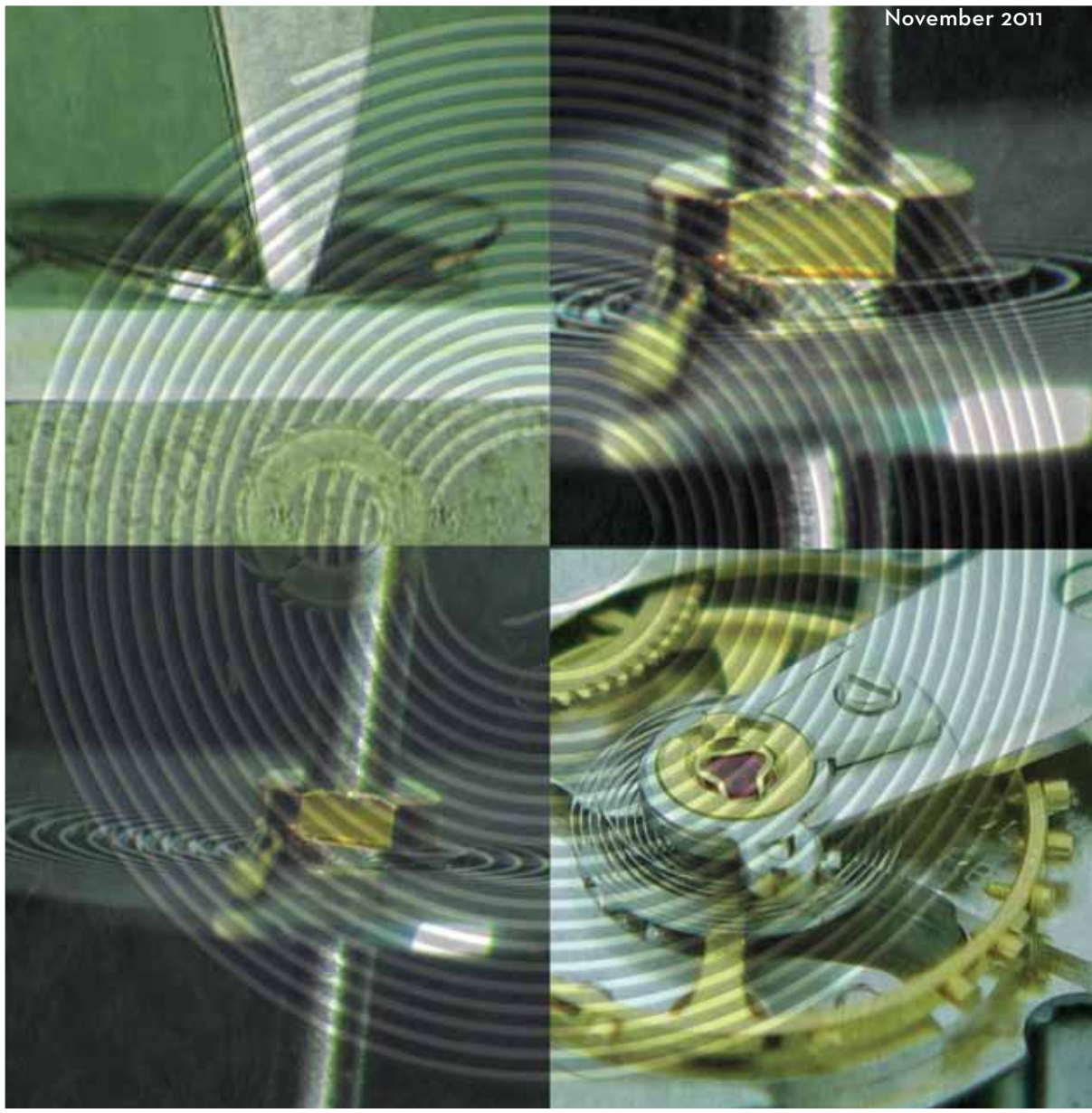
HOROLOGICAL TIMES™

ADVANCING THE ART, SCIENCE & BUSINESS OF HOROLOGY

November 2011



AMERICAN WATCHMAKERS-CLOCKMAKERS INSTITUTE

This Month's Focus: *Technical Insights*

Introducing an Upgrade for Jun Air Compressors

New 1/100th micron filter now available

Now with 2 filters!
.01 micron & 5 microns

AC6411
Jun Air
$1495.00

Create pressure efficiently using the Jun Air. Tank pressurizes to 175 psi or 12 BAR. This silent air compressor is recommended for use with the Witschi Proofmaster S and Proofmaster M waterproof testers.

AC6409/4071055
.01 Micron Filter
$99.00

Provide greater protection for your waterproof testers

The Jun Air compressor now has two air filters. A .01 micron air filter has been added to the 5 micron filter. Protect your Witschi Proofmaster S and Proofmaster M from contamination!

