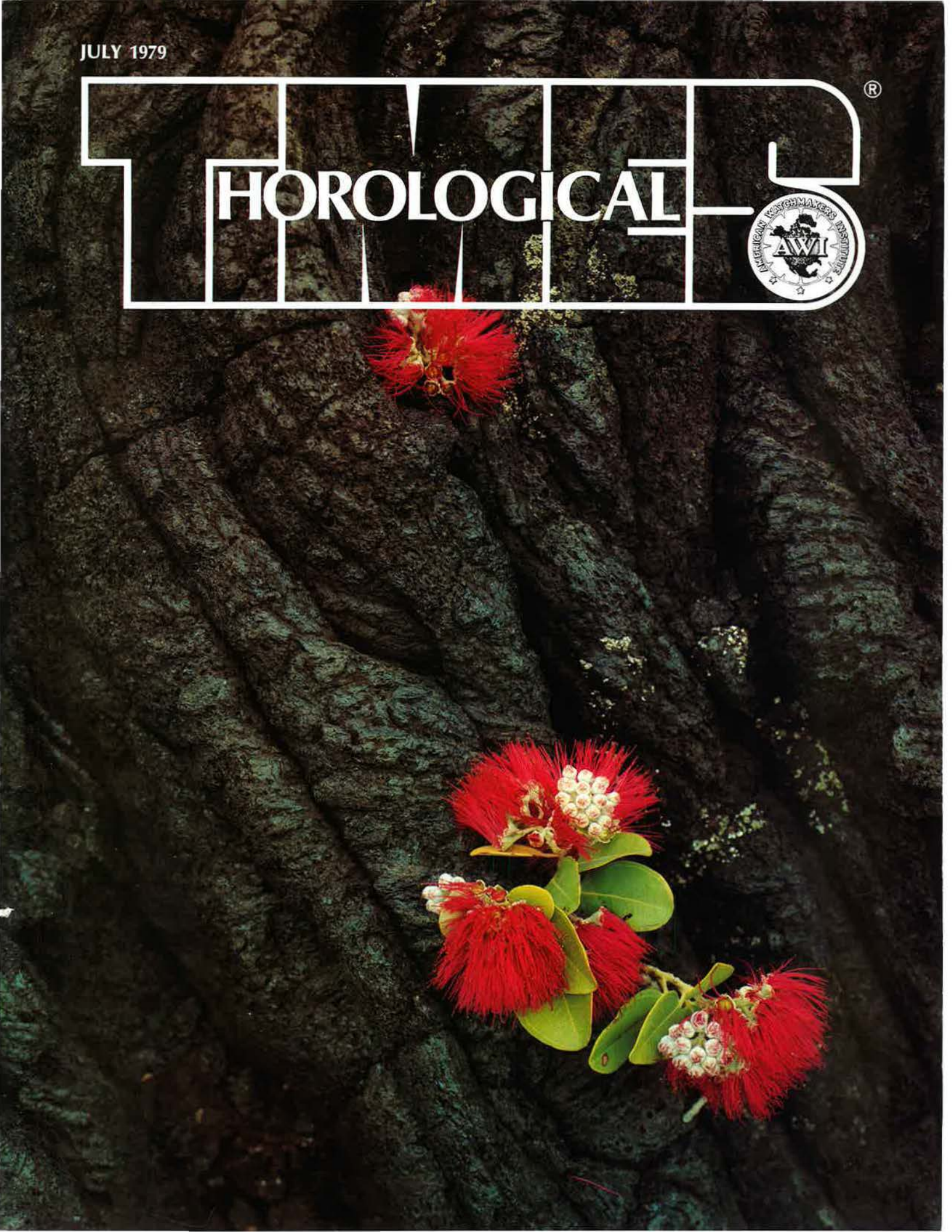
JULY 1979

HOROLOGICAL TIMES®



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OFFICIAL PUBLICATION OF THE AMERICAN WATCHMAKERS INSTITUTE

VOLUME 3, NUMBER 7 JULY 1979

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Newly-elected Directors, L-R: Dorothy M. Aderman, Florida; Joseph G. Baier, Arizona: Joe Crooks, North Carolina: James H. Broughton, Ohio; Eric R. Samuel, New York; Robert F. Bishop, Affiliate Chapter Chairman, Pennsylvania.

Look for details and photos of the AWI 1979 Board of Directors Meeting in next month's (August) issue of Horological Times.

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Editorial

The American Watchmakers Institute and it membership have indeed been very fortunate this past year for the experienced guidance of its president. Many years of first hand knowledge working with jewelers, watchmakers, and clockmakers has presented us with a complete knowledge of the industry. His true interest of the needs of us all was prevalent with the exceptional amount of time he devoted to the everyday workings and aims of the Institute. His philanthropy toward one of the loves of his life may not have been evident to all, but to those who were near, it was profound. At any time of the day or night, he always held a listening ear and offered sound advice.

Thank you Orville R. Hagans, for giving of yourself to remind us all that we are true professionals.

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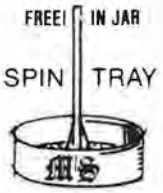

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The Presidents' Message

BY ORVILLE R. HAGANS, CMW, CMC, FBHI

This month's column is difficult to write for a number of reasons. From the standpoint of time, this column must be in the hands of the Horological Times editor by May 25 to insure prompt mailing of the July issue by July 1.

The fact that I will be out of office by the time this column appears makes it doubly difficult. Unfortunately, since I do not possess psychic powers, I cannot foresee in May what will take place in June. Much will happen because I will be traveling on association business through the balance of May and most of June.

At one recent Executive Board meeting, Jim Broughton, AWI's immediate past president, expressed the frustrations that befall a past president when he's turned out to pasture. I admit to feeling a touch of this frustration already.

The president of AWI is in the mainstream of administrative decision making during his tenure in office. This continues until the very day he passes the torch to the next president. I suppose it is this abrupt end, with no tapering off period, that creates the frustrations.

Perhaps this feeling is more deeply felt by those who have truly sacrificed through devoting their all. True they are a part of a committee, but not called on or expected to devote time as they would prefer.

In my position, having spent forty-six years to bring about the realization of a true horological body, being owned and controlled by the profession, there is a great satisfaction of seeing this realisation. However, I still want to see a more powerful and secure Institute, and would like to be an integral and active part of its growth.

Time is a factor in the minds of many. But years to an active person mean nothing, and many times experience is a valuable asset to our younger generation in order to help guide and counsel.

So, as I am no longer a focal point of administrative decisions, I truly hope and pray that those who are will continue the splendid work now being performed. With God's help and guidance they will.

I am firmly convinced that AWI and ELM Trust will continue to prosper and serve our profession to the fullest measure. I pledge my support toward their goals.

Support your Institute and its administration to the best of your ability. If my counsel is desired, do not hesitate to call on me, personal or otherwise. People are dear to me; that's all I live for. The only real satisfaction man has is to help others within the bounds of his experience and ability.

About the Cover

Our July cover takes us to Lehua Blooms in the Hawaiian Islands. This view shows the flower, Ropy Lava, growing from solidified rock, once molten lava.

Josephine and Orville Hagans

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Second of a three part series

The Watch Cell as it Relates to the Watchmaker

Figure 1.

Figure 2.

by Gerald G. Jaeger CMW

It must be agreed that the cell or battery does have a place in the scheme of things insofar as watchmaker income is concerned. Our first article attempted to make some points and to arouse some interest. Point 1, cell replacement is necessarily the job of the watchmaker because we are the true link between the timekeeper (watch) and the consumer. Point 2, electrons provide the power and the battery provides not only the electrons but the electron moving force (voltage). Point 3, the volt-ohmmeter is not the instrument to measure the true quality of a battery.

I intend no endorsement and express no opinion as to the best instrument to measure the true quality of a battery. Some specific and some general reference must be made regarding my research into the function of some of these available test units. In order to test both the voltage of a battery and the ability of a battery to deliver electrons to the watch, the battery must be tested under a load. The unit pictured in Figure 1 tests a battery for voltage only. The VOM pictured in Figure 2 also tests the voltage only providing the selector is set at DC volts. Frankly, these tests, as indicated in my previous article, are not very meaningful tests. The testers pictured in Figures 3, 4 and 5 test the batteries under load. When testing a battery under load we are testing to what extent the voltage of the battery drops during the time it is moving electrons through a circuit. When we test the voltage of a battery with a voltage tester or a VOM (Figures 1 and 2) we insert a very high resistance into the circuit. This resistance allows only a very small amount of current to flow in the circuit. It may be presumed that the higher the internal resistance of the voltmeter the better. This presumption would be valid were we interested in little or no current flow while the battery is under test. In one sense this little current flow during test could be deemed as advisable in that it does not drain the battery of its future current supply. For practical purposes it is not a relevant test as it does not indicate the internal condition of the battery and its ability to move electrons through an active circuit. The testers shown in Figures 3, 4, and 5 place a sizable load on the battery as they provide a relatively small resistance to the flow of current while the battery is under test. In view of this small resistance in the circuit there is a substantial flow of current from the cell. In a sense we are now testing a battery's power (power = voltage X current). This is what we really want to test: the ability to deliver current while the battery is actually working.

The companies who manufacture these battery testers all seem to have a somewhat different opinion as to just how much current they want to draw from the battery during this test. I say this because they all (Figures 3, 4, and 5) enter a different resistance into the circuit at the time of test. They all also show a different low end voltage at which they accept the battery to be good. I do not view this as necessarily an asset or deterrent when considering one tester over another. It is more or less an opinion as to what is the proper load–current ratio. The main consideration here for the watchmaker

(continued on page 8)

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THE WATCH CELL AS IT RELATES TO THE WATCHMAKER

(continued from page 6)

is that we treat the testing of these batteries in a professional manner similar to the way the battery manufacturers do. They cannot afford to test only the voltage and ship batteries to their customers, and we cannot either. They, as we, must stand behind the product. When we deliver a faulty battery to a customer it is by far a worse reflection on us than it is on the battery manufacturer. In fact very few purchasers of watch cells have the vaguest idea of who made the battery but most all of them know what watchmaker or jeweler installed it in their watch. The customer also remembers at what variety or drugstore he purchased a spent or incorrectly installed battery, and this elates me. What disturbs me is that too many of our watchmakers and jewelers treat battery replacement in the same manner the variety and drugstores do.

We can conclude that testers (Figures 3, 4, and 5) and other testers employing the same principle of testing under load will give us an insight into the expected life of the battery. We could give you a breakdown on each tester and what load it puts on the battery at time of test. It would serve very little purpose other than to create confusion. We can draw positive conclusions, though, if we briefly study each tester. You will note that each tester (3, 4 and 5) tests batteries under at least two different conditions. Tester 3 has a selector switch which offers the option of testing either LCD or LED batteries. Here we would consider the LED position to be designed to test batteries that are manufactured to function well and retain adequate voltage while being subjected to short periods of relatively high current demand. We would consider this to be during the period in which the display has been called upon. This cell has been designed to handle this high drain for a short time and immediately restore its energy for a future showing of the display, while at the LED setting the resistance placed in the circuit by the tester is relatively low and it allows a greater current to flow from the cell. It now tests if the voltage remains adequate despite this high current flow. When the selector is placed on the LCD position the tester places a greater resistance into the circuit allowing a lesser current to flow from the battery. This battery is designed to deliver a satisfactory current over a long period of time and without the expected surges of current for which the LED battery is designed. This type of battery would be used in a watch with an LCD display or in a step motor quartz analogue. If the tester indicates the battery to be good we can expect a reasonable life for this cell. Here we must consider that the voltage drop of a battery is proportional to the current flow from the battery at the time of test. The greater the current flow the larger the voltage drop. It must also be considered that tests are similar to accelerated tests. This is to say the battery is being subjected to a much greater drain during these tests than is expected during normal use in the watch. This is why one or two tests within a short time should be sufficient and these tests should be of short duration.

The tester in Figure 4 provides three options for test, the 1.5 V silver cell high drain, the 1.5 V silver cell low drain and the 1.35 V mercury. This tester also puts various loads on the battery being tested. These loads vary depending upon the designed use of the cell being tested. The testers in Figures 3 and 4 use small red and green LED's to indicate a good or bad battery condition. They also contain other electronic components and require an internal power source.

The tester pictured in Figure 5 employs an analogue readout and does not have its own internal power supply. It offers one test for the 1.5 V batteries and another test for the 1.35 V battery. The functions of this tester are similar to the other two in that it too tests the cell under a predetermined load.

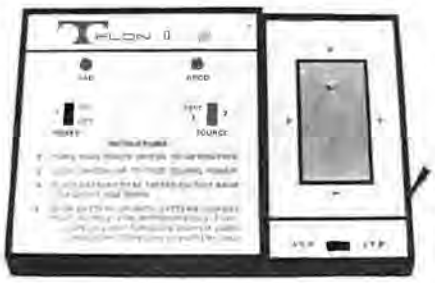

Figure 3.

Figure 4.

Figure 5.

These types of testers provide a valid test in that they offer an indication as to the actual condition of the cell and this could be presumed to be a test of the battery's ability to function properly for the job and for the time it is designed. When we consider that we want to measure the power the battery is delivering to the load, rather than the voltage, it makes sense to consider Ohm's Law, voltage = current X resistance, and power = current X voltage. Here, using the voltage formula we can see it is possible to have a normal voltage reading but a subnormal current flow. Using the power formula we get an insight into the battery's actual potential as both the current and voltage provide the power rating.

Our concluding article will discuss yet another method of battery testing along with a few recommendations on the does and don'ts of the battery replacement business. □

Our Readers Write

Beautiful Covers!

Your covers are so beautiful, but it is a shame you have to put the magazine's name just where it spoils the picture for framing or mounting. Your logo on page one is enough for us.

Mrs. James Servinsky
Johnstown, Pennsylvania

Ed. Note—Thank you for your compliments regarding our covers. Since we must have our name on the cover, why not frame it—name and all?

Better Cleaning Method

To Mr. Otto Benesh: I enjoyed your article in *Clock Chatter* which was entitled *My Method of Cleaning Clocks (April, 1979).* I know that I will find using your method an improvement on my own.

John Tischer

Good Reading from Benesh, Hagans, and Perkins

When I first decided to become a member of the American Watchmakers Institute, it was an uncertain decision, due to the cost. But after the first couple of issues, I realize it was well worth every penny and I wish to say that this new year the magazine is better than ever.

I especially enjoy Mr. Orville Hagans' articles about various horologists through history, Mr. Archie Perkins' lessons on repairing antique watches and Mr. Otto Benesh's "Clock Chatter."

George Sharkey
Madison, New Jersey

Horological Times welcomes letters from its readers. Please write us at AWI Central, P.O. Box 11011, Cincinnati, Ohio 45211. We reserve the right to edit all letters.

THE SHIP'S CHRONOMETER © 1979

by Marvin E. Whitney
CMC CMW

Repairs of the Mainspring

Frequently the end pieces of the mainspring are broken. Because the spring may be an odd size or because a replacement may be difficult to obtain, the end must be repaired. There are generally three types of mainspring end pieces used in chronometers; the hole end, the English square hook and the three-quarter round riveted hook which is used in conjunction with a mainspring brace.

When repairing a hole end, the temper is first drawn about one and one-half inches from the end of the spring. It is not advisable to punch a hole as there is always the risk of breaking the spring. Mark the position of the hole with a centering punch. Now drill two holes directly in line with each other. When drilling the holes, it is best to back up the spring with a piece of brass or wood so when the drill pivot breaks through the thin spring strip, the drill will not catch and break off.

Place this drilled end of the mainspring in a flat jaw pin vise or in a toolmaker's clamp. Then, with a fine round file, file out the connecting piece between the two holes. Elongate the hole to size, keeping the hole centered and the sides straight. Do not file too large a hole. With a fine square file, make the upper end of the hole square and at a slight angle so as to produce a sharp hooking edge. Then round off the end of the spring and remove any burrs. With a fine emery stick polish both sides of the spring, leaving it white. The final operation is to bend the tip end of the mainspring so it follows the curvature of the barrel. This will ensure a positive hooking.

The square hook type (Figure 1) which fits into a hole in the side of the barrel is more difficult to make. Take a piece of flat steel and file it to fit the square or rectangular hole in the side of the barrel. Before inserting the filed piece in the hole, check the angle of the hole in the barrel. This angle should be no less than 45° or the hook may pull out when under tension. Insert the filed piece into the hole from the outside on the same angle as the hole. When the piece is properly fitted, scribe a line on it using the inside and outside edges of the barrel as a template. (Figure 2) Be certain there is sufficient steel projecting through on the inside of the barrel on which the rivet will be formed. Withdraw the scribed flat of steel from the barrel and place it between the false jaws of a bench vise (to protect the part which is to become the hook) so the upper scribe mark is even with the top of the vise. Then file up the rivet post. At the Observatory,

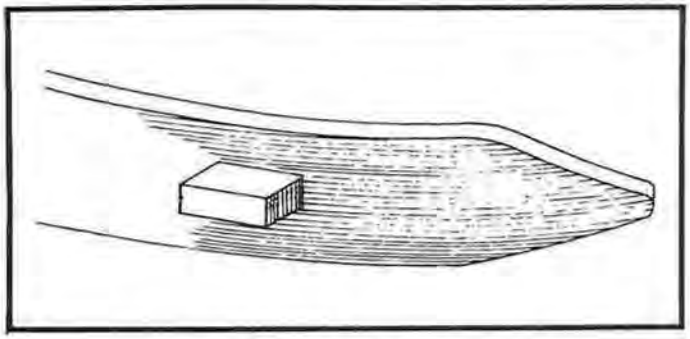

Figure 1. ENGLISH SQUARE HOOK.

after filing the rivet nearly to size, a rose cutter with its serrated face was placed over the end of the rivet post and after a few turns the post and shoulder were finished to size.

The hole in the mainspring may now be drilled. About a quarter of an inch from the end of the spring, drill a small hole just large enough to take the rivet. The post of the rivet should fit tightly in the hole, and the

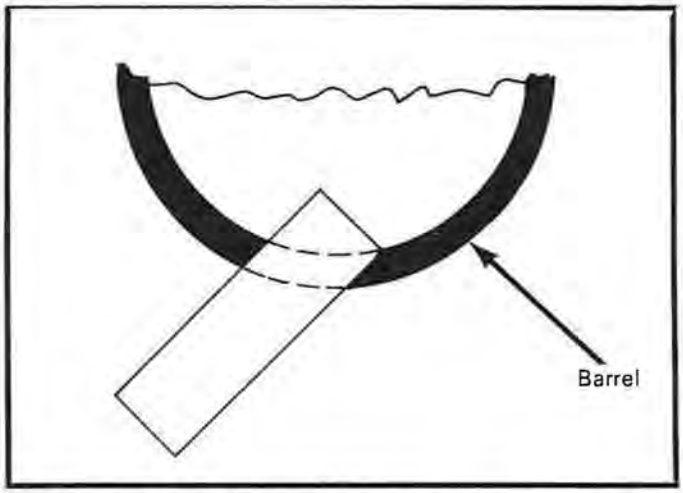

Figure 2. Sufficient steel protruding through on which to file rivet.

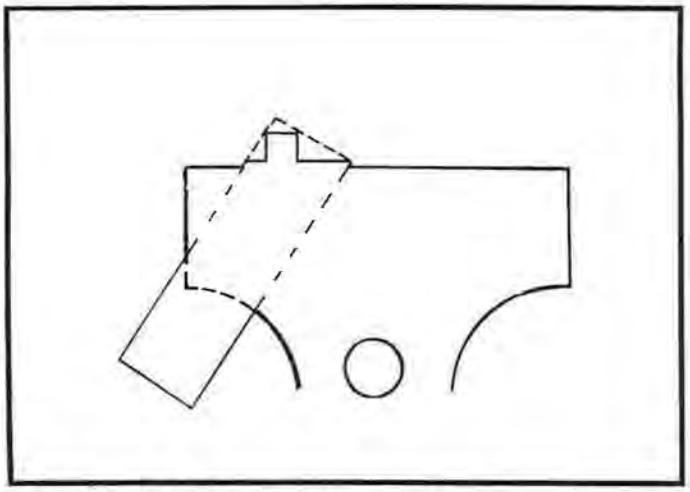

Figure 3. The filed up rivet post for a square mainspring hook.

shoulder should rest squarely onthe spring. Remove the burrs and countersink the hole on the inside of the spring so that when the hook is riveted into place, no part of the rivet will project above the surface of the spring. The end of the spring is then tapered but not shortened.