Already own a Jun Air?
Add the .01 micron filter for only $99.00.

TS-PROOFMASTER S
Witschi Proofmaster S
Call

- Pressurize from .2 to 10 BAR
- Set vacuum to -.7 BAR to detect small and large leaks
- Leakfinder program pressurizes case to determine the leaking point when placed under water
- Small footprint

TS-PROOFMASTER M
Witschi Proofmaster M
Call

- Pressurize from .2 to 10 BAR
- Set vacuum to -.7 BAR to detect small and large leaks
- Leakfinder program pressurizes case to determine the leaking point when placed under water
- Fully automated dome opening and closing
- User-friendly touch-screen–easily select desired programs

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DOUG THOMPSON, CW21

Hello everyone! I hope your Thanksgiving holiday was full of familial warmth, delightful reunion and scrumptious good food.

"A nickel ain't worth a dime anymore."

Yogi Berra

In terms of value, we have all seen a great many changes in the past few years. Getting the most value for your dollar is something we are all aware of these days, and I feel AWCI has created something that has increased the value of membership to an even greater degree: Our new website.

Very soon now, you'll be using the new AWCI website. The Board is currently reviewing it and we hope to have it up by the end of November. What a marvelous thing it is! It has such a welcoming feel, it begs to be explored and that's what we want you to do. It's bigger and better than our previous website and far more powerful. Navigating through it is much easier than before. It has lots to offer all of our members and more for the general public, too! It is far from being finished, in fact, it will never be finished! There are more and more things that we'll be able to do and add to it as time moves on. The software is far less complicated so it can be updated "on the fly," as Amy Dunn says. This makes it much quicker for you to stay in tune with what's happening in our horological world. You'll be asked to help us with links and information that we can add to the site. As a member, this is *your* website and you can make it even better. Feel free to offer suggestions, because if you've got a great idea, we want to hear it. Send them to Amy Dunn, Marketing Director: adunn@awci.com.

We want the public to come to our site for their horological questions and answers. We want them to be comfortable recommending it to others, as well. As the public becomes more and more aware of the importance in having qualified individuals work on their valuable clocks and watches, our website is where they should be looking for help.

Some areas will still be under construction when it first goes "live" so we ask for your patience. There will be technical guides and links to technical guides as the site develops. Some sections from the old site will migrate to the current site and others will have to start over. New to the Referral Directory is a feature that will enable an "Enhanced Listings" section: The ability to place advertising next to your regular listing, kind-of like the Yellow Pages.

Be sure to watch for our new website, then discover all it has to offer. This site is certainly something we can all be proud of, and is yet another example of the progress we're making in advancing the organization.

a message from the executive director

BY JAMES E. LUBIC, CMW21

The AWCI ELM Charitable Trust needs your support. Again this year when you receive your dues renewal, you will see that you are being asked for a $25.00 donation to the Trust. When the ELM Trust receives a donation, not only does this benefit the Trust, it benefits AWCI and ultimately, you, as well. (Remember, your donations to the ELM Trust may be tax deductible.)

Educating the public about watches, clocks, watchmakers and clockmakers is the main mission of the ELM Trust. Through the efforts of the ELM Trust, consumers learn more about how unique you are as a watchmaker or clockmaker. This is also a benefit to you because consumers will learn about the need for qualified watchmakers and clockmakers. They will also learn that our trade is not the proverbial "Dying Trade" or "Lost Art," and that it's alive and prospering. The public also hears there is a real need for more people to obtain the proper training so they can enter our profession and become successful.

So far this year, the ELM Trust has received, through donations, all the required equipment for our new enlarged polishing room. Arbe Machines Inc. has teamed up with Jules Borel & Co. to donate both a model CFSD 920 and a MMD 948. JDS Inc. has donated one of their Best Built Watchmakers Polishing Systems, and Reimers Electra Steam Inc. has donated a Cyclone Steamer. This is another way the industry can help by keeping AWCI classrooms updated with the latest equipment.

Donating to the ELM Charitable Trust is a great way for any company, supplier or brand involved with the watch and clock trade to support our profession in a way that can be mutually beneficial. The ELM Trust thanks all of you for your past and future support. Donors, as always, will be recognized in the *HT* in appreciation for their generosity.

This year's ELM Trustees are:

- Jack Kurdzionak, Chairman
- Paul Wadsworth, Treasurer
- Dennis Warner, Secretary
- Charles Cleves, Museum Curator
- Brad Wellmann (we welcome Brad as our newest Trustee)

If you would like to donate, or suggest that someone donate to the ELM Charitable Trust, please have them contact me: 866-367-2924 ext. 310, jlubic@awci.com.

AWCI new members

Welcome to these new or reinstated members!