The rivet is now shortened to about the thickness of the mainspring. Place the mainspring over the rivet and carefully peen over the rivet, but not all the way. Remove the pieces from the bench vise and with a jeweler's saw, cut off the excess portion of the filed hook, leaving just a trifle more than the thickness of the barrel attached to the mainspring. Remove any burrs and to ascertain the correct height insert the hook through the hole in the barrel from the outside. Through this trial fit, the thickness of the hook can be reduced if necessary and the alignment of the hook may be checked to see whether or not it became distorted during the peening operation. At this point, necessary corrections should be made. Place the hook on a bench anvil and finish peening the rivet. Being satisfied, wind the mainspring into the barrel. To make certain that the spring and hook is home, strike the bottom of the barrel against the bench top several times.

(continued on page 14)

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THE SHIP'S CHRONOMETER

(continued from page 11)

Figure 4. 3/4 Round or "D" shaped mainspring hook.

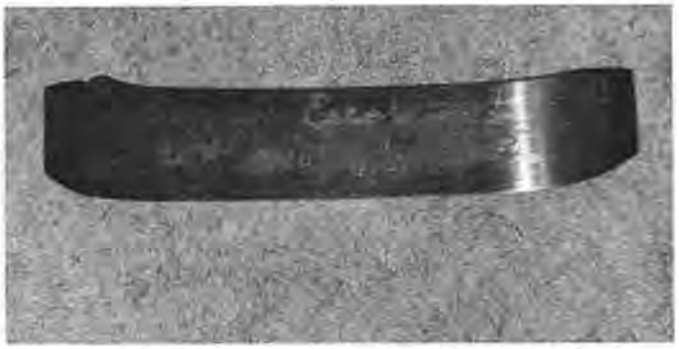

Figure 5. Chronometer Mainspring Brace.

If any of the hook protrudes above the outside surface of the barrel, it can now be filed down so it is flush with the barrel. So as not to file the surface of the barrel, place a thin piece of paper over the hook and file both the paper and hook together until the file just touches the surface of the barrel. The barrel should not be marred. The job is finished by stroking the hook with a burnisher a few times, also through a piece of thin paper. Some repairmen, after filing the hook to the level of the barrel, remove the mainspring from the barrel to finish the hook.

The hook must be finished flush with the outside surface of the barrel; for if any part of the hook protrudes above the surface, the fusee chain may turn over as it is being wound onto the barrel. This is a distinct possibility, should the path of the chain coincide with the seam between the hook and the barrel.

The three-quarter round or D shaped hook (Figure 4) is used where a mainspring brace is employed. The brace is made from a piece of mainspring steel, measuring approximately three inches in length. (Figure 5) One end of the brace is chamfered so it will fit in under the lip of the barrel hook, while the other end is chamfered the opposite way to fit in under the mainspring hook.

The rivet is made from 3/16 inch round drill rod. Turn a rivet with a shoulder, the height of which should be no more than the thickness of the mainspring. The length of the post should be about twice the thickness of the spring. After turning the shoulder and post, cut the

Figure 6. Victor Kullberg Chronometer beautifully finished by spotting.

piece off a little behind the intended height of the rivet head. Reverse the piece in the lathe and reduce the head to the desired thickness and polish. Lock the headstock with the index pin and with a fine, flat file, file approximately one-quarter of the head off. Be sure this edge is filed straight. With the piece still in the lathe, chamfer the lip with a fine slotting file.

The hole in the mainspring may now be drilled. About one inch from the end of the mainspring, spot center and drill a small hole. Using a broach, enlarge the hole, but only large enough, to ensure a tight fit of the rivet. Remove the burrs and countersink the hole on the inside of the spring. Place the rivet head down on a bench anvil, and position the mainspring over the rivet with the rounded portion of the rivet facing toward the end of the mainspring. Peen the rivet, but not all the way. Then check the alignment of the hook lip. The lip must be at right angles to the top and bottom edge of the mainspring. Adjust if necessary and then peen the rivet up tight. Finally, remove all burrs and round off the end and reshape the end so it conforms to the curvature of the other coils.

Uprightness Of the Arbor and Barrel

Before reassembling the barrel, replace the arbor and cap and check for uprightness. The barrel cap snaps into the barrel edge (except the Hamilton where it is held in place by five screws), but it will only be a proper fit when it snaps in its original position.

Often a small "dot" is placed on the barrel cap and the edge of the barrel to enable the repairman to replace the cap in the "centered position." To "center" the arbor hole in the mainspring barrel with the corresponding hole in the barrel cap, place the barrel arbor in the barrel and snap the cap in place. Chuck the lower arbor pivot in the lathe and slowly turn. If the barrel cap is "off center", remove and shift its position on the barrel. Continue to do this until a place is located where the barrel cap and the barrel run true. Then make a small dot on the barrel cap in line with a dot on the barrel edge, so the cap can be replaced on "center" when it is necessary to again remove it. If you are unable to

(continued on page 56)

Technically

WATCHES

by Archie B. Perkins, *CMW*

Watch Cases and Their Accessories

One important aspect of the watch repair trade is the watch case and its accessories. Many times the watchmaker does a beautiful job repairing the watch movement but overlooks something about the case that will either prevent the watch from functioning properly or cause the repair job to go bad prematurely. In searching through books and trade magazines, it was found that most of them had nothing on the watch case and its accessories, and some barely touched on the subject. Therefore, it is the intention of this article to cover the subject in a practical and thorough manner.

When overhauling a watch, it is very important that the case be in good condition. The back and bezel should fit correctly, and the crystal should be the proper one to fit tightly. If the case is a water resistant type, the case gasket and the crown gasket must be in good condition and fit correctly. Otherwise, water may get into the case and damage the watch movement beyond use. If a case on a non-water resistant type watch has been damaged and the parts don't fit closely, there is a danger of dust and lint getting into the watch and causing it to stop, thus shortening the life of the cleaning job.

The pocket watch case and the older style wrist watch cases are often neglected. These older type cases were used with the negative type winding and setting watch movement. The negative type watch movement requires that the stem be held in the pendant of the watch case and be a part of the watch case rather than part of the watch movement. The later, more modern watch, has the stem held in the watch movement by a set lever and is part of the watch rather than the case. This is called a positive type winding and setting mechanism.

Figure 1 shows an exploded view of the winding and setting accessories of an older style pocket watch case. The part of the case that these accessories fit into is called the pendant, shown at A. B is the winding stem, C is the sleeve, D is the pendant cap, and E is the crown. The winding stem has a square on one end that goes into the winding and setting mechanism of the watch movement. Near the center of the stem is a shaped portion called the boss. This is the part of the stem on which the spring arms of the sleeve work. On the opposite end of the stem from the squared end is a thread onto which the crown screws. Next is the sleeve, which is used to hold the stem and crown into the pendant of the case and to shift the stem between the winding and setting positions while winding and setting the watch. The body of the sleeve is made of brass or nickel silver. The part of the sleeve which works on the stem is of spring steel that is split in four places and formed in a certain manner, so as to work in connection with the boss on the stem.

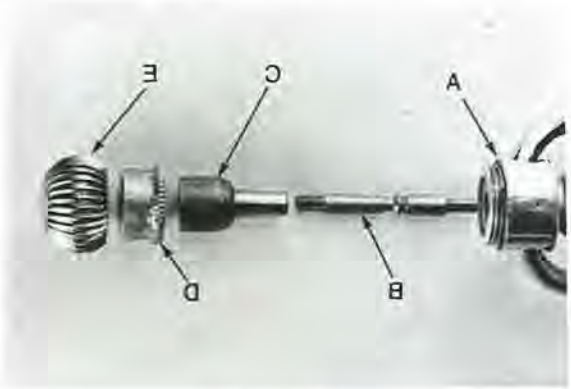

Figure 1.

The sleeve in Figure 1 isn't threaded like the more modern styles. Instead, it fits inside the pendant against a seat and is held into place by a pendant cap that screws onto the pendant. The crown fits around this cap as shown in Figure 1. Figure 2 shows a more modern style of stem and sleeve arrangement. This sleeve is threaded and screws into the pendant. It can be adjusted up and down in the pendant to shift the depth of the stem square in the watch movement. This simplifies the adjustment of the winding and setting mechanism. No cap is needed to hold this sleeve in place in the pendant as long as the thread on the sleeve fits tightly in the pendant. Note that the threaded portion of the sleeve is split in four places. This is to accommodate a sleeve wrench for removing, replacing, and adjusting the sleeve. Figure 3 shows a sleeve wrench and how it is used to remove and replace the sleeve in the pendant of the case. The sleeve

Figure 2.

Figure 3.

Figure 4.

Figure 5.

Figure 6.

Figure 7.

wrench has different sized prongs to fit different sized sleeves. These prongs are milled in such a manner that there are fins left on the prongs which fit into the slots of the sleeve.

It is very important for the prong on the sleeve wrench to fit the sleeve correctly. If the prong is larger in diameter than the sleeve, the fins on the prong will damage the threads in the pendant. If the prong is too small for the sleeve, it will turn inside the sleeve and damage it beyond use.

Figures 4 and 5 show how the spring arms of the sleeve work on the boss of the stem. Figure 4 shows the position of spring arms on the stem when the stem is in winding position. Figure 5 shows the position of the spring when the stem is pulled into setting position.

Figure 6 shows a different type of sleeve which is not threaded and goes inside the case where it is held in place by the watch movement. In this style, the stem also goes in from the inside of the case. This sleeve works on the stem in the same manner as the other types of sleeves and is called an inverted sleeve. This sleeve is used on wrist watches and some pocket watches where the pendant is very short or has little space for a sleeve.

The following is an example of what takes place in a 16 size Waltham as the stem is moved in or out. When the stem is pushed in as in Figure 7, it presses on the end of a plunger that works through the hollow winding arbor which carries the winding and clutch pinions. The end of this plunger presses against a lever called the shipper lever. The other end of this shipper lever works in a V-shaped notch in another lever called the shipper. The other end of the shipper goes into a groove of the clutch pinion. The two levers, where they contact each other, are held together by a wire spring, and all of this is held down by a round cap and a screw, as seen in Figures 7 and 8.

When the stem is pushed in, it causes a plunger to apply enough pressure against the shipper lever and spring to cause the shipper to shift the clutch pinion into connection with the winding pinion. This allows the watch to be wound. If the stem and crown are pulled out to setting position, the following takes place. The pressure is released from the plunger, which lets the shipper lever and shipper, acted on by their spring, to shift to another position. This causes the clutch pinion to separate from the winding pinion and go into connection with the intermediate set wheel, allowing the watch to be set.

If a watch won't set when the stem is pulled into setting position but will still wind, this is a good indication that either the sleeve is screwed too far into the pendant or the square on the stem is too long. If, on the other hand, the watch will still set but will not wind when the stem is pushed in, this indicates that either the sleeve is screwed out too far or the square on the stem is too short. Before the sleeve can be adjusted or removed from the pendant, the crown must be removed. To do this, take a smooth jaw plier and grasp the stem to hold it while the crown is removed; the sleeve wrench can be used to adjust or remove the sleeve.

There are several types of problems which may result in the maladjustment of the sleeve. A common problem is when the thread on the sleeve is either too worn or too loose in the pendant thread. If the thread is badly worn, then it needs to be replaced. If the thread is still good but slightly loose in the pendant, it can usually be tightened by placing the sleeve into a hole in the bench anvil, which is just large enough so that the spring portion of the sleeve will go into the hole freely without binding. This will allow the threaded hub of the sleeve to be supported by the bench anvil. A thin knife blade that will fit into the slots on the threaded part of the sleeve without going to the bottom of the slots, should then be placed in one of the slots. With a brass hammer, the top of the knife blade should be tapped lightly. Repeat this operation in the other slots. See Figure 10. CAUTION: If this is overdone, it can cause the sleeve to be broken. This causes the slots to be spread slightly which increases the diameter of the threaded part of the sleeve. This will cause it to screw into the pendant more tightly.

Another common problem with the stem and sleeve is that the spring arms of the sleeve or the boss on the stem may become worn so that the stem pulls out too easily. Sometimes this problem can be corrected without replacing the sleeve or stem. First, try closing the ends of the spring arms of the sleeve. To do this, place the sleeve on the die plate of the staking tool with the thread end of the sleeve on the die plate. Then select a taper mouth punch that fits over the end of the spring arms of the sleeve, (See Figure 11), and tap the punch with a brass hammer. This closes the hole in the end of the spring arms, making the sleeve slide over the boss of the stem with more resistance. This will cause the stem to stay in the proper position. Another method of making the stem harder to pull out involves chucking the stem in the lathe and using a graver to reshape the boss. By making the incline steeper, more resistance is created when the spring arms of the sleeve climb the boss to shift from one position to the other. See Figure 12.

If a stem is hard to pull into setting position, then the stem and sleeve should be cleaned and oiled. If this doesn't cure the trouble, then the stem can be chucked up in the lathe and a graver used to lessen the slope on the boss allowing the spring arms of the sleeve to slide over the boss more easily.

Anytime the watch case is cleaned, the stem, crown and sleeve should be removed from the case and cleaned separately. Also, the boss on the stem should be lubricated. This will lengthen the life of the stem and sleeves as well as make it function more satisfactorily.

When replacing a sleeve with a new one, it is very important to select one of the same length as the old one. Otherwise there might not be enough room in the pendant to adjust it for proper functioning.

When fitting a new stem, it is very important to remember that the boss on the stem should be in a certain position on the stem. Otherwise the stem may not work correctly. Usually new stems come with an unnecessarily long square and thread that must be cut off in order to be fitted to the watch and case. If the stem is too short from the boss to the end of the square, it may not be possible to lower the sleeve far enough into the pendant to make the stem work in the winding position. On the other hand, if the portion of the stem from the

Figure 8.

Figure 9.

Figure 10.

Figure 11.

Figure 12.

Figure 13.

boss to the threaded end of the stem is too short, there will not be room for the crown to screw on and still function correctly.

Stems and sleeves are considered to be watch case material and should be ordered for the particular brand and size of case that they are to be used in. It is also important to mention the make of movement the stem is to be used with.

If the thread in the pendant is found to be bad, it can be rethreaded with a pendant tap. See Figure 13. Pendant taps come in sets of six for 18 size - 16 size, 12-6 size, 0 size, 5/0 size and 10/0 size cases.

The 18 size tap has a diameter of 5.90 mm with 50 threads per inch. The 16 size tap is 5.00 mm diameter with 60 threads per inch. 12-6 size is 4.40 mm diameter with 66 threads per inch. 0 size is 3.90 mm diameter and 66 threads per inch. 5/0 size is 3.20 mm diameter with 80 threads per inch, and the 10/0 size is 2.58 mm diameter with 90 threads per inch.

In next month's article, the crown, bow and other case accessories will be discussed.

THE ROCK QUARRY

Basic Gemology for the Repair Shop

by Fred S. Burckhardt

Identification of Gemstones by Color

Trying to guess the identity of a gemstone by color alone can have a devastating affect on your reputation, business, and billfold! Many people, including those in the business, think because a stone is blue it's automatically a Sapphire, red - a ruby, green - an Emerald, and so on; however, this is not true.

There are many gemstones, in all colors of the spectrum, that could easily be mistaken for another. Before the advent of Gemology as we know it today, there were some famous gemstones thought to be a certain species that turned out to be something else. The Timur Ruby and the Black Prince's Ruby, part of the British Crown Jewels, are actually red Spinels,) which for centuries, have been called Rubies. At one time, all yellow stones were called Topaz. Even today, quite a few stones in this color range, particularly the Citrine and Smoky varieties of Quartz, are still called and sold as Topaz.

The two most widely used synthetics, synthetic Spinel and synthetic Corundum, come in colors to imitate just about every color of genuine stones. The majority of these are difficult to separate from the genuine stone which it imitates. To give you an example, recently, I held in my hand three stones, an Aquamarine, a blue Topaz and a synthtic blue Spinel. Laying side by side, it would be improbable if not impossible, for anyone to separate them by sight alone. This is what all of us are faced with each day at the repair counter. Now, let's go a bit further and separate these three stones. The Aquamarine was priced at $950.00. It's a hard and fairly tough stone. It could change color at high temperatures, and could by damaged by Hydroflouric acid.

The blue Topaz was priced at $1800.00. It is a

TRANSPARENT GEMSTONES

COLORLESS

Diamond — Sapphire (Genuine and synthetic)	Garnet
Beryl — Spinel (Genuine and synthetic)	Zircon
Cubic Zirconia — Glass	Topaz
Synthetic Rutile — Quartz	Strontium Titanate

RED

Ruby (genuine and synthetic) — Glass	Doublets
Spinel (genuine and synthetic) — Synthetic Rutile	Triplets
Garnet — Zircon	Alexandrite
Diamond — Topaz	Andalusite

GREEN

Garnet — Diamond	Tourmaline
Emerald (genuine and synthetic) — Glass	Andalusite
Spinel (genuine and synthetic) — Peridot	YAG
Sapphire — Quartz	Zircon
Alexandrite — Topaz	Doublets
	Triplets

BLUE

Aquamarine — Glass	Zircon
Sapphire (genuine and synthetic) — Topaz	Doublets
Diamond — Synthetic Rutile	Triplets
Spinel (genuine and synthetic) — Tourmaline	

PURPLE and VIOLET

Garnet — Amethyst	Zircon
Sapphire (Genuine and synthetic) — Spinel (genuine and synthetic)	
Diamond — Topaz	
Glass — Tourmaline	

YELLOW and GOLD

Topaz — Glass	Synthetic Spinel
Citrine — Garnet	Doublets
Beryl — Synthetic Rutile	Triplets
Sapphire (genuine and synthetic) — Tourmaline	
Diamond — Zircon	

BROWN and ORANGE

Smoky Quartz — Glass	Tourmaline
Topaz — Garnet	Doublets
Beryl — Quartz	Triplets
Sapphire (genuine and synthetic) — Spinel (genuine and synthetic)	Zircon
Diamond — Synthetic Rutile	

hard stone but not very tough, as it can cleave and it is sensitive to heat. Again, heat could cause it to crack or cleave, possibly even under the steamer. Certain temperatures could cause a color change; acids are no problem.

The synthetic Spinel costs about $12.00. It is hard and has good toughness. High temperatures may cause a slight color change. As with the blue topaz, acids are no problem. As you can see, all of these stones may look alike; yet they will react differently under certain conditions.

Because a stone is set in an inexpensive mounting, this does not mean it's an inexpensive stone. From time to time, you may come across a fine quality gemstone set in a sterling, gold filled or even a plated mounting. On the other hand, you may see some very expensive pieces of jewelry with synthetic or imitation stones. If you make a quick judgement by the quality of the mounting, you could stand a chance of being wrong. Recently a woman brought in a ring to be appraised. It had about three carats total weight of tapered baguettes and brilliant cut diamonds. In the center was a beautiful green stone. Judging from the appearance of the ring, there was little doubt that the stone was anything but a fine quality genuine Emerald. In fact, she let it be known right away that it was a genuine Emerald. It proved to be a synthetic Emerald which would retail for less than two hundred dollars. A genuine Emerald in the same quality would sell for about five thousand dollars. Suppose you had taken the customer's word that it was a genuine Emerald and accepted the ring in to be sized or to re-tip a prong, and it was damaged while in the shop? Remember, you didn't know if it was genuine or synthetic. Would you buy a genuine Emerald to replace it? Would you try to replace it with a synthetic Emerald, hoping she wouldn't know the difference; yet, taking a chance she would find out later on and accuse you of switchin stones? In this age of consumerism, just hope a customer never takes you to court. If so, you may end up not only paying more than what the piece was worth but paying for personal injuries as well. Mental anguish,

(Continued on page 55)

Questions and Answers

by Henry B. Fried
CMW CMC FBHI

Loud Hum - Bad IC?

Q. I have two questions. First, has anyone come up with the solution as to why one Accutron 218-219 will "hum" so loud that it has to be put in the sock drawer at night so as not to offend the "missus" and yet another will be so quiet that one has to really have good hearing to detect the hum?

Second, what causes an apparently in good condition ESA 9200, when first started, to give a kick, pause, etc. Sometimes, when a good motion has been established, the watch will appear to be functioning well, but may come back as a "stopper" or give a slow runner indication?

Keep up the good work–(this) is a tremendous aid to the trade.

Richard C. Kowalski
Fort Wayne, Indiana

A. I have made inquiries regarding your loud Accutron. It seems that this is not an entirely isolated complaint although not frequent.

The cause, I'm told, is due to a few things, either separately or compounded. One source of noise is that the pawls are not properly aligned; that is, the jewel may be tilted or not engaging the pawl wheel properly. It may be out of parallel, one jewel may be beaked in or outward. Another reason is that one tine of the fork may be out of balance or slightly out of tune with the other. In this case a new fork is required. Another reason is that the pawl jewels while gathering up the correct tooth are coming back and forth just a bit too far and thus the fork is just a bit more active. Still another reason is that the well in the main plate which houses the tuning fork may be conducive to amplification of the humming. In these cases, a new plate is found which better suits the fork, that is, acoustically. Also, a combination of resting such a watch on a resonant surface would augment the sound.

The symptoms shown in your ESA 9200 are unusual and may reveal a defective IC which will have to be changed. This calibre is self-starting but not mechanically. The electronic circuit slowly builds up until the motion is adequate. In your watch, the charges may build up, become exhausted and repeat the cycle. The "slow" running indication shows an intermittent, short term, but collective failure to index. A new IC may cure this.

Seldom Meeting

Q. We have a clock in for repair that has been giving us a problem. It is an 8 day, spring wound, striking wall clock by Kienzle about 80 years old.

It will run fine for 2 or 3 weeks and keep good time; then it will begin stopping. It will run an hour or two, then stop; maybe a day or so, then stop again. Then after stopping off and on like this for a week or two, it may then run 2 or 3 weeks again without stopping. It always stops a few minutes before the hour or half-hour, while it is in the warning. It was acting like this when our customer brought it in, and it is still doing the same thing since we have gone over it.

We have taken it apart, cleaned, bushed several pivot holes that were worn, and replaced the time side mainspring because it was somewhat narrower than the barrel. We have checked the strike tripping mechanism to make sure it isn't binding when the clock goes into the warning, and it appears to be free.

We have torn the clock down several times to see if we might have missed something, but everything appears to be okay. I know this is not much to go on, but we would appreciate any suggestions you might have as to the cause of the erratic behavior.

Walter J. Cline, Jr
Memphis , Tennessee

A. It is difficult to determine from this distance just what may be causing your clock to stop after 2 or 3 weeks. The fact that you have overhauled the clock and taken it down that often indicates that you haven't overlooked too much at all. Also, you have rebushed the holes, indicating care, but then again, were the holes rebushed so that the pitches of the wheels were corrected properly? Testing each for ease and concentricity of the wheels should help.

When such clocks do stop at certain, long intervals, sometimes it is due to a fault in one of the wheels and a pinion which, because of the mathematics, do not meet in short, periodic cycles. Say for example a barrel with 88 teeth in a barrel. One of the barrel teeth has a slight deformity, not enough to stop a clock. However, the pinion has 12 leaves. It would take 7 1/3 turns for the pinion to one turn of the barrel. Now one of the leaves in this pinion has a slight deformity, not enough to stop a clock. This pinion and that leaf, should they meet, might stop the clock. They won't meet

(continued on page 24)

Let's get down to Cases! Your customers may be better off if you supply a brand new movement. BOREL has the answers.

Listed below a number of movements we carry in stock or can special order. The movements are listed in order of size.

17 JEWEL • INCABLOC SHOCK PROTECTED • QUARTZ ANALOG*

59-21

1977-2

69-21

969

6498

NEW MOVEMENTS

CALIBER	SIZE	HEIGHT	FEATURES	PRICE
FHF 59-21	3¾ x 10L	3.50mm		$26.80
FEF 6650	5 x 7L	3.55mm		24.90
AS 1977-2	5½ x 6¾ L	3.60mm		20.70
ETA 2442	6L round	3.20mm		47.30
FHF 69-21	6¾ x 8L	3.55mm		17.70
FHF 691	6¾ x 8L	4.10mm	Sweep Second	19.10
ETA 2512-1	7¾ L round	2.90mm		23.75
ETA 2551	7¾ L round	4.60mm	Auto, Date, Sweep	34.95
FHF 371	8¾ L round	4.05mm	Sweep Second	20.05
P 7040	10½ L round	3.10mm	Small Second	24.95
FHF 969	11½ L round	4.55mm	Sweep Second	17.00
FHF 969-4	11½ L round	4.55mm	Sweep, Date	18.90
AS 1951	11½ L round	4.50mm	Sweep, Date	19.35
AS 2066	11½ L round	5.95mm	Auto, Day/Date Sweep Second	30.10
ETA 2783	11½ L round	5.20mm	Auto, Date, Sweep	32.40
ETA 2824	11½ L round	4.60mm	Auto, Date, Sweep	38.20
AS 5206	12L round	6.50mm	Auto, Day/Date Sweep Second	21.70
UT 6497	16½ L round	4.50mm	Small Second	21.70
UT 6498	16½ L round	4.50mm	Hunting case type, Small Second	26.90
ESA 961.001	6¾ x 8L	3.50mm	QUARTZ ANALOG	39.15
ESA 960.111	11½ L round	4.50mm	QUARTZ ANALOG Sweep, Date	32.90

Additional Calibers — Special Order, Only

CALIBER	SIZE	HEIGHT	FEATURES	PRICE
AS 1051	5¼ x 8½ L		Non-Incabloc	$23.00
AS 5103	8¾ L round	5.35mm	Auto, Date, Sweep	28.90
AS 5106	8¾ L round	5.95mm	Auto, Day/Date, Sweep	30.75
FHF 372	8¾ L round	4.05mm	Sweep, Date	21.90
ETA 2412	6¾ L round	3.40mm		24.70
ETA 2671	7¾ L round	4.80mm	Auto, Date, Sweep	39.60
ETA 2678	7¾ L round	5.35mm	Auto, Day/Date, Sweep	43.35
ETA 2789-1	11½ L round	5.90mm	Auto, Day/Date, Sweep	34.30
ETA 2892	12½ L round	3.60mm	Auto, Sweep	64.15
F 4520	6L round			47.30
FEF 6632	5½ x 6¾ L			23.60
FEF 6664	6¾ x 8L	3.55mm		21.90
FEF 6686	8¾ L round	4.90mm	Sweep, Date	21.90
P 7001	10½ L round	2.50mm	Small Second	31.95

*All 17 Jewel and Incabloc except QUARTZ ANALOG movements, or if otherwise indicated.

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QUESTIONS AND ANSWERS

(continued from page 22)

until the barrel has made at least three revolutions and if the tooth and pinion weren't meshed to begin with, their chances of meeting with their collective faults may occur in perhaps two or more weeks. You can think of other such combinations along the way. It does happen in trains, dial trains, etc. I can't suggest more. Perhaps if this is printed in the Q&A column, we may get some other suggestions.

Steel Hardness

Q. I have a question regarding hardening and tempering of small parts. Instructions on the making of stems, staffs, etc., usually tell you to harden and temper prior to cutting on the lathe.

My question is, can the part be hardened and tempered after cutting is completed? If so, how? Without burning pivots, etc.

Thank you for past information and an enjoyable and informative magazine.

John J. Wood
St. James, New York

A. With today's tungsten carbide gravers it is possible to turn stems and staffs with tempered stock. However, some still prefer to work the metal while it is soft. In such a case small pieces can be tempered after cutting and brought to the correct temper by packing the object, staff, stem, etc. in a small box of fine brass filings.

Place a polished screw, head up, into the filings so that after hardening and quenching, you can see the color of the screwhead change color to the desired temper, blue, wine, straw, etc.

Staffs can also be hardened by taking very fine wire and wrapping it around the staff, stem or other object, so that it resembles a cocoon. Heat this to a cherry red and plunge it into oil. Then merely light the oil-drenched cocoon. Let it burn for about 3 seconds and again quench it into oil. The flames never actually reach the staff since it is surrounded by the oil, but the oil becomes hot enough to temper the staff so that it is no longer brittle. The pivots of stems will not become burned and if the air is kept from the parts by the aforementioned packed brass filings and in the oil-drenched wrappings of fine wire, the polish will not be affected.

Counterbores

Q (to James Tigner). I find your articles very interesting and helpful. Keep up the good work.

I have had no luck in finding a counterbore with pilot which you illustrated in your June 1978 article on wooden movements. Could you please send me the name of your supplier?

A suggestion for a future article would be the replacement of trundles in a lantern pinion, a common problem which often is incorrectly handled by many repairmen.

Jeff Kingdom
Niwot, Colorado

A. Thank you for your generous comments on "Inside the Clock Shop." I agree that there is a need for an article on the replacement of trundles in lantern pinions, and will make a note to have a go at it before too long.

My supplier for counterbores is the R. Van Alstine Tool Co., Inc., 209 Central Avenue, Schenectady, New York 12147, who will be happy to ship to you, I'm sure. The order may take a little while to fill since Van Alstine is only a distributor and will probably have to order the tools from the manufacturer in the Midwest.

The 3/8" and 1/2" bores are all you need for wooden shelf clocks, but the 5/8" bore is advisable in grandfather clocks where some pivots are wooden and 1/4" or larger in diameter.

These counterbores are drilled and fitted with set screws for pilots. However, there is an extra charge for the pilots, which I believe you can beat by turning them up on the lathe yourself–and to the exact size you want. But if you want the pilots, they have them. Ask for estimates on all the tools.

On some jobs, I have needed pilots with smaller diameters than the drilled holes in the counterbores. In such cases I simply turn a pivot of the right size on the end of the pilot, and then with small burrs (carbide dental burrs are good) mill a short helix and cutting lips on the pilot's shoulder so the counterbore will cut flush to the reduced diameter of the pilot. In wooden clocks, this is never really necessary. Just broach and drill out the old, worn pivot holes to the size of the pilots, always being careful to maintain the holes' original center.

On several occasions, I have expressed ideas about the role of R.E.C., and suggested some possible areas we should consider as our responsibilities to act upon. Following the same trend of thought, I would like to pose some questions about selection of students for training in watchmaking.

The importance of this question did not occur to me until I was faced with almost 100% increase in registration for the course at the George Brown College. While such a large registration obviously represents an advantage, it also poses several problems. The training arrangements could be adjusted to accommodate larger numbers; and the employment prospects are favorable for the extra number of graduates. The other alternative is to select the best prospects and accept only the number that the present facilities could accommodate. Either of the alternatives is administratively acceptable to the College, but I believe that there are also philosophical implications which should be considered. Before a decision is made in such situations, we should also consider the following: 1) It seems to me that the training of future watchmakers is, by and large, the responsibility of watchmaking schools; though the alternative training may be available through apprenticeship and through correspondence courses. The decisions we make regarding qualifications for training as well as selection methods will have profound effect on the quality of watchmakers in the future. 2) Indications are that with ever increasing diversity in the watchmaking industry, the demand for product knowledge and variety of sophisticated servicing techniques will demand a more intelligent craftsmen in the future. It is also possible that one segment of servicing will become more and more specialized, and production oriented, so that only a minimal number of operations will be performed by any one person. Such operators would not have to have all the skills of a watchmaker. It appears that both categories will co-exist within our industry. 3) The next consideration should be, who will train the semi-skilled. It seems to me that the industry is better suited for such a job than the watchmaking schools. 4) If the schools are to train the traditional watchmaker, or for want of a better word, the all-around craftsmen, what should be the admission standards, and what would be the standards of competence? 5) How could the admission standards be established? Are there tests available which would clearly separate those suitable for training from

Scholastically Speaking

by Joseph Rugole *CMW*

Chairman, Research and Education Council

those who are not? What would be the separation demarkation between the two groups? 6) Given that all the above can be determined, who might be the authority to set the standards? One person? The school administration? Advisory Committee? A panel of experts? Local association? Should A.W.I. or R.E.C. have an input? 7) What about the applicant? Are his civil liberties protected? Is he treated as a person of value, an equal among equals, or merely as a statistic.

I don't believe for the moment that I have asked all the questions that we must think about. I don't believe that a concensus can be reached among the member schools or among the individuals, because we have our own ideas and our specific conditions to consider. I do believe, however, that a common set of ideals could be formulated so that we could use it as a guideline in our decision making, and hopefully in this way better serve the common goal.
Tempus Fugit!

Award Received

The 1978 award for highest score on the AWI Certified Watchmaker Exam went to Jim Thorpe (center). He was presented the award by Joe Perkins (right), instructor and AWI area representative. A Portescap ultrasonic cleaner was awarded Jim's school and was accepted by Dr. Clyde A. Erwin (left), president of Wayne Community College, North Carolina.

BENCH TIPS

with Joe Crooks

There are very few Bench Tips that could save much time for all watchmakers. Having a list of which side of the movement to disassemble, to tighten offset cannon pinions would be helpful.

As there are only two sides on a watch, it looks like the odds would be fifty-fifty that a watchmaker could guess which side to get to the offset cannon pinion. But, up jumps "Old Murphy's Law" and ninety per cent of the time you disassemble the wrong side. The end result is lost time at the bench.

The original listing idea was submitted by my first cousin, Laurance Crooks, Rt. 14, Statesville, N.C., and was printed in the Horological Times, July 1977. This month we have his up-dated list.

Wouldn't it be nice to have a complete list for all caliber watches manufactured? It can be done, but only with your help by copying this list. Allow enough room for the different make and caliber watches not shown, and keep it handy in your bench. Jot down all the unlisted movements you repair and send the new list to me monthly. We will periodically update it in the Horological Times.

We may have some errors as some models were sent in with conflicting sides to disassemble. Perhaps on these models, the offset cannon pinion can be removed from either side. Please let us know if you find an error.

Send your bench tips to Joe Crooks, 265 North Main Street, Mooresville, N.C. 28115. We will print them with your name and address if they have never before been used.

Where to Gain Access to Offset Cannon Pinions

	Dial Side	Train Side
Benrus EG	X	
Bernhard Forster 220		X
Bulova 7EDA, 7 EDAD		X
10CRAC-10COAC	X	
All other Bulova Models		X
Caraville (all models)		X
Cuppilard 140-142	X	
Elgin 761-814-990	X	
925		X
ETA 2375-2550-1		X
France Ebauches FE 140-2A	X	
Gruen 518CA		X
G.P. 30 to 34-39		X
Hamilton 629,646		X
INT. 611		X
L.P. 91BN	X	
Mathey Tissot 721		X
Mrs T4-T5-T43 to T57	X	
Movado Kingmatic "S"	X	
A. Schild 1713-1716		X
1746 to 49	X	
1775, 1780 to 83		X
1802, 3	X	
1858-60-62-66		X
1863-80-83-92-93-96	X	
1900-1-2-3-4-6-13-14-16		X
1940, 41-1950, 51	X	
1986-1993	X	
2060-1-2-3-4-6		X
2072-3-4-6-84-86		X
2160-1-2-3-4-6		X
2174-76-84-86		X
Sgt. 140-1-A-E4	X	
ST 479		X
Zodiac 70-72-80		X

OTTO BENESH CMC

"CLOCK CHATTER"

A dealer friend of mine and I were attending a meeting of a local chapter of the National Association of Watch and Clock Collectors when we bumped into another dealer who was a friend of my friend. After the usual amenities he suggested that we pay a visit to his place (which was not very far from the meeting) and see some of the items he had in stock.

In the car, and on the way, I was daydreaming and admiring the beautiful countryside. I suddenly came to when I heard my friend say, "Otto can do it."

"I can do what?" I asked.

"Fred just asked me if I knew of anyone who could pivot an arbor in a clock, so I told him you could."

"Thanks a lot," I replied, "right now I have more work on hand than I can handle–what kind of a clock is it?"

"It is an early Dutch piece and the pivot is gone from the gathering wheel on the strike side."

Thinking that it wouldn't take a great deal of time to pivot the wheel (having been told that it was the pivot on the inside of the plate) I agreed to do the job stipulating that it was all I would do!

When we arrived at his place I looked at the clock, which was a magnificent long case clock, with marquetry inlaid in a mulberry wood background. The maker was S. van Leeuwen of Amsterdam who is listed as working circa 1704-1716. Closer examination showed that the pivot was gone and it was between the plates. But the clock had an internal rack

The Case of the Missing Alarm

Figure 1.

and the gathering pallet that was an integral part of the arbor and located next to the rear plate. The only thing after the gathering pallet was the broken pivot (lesson to be learned, never make promises without knowing *exactly* what you are talking about).

At the time of inspection of the clock it was noticed that there was a series of stopped-up holes at the upper left hand side of the plates (looking at the clock from the rear) and from the placement of the holes as well as the fact that it was a long case clock, I deduced that the missing work was from an alarm mechanism and not a pull-repeat. But nothing was said about this at the time.

The only real problem in pivoting a piece such as this is in finding a satisfactory method of holding the wheel arbor in order to drill the hole for the new pivot. Having the pallet at the end does not simplify the task.

One of the solutions that has been successful for me is an attachment (modification) I made for my tip-over T-rest on the watchmakers lathe. It is merely an easily made new rest as shown in Figure 1 and the key item is the V notch filed in the top edge. This notch can be filed in your standard rest but as the rest is used at a right angle to the lathe bed, having the rest a relatively thin piece and vertical gives more room for working and visibility. The rest is used by holding the wheel or pivot in a collet in the headstock, adjusting the V notch to support the arbor at an optimum point and by using the index finger or a piece of wood to hold the arbor in constant contact with the notch, proceed to drill the hole. Incidentally, you can cut several notches of different sizes to fit various diameters of arbors. I have also used this rest for turning, grinding, and polishing. In the case of turning, an additional T-rest is used to support the graver.

The pivot having been replaced, I told my dealer friend the clock was ready for pick-up. He said he had been thinking about the clock and asked if I didn't think it originally had been made with an alarm. I told him that this was so in my judgment and he asked if the alarm mechanism could be restored. I told him it could be done. He asked if I would do it. I then asked him what his interest in the piece was. "I have no interest, financial or otherwise," he said, "but both Fred and I feel that it had an alarm and if it can be restored the clock will be worth much more. So knowing we are friends he

asked me to see if I could prevail upon you to undertake the work. He said you would undoubtedly turn him down if he asked you."

Reluctantly, but with my interest now piqued in accomplishing a job that was far from run-of-the-mill, I agreed and the only stipulation was that I use the original stopped-up holes which would have been done in any case.

Taking inventory of what had to be made, I prepared the following list.

Alarm dial
Alarm actuating wheel (let-off wheel)
Alarm lifting lever
Alarm hammer
Alarm hammer spring
Alarm verge
Upper potence
Lever arbor and stop finger
Crown wheel
Winding wheel
Platform for lower potence, crown wheel and winding wheel arbor

Where to start? Luckily, among my drawings were those for a Dutch alarm by Abraham Clarenbeek of Haarlem and dated about 1760. The layout for long case alarms had not changed significantly in the years between, so with certain modifications the drawings in Figure 2 could be used. At this point I should like to say that it has been my policy to make drawings or photographs of mechanical components of old clocks that generally are not covered in the available literature. I also record any designs that appeal to me, such as the "dirty old clockmakers" who made lifting pieces in the shape of women's legs, but I also like well executed designs such as the platform in the piece under discussion. It could have been made as a plain rectangle without the side curve and the ornamental curves at the bottom.