Alabama
John Gillis-Tuscaloosa

Nebraska
Todd Martin-Arlington

New York
Jason Appelbaum-Brooklyn

Oklahoma
Turner Walker-Okmulgee

Ontario, Can.
Rob Phillips-Toronto

Oregon
Gregory D. Davenport-Oregon City

Texas
Stephen P. Zappala, III-Houston

Washington
Kit Keung Man-Bellevue
Wilson Garcia Melegrito-Seattle

Welcome to these new or reinstated members!

High Time for Denver!

August 1-5th, 2012

We're on our way to the "Mile High City," where the air is clean and the mountains are "pretty!"

Yes, we're taking the 2012 annual convention and educational symposium to new heights! For the convenience of attendees and vendors, we have also made several schedule changes. The business meetings of our various governance committees will now take place on the first two days (Wednesday and Thursday). Friday, Saturday and Sunday will be devoted to the educational seminars, the vendor fair, the ELM Trust off-site dinner and our awards banquet. A Sunday Swap Meet is also being considered.

Our meeting planner has chosen a great hotel with convenient transportation around the area. More information will be included in upcoming *Horological Times* magazines, as well as on the new AWCI website, and of course, on AWCI's Facebook page. Remember, the business portion of your trip can sometimes be tax deductable.

We will also offer the popular off-site day for spouses, so think of this as a possible business/vacation combination. It's time to plug the dates of August 1-5, 2012 into your calendar and prepare for the time away from your shop/work. And be sure to take advantage of early registration when it is announced.

Take it from someone whose birthday is in August... the date comes more quickly as the years go by!

Terry Kurdzionak

Plan Your Holiday Shipping Now. Then Relax.

Life can get hectic over the holiday period. The FedEx 2011 holiday shipping website can help! You'll find holiday shipping news, including days and hours of operation, exceptions to the money-back guarantee* and last days to ship for timely holiday delivery at fedex.com/holiday.

Nervous you'll spend a fortune getting your packages there on time? Don't be. And, as an AWCI member, you can save up to 29% on your FedEx Express® shipping (includes a 5% electronic shipping discount) and up to 20% on your FedEx Ground® shipping. Best of all, these are year-round savings. Join the AWCI Freight Savings Plan today and start saving. For more information, go to www.siriani.com/awcifsp or call our service provider Siriani at: 800-554-0005.

For details on the FedEx Money-Back Guarantee, see Our Services at fedex.com. For eligible FedEx® services and rates, contact your freight savings program provider, Siriani & Associates. All FedEx shipments are subject to the applicable FedEx Service Guide. *FedEx service marks used by permission.*

"I cannot retire because I feel I have never actually worked. Rather more, I have enjoyed hard labour to achieve my own ends ... After some fifty and more years at the watchmaker's bench, I have learned patience, and to know that everything will get done 'all in good time.'"

Excerpt from *All in Good Time, Revised Edition, Reflections of a Watchmaker* by George Daniels

George Daniels, Henry Fried and J.M. Huckabee at AWCI's Orville R. Hagans History of Time Museum.

On October 21, 2011 George Daniels passed away at age 85 in his home on the Isle of Man. Daniels is best known as the inventor of the co-axial escapement, which was eventually purchased by Omega. Although he only built 37 timepieces in his career, his impact on the horology industry is indisputable. Daniels also mentored Roger Smith, another great watchmaker of our era.

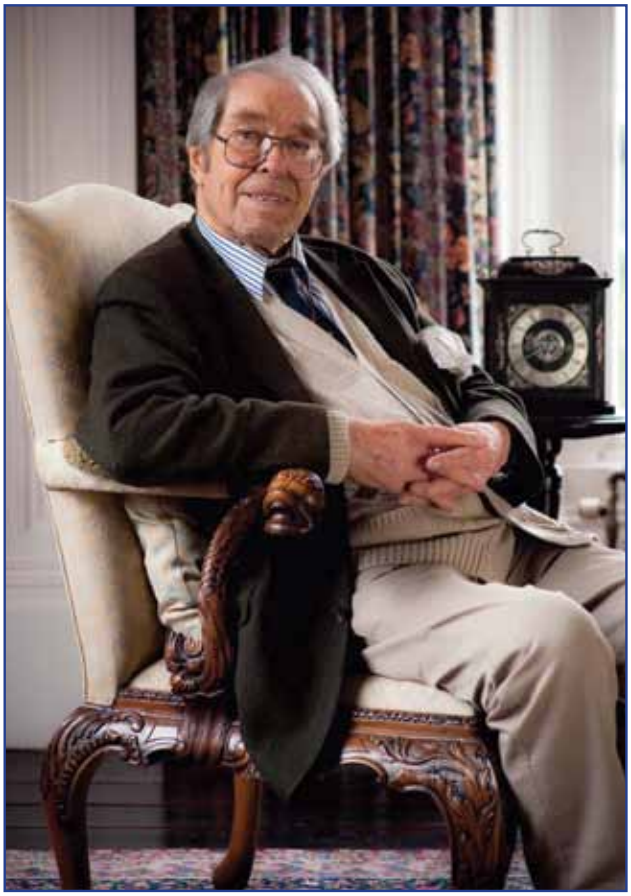
Dr. George Daniels, OBE, FBHI, FAWCI, was an AWCI Fellow. He was first introduced to AWI at our Silver Anniversary Convention as one of our speakers in 1985. He was also the Keynote speaker at our 30th and 35th anniversary conventions.