So it is time to start! In order to give you a reference point to compare the drawing with the actual pieces made, Figure 3 shows the clock with the new pieces in place and as most of them are self-explanatory a short running series of notes will be made.

In some cases the plugs that had been made to fill in the holes in the plates were larger than that needed for pivot holes so it was a question of locating the proper position for drilling. I use a surface gauge as shown in Figure 4 to determine the height of the holes and the measurement is easily done with calipers and the hermaphrodite type is best for this type measurement.

Proceeding in a clockwise direction around the drawing, the first item we encounter is the alarm hammer spring. This was sawed from a solid piece and the arms were filed round. The steady tip is bent and I would suggest that the piece be heated red hot before bending as it can be quite brittle. The tip is rounded after being bent.

The next piece is the alarm actuating or let-off wheel and it is straightforward work, but don't forget the pin which fits in the alarm dial.

Continuing along we come to the alarm lever and this did present a bit of a problem, as this clock has a moon phase

(continued on page 34)

Figure 2.

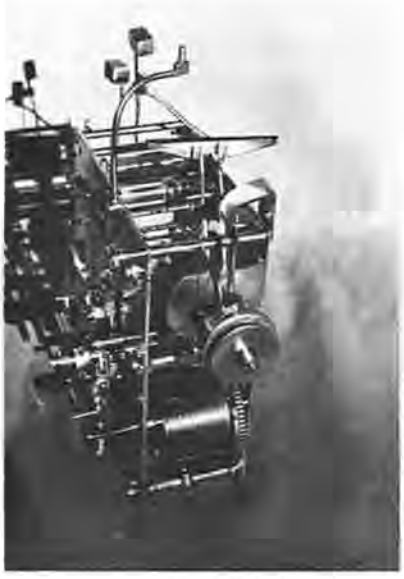

Figure 3.

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CLOCK CHATTER

(continued from page 30)

dial that is located just under the 12 o'clock in the place where the seconds ring usually is located. As you can see from Figure 5, the lifting pin on the moon phase gear would hit a straight lever as in the drawing, so imagination was called into play and the shape in Figure 5 was developed. Other than that it was an ordinary piece of brass work. I might mention that I have found that the aluminum used in flashing roofs on houses, which comes in rolls, is excellent for making trial designs. It is inexpensive and easily workable.

We now come to the platform, and the design worked almost to a "T." The original was from a casting and I took the liberty of brazing the edge piece. Bending would have produced a bulky rounded edge. The lower potence which fits into the round hole at the bottom of the platform can be made with either a blind hole or a screw in the bottom to hold the lower pivot of the alarm verge. The blind hole in this case is the most authentic. This brings us to the stud or arbor for the crown wheel and the winding wheel. The only peculiar thing is the opening that must be made for the verge to pass through—notice the simple but nice design.

The next piece to appear is the hammer and it is merely cut out of a piece of steel or iron and attached to the verge. The verge is a piece which seems to throw many clockmakers into a real sweat. It is simple to make. As you notice, the original design was modified to provide for a pivoted end operating in an upper potence. This decision was based on "reading" the holes in the back plate and the design is irregular. So rather than a long bent verge we have a two-piece joined by brazing or silver soldering. The verge is sawed from a piece of flat stock with the flags (pallets) on one side. Holding the verge in a pin or hand vise, rough rounding is done with a file using a wooden block as a backstop. When the piece has assumed a round shape, the verge is heated red hot between the flags and then twisted until they are about 90° apart. From here on it is just a question of filing and finishing. Two cone points and driving the work between centers makes the rounding of the arbor easy. The pivots can then be cut on the lathe between centers or on a device such as that in Figure 1.

The winding wheel is easiest done as an assemblage rather than trying to cut it from the solid. The first piece cut is the arbor, then the two flanges which often are tapered on the inside outer edge. When this has been done the center hub is made and drilled for the spikes that keep the rope from slipping. The spikes are easily inserted and points filed at this time rather than trying to work down in the recess. The pieces may be riveted or soft soldered together. The spring that engages the alarm crown wheel is made from steel that can be tempered and is cut and filed from a piece thick enough to provide the step which engages with the arms of the crown wheel.

Proceeding along we come to the lever arbor and stop finger which is the brake holding the alarm in readiness to sound when the alarm lever drops into its slot in the alarm wheel, thereby freeing the crown wheel to run. The drawing shows a front and side view of the stop finger and you can see its shape had to be modified to engage the crown wheel alarm stop due to the placement demanded by holes for the platform.

This brings us to the alarm crown wheel and it has two differences from a regular one used for the timekeeping side of a verge escapement. One, the teeth are cut backwards

Figure 4.

Figure 5.

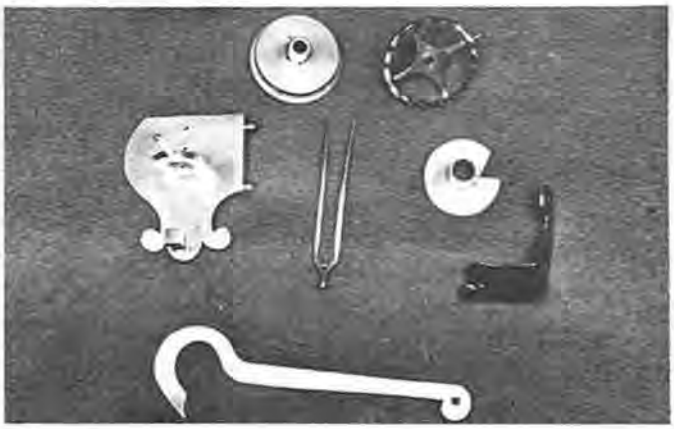


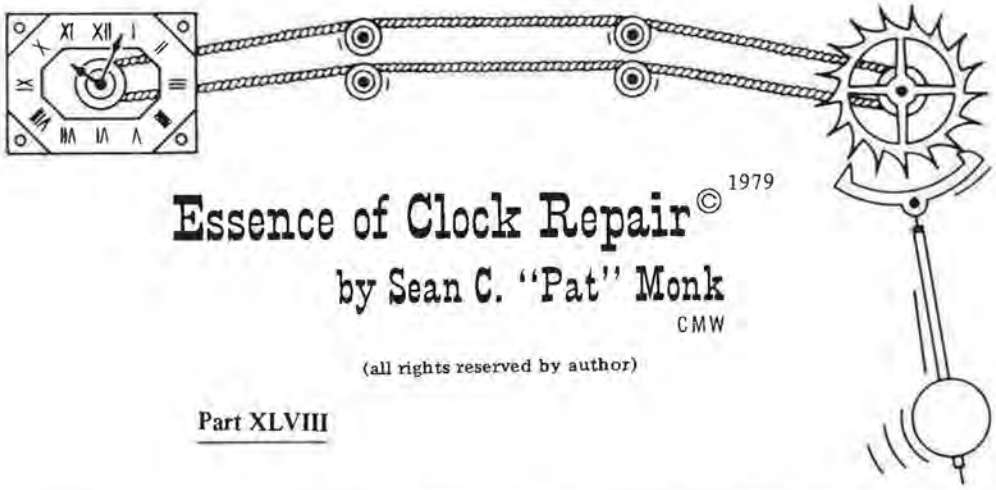
Figure 6.

Figure 7.

from the shape of a timepiece and secondly, there is a stop attached to the outside of the wheel for the above mentioned stop finger to hold the wheel from turning. Occasionally you will find a pin inserted rather than the tapered stop, but high class workmen always used the tapered stop.

The final piece is the alarm dial which was cut out using the piercing saw. From my files a suitable photo was sent to the engraver so he could copy the correct syle of the numbers. A quick-copy of a suitable dial from a book can be used by the engraver and I have even left the book with him.

We are now at the end of our adventure in "The Case of the Missing Alarm." You can see from some of the pieces (Figure 6) that were put together the final solution as shown in Figure 7. Thus we were able to say "case closed." The final stamp of approval was when my friend said, "That really looks Dutch." □



Essence of Clock Repair©1979

by Sean C. "Pat" Monk
CMW

Part XLVIII

8-Day French Count Wheel, One Half Hour Strike

(circa 1820)

Our fine antique ormolu French mantel clock under this discussion was manufactured by Pons in the early part of the nineteenth century. According to G.H. Baillie, "We believe this could be the same Pons De Paul who went to St. Nicolas d'Aliermont."

Our clock is marked "Medaille d'Argent" 1823. However, it is of the count wheel striking variety which we did not cover in too much detail in a previous article. Actually, this type of clock has many facets to its operation, none particularly complicated, but nevertheless in sufficient detail to warrant more writing than we shall endeavor in this sparse description. Therefore, we shall try to simplify dwelling only on that considered to be of main importance. Also, we shall only concern ourselves with the striking mechanism.

We will begin with the matter of what happens when the time train is rotated. In referring to our diagrammatic sketch, it will be noticed that, behind the hour wheel (i), there resides the cannon pinion (g), complete with two steel lifting pins on its underside. These two lifting pins are set 180-degrees from each other and promote the initial lift which occurs each half hour to promote the striking function.

At each hour and half-hour, one of these lifting pins reaches its high point. If we look behind the cannon pinion and observe the lift of the particular pin as it reaches this high point, we will see that it lifts the lower arm (k) of the lifting-unlocking lever. This action also moves the intermediate lift lever (j). However, this intermediate lever is mounted on the same arbor as the stop lever (t). The stop lever now moves and frees the stop lever finger (p) from the stop wheel pin, freeing the striking train. The stop wheel, together with the stop wheel pin attached to it, are shown as (o) in the sketch.

The stop wheel meshes with the pinion of the warning wheel (d) so that the latter is also temporarily freed and is allowed to rotate one-half turn. Once again, if we look at the sketch, it will be observed that we have shaded (in black) a release flag which is set at the end of the upper arm of the lifting-unlocking lever (f). This flag passes through a slot (c) cut into the front clock plate.

Figure 1.

However, at the same time as the train is freed, the release flag has commenced to move and eventually blocks the warning wheel pin, again stopping the train. This action is "the warning" and it occurs just prior to the physical striking of the hour and the half-hour.

However, at this point the time train is continuing to move and eventually the particular lifting pin on the cannon pinion (g) will move on past the lifting-unlocking lever, allowing the latter to drop. The release flag will, of course, move out of the path of the pin on the warning wheel. In addition, the stop lever finger will again move

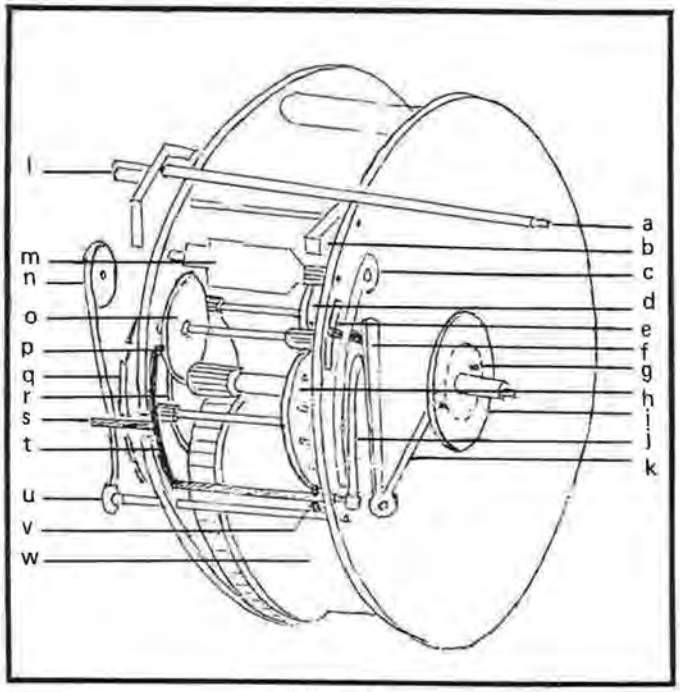


Figure 2.

Our nomenclature for our sketch:

(a) regulator
(b) pallet
(c) tension spring post
(d) warning wheel (with pin)
(e) slot in plate
(f) lifting-unlocking lever (with release flag passing thru slot
(g) cannon pinion (with two lift pins)
(h) hammer wheel
(i) hour wheel
(j) inter lift lever
(k) lifting-unlocking lever
(l) silk-thread suspension post
(m) fly (fan)
(n) hammer
(o) stop wheel (with stop wheel pin)
(p) stop lever finger (resident against stop wheel pin)
(q) count wheel
(r) main striking train wheel
(s) stop-lever beak (extension)
(t) stop lever
(u) hammer arbor
(v) hammer tail
(w) striking mainwheel (barrel)

clear of the stop wheel pin. The striking train will now be completely free and striking occurs.

The count wheel (q) which is responsible for the actual number of hours struck, is attached to the squared end of an extension of the arbor of the main striking train wheel (r). The strike is controlled by the position of the stop lever "beak" (s), which normally resides (except at the hour) in one of the slots cut into the outer periphery of the count wheel. The number of hours struck is dependent upon the position of the stop lever extension (beak) on this outer count wheel periphery. At the completion of the hour striking, a "finger" (p) at the end of the stop lever blocks the path

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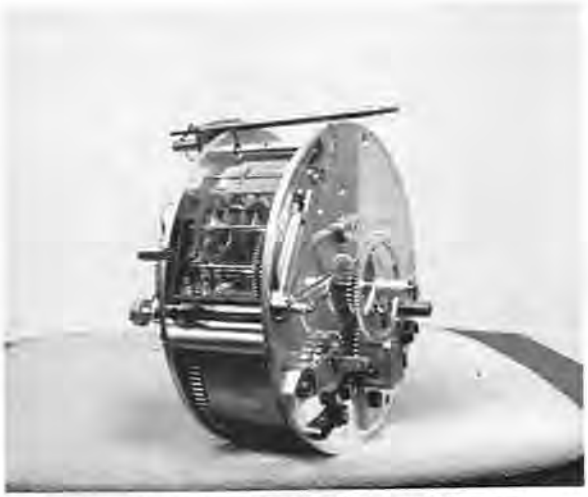


Figure 3 is the movement, front-plate wise.

Figure 4 is the movement, back-plate wise.

of the stop wheel pin on the stop wheel (o). (i.e. after the count wheel has allowed the stop lever beak to fall into one of the count wheel slots.) This arrests the strike.

After the hour striking sequence is completed, the stop lever beak moves into a cutaway slot on the lower periphery of the count wheel. The stop lever finger (p) will, again, block the path of the stop wheel pin. However, when the lifting-unlocking lever moves the stop lever at the one-half hour, and the train is temporarily freed, the beak is allowed to move in the lower rim (periphery) of the count wheel. This movement is just sufficient to allow one strike, for the one-half hour, to occur.

If one looks at the count wheel, it will be observed that most of the slots (for conclusion of the hour strikes and allowance for single one-half hour strikes) are the same size. Not so, in one instance. There exists one slot made longer than the rest. This is made especially to concur with the three successive single strikes occuring at 12:30, 1:00, and 1:30.

The hammer wheel (h) which is responsible (via the hammer pins which are shown in the sketch) for the physical kicking of the hammer tail (v) is meshed by its pinion with the main striking train wheel (r). The amount the latter is allowed to rotate, of course, is directly dependent upon the distance moved by the count wheel, the two wheels being set on the same arbor. The number of hours struck depends upon the number of

Figure 5 is the front plate

Figure 6 is the back plate.

pins allowed to kick the hammer tail. This also is relative to the count wheel distance moved.

Precautions in disassembly and assembly are the same as we have mentioned in previous articles. Dot-code your wheels. Especially dot-code the count wheel, so that it is returned to the arbor in the correct position on the squared end of the latter. Should this wheel be incorrectly mounted, haphazard striking will occur and one must keep moving the count wheel, one quarter turn at a time, until the correct striking sequence is obtained.

Our thanks, once again, to our mechanic, Dan Castner, for his work on the restoration of this fine timepiece in our shop and for his help in our general preparation. Our thanks, also to our shop manager and photographer, Dick Glasson, for his usual good work.

AFFILIATE CHAPTER COLUMN

by Willard Blakley CMW

Affiliate Chapter Meeting a Success!

At the time of this writing the annual Affiliate Chapter meeting is yet some three weeks away, however, I feel confident in saying that the meeting was a productive one which saw a great many things accomplished. I sincerely trust that we have answered any questions you have raised to your satisfaction, and have addressed ourselves to any problem with a suitable solution at the meeting. If we as a unit have been able to do this, then we can say we have achieved our goal, for this is the purpose for the Affiliate Chapter meeting, to make the field of watch and clockmaking a little better and more profitable way of life for all of us.

It has been my pleasure to serve you as Vice Chairman of the Affiliate Chapters for two years and then as the Chairman for the past two years. It has truly been a pleasure, not only to work with you with whom I've had close contact, but just to meet all of you at the annual meeting. By now I'm sure you all know that I believe in AWI and that I will promote the organization no matter what capacity I happen to be in. I also plan to continue to attend the Affiliate Chapter meetings and intend to serve on committees where I can. My wife Marian and I have enjoyed very much the opportunity to try to make the picnic an enjoyable change of pace after the long days of meetings. We would like to thank all of you for your kind compliments on our efforts and to thank you for helping to make these a success. We will be happy to prepare this cookout for those who wish our assistance in this in the future.

Thank you for your confidence which you have displayed in me and my ability by electing me your Affiliate Chapter Director. Now, as it is time for the responsibility to be turned over to another and for me to step down from this position, I trust that I have been worthy of your confidence and have not disappointed you in the performance of my duties. I am looking forward to working with the new Affiliate Chapter Director in the coming year, and hope that I have laid a proper foundation so that this person's job will be made easier.

Looking forward to the future for AWI, I see a great potential for growth. We are not a doomed and dying breed as some would have you to believe. With an organization such as AWI to guide us we have a great future and are limited only by our own limitations.

Thank you all once again for the privilege and pleasure of serving you and I will look forward to perhaps serving you again in the future.

Looking forward to the future for AWI, I see a great potential for growth. We are not a doomed and dying breed...

OHIO

The Watchmakers Association of Ohio, Inc., presented the second seminar of 1979 on March 18, at the Holiday Inn at Cambridge, Ohio. Howard Opp, WAO member, and AWI instructor, presented the program on the Bulova 242 Quartz Analog Stepping Motor Model. There were 28 men in attendance, and they all received their certificate from the AWI Education Committee. To receive this certificate, they had to disassemble, then reassemble the movement, and it had to pass all the electrical checks and be in a running condition when handed in. The fact that all the men taking the course received their certificate meant that there was a very good group of watchmakers and also a fine instructor. Mr. Opp has been presenting this seminar for about a year now. He takes the time to fully explain the problems that might

come up with this repair, as well as introducing new equipment used in making the electrical checks. One in particular is a small volt-ohmmeter in which he has inserted a 220 microfarad-25 volt capacitor into the circuit, and with the addition of a separate switch can utilize his VOM to test for current consumption. Complete instructions on adapting a VOM in this manner can be obtained by contacting Howard Opp or Jerry Wilson.

Howard Opp and Al Finch at AWI seminar held in Cambridge, Ohio.

Left to Right: Jacob Montgomery, Ralph Giantonio, and Andra Jett at Cambridge seminar.

The WAO held their spring seminar at the Holiday Inn at Perrysburg, Ohio, on Sunday, May 6. The instructor was Robert Nelson and he was assisted by Darrel Archer. Both men are very active in the American Watchmakers Institute Research and Education field. The seminar presented was titled, "An Introduction to Solid State Watch Repair." There were 36 men in attendance.

Ohio Watchmakers Attending Perrysburg Seminar. Left to Right: Ed Birtcher, Max Bargar, Harry Wysong, and Joe Gresh.

This seminar is intended to make the average bench watchmaker familiar with the dismantling and repair of LED and LCD watches. The program is 7-7½ hours long so as to cover the basics of construction of both styles. Each watchmaker attending this seminar receives a kit containing the component parts of an LCD watch. With careful and patient step-by-step instruction, Bob and Darrell took the 36 men right up to the completely assembled LCD watch, needing only a watchband to make it a mighty fine looking watch, capable of keeping time to within a minute a year.

ILLINOIS

The May 17 meeting of the Central Illinois Watchmakers Association was held in the Round Barn Banquet Center in Champaign. Stephen B. Binkley, biochemist from Eureka College, spoke about his hobby, clock collecting. Mr. Binkley talked about "American Clocks."

(continued on page 52)

AWI technical bulletins AWI hot line AWI bench courses AWI horological times AWI museum AWI employment service AWI films and slides AWI ad assistance AWI library AWI home study AWI certification AWI federal liason AWI scholarships AWI awards

AWI NEWS

By Milton C. Stevens

There are many ingredients which go into making AWI a viable and successful organization. One of the key factors, of course, is membership which exhibits a modest, but steady gain each year. This is especially significant in light of the diminishing number of watchmakers each year.

This continued growth in membership can be attributed to the cooperation that we receive each year from watch material distributors. Each year, distributors are surveyed to enlist their aid in our membership drive. They subscribe to mailing AWI membership brochures in with their monthly billing during the membership drive period. We are pleased to recognize those distributors who cooperated in the same manner this year. Below is the listing of those distributors. These firms have made an extra effort to support and promote AWI; members should make an extra effort to support them.

We further acknowledge that there are firms and individuals who continually promote AWI membership the year-round. They too deserve our thanks and support.

BJS, Buffalo, New York
M. Beresh, Inc., Oak Park, Michigan
Berkey Brothers, Inc., Oklahoma City, Oklahoma
Blankinship-Porter Company, Inc., Birmingham, Alabama
Jules Borel and Company, Kansas City, Missouri
Borel and Frei, Los Angeles, California
Bucks Wholesale, Charleston, West Virginia
The Cas-Ker Company, Cincinnati, Ohio
Colmans Inc., Cleveland, Ohio
Davis Jewelers Supply Company, Roanoke, Virginia
Davidson Jewelers Supply Inc., San Diego, California
Stanley Donahue Company, Houston, Texas

D.R.S., Inc., New York, New York
Esslinger and Company, St. Paul, Minnesota
Ewing Brothers, Tucker, Georgia
Otto Frei and Jules Borel, Oakland, California
Fried and Field Company, San Francisco, California
Friedman-Gessler Company, Los Angeles, California
Ray Gaber Company, Pittsburgh, Pennsylvania
Green's Jewelers Supply, Fort Worth, Texas
Harry's Watch and Jewelers Supply, Chicago, Illinois
Iowa Jewelers Supply Company, Des Moines, Iowa
Jewelmont Corporation, Minneapolis, Minnesota
Kilb and Company, Milwaukee, Wisconsin
S. Kramer, Orlando, Florida
Kurtz, Inc., Houston, Texas
Langert Brothers Company, Phoenix, Arizona
S. LaRose, Inc., Greensboro, North Carolina
Livesay's, Inc., Tampa, Florida
Mahar and Engstrom Company, Inc., Boston, Massachusetts
Marshall-Swartchild Company, Dallas, Texas
Marshall-Swartchild Company, Chicago, Illinois
Mayer Brothers, Seattle, Washington
Mayer Brothers, Portland, Oregon
William S. McCaw Company, Toledo, Ohio
Meiskey's, Lancaster, Pennsylvania
Michigan Jewelers Supply Company, Troy, Michigan
Norvell-Marcum Company, Inc., Tulsa, Oklahoma
Posner Jewelers Supply Corporation, New York, New York
L. J. Pracht Jr. and Company, Wichita, Kansas
Queen City Material Company, Inc., Buffalo, New York
Reed and Hieb, San Antonio, Texas
Royal Tschantre, Inc., Baltimore, Maryland
St. Louis Watchmakers Supplies, St. Louis, Missouri
Swest Inc., Dallas, Texas
E. and J. Swigart Company, Cincinnati, Ohio
Time Watch Materials, Inc., Albuquerque, New Mexico
Toledo Jewelers, Toledo, Ohio
Twin City Watch Supply Company, Minneapolis, Minnesota
William Werkhaven and Son, Columbus, Ohio
Wisconsin Jewelers Supply Company, Milwaukee, Wisconsin
Young-Neal Company, Nashville, Tennessee
Zantech, Inc., Trenton, New Jersey

THE ROCK QUARRY

(Continued from page 21)

physical upset, etc. can be very expensive! A simple repair job could turn into a nightmare.

Once again, because it merits repeating: When accepting a stone, if you are not sure of its identity, list by color, measurements and description. Any abrasions, chips, fractures, noticeable inclusions or blemishes should be pointed out to the customer. Leave no doubt in the customer's mind that the same stone is being returned when they come in to pick up the job.

The list on page 20 is by no means complete. It covers the most popular transparent gemstones. In the case where "Garnet" is listed, there could be several species or varieties of Garnets that exhibit the same color.

Have You Joined A New Member?

NEW MEMBERS

ALVAREZ, Desiderio O.–Phoenix, AZ
ANDERSON, Paul–Woodside, NY
ARNOLD, Mark A.–Quincy, IL
BENNETT, Billy R.–Gaston, IN
BROWN, George D.–Superior, WI
BURKEY, Rod–Quincy, IL
DARSE, Richard–N. Arlington, NJ
DAVIDSON, Jimmy D.–Albuquerque, NM
DAWSON, Larry R.–Mt. Airy, NC
DEISSLER, Ewald–Melrose, MA
DIAZ, Julius–Jackson Hts., NY
ECHEVERRI, Gustavo–Canton, MI
FALCO, Pierre A.–Christiansted, St. Croix, VI
GRAHAM, John–Paris, TX
GRAHAM, Leon–New York, NY
HERMAN, Alan–Worcester, MA
HEYNIGER, Cortlandt–Woodbury, CT
HORTON, Jimmy R.–Mountain Home, AR
JACOBWITZ, Jerry–Brooklyn, NY
KLEIN, Leo–Brooklyn, NY
LISTH, Jeff–Sterling Hgts., MI
LOKHMATOVA, Larisa–Brooklyn, NY
LONGO, Kenneth R.–N. Valley Str., NY
McBETH, Lee R.–Sacramento, CA
McCARTHY, John P.–Banning, CA
MARGI, Raymond–Los Angeles, CA
MEISEL, Norman–Cape Coral, FL
MUNCHEL, Gary–Oldenburg, IN
MURCHA, Charles Jr.–Woodside, NY
NEILL, Robert W.–Tampa, FL
OLSEN, Donald–Santa Barbara, CA
OWEN, Gary–Garden Grove, CA
PILTZ, Robert L.–Plantation, FL
PURCELL, V.I.–Webster, TX
RICE, John D.–Dallas, TX
RUDOLPH, William F.–Brooklyn, NY
SAMUELIAN, N.–Long Island City, NY
SCHNURE, William F.–Laurelton, PA
SHRYOCK, C.L.–Malvern, AR
SILPOCH, Gerald D.–Flint, MI
TOFTEGAARD, Howard Jr.–Troy, NY
TOSSINI, Louie–New York, NY
VALENTINO, Claire–Bronx, NY
VARGAS, Felix L.–Ponce, PR
WHITE, Henry F.–Dayton, OH
WHITWORTH, John E.–Clarksville, TN
YEAGER, Hayes P.–Youngstown, OH
ZALNO, Ron–Clearfield, PA

WATCH ADJUSTMENTS

by Joseph Rugole, CMW

Every watchmaker occasionally receives a watch for servicing which is extremely difficult to time to positions. After careful poising (static and dynamic), the pendant positions are equalized, but the dial positions present considerable problems in two ways. First, there is considerable difference between the two dial positions, and second, there is a substantial difference between dial and pendant positions.

If the pivots are well polished and the ends properly finished, one has to look for the parallelness of the cap jewels. One example for such a condition has been described and illustrated already, but there are many more possibilities. The ones that come to mind would be:

1. Upper or lower cap jewel plate not parallel to the pillar plate. This can occur in many different ways: a) Some watchmakers place burr marks on cap jewel plates to increase the endshake of the balance. This is quite wrong because it puts the cap jewel out of flat. b) Some watches have the upper cap plate extended into a tail-like bar to which the two screws are fitted from the bottom of the balance bridge. The tail-less regulator is held in place by the cap plate and it exerts upward pressure at that end of the cap plate which has no screws to hold it down. The result is that the front part of the cap plate never lies flat on the balance bridge. (Some Benrus models were made in this fashion). c) Some cap plate screws are somewhat rough and the watchmakers have a hard time tightening them the same amount on both sides of the plate. d) If one of the two cap jewel screws is crossthreaded, the plate will invariably not lie parallel to the bridge. These are just some of the examples.
2. Raising or lowering of the balance bridge by bending it excessively to adjust the end shake where the balance staff is either much too long or too short presents another problem. It places both jewels out of perpendicular with the balance staff, and causes serious positional variations.
3. Burred pivot ends which usually are caused by excessive shock. This usually occurs on watches which have rather weak balance bridges and where the balance wheel had too much end shake. If the shock is in the direction of the balance bridge, the bridge might flex sufficiently to let the bottom pivot come out of the jewel hole. When the shock is spent, the balance bridge is like a spring under tension that forces the pivot back into the jewel hole. The edge of the jewel hole is sharp enough to slice some material off the edge of the pivot. The cut invariably leaves a small burr on the edge. Sometimes the damage is so slight that it can only be seen under 10x magnification; yet it can cause no end of problems in adjusting a watch to positions if it is not detected and corrected.
4. Forgetting to lubricate one pivot makes it impossible to equalize the two dial positions.
5. A speck of dirt in one of the jewel holes will create similar problems. The bottom jewel is usually more susceptible to this condition. It usually happens in the following manner; if the balance wheel has to be removed after the jewels have been lubricated, the pivots will carry some oil out of the bearing. When the balance is placed on the bench with the bottom pivot in contact with the bench top, it will pick up some specks of dirt from it, and when replaced into the watch, the dust will be carried into the jewel bearing. Instead of the pivot turning on the hard surface of the cap jewel, it will be different. Never place a wet pivot on any part of the bench or any other surface. Always turn the balance assembly around and place the balance bridge on the bench top.
6. Metallic chips in the jewel hole. This often happens on the upper balance hole jewel on watches which are not shock-proof. When using too large a screwdriver blade, it may chip off some of the metal around the screw hole, which can find its way into the jewel hole. Similarly, a chip off the screwdriver blade can cause the same kind of problem.

The situations just mentioned will always cause a difference between the two dial positions. When the two dial positions are adjusted, the next step is to equalize dial and pendant positions. The problems causing the differences between dial and pendant positions are those found around the balance pivots as discussed before, and those caused by the escapement.

Other Causes for Differences in Friction

The Effects of the Escapement.

Some horologists view the escapement as part of the oscillating system, and others see it as an auxiliary to the oscillating system. The difference between the two

views is somewhat more than semantic. The former are basically concerned with the escapement as a means for delivering a uniform impulse, while the latter think of it as a necessary evil which must be tolerated and made less of an evil at all costs. I happen to favor the latter view and I hope to present a number of valid arguments to support it.

The operation of an escapement should be analyzed from two different points of view:

1. How much friction does it create during its operation?
2. How disturbing is the impulse to the regularity of motion of the balance wheel.

Since we are already discussing the effect of friction on the balance motion, the friction of the escapement is an integral part of the total picture of position adjustments, and should be thoroughly analyzed.

To review the basic concepts briefly, one of the main causes of time variations in positions is the variation of amplitude of the balance caused by variations in friction. Any increase in friction, demands a greater amount of the energy of the balance to be spent on overcoming friction. The visible outcome of increased friction is a reduction of amplitude. Smaller amplitude of the balance produces less kinetic energy, but the quantity of energy spent on friction remains the same for a given situation. Proportionally less and less net energy remains to maintain the constancy of motion. Consequently, the frequency of the balance slows down and the watch will show a loss in short amplitudes. To maintain the constancy of rate, the hairspring would have to compensate for the loss. Under certain conditions it is capable of doing that, but only if the differences in amplitude are not too large.

Supposing that all the conditions on the balance unit are as close to perfect as is mechanically possible; the escapement alone is capable of providing large enough friction to render position adjustments practically impossible. The following are some of the obvious, and some not so obvious causes of excessive friction of the escapement:

1. Chipped or broken pallet arbor jewels
2. Chipped or broken roller jewel
3. Rough fork slot of the pallet
4. Damaged or chipped pallet stones
5. Lubricated pallet arbor pivots; this problem is so widely spread and so insidious in its consequences that it needs detailed discussion and explanation.

It has been recognized for some time that even the most careful and proper lubrication of the pallet arbor pivots on wrist watches creates more problems than it solves. This can best be understood by following the arguments in the order in which the problems develop. When a watchmaker decides to lubricate the pallet arbor, he commits himself to lubricate both the top and the bottom pivots. To do otherwise would immediately create a difference in friction between the two dial positions. Let's assume that he uses the same quantity of oil for each pivot. The bottom pivot presents no problems as long as the oil droplets are neither too small nor too large, and the oil is of proper viscosity. With the top pivot, however, the problems begin soon after it has been lubricated. The prime reason for most of the problems is the closeness of the pallet arm to the pivot

(continued on page 58)

New Products

GEM PROFESSIONAL JEWELER'S INSTRUMENTS BROCHURE

A new edition of the 20-page fully illustrated brochure featuring professional jeweler's instruments is now available from Gem Instruments Corporation. GEM is a wholly-owned subsidiary of Gemological Institute of America.

In announcing the new edition of the brochure, Ken Moore, Gem vice president, pointed out several changes that have been made in the new brochure. The Gem diamond pen is included in the brochure. It assists in distinguishing diamond from diamond substitutes having a refractive index over the 1.80 limit of conventional refractometers. The Diamondlux page now includes illustrations of various types of installations.

A new Mettler Diamond Balance is available which combines practical features and technical possibilities through advanced electronics. A new Tensor lamp is also offered.

Moore also pointed out that many jewelers are using Gem instruments in foreign countries where 220 volt, 50 Hz electrical current is standard. Therefore, many instruments are now available in both 110 volt, 60 Hz and 220 volt, 50 Hz electricity models

Gem offers a new service to make it easier and faster for jewelers to order instruments. They may call a toll-free 800 number from any state except California to order from Gem Instruments. The number is 800/421-8161.

All the instruments in the brochure are described in detail, with specifications. This includes the Custom and Deluxe Mark V Gemolites, the Diamond Grader, the DiamondLite, the Diamondlux, Gem Prism Spectrascope, the Proportionscope and the Gem Mini-Lab.

Except where otherwise noted in the brochure, Gem Instruments ships all orders prepaid, with prices FOB destination in the continental United States.

Jewelers add a profitable new dimension to their business with pro-

fessional instruments, according to Moore. The wide selection of professional instruments offered by Gem were developed expressly to examine and grade gems; and to dramatically show and demonstrate diamond and colored stone value to customers.

Gem Instruments designs, develops and markets the most complete line of professional jewelers instruments available. Gem instruments are not available from any other source, according to Moore.

All instruments designed by Gem are thoroughly tested in the GIA laboratories before they are marketed to the trade. Gem instruments are precision engineered and manufactured to the highest quality specifications.

With proper care, they will provide a long lifetime of accuracy and trouble-free performance. Moore cautioned that any electrical instrument should be unplugged before servicing the instrument or changing lamp bulbs.

Copies of the 20-page Instrument Brochure are available from Gem Instruments Corporation, P.O. Box 2147, Santa Monica, CA 90406, 800/421-8161.

LCD CHRONOGRAPH

This new elegantly slim water-resistant yellow Bulova liquid crystal display (LCD) chronograph reports the seconds, minutes, hours, month, day and date—and measures elapsed time to 1/10 second. Other features include a scratch-resistant and distortion-free Dura-Crystal (registered trademark), tritium illuminated dial, for night viewing, and traditional brown strap. Suggested retail price is $140. Additional information is available from National Sales Manager, Bulova Watch Company, Inc., Bulova Park, Flushing, New York 11370.

COLORED GEMSTONES— FUTURE OR FASHION FAD?

"Colored Gemstones . . . . . Future or Fashion Fad?" is the topic for Monday, July 30, the second day of RJA's 1979 Convention Session at the Ziegfeld Theater, 54th Street between Seventh Avenue and Avenue of the Americas, directly across the street from the New York Hilton Hotel.

"We are seeing a dramatically increasing public interest in colored gemstones," comments RJA Chairman Michael D. Roman. "It's vital for jewelers to be given a complete picture of the market—product understanding, market potential and merchandising updates are necessary to reap the utmost benefits from this growing source of business."

A panel of experts will cover the various aspects of the colored gemstone market and will speak on "Professional Guidelines for Selling Colored Gemstones," "The Colored Gemstone Oppor-

tunity," and "Your Share of the Colored Gemstone Bonanza.

Serving as moderator will be Sallie Morton, Morton Jewelers, Inc., San Jose, California. Names of the panel speakers will be announced shortly.

Jewelers interested in attending this session should write to RJA for their free tickets.

DECORATIVE PENDANT

This highly ornamental Bulova Caravelle lady's fashion pendant, complete with matching 24-inch chain comes in either yellow or white, with champagne or

silver-tone dial, respectively. Suggested retail price is $74.95 for yellow and $69.95 for white. Additional information is available from National Sales Manager, Bulova Watch Company, Bulova Park, Flushing, New York 11370.

NEW FASHION WATCH CRYSTAL by G-S

PRISM-TITE, a new nine-facet crystal recently introduced by Germanow-Simon, beautifies any watch. There are 211 sizes from 15.0 mm to 36.0 mm in 1/10 mm graduations. Supplied with one each white & yellow step style rings in each envelope. Also available in convenient sets.

Information on the complete G-S crystal line is available from G-S Wholesalers or from the manufacturer — Germanow-Simon Machine Co., Inc., 420 St. Paul St., Rochester, N.Y. 14605.

NEW DESIGN BY ERNEST BOREL

Model 4055 was designed for the style conscious man. Made of steel, the case and bracelet offer an elegant unit enhanced by a rich blue and white dial. Automatic,

Day-Date, Water resistant. $155.00.

Other ERNEST BOREL watches available from $59.50. U.S. Distributor, BOREL WATCH COMPANY, 1008 Walnut Street, Kansas City, MO 64106.

electroplate case. It is also available in all stainless steel with bracelet.

The stainless steel and yellow model with strap carries a suggested retail price of $215; the yellow model with bracelet $230.

NEW DIRECTORY AVAILABLE

Watch Material and Jewelry Dealers Association announces the publication of the 1979-80 Membership Directory.

This Directory does not necessarily list all companies in this industry. It does however, list a membership of companies as of January 15, 1979 that, by their membership, agree to support the Code of Ethics, Standards and Objectives of the Association.

"As the voice of the distribution arm of the industry, we desire to have this directory be a resource document for those having an interest in the watch material and jewelry industry," stated John Cassedy of Cas-Ker Company, President of WMJDA.

Contact Glenn W. Bostrom, Executive Director, Watch Material and Jewelry Distributors Association, 435 North Michigan Avenue, Chicago, IL 60611, telephone 312-644-0828 for additional information.

MIDO — A CLASS BY ITSELF

Introducing Fashion in Steel by MIDO. This Ultra-Thin Quartz watch, Model 0656.418 has a classically designed steel case with a handsome matched band, water resistant.

MIDO watches from $99.50. Ask for our new color catalog.

MIDO/BOREL Distribution Center, 1008 Walnut Street, Kansas City, MO 64106.

NEW FROM HAMILTON

Black Roman numerals on a white enamel-like dial, black sweep second hand, and a closed minute track are features of Hamilton Watch Company's new Ferrari Calendar IV quartz analog watch.

The unit is available with a black lizard strap or mesh bracelet in a 14K yellow gold

OKI SEMICONDUCTOR EXPANDS TIMEKEEPING CIRCUIT FAMILY

OKI Semiconductor now offers seven new IC's that can expand and change LCD watch functions when interchanged in standard modules.

These circuits, shown for the first time at an application suite at the Consumer Electronics Show in Chicago, June 3-6, expand OKI's line of watch circuits to a total of 12. All feature the low power consumption of ion-implanted CMOS technology and the precision of crystal-controlled time-base generation.

The family approach to LCD watch circuits taken by OKI Semiconductor works to the advantage of both watch manufacturer and consumer, according to OKI's president, Jerry Crowley.

"We offer the manufacturer a full range of products, from the low-end basic chip to high-end multi-function circuits, that meet standard specifications and performance re-

quirements across the board," Crowley said. "This means that reliability and yield can be better controlled regardless of final product complexity. Different circuitry dropped into standard modules reduce such factors as tooling costs while still meeting a variety of consumer needs.

"This packing of extra functions into the same 'skin'," Crowley continued, "can offer the consumer a product line whose elements share a common appearance but have a wide range of options."

The members of the watch circuit family shown at the OKI CES suite are: a 3½-digit and a 6-digit LCD watch circuit; a 6-digit chronograph circuit; an 8-digit "no-hands" watch circuit; 4- and 6-digit alarm and timer watch circuits; two 6-digit "Super Chronograph" circuits and 6- and 8-digit multifunction watch circuits.

For more information, contact Jim Brennan at OKI SEMICONDUCTOR, 1333 Lawrence Expressway, Santa Clara, CA 95051, phone (408) 984-4840.

PORTESCAP "QUALITY TRANSFER" FOR QUARTZ WATCHES

Portescap, manufacturer of the Incabloc® shock absorber and Vibrograf® timing equipment, has introduced the first industrial measuring and timing instrument for the mass production of quartz crystal watches.

The Portescap® "quality transfer" equipment links a transfer chain loop to a set of electronic sensing devices by which it is possible to measure electrical magnitudes, to make timing corrections, and to verify the rate of LED, LCD, and quartz analog watches. The chain is equipped with three different sensing units which work simultaneously:

A. Measuring head (power supply, power consumption, multimeter).
B. Timing correction head (frequency of the quartz crystal, correction of the rate by rotation of the trimmer).
C. Testing head (final testing at the level of the stepping motor or of the numerical display).

For additional details, please contact Mr. Gerard Progin, Vice President of Portescap U.S., 730 Fifth Avenue, New York, NY 10019.

CRONUS INTRODUCES THE HANDS-OFF, WATER-TIGHT ELECTRONIC STOPWATCH

At last there's a series of five lightweight electronic digital stopwatches that you can wear on your wrist, around your neck, in the air, in the water, just about anywhere! And they're from Cronus, the world's largest manufacturer of digital stopwatches. The new Cronus "LC" (Liquid Crystal) series is packaged in a watertight case and has a large ¼" liquid crystal display that reads out to one hour (with automatic rollover at 59:59:99).

Each LC stopwatch weighs 2 ounces and comes complete with a large (1½") Velcro wristband and lanyard, plus an attractive gift/storage display box. Built to withstand the abuses of sports activity and water damage from sports like sailing, swimming, and jogging, the Cronus products are accurate to 1/100 second. They feature low battery indicators to prevent inaccurate timing. The five models include an Addition Timer (LC-A), Split Timer (LC-S), Taylor Lap Timer (LC-T), Split-Taylor Timer (LC-ST), and Countdown Timer (LC-CD).

In continuous use the stopwatches will operate well over one year on replaceable button-cell batteries. Each stopwatch has a full one-year limited warranty.

For details on the new Cronus "LC" series and information on the other Cronus products, contact: Cronus Precision Products, Inc., 2895 Northwestern Parkway, Santa Clara, California 95051.

GRAVERMEISTER — WONDERFUL!

The two words are synonymous. The fact that Gravermeister makes hand engraving not only easy, but effortless — is wonderful! The machine does the work, the operator does the guiding. In this manner, the engraver can work all day without tiring. Almost any engraving operation that can be done by hand, can be done with this machine. The hand gravers may be fitted into the handpiece that comes with Gravermeister, or, specially designed gravers may be ordered.

Gravermeister makes the art so much more easy to learn. Beginners, who don't wish to spend a lifetime learning to engrave, find the machine an ideal substitute. A small amount of practice can produce professional results. The machine is ideal for Diamond Setting, Bright Cutting, Bezel Setting, Florentine Finishing and Stipple Finishing, as well as engraving. It even cuts cold rolled steel almost as easily as a knife through butter.

To guarantee the proper cutting angle for your gravers — every time — all the time — no matter who dies the sharpening, The GRS Graver Sharpening Fixture is the answer. The graver is simply inserted into the holding device, the correct angle is set on the dial and the graver is ready to be sharpened. The GRS

Power Hone with Diamond Wheel is the ideal companion piece. The hone rotates at 240 RPM for fast, no-heat sharpening. The diamond lap is 5" in diameter and is 600 grit for fast cutting with a smooth finish.

Call or write for more detailed information. Paul H. Gesswein & Co., Inc., 255 Hancock Avenue, Bridgeport, Ct. 06605, 203-366-5400. 676 West Wilson Avenue, Glendale, Ca. 91203, 213-240-7113.

NEW DESIGNER QUARTZ CLOCKS INTRODUCED BY SEIKO

Seiko Time Corporation announced here today the introduction of eight new models in its "QP" series of lovely designer quartz clocks. The new models, range in retail price from $90-$100, featuring two new "octagon" and "arch" shapes.

Among the new introductions is octagonal-shaped, battery-powered quartz alarm QP022K, with gun metal case, white dial and raised hour markers. It retails at $90.

Equally as beautiful are three other octagonal-shaped clocks, available in choices of: yellow case, with gilt dial and raised hour markers; yellow case, with gilt dial and gilt minute track; and white case, with digital dial and gilt minute track.

An arch-shaped gilt case highlights new model QP030G, which features a white lunette bordering its silver-tone dial and gilt minute track. This beautiful model sells for $100. (pictured right). This new styling is available in three other combinations — yellow case, yellow lunette and gilt dial; white case, yellow lunette and maroon dial; and gun metal case, yellow lunette, black dial and gilt minute track.

OLYMPIA STOPWATCH DISPLAY

This eye-catching Heuer Olympic stopwatch display is available to jewelers and sporting good retailers for window, counter-top or display case use. Made of lightweight plastic, it is portable, fast-cleaning and easy to assemble.

Two Microsplit digital stopwatches made by Heuer have been chosen the Official Stopwatches of the 1980 Olympic Winter Games in Lake Placid. The company, the world's largest manufacturer of stopwatches, will be offering the electronic digital timepieces for sale to the public in special Olympic editions. The two stopwatches are available in Mini-Microsplit and Round Microsplit versions, and have been specially packaged in the display pictured above.

With 1980 fast-approaching, growing public awareness and interest in the Olympic Games will make this display an important addition for your store or counter.

WINDERT INTRODUCES NEW COLOR CATALOG WITH GLOSSARY OF MOST USED TERMS IN THE ELECTRONIC WATCH INDUSTRY.

The new Windert Watch Co., Inc.'s 16-page color catalog for 1979/80 contains more than 100 of their latest and most popular electronic watches. Featured are the Reminder Ladies Alarm, Time Log, Globetrotter, Wrist Secretary and Musical Alarm. Plus, there are many other LCD multi-function and quartz analog models. Many of the models shown are Windert exclusives. All are popularly priced. The new catalog also includes a glossary of the most up-to-date terms used in the electronic watch industry. It will be an invaluable teaching and training aid for all sales persons. This complete catalog is available free of charge to anyone visiting the Windert booth at the RJS Show, Hilton Hotel, Room 648-649, New York, N.Y.; or by writing on your business letterhead to Windert Watch Co., Inc., 448 South Hill Street, Los Angeles, California 90013.

News In The Trade

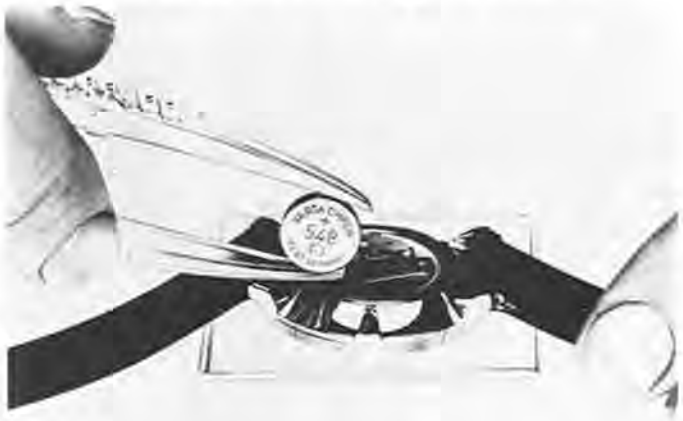
VARTA Institutes New Distribution Approach

Dr. Hans B. Kramer, President of VARTA Batteries Inc., has announced that the distribution of VARTAchron Watch Batteries will be handled directly by this company's headquarters at Elmsford, New York as of June 1, 1979.

VARTAchron, an internationally recognized premium watch battery line which was formerly distributed by Portescap U.S., will now be marketed throughout North America by VARTA through an expanded network of distributors. The change has been instituted by VARTA to facilitate broader distribution and improved customer service.

VARTAchron Watch Batteries are produced in West Germany by Electronic Watch Batterie GmbH, a company closely affiliated with VARTA Batterie AG.

Inquiries should be directed to: VARTA Batteries Inc., 85 Executive Boulevard, Elmsford, New York 10523. Phone (914) 592-2500. Telex 996548



MARKETING RESTRUCTURE AT PORTESCAP

Portescap U.S., American subsidiary of the Swiss-based Portescap, manufacturer of the Incabloc® shock absorber for watches and of the Vibrograf® line of timing instruments, has restructured its horological marketing activities under the leadership of Gerard Progin, Vice President.

The new group integrates all marketing activities for the Vibrograf® Machine Division as well as for Incabloc®, Antichoc 2000®, platform escapements, and stepping motors for quartz watches and clocks. Joseph Presti, formerly Operations Manager, was promoted to General Manager of the Vibrograf® Machine Division, succeeding Robert T. McClancy, who recently resigned.

Portescap U.S. has engaged in an aggressive expansion program externally with the acquisitions of the assets of the Watchmaster Division of Bulova in February 1977 and of Transicoil, Inc., a leading manufacturer of servosystems and components in November 1978. Internal expansion has also been a major contributor to Portescap U.S.'s eightfold growth in the past three years as new products were channeled to the market. Indeed, the Vibrograf® Machine Division anticipates still further growth through the introduction of several new products for jewelers and watchmakers, two of which will be introduced at the forthcoming RJA Show: the first servo-electronic watch cleaning instrument and an electronic water-resistance testing device for both mechanical and quartz watches.

BULOVA FORMS EXECUTIVE COMMITTEE

Bulova Watch Company, Inc. has formed a six-member Executive Committee according to Preston R. Tisch, President and Chief Operating Officer of Loews Corporation. Loews recently purchased over 90% of Bulova's common shares.

The Executive Committee will be responsible for the overall operations of Bulova.

Members of the newly-formed committee include: Preston R. Tisch, who will serve as Committee Chairman; Laurence A. Tisch, Chairman and Chief Executive Officer of Loews; Herbert C. Hofmann, Vice President, Loews Corporation; R. Mark Bourquin, President of Bulova; Andrew H. Tisch of Loews Corporation; and, Harry B. Henshel, Bulova's Board Chairman.

In addition to the above announcement, Mr. Tisch also disclosed that five new management appointments had been made in the areas of manufacturing, finance, merchandising, special projects and sales.

James S. Waterwash, formerly General Manager of Loews' Lorillard facility in Louisville, Kentucky, has been appointed Vice President-Manufacturing. He will be responsible for watch manufacturing, watch line assembly and shipping, watch case manufacturing, electronics, movement manufacturing, research, engineering and quality assurance.

Paul Sayegh, previously Assistant Controller at Loews, has been appointed Division Controller and will be responsible to the Executive Committee for all matters pertaining to finance, control and credit at Bulova.

Herbert Lewis, an employee of Bulova since 1948, has been appointed Vice President-Special Projects. Mr. Lewis began his career at Bulova as a sales representative and has held various management positions, including most recently, Western Regional Vice President. In addition to his new position, Mr. Lewis will continue as Account Executive on two of Bulova's largest jewelry accounts.

Jerry Josephson, Sales Representative for Bulova's Southwest Region since 1960, has been appointed Regional Sales Manager - Western Region.

Barry Gell, formerly Bulova's Product Manager, has been appointed Director of Merchandising. He will report directly to Mr. Bourquin. Mr. Gell joined Bulova in 1972 as Product Manager, responsible for men's watch styling.

MIDO AT THE EUROPEAN WATCH AND JEWELRY SHOW IN BASLE

Mido's new look . . . a class by itself

The Mido stand at the Basle Fair has again attracumerous customers from all over the world.

The huge show window with its exotic plants and watches running steadily and precisely under the water had a blue color scheme to stress the longlasting water resistance of Mido Oceanstar watches with the special AQUADURA system. Never before did Mido present such a great number of new models, most of which are available with the traditional selfwinding movements and with the latest quartz modules.

Mido King of Water Resistant Watches, distributed exclusively by MIDO/BOREL, 1008 Walnut, Kansas City, MO 64106.

HAMILTON'S BEST

The 1978 Hamilton Watch Co. "Salesman of the Year" award has been made to Garfield L. Fellman II, territory sales representative located in Marlborough, Conn. His territory covers the New England states.

Mr. and Mrs. Fellman will receive an all expense paid tour of Europe. Special spending money is also part of the award.

The annual Hamilton "Salesman of the Year" award is based on performance against quota, new accounts, and cooperation with Sales, Order, and Credit departments.

MARVIN SILVERSTEIN JOINS PICCO AS FIELD SALES MANAGER

John McCabe, national sales manager for PICCO, leading producer of high-quality quartz clocks, quartz travel alarms and popular children's character watches, today announced that Marvin G. Silverstein has joined the company as field sales manager.

Mr. Silverstein, 41, had been national sales manager for BSR Housewares Group, Blauvelt, N.Y., for the past year. Previously, he was a manufacturers' representative for R. F. Skelly Associates, Stamford, Conn., for six years.

PICCO's new field sales manager graduated from New York University's College of Arts and Science with a BA Degree in 1959. He resides with his wife and their children in Suffern, N.Y.

KEY SEIKO EXECUTIVES TOUR COMPANY'S PRODUCTION FACILITIES IN JAPAN

Hideaki Moriya (left), president of Seiko Corporation of America, and Robert Pliskin (center), president of Seiko Time Corporation, recently visited several of Seiko's manufacturing complexes in Japan. Here, they tour the company's production facilities located in Suwa. Showing them through a quality control department is Koichi Hama (right), director of the Suwa operation.

ASUAG ACQUIRES U.S. QUARTZ COMPANY

ASUAG, the General Corporation of Swiss Horological Industries Limited, has acquired the major interest in the Statek Corporation in Orange, California, it was announced yesterday.

This acquisition consolidates the well established relationship between the two companies. It will provide new opportunities in the field of electronic watch component production as well as in the area of ASUAG's diversification.

Statek's expertise lies in the development of production of quartz crystal resonators of the "leaf tuning fork" type. Production of these new resonators has also

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AFFILIATE CHAPTER COLUMN

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WISCONSIN

Watchmakers converged on the Midway Motor Lodge in Wausau on April 27-29 for a 2½ day convention. Starting the program out Friday night was a 3½ hour bench course on the Citizen LCD alarm by Buddy Carpenter, an AWI instructor, from Tarboro, North Carolina.

Saturday began with 2 slide presentations, put together by Henry B. Fried, one of the most renowned watchmakers in the country today. A business meeting was called to order for the election of 4 directors, who would appoint the executive board. Elected were Ken Froh, Sheboygan, Conrad Kasten, Waukesha, Egon Danielson, Janesville, Rudy Wagner, Oconomowoc. In the afternoon Mr. William O. Smith, director of horology at Parkland College, Champaign, Illinois, presented a program on "Troubleshooting and Production Methods of Servicing Watches."

Saturday night saw the 1978 queen, Janet Grubba from Stevens Point, crown a new queen, Jean Wiesner from Sun Prairie. The past queen received a lovely 14 kt charm and bracelet, donated by Jewelmont Corporation in Minneapolis. The banquet program was very enjoyable. The master of ceremonies, Mr. Jim Langenhahn, was delightfully entertaining. The University of Wisconsin Marathon County Swing Choir provided entertainment.

Sunday the business meeting was held. During the meeting it was brought to everyone's attention that consumers were getting taken again. In the 1979 Senate Budget Bill, Licensing of Watchmakers is being deleted from the Statutes. This is a great injustice to the public and all present were instructed to tell their customers about the situation. If customers objected to this part of the bill, they were to contact their Senator and let him know how they feel about it.

The new insurance program for the group was presented and a question-and-answer period followed. Also at the meeting, the elected directors appointed Francis Kress, CMW, Monona, President; Ralph Jacobs, Berlin, Vice President; Glenn D. Gardner, Madison, Secretary; and Wilbur Guell, Fond Du Lac, Treasurer. After lunch Mr. Jacob Hess, a true craftsman from the past, gave several demonsrations on lathe techniques and tools to make different parts in watches.

Mr. Marvin Whitney, a past president of the American Watchmakers Institute, filled in the rest of the afternoon with a program on the chronometer. Mr. Whitney has been called on by the White House several times to put his skills to work. The program consisted of a chronological evolution of the chronometer and how it has become one of the most accurate timepieces available before the quartz timepiece.

The hosts, Art and Connie Seidl, and Glenn and Kathy Rogers, are to be commended on a great job of organizational work in Wausau.

The convention was a great success.

NEW JERSEY

Jacques Reymond from Watchmakers of Switzerland was guest speaker at the April meeting of NJ Watchmakers Association. His slide lecture brought members up to date on latest Ebauche SA quartz models. Of special interest was the new multi-function Swiss combo, which is an LCD analog combination.

A newly developed movement identification system was also explained. Ebauche claims it will make life easier for the watchmaker because movements are arranged in family groups, making it readily apparent which parts are interchangeable.

The May meeting for NJWA was planned as a double feature, a ladies night and a buy-sell-swap.

Walter G. Riegler, resident watchmaker and appraiser at McGuire Air Force Base, New Jersey, was recently awarded the title of Certified Senior Appraiser at a dinner at Pal's Inn by the American Society of Appraisers, a Washington, D.C.-based, multidiscipline appraisal society, international in scope.

Walter G. Riegler

Mr. Riegler is the fourth person in New Jersey to attain senior level in the gems and jewelry discipline of the society and is the only professional watchmaker (CMW, AWI) in the continental United States to reach this level. Mr. Riegler is also a certified diamond grader and a graduate gemologist. He also has a degree from Edison College and is presently the president of the New Jersey State Watchmakers Association.

COLORADO

On May 6 the Colorado Horological Society and the American Watchmakers Institute presented three bench courses in Denver. Thirty members completed the courses.

Left: Emery Brittenham, president of the C.H.S. Right: William Biederman, AWI instructor.

Some of the 30 members of the Colorado Horological society who completed an AWI bench course.

PENNSYLVANIA

Delaware Valley Watchmakers Guild's first annual dinner was a huge success. Sixty-four members and guests attended and everyone was pleased. The great food and wonderful entertainment were enjoyed by all. The program for May 21 was a doubleheader. Mr. Ray Hopkins, field representative for Ray-O-Vac watch batteries, gave a short talk on his company's newest products, and a new incentive program Ray-O-Vac will be initiating shortly. Mr. Albert Schwartz of Barton and Chase assisted Mr. Hopkins in this short program which was followed by a question and answer session.

MASSACHUSETTS

The May 15 meeting of the Massachusetts Watchmakers Association, Inc. was held at the Fenway Howard Johnson's Motor Hotel in Cambridge. The program featured a program from AWI on "Increasing Profits with In-Store Jewelry Repair," supplied by the Jewelmont Corporation.

This program showed the members a step-by-step procedure for ring sizing, shanking, welding together, and retipping. It also contained many tips for those who were already proficient in this work. The methods shown are those taught in the Jewelmont Jewelry School in Minneapolis, Minnesota.

CALIFORNIA

Time at sea was featured at the Horological association of California's April meeting and it was overwhelming. Not only the vastness of information imparted by Jay Foreman in his specially prepared program about ship chronometer and ship bell clocks. Jay Foreman (founder and President of House of Clocks, Inc., Los Angeles) was the featured speaker at the April 17, 1979 meeting of the Horological Association of California in Los Angeles. Mr. Foreman's presentation centered around several types of ship's timepieces, samples of which were on display.

Mr. Foreman began his program with the first type of timepiece to go to sea, the 30-minute sand glass. The 30-minute glass could be considered the predecessor to today's ship bell clock because, like the latter day clock, it was used to time a sailor's "watch"– the sailor's day, beginning at noon, being divided into a series of "watches" each of four hour duration. During the watch the ship's bell is struck at the end of each half hour. Thus at 12:30 there is one bell; at 1:00 there are two bells; and so on up to eight bells at 4:00 at which time the watch cahnges and the bell sequence begins again at 4:30. Today this timing sequence is accomplished by the clock which also strikes the bell. Early sailors, however, relied on the 30-minute glass to tell them when to physically strike a bell.

Mr. Foreman then proceeded on to the next timepiece, considered by him to be one of the finest pieces of machinery in the area of timekeeping ever built, the Hamilton model 21, 85 size, 14 jewel, ship chronometer, circa 1941. Although today's horologists may not have many chronometers come in for repair, the techniques and knowledge learned from Mr. Foreman's disassembly and reassembly demonstration can also be valuably applied to other types of timepieces. "When you repair this timepiece, you should do so when it is quiet and when you are not going to be interrupted," says Mr. Foreman. "And when you are finished you will have a keen sense of accomplishment; it is an exhillerating feeling to know you have brought back to life a fine piece of machinery." Prior to the actual disassembly of the movement the HAC members were cautioned of two "don'ts" to remember in handling the Hamilton chronometer, either of which if not remembered could be disastrous: 1. When the chronometer

Jay Foreman diagnosing clock problem for member at meeting of Horological Association of California, April 17, 1979.

Jay Foreman presents program on ship clocks and chronometers for Horological Association of California. April 17,

is running or when winding the chronometer, keep fingers away from the second hand. If the second hand is touched, there is a 90% chance of breaking the detent or escape wheel. 2. When transporting, do so with chronometer completely run down and insert a "V" shaped piece of paper under the balance for added support. Mr. Foremen then proceeded to disassemble the chronometer, pointing out the procedure to follow in taking power off the mainspring; describing the purpose of the power indicating wheel and power retainer; and advising the care to follow in removing the balance, the fusee chain, the escape wheel, and the mainspring barrel. During the reassembling, Mr. Foreman discussed the operating theory behind the chronometer; the recommended cleaning and oiling steps; the accuracy as it relates to heat, humidity, and other factors; and regulation procedure.

Turning to the third type of "sea timepiece," the ship bell clock, Mr. Foreman disassembled and assembled the Seth Thomas ship bell of 1900, and the newer models by Chelsea and Schatz, advising specific details to be aware of in each clock in order to assure that the repaired and reassembled clock will not only keep time properly but strike correctly as well.

Questions and answers followed. As an added learning experience for all, one member actually brought a ship bell clock with him, the malfunction of which had plagued him for several months. The problem was diagnosed and further increased the already great amount of knowledge received.

The meeting concluded with a drawing for door prizes: Universal movement holder compliments of Norman Levine (Portescap); Accessory tools for hand piece from Friedman-Gessler; Horological book and case opening knife from House of Clocks.

MICHIGAN

The Michigan Watchmakers' Guild held its 25th anniversary convention at the Doherty Hotel in Clare, Michigan on April 29, 1979. Mr. Pat Monk served as the program chairman for this festive occaision. Mr. Jack Schecter from Seiko was the featured speaker. All who attended enjoyed the specially decorated "Guild" cake commemorating the 25th anniversary.

Clocks and Watches in the Coffin

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

The above title may seem strange. For one may ask, "What connection could horology have with the coffin, or casket, and the burial of the dead?" The ancient Egyptians provided for the afterlife of the dead as we have seen from the deposits in their tombs in the way of food and all the necessities of life to the worldly treasures of gold and silver. Thus, it was natural that the timepiece of that glorious age for the few should have been included.

One Pharaoh had his clepsydra, or water clock, in his coffin along with water to fill it in a sealed jar. This was done so the high one of all Egypt, could thus commence recording the time when he came to life again.

We have read of a sundial being found in the tomb of an ancient Roman nobleman which no doubt had the same significance. This dial on marble, did not perish by the hand of time.

In the 10th century, graduated wax candles were enclosed in the coffins of those of exalted rank and fashion. This practice would appear to have been a survival of the elder faiths. In the Christian way of life, the candle in its mellow glow, was the associate of death itself.

It was not, at least in our researches, until the 17th century that the watch was placed in the coffin under the pillow of the deceased and he too wore his gold and silver rings on his death-stiff fingers. Was the watch the real symbol of the awaited resurrection? Or was it the deceased's most faithful friend who rendered him signal service in this life? We rather fancy that like the finger rings, it was one of his worldly treasures he had taken with him on his journey into life everlasting.

The celebrated Dean Swift, the great satirist and wit of the republic of letters, took his watch with him to the clay of death. Lord Mornington, the father of the famous Duke of Wellington, took with him his table clock.

The long-case clock of the 1660's with its long swing pendulum was called a coffin clock by reason of its coffin-like case. Indeed there is the record of a clock of circa 1697, having a case in the shape of a coffin.

At the beginning of the last century, a coffin maker named Joseph Smith, of Union Street in Belfast, Ireland had a sign in his shop window which read, "Coffins Made and Mended Here". Also in his shop window, was a macabre clock. The case was made as an ordinary six-foot coffin. A round dial with a moving skeleton beset within its numeral ring, was inset in line with the center of the elbow angles. As the movement ticked quietly, the mechanical skeleton moved and shook as a reminder perhaps of the vanity of life to those who passed by.

So, the casket of death and the fine art of horology had a common link in the fleeting ages of time. We are sure one could collect much more data on the subject from many obscure records of the hoary past.

THE BIRD BOTTLE CLOCK

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

When the keeping of time by fire first commenced, is a mystery of antiquity. We know that the ancient Chinese and Japanese measured the hours by burning a fibre rope. This rope had been treated with some substance which made it burn very slowly at a time measuring rate between the knots tied on its length. King Alfred used burning wax candles to measure the time in the period 871-901. The candles were twelve inches long, marked off in inches and they burned four hours. We don't know when burning oil was first used in recording the hours, but there is a hint that the ancient Greeks used a lamp in their early timekeeping in some instances. There were, in the Middle Ages, various time burning wicked lamps in all the countries of Europe. The development of glass blowing marked the coming of lamp clocks as glass made

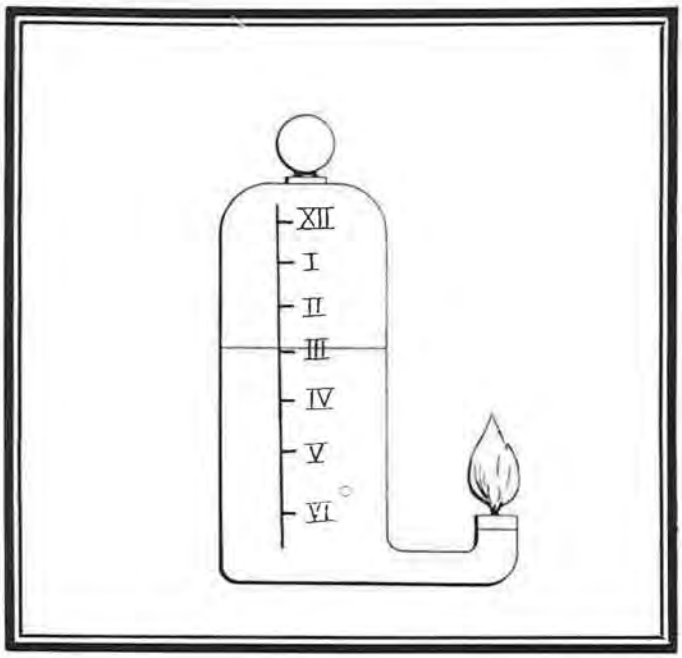
the ideal fountain for time graduation. The effluxion of the hours were measured by the fall of the oil.

What became better known at the beginning of the last century as the "bird bottle clock" first appeared about the end of the 14th century, and is here depicted. The pressure of the atmosphere keeps the tube at the bottom of the container. As the oil in the bottle is fed to the wick in the "U" tube, oil burns bubbles of air, which pass along the tube and rises to the top of the oil as its level gradually sinks. The burning time of the clock or lamp shown was reckoned as six hours, but in the days of the early oils, their burning time varied so it was a rough method of timekeeping.

It was this type of timepiece which gave us the prototype for the bird cage drinking bottle with its trough instead of a "U" tube from which the bird could drink. Therefore, the name "Drinker" was adopted for the clock as it became more commonly used. This was the advent of clocks for mechanical measuring of time.

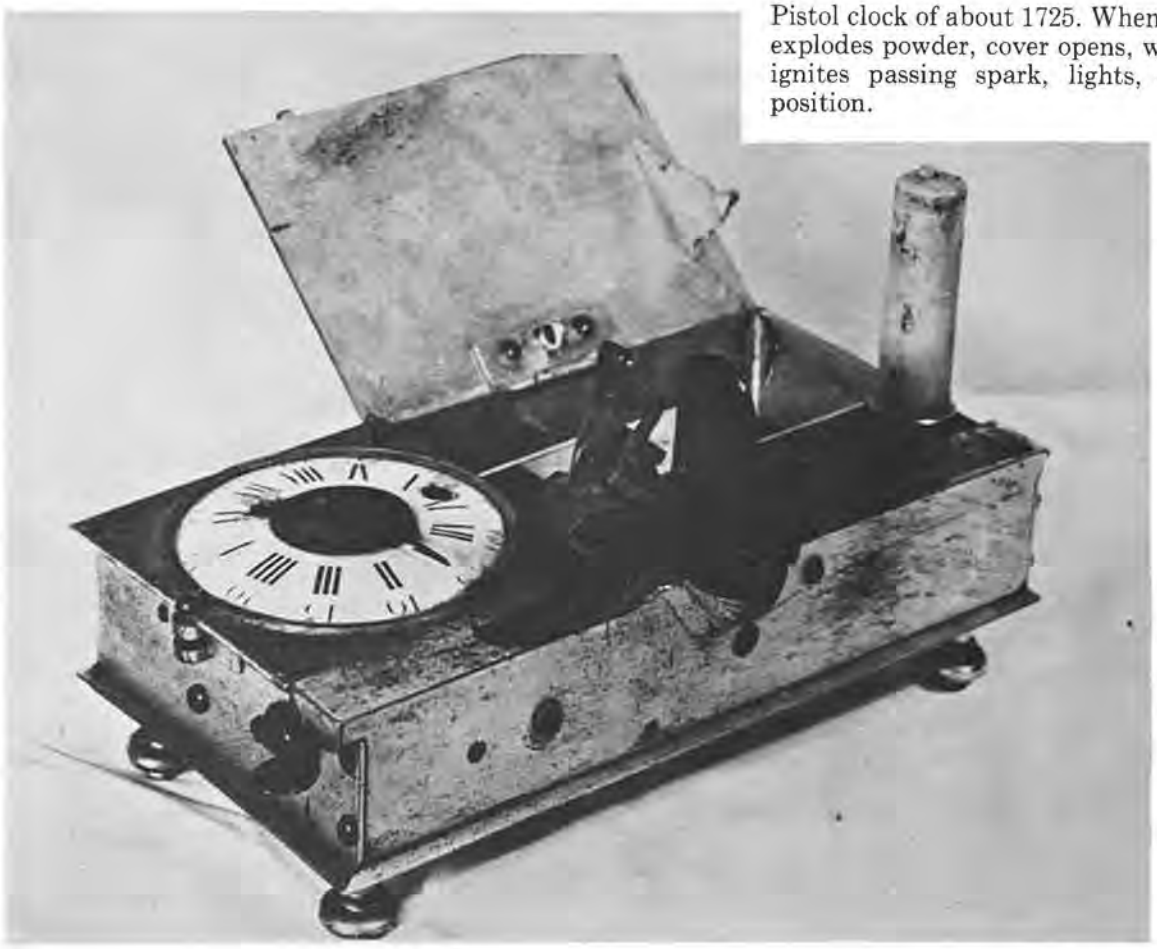
Burning for the time was more used in the hours of darkness when the sundial had faded out in the shadows of the night and in cloudy weather. With the improved oils of the 18th century, bird bottle clocks were graduated to twelve hours burning for the filled fountain. We saw one of these clocks still in use in Donegal in 1912 and we learned that one may still see them in the scenic mountain regions of Europe and also in the U.S.S.R.

Thus, burning for telling the time has a most remote story in the hoary annals of horology.



PISTOL CLOCK

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



Pistol clock of about 1725. When alarm sounds, flintlock explodes powder, cover opens, wick of concealed candle ignites passing spark, lights, and snaps to upright position.

THE SHIP'S CHRONOMETER

(continued from page 15)

center the cap, then one or both arbor holes will have to be bushed.

To bush, remove the arbor and replace the cap. Chuck the barrel in either a 3 or 4-jaw chuck and true. Since the sides of the barrel are straight (without teeth), it is easily fitted up in either of these two types of chucks. Although the jaws of a 3-jaw chuck moves simultaneously and automatically centers the work when the outer knurled ring is rotated, occasionally you may have to loosen the jaws a trifle and rotate the barrel slightly before a place is found where it is turning absolutely true. In using the 4-jaw chuck, it is easier to mount the work so it will run perfectly true since each jaw is moved independently.

Then true up the cap hole with a boring cutter in the slide rest and bush the hole. If both holes are in need of bushing, bore both of them at the same time. Thus, both will be concentric to each other.

The hole is now bushed with a solid bushing. After dead center is marked, a small hole is drilled. The hole is then bored to size with a boring cutter mounted in the slide rest. Remove the barrel and cap from the chuck and open the holes in the bushing with a large round broach lubricated with a smear of mutton tallow, until the arbor fits freely. Using the round broach, not only opens the hole, but it also burnishes the inside of the hole and thus hardens the surface. With a countersinking tool, remove from both sides any burrs that may have been thrown up by the broach. Finish the oil sink side with a wheel countersinking tool, using the cutting end first and then the burnishing one.

Although I have never used a Bergeon or KWM bushing in a chronometer barrel, I am sure they would work equally well. Even if you were using a boring cutter in the slide rest to true and enlarge the hole, the cutter could be backed off in order to try the bushing for size. It may be necessary to turn the bushing down to the correct height and ream the arbor hole to the correct size which would be no problem.

Polishing and Bluing Screws

All foreign and Continental chronometer screws are found to be beautifully blued; so when repairing an instrument, those that are not should be restored to a rich blue color. They were blued not only for their aesthetic value but in order to provide protection against rust.

Hamilton did not blue its screws. Screws used in the earlier movements were just polished. Many of the screws used in the Hamilton were watch stock items. However, when rust began to appear on the screws and a number of instruments were rejected because of rusty screws, Hamilton began to nickel-plate its screws.

It was standard operating procedure at the Naval Observatory to polish and re-blue all screws that needed such attention. First, all burrs are removed with an oilstone slip or fine file and the slot dressed up. Then with a fine emery stick, polish both the side and the head of the screw. By applying a steady pressure, a fine circular grain finish will ensue. Some of the repairmen, after polishing the head with a fine emery stick, would finish the head with an iron polishing slip charged with a thin mixture of levigated alumina and oil. Before bluing, the screws must be thoroughly cleaned and free of any trace of oil and polishing compound. The screws should not be touched with the fingers after cleaning, or it will be difficult to obtain the rich blue color.

Place the screws, thread down, in a bluing screw holder. Move the holder about the flame so the heat will be more evenly distributed. This is done because when bluing or tempering any piece of steel, the effect of a slow heating process will do a much better job, than if it is done rapidly. When a rich blue color appears, the screws are immediately quenched in oil; otherwise the color will change to a pale blue. Remove and clean.

Spotting

Often we fine chronometer plates and bridges beautifully finished with rows of equally spaced spots. (Figure 6) These spots are produced by a small circular polishing tool and often referred to as damaskeening. Damaskeening is defined as the ornamental work on metal. The word Damaskeening or Damascene is derived from the word Damascus, the famous city in Asia Minor where sword blades were inlaid with various types of metals and materials.

Spotting can be done on a watchmakers lathe if you have the necessary accessories. Occasionally, one of the Observatory's chronometer makers would refinish the plates and bridges by spotting. But since it is rather time consuming and the effect is only cosmetic, it was seldom done.

The plates and bridges to be spotted must be well finished and free from scratches, as very little metal is removed during the grinding operation and thus, the smallest of scratches will surface. The plate is fixed to a universal face plate or 3 or 4-jaw chuck, and the circular marks are made with a small round lap of either boxwood or ivory, or as we found at the Observatory, the rubber tip of a pencil eraser worked very well. The small lap is affixed to the end of the pivot polisher spindle. The grinding material used to produce the pattern is a mixture of oilstone powder, red rouge and oil. Other grinding materials may also be used. The charged lap is pressed lightly against the work. Do not cut deep lines but just scratch the surface so the spots will take on a radiant appearance.

Straightening and Topping An Escape Wheel Tooth

When examining the escapement, if the intersection of the escape wheel tooth and the impulse jewel is deeper on some teeth than on others, then either the pivots are bent or the teeth are not equal in length or bent. A bent escape wheel tooth may also neutralize the draw and thus, reduce the safety action.

Chronometer escape wheel teeth are straightened with a pair of snub-nosed brass tweezers. Press them back into shape or place the blunt end of the tweezer near the base of the bent tooth, and while gently squeezing the ends together, draw the tweezers straight away from the wheel. Then dress up the end of the tooth with a fine jasper stone.

To even up the escape wheel teeth so all of them are symmetrical, mount the escape wheel arbor in a chuck while supporting the other pivot in a runner or a center held in the tail stock, so the arbor runs true.

Set the T-rest so that one end of a pivot file or a thin fine oilstone slip can be rested on it, while the other end of the file or slip rests on the base. With the lathe turning at a high speed, gradually allow the file or slip to

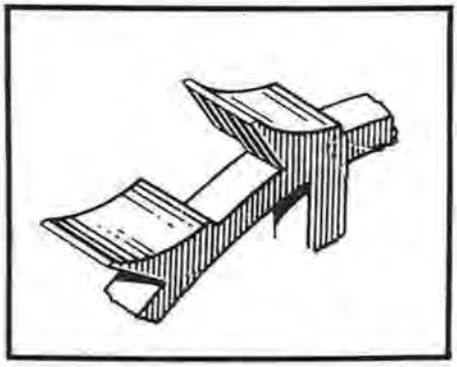


Figure 7. Proper formed escape wheel tooth.

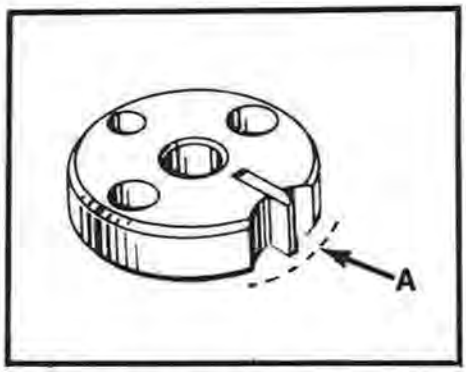


Figure 8. Correct position of impulse jewel-even with the periphery of the roller. May have to be pulled out beyond the periphery to "A" if clearance remains excessive after the escape wheel has been "topped".

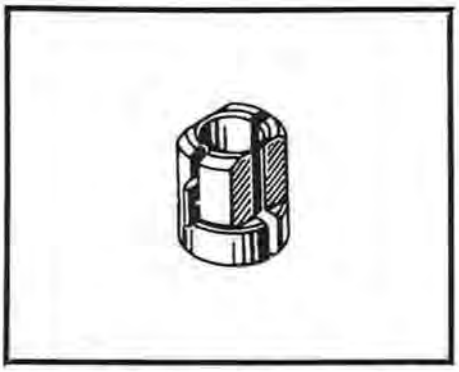


Figure 9. Unlocking roller and jewel must extend out far enough to engage trip spring.

slide on the T-rest and base until it just touches the long tooth, after which the file or slip is permitted to slide toward the wheel until each tooth has just been touched. Do this slowly and very carefully, as the short teeth must be only brightened by the file or slip, or the wheel will be made too small.

After topping, remove any burrs, shape-up the teeth, and polish the concave portion of the tooth. The point of the tooth must be thin, but not pointed. (Figure 7) It must be no wider than absolutely necessary because any width results in a loss of impulse.

Replace the escape wheel in the movement and check the drop, impulse, and lock. Since topping reduces the diameter of the escape wheel, the above adjustments will no doubt be affected to some extent. The lock will be decreased and the clearance between the escape wheel teeth and the impulse jewel and roller will be increased. This will cause the drop off of the impulse jewel onto the locking jewel to be too great, causing a loss of impulse; also the drop of the escape wheel tooth onto the impulse will be unsafe.

The lock may be increased by turning the banking screw. The clearance may be decreased by moving the detent forward or towards the impulse roller. But moving the detent also changes the locking, which also changes the position of the teeth when at rest or locked. If the drop of the escape wheel tooth onto the impulse jewel is shallow, there is danger of the tooth missing the impulse jewel.

To increase the drop, the angular distance between the impulse and unlocking jewel must be decreased. In other words, the impulse roller is moved towards the line of center. However, if the clearance remains excessive after the above adjustments, the impulse jewel must then be pulled out beyond the periphery of the impulse roller (Figure 8-"A") to bring it closer to the teeth. This should be done as the last resort.

Resetting the Impulse and Unlocking Jewel

The watch pallet stone setter with a spring arm will work well in holding the impulse roller while resetting the jewel. To aid in holding the roller, turn a small brass stud to fit the roller hole with a small pivot to fit the largest hole in the warmer table.

Place the roller, underside up on the table. Position the spring arm over the roller and heat. If the roller is so designed, apply a piece of shellac behind the jewel and in the shellac crevice on each side of the jewel. Pull the jewel out slightly and then push down lightly on each end of the jewel with the back end of the tweezers. This is done to insure that the top of the jewel is flush with the top side of the roller on the warmer table. Then push the jewel back into the slot so the outer tip of the impulse jewel is even with the periphery of the roller.

A jewel locating tool can be easily made that will facilitate in setting the jewel in its exact position. Take a 1/4" x 1/16" x 2" piece of flat brass and with a round file, cut a concave crescent in the end of the piece so it will fit the roller edge. Reheat and push the jewel back into the slot until the crescent contacts the side of the roller. The tip of the jewel will then be even with the periphery of the roller. Remove all excess shellac with a brass, chisel shaped blade. Be especially careful to remove any shellac in the large and small crescents.

To reset the unlocking jewel, place the roller, top side down, on the warmer table. Heat the warmer and place a piece of shellac in the slot behind the jewel. While still warm, push the jewel down and back into the slot. The unlocking jewel should extend beyond the roller far enough to engage the trip spring and lift it sufficiently to unlock the escape wheel.

WATCH ADJUSTMENTS

(continued from page 45)

shoulder. The drop of oil which forms on the flat face of the jewel is large enough to wet the shoulder chamfer. When the watch is turned into dial-up position, even more of the arbor is wetted, and soon the oil spreads onto the pallet arm. Through capillary action, it starts traveling up the shank, and within three months it will reach the banking pins and the fork slot. By this time, the oil is spread so thinly that it acts like glue. A watch so lubricated knocks as if something physical is obstructing the motion of the balance. The fact is that the pallet fork sticks to the banking pins and it takes a lot of force to move it. The noise comes from the roller jewel striking the fork slot. If the roller jewel is inspected with a 10x loupe, a thick smear will be seen across the flat face which increases friction because of its stickiness. The increase in friction from these two sources is frequently large enough, not only to reduce the amplitude to a bare minimum, but to stop the watch completely. This usually happens after the watch has been running for about six months to a year and losing several minutes per day. When such a watch is taken for repair, the oil smears should be removed with pegwood before machine cleaning.

Some watchmakers like to argue that the pallet can be lubricated without causing the oil to spread, and they suggest two different methods for doing it. One is to deposit half the drop from the smallest oiler on a clean glass or on the fingernail before carrying the oiler to the jewel hole. This way only half of a small oil drop is deposited on the pivot. Others prefer to dip a sharp pegwood into the oil cup and then peg the pallet bridge hole. By this method, one deposits only an oil film on the jewel.

There is a strong argument against both these methods. Watch oil, like any other liquid, evaporates when exposed to air and heat. The real problem is that all liquids, including oil, evaporate much faster when they are spread thinly over a large surface. It is a well known fact that only the volatile components of oil evaporate, leaving a residue which is several times more viscuous than the original lubricant. The effect is approximately the same as if someone would grease the pivots rather than oil them. (The characteristics of watch oils will be discussed further under the topic of lubrication.)

Thus far, an argument against lubricating the pallet arbor pivots was made by analyzing the events that take place after lubrication. A solid argument could also be made by explaining why it is not necessary to lubricate the pallet arbor. First of all, the pressure on pallet pivots is the smallest of any part in the system. The mainspring pressure is reduced through the leverage in gearing to about 3/1000 of the original pressure on the mainspring barrel. Secondly, the pallet arbor rotates only 10° from side to side. Because of these two factors the friction is really very small. We must also consider the fact that the adhesion of oil to the pallet pivots and to the jewels, is also a form of friction which becomes more effective when the original friction is small. The net benefit derived from lubrication is quite minimal. The density of oil changes greatly through decomposition and evaporation. Therefore, the benefit derived from lubrication at the time the watch is serviced turns into a liability only a few months later, even if spreading of oil does not occur.

I am quite certain that a number of readers will not agree with my arguments mainly because the experience, the best teacher of all, has taught them differently. Many watchmakers have tried not to lubricate pallet pivots, only to be faced with an unbelievable increase of comebacks. When such watches were checked for possible errors in servicing, none were found. The quick solution was to lubricate the pallet pivots, and to their surprise, the amplitude improved the instant the oil was applied. In conclusion, the arguments for not lubricating are wrong. The watch cannot work without lubrication.

If those watchmakers, so convinced, would have taken the time to examine the problem thoroughly, they would have found that when the pallet was removed, a smear appeared around the jewel hole. This could only happen if the pallet arbor had been lubricated before. However,the cleaning solution did not manage to remove all of the dry oil, especially from the corner of the pivot and shoulder. In fact, the cleaning solution only removed the more liquid parts of the oil and left the residue even gummier than it was before cleaning. Often it happens that the amplitude of the balance is too small for proper adjustments in positions as soon as the watch has been cleaned. The problem can be frequently traced to the sticky pallet arbor. There is an easy solution to this problem. Simply cut the pegwood to a point and then cut the point off with a sharp knife. Force the pivot into the pegwood by rotating the pegwood slowly while pressing it down on the pivot. Repeat this procedure twice for each pivot. Place the pallet in the cleaning machine with the rest of the parts and it will be cleaned perfectly every time.

The benefit of leaving the pallet pivots dry is clearly demonstrated in the long term performance of watches so serviced. Some watchmakers are constantly required to regulate watches they have serviced. The customer usually returns after two to three months complaining that the watch loses several minutes per day. The watchmaker dutifully moves the regulator and sends him away for another three months or so. Invariably, the watches lose time because the lubricating factors have changed as described above. With pallet arbors dry, the performance is uniform for approximately two years (if the case is well closed), at which time the watch normally needs an overhaul.

The advantage of leaving those pivots dry which are under minimum pressure is clearly shown also with Atmos clocks (Jeager Le Coultre). If the gear train is lubricated after cleaning, it is expected that the clock will run for two years between servicing. If it is left dry, it is expected to run for eight to ten years between servicing. It should be pointed out that the gear train is very lightly powered so that the friction on each pivot is very small. The viscosity factor of watch oils changes in time due to evaporation and decomposition. After two years, it becomes too viscuous for the light power supply, so that the adhesion (stickiness of the oil) creates sufficient friction to stop the clock completely.

Thus far, only the effects of friction caused by improper cleaning and lubrication of the pallet arbor have been presented. The problems of design and the adjustment of the escapement will be presented next.

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8-11—Canadian Fall Gift Show; Toronto International Center; Toronto, Canada.

8-11—St. Louis Gift & Jewelry Show; St. Louis Convention Center; St. Louis, Missouri.

13-15—Pacific Northwest Jewelers Association Annual Convention; Sea Tac Red Lion Inn; Seattle, WA.

14-15—73rd Annual Oklahoma Jewelry Show; Camelot Inn; Tulsa, Oklahoma.

14-15—Great Lakes Exposition: Trade Show: Hyatt Regency O'Hare; Chicago, Illinois.

15-18—Memphis Gift & Jewelry Show; Memphis Cook Convention Center; Memphis, Tennessee.

18-19—Jewelry Management Institute; New Advertising and Sales Promotion Workshop; Atlanta, Georgia.

19-24—Independent Jewelers Association Fall Seminar/ Buying Group; Opryland Hotel; Nashville, Tennessee.

20-21—Jewelry Management Institute; Financial Management Workshop; Atlanta, Georgia.

21-28—Trade Fair of the Americas; Miami, Florida.

22-25—SJTA Atlanta Show; Hyatt Regency; Atlanta, Ga.

24-25—Jewelry Management Institute; Inventory Control and Management Workshop; New York, New York.

26-27—Jewelry Management Institute; New Advertising and Sales Promotion Workshop; New York, New York.

27-29—Watchmakers Association of Ohio, Inc.; Thirty-third Annual Convention; Marriott Inn; Columbus, Ohio

28-August 1—Retail Jewelers of America; Fall International Jewelry Trade Show and Convention; Americana and New York Hilton; New York, New York.

August

2-5—Pacific States Craft Fair; Fort Mason Center; Pier 2; San Francisco, California.

2-23—AGS South American Tour.

4-6—MINK Jewelry & Silverware Show; Breckenridge Inn Hotel; Kansas City, Missouri.

5-8—New Orleans Gift & Jewelry Show; Rivergate Convention Hall; New Orleans, Louisiana.

7-8—Jewelry Management Institute; Inventory Control and Management Workshop; Chicago, Illinois.

9-10—Jewelry Management Institute; New Advertising and Sales Promotion Workshop; Chicago, Illinois.

10-13—Mississippi RJA Annual Convention; Biloxi Hilton; Biloxi, Mississippi.

11-12—Arkansas Retail Jewelers Association; Annual Convention; Hilton Inn; Little Rock, Arkansas.

11-14—Midwest Jewelry Show, Palmer House; Chicago, Illinois.

11-13—RJA - Central U.S.A.; International Jewelry Trade Show and Conference; Expo Center; Chicago, Illinois.

12-15—Minneapolis Gift & Jewelry Show; Radisson Hotel & Radisson Center; Minneapolis, Minnesota.

14-15—Jewelry Management Institute; New Advertising and Sales Promotion Workshop; Los Angeles, California.

16-17—Jewelry Management Institute; Sales Management and Motivation Workshop; Los Angeles, California.

18-20—Fall Pacific Jewelry Show; Century Plaza Hotel; Los Angeles, California.

26-29—Denver Gift and Jewelry Show; Denver Merchandise Mart and Exposition Building; Denver, Colorado.

26-29—Frankfurt International Fair; Frankfurt, Germany.

28-29—Jewelry Management Institute; Financial Management Workshop; Dallas, Texas.

30-31—Jewelry Management Institute; New Advertising and Sales Promotion Workshop; Dallas, Texas.

September

2-3—Mid-America Jewelry Show; Cincinnati Convention Center; Cincinnati, Ohio.

2-4—Dallas Fall Gift, Jewelry and Housewares Show; Anatole Hotel; Dallas, Texas.

2-7—Fall Gift, Jewelry & Housewares Show; Dallas Market Hall & The Anatole Hotel; Dallas, Texas.

11-12—Jewelry Management Institute; Inventory Control and Management Workshop; Toronto, Ontario.

13-14—Jewelry Management Institute; New Advertising and Sales Promotion Workshop; Toronto, Ontario.

14-16—Nebraska and South Dakota Jewelers Association; Annual Convention; Holiday Inn; Kearney, Nebraska.

16-18—Phoenix Gift and Jewelry Show; Civic Plaza; Phoenix, Arizona.

16-19—Philadelphia Gift & Jewelry Show; Holiday Inn-City Line. Philadelphia, Pennsylvania.

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

22-23—Iowa Jewelers and Watchmakers Association; Convention and Tradeshow; Hilton Inn; Des Moines, Iowa.

22-23—Bay Area Watchmakers Guild; Convention; Monterey, California

24-25—Jewelry Management Institute; Inventory Control and Management Workshop; Philadelphia, Pennsylvania.

26-27—Jewelry Management Institute; New Advertising and Sales Promotion Workshop; Philadelphia, Pennsylvania.

28-29—Jewelry Management Institute; Financial Management Workshop; Philadelphia, Pennsylvania.

28-30—Florida Jewelers Association Convention; Sarasota Hyatt House; Sarasota, Florida.

29-Oct. 3—National Exhibition of Gems, Fossils, Gem Tools, Machinery, & Precious Stones Equipment. Vicenza, Italy.

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UNIVERSAL GENEVE AT BASLE

Basle Fair 1979. The Universal Geneve stand has been a great centre of attraction. A large number of distributors of the brand from Europe and overseas have been able to view the 100 or so new models presented at Basle. While the whole collection has had a justified success, it is interesting to note that buyers have been above all attracted to the gold models, both men's and ladies', as well as to the watches equipped with the new "Triple Seal" system for maintaining water resistance. This Universal Geneve system is specially designed to provide optimal protection for extra-slim watches against water and humidity. The results obtained by Universal Geneve at Basle have been particularly satisfying.

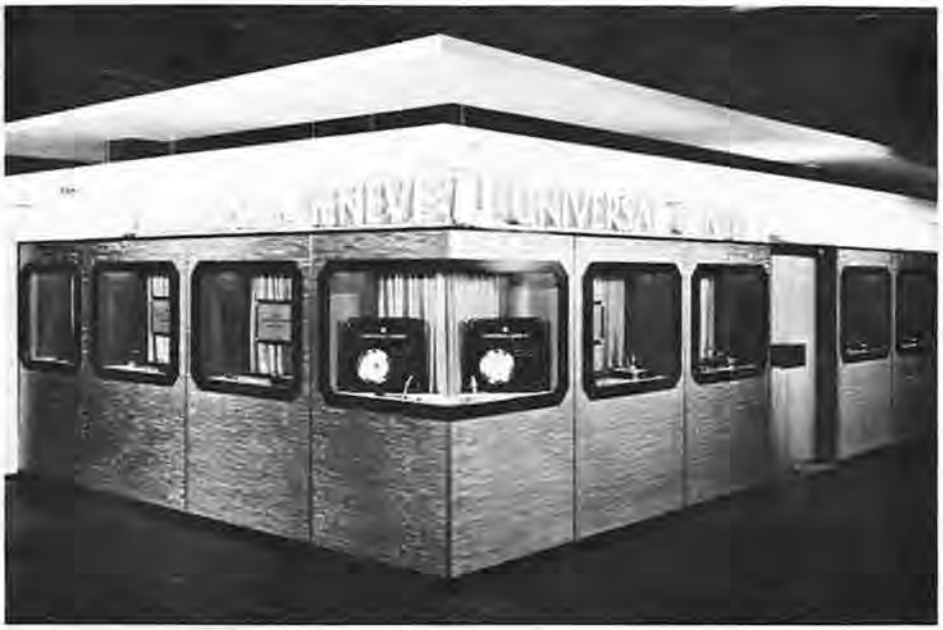
SEPTEMBER 1979: GENEVA, THE WORLD CAPITAL OF CHRONOMETRY

Switzerland has been entrusted with staging the next International Chronometry Congress (ICC). It will take place in Geneva, a city with centuries-old horological traditions, from September 11 to 14, 1979. About 800 people representing some 20 countries are expected to attend this congress, held every five years.

Three national societies

Three countries have chronometry societies: the first was established in Switzerland in 1924, the second in France in 1931 and the third in West Germany in 1949. These learned societies are esentially concerned with studying various aspects of scientific and technical time measurement. Their initial work was rather theoretical (defining the second, for instance) but gradually, over the years, their members have turned their attention to practical problems associated with small timepieces like wristwatches and their production.

Annual congresses (held jointly by the French and Germans since 1967) enable researchers to read papers on their recent work and to publish them for the benefit of interested circles everywhere. Since members include both people in industry and engineers and university researchers, a wide variety of subjects are aired ranging from highly technical to highly abstract considerations: the influence of such



phenomena as temperature, magnetism, shocks and atmospheric pressure on watches, detailed studies of lubricants and alloys, watch developments from mechanical to solid-state time and including electric, electronic technologies and sprung-balance, tuning-fork and quartz-piloted timepieces, studies of atomic or molecular time standards and so forth.

An international congress every five years

The first international meeting was staged in Paris in 1898. But regular congresses have been staged systematically, every five years, only since the second world war. The first took place in Geneva in 1949 and then, in turns, in the other countries involved. They have naturally grown in importance as the figures below show:

1949 Geneva — 29 papers — 395 participants

1964 Lausanne — 108 papers — 772 participants

1979 Geneva — about 120 papers — about 800 participants.

So in only three decades the number of participants has doubled and the number of papers has increased fivefold. The importance of international congresses can also be gauged by comparing them with national meetings: five times as many papers are read, along with wide-ranging surveys of various important technological developments (since 1964, quartz and electronics for instance).

A rich source of information and invaluable international exchanges

In addition, national and international chronometry congresses provide the major source of specifically horological information on scientific and technical matters. Their annals account for nearly half the published material on these subjects.

Finally, ICC meetings are events of major importance to and interest for the industry. Save for ISO (International Organization for Standardization) sessions — concerned solely with the limited field of standards — they constitute the only exclusively horological international meetings.

THE FICHTEMANN METHOD

Marvin Gerstein, Chairman of The Canadian Jewellers Institute, is pleased to announce that Ron Fichtemann, owner of The Jewel Box in Estevan, Saskatchewan, has discovered a new method to discern Cubic Zirconia, the latest diamond substitute.

The Fichtemann method was perfected at The Canadian Jewellers Institute's Intermediate Diamond Seminar held at the Casa Loma Campus of The George Brown College of Applied Arts and Technology from February 25 to March 2, 1979. It involves placing the Cubic Zirconia in a microscope with the table down as close to the illuminated dark field as possible. When the table of the stone is absolutely flat to the eye it will show many colours, but predominately yellow. When the stone is moved towards the eye, the colours will move up and down the stone.

Christel Klocke, F.G.A., G.G. (G.I.A.) has run tests with loose stones and this method also works with mounted stones, but not necessarily in all instances. This appears to be a valuable and easy method for the jeweller to separate Cubic Zirconia from a diamond.

The Institute congratulates Mr. Fichtemann on this discovery.

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