It is widely accepted that no one else knew the work of Breguet more intimately than Daniels. He carried Breguet's philosophy and spirit of watchmaking into the present. In fact, he was successful in developing one of Breguet's lifelong pursuits in watchmaking, the co-axial escapement, which was lubrication free. Another of his revolutionary development was the independent double wheel. Both of these escapements have enjoyed support from the global watchmaking industry. Some believe these escapements represent the first advance in their practical design since the invention of the lever escapement in 1754.

The advance of the quartz watch in the 1970s impacted the traditional watchmaking arts. But in 1969, George Daniels' mechanical contributions attracted the attention of connoisseurs and collectors worldwide. This helped bring about a resurgence in popularity of the mechanical wristwatch.

Watchmaking, written by Daniels in 1981, is widely regarded as the premier reference book for the horology industry and has remained a popular selection in the AWCI online bookstore. Twenty-eight years after its first publication, the best-selling horological text continues to inspire and encourage both new and practiced horologists.

George Daniels will be greatly missed, but his legacy will continue to live on.



George Daniels was an AWCI Fellow.

BY HENRY KESSLER

How To Safely Store and Transport Watch Batteries for Recycling

By Henry Kessler, Sy Kessler Sales, Inc., North American Headquarters for Renata Batteries

The days of $5 silver began to disappear back in 2003, and the value of silver has been climbing ever since. In January of 2009, silver was trading around $11 an ounce on the spot market, and by January 2010, silver was hovering around $17. By January 2011, silver was trading around $28, representing an increase of 65% over a single year (see Figure 1). By September 2011, the cost of silver grew to an average of $40 per ounce, representing a further cost increase of 43% just since January! Since silver is the key ingredient in silver oxide batteries, the rising cost of this raw material should convey two important messages:

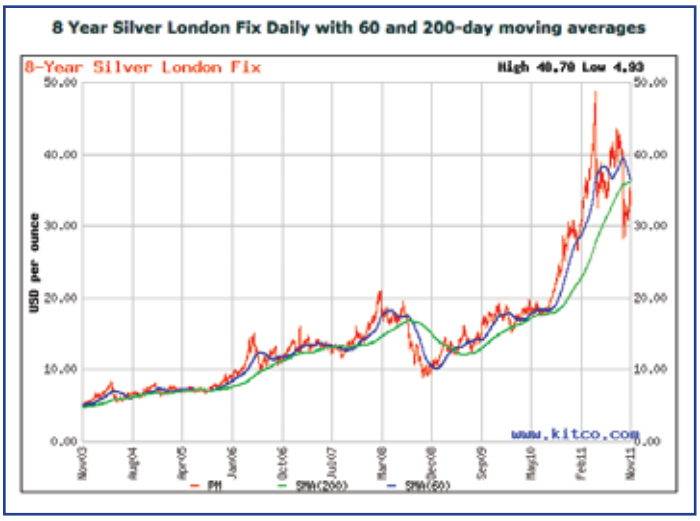


Figure 1

1) Expect the cost of silver oxide watch batteries to increase—soon.

2) If you are not recycling your spent watch batteries, you are missing an easy income-producing opportunity.

What this means for those watchmakers who have been storing spent watch batteries for years is that their collection has become very valuable! With recycling companies paying $40 per pound and more, there has never been a better time to become environmentally responsible.

Before becoming involved in this profitable, environmentally-positive practice, please review the following guidelines for how to safely handle watch batteries:

(A) After performing the watch battery replacement service

(B) When packaging the batteries for safe transport for recycling

The following suggestions were compiled with the assistance of NEMA (The National Electronics Manufacturers Association), Panasonic, Renata, and the Department of Transportation, and are presented as a public service in this report to the American Watchmakers -Clockmakers Institute by Henry Kessler, President of Sy Kessler Sales, Inc./North American Headquarters of Renata Batteries.

Recommendations for Safe Storage and Transport:

1. Generally, there is little risk of a fire from handling spent watch batteries. For years, service technicians have safely removed spent batteries from watches, storing the spent batteries in empty coffee cans for recycling. Occasionally, however, service technicians have reported that batteries have *loudly popped* shortly after landing in the coffee can. This is due to the fact that some batteries are often not fully spent, resulting in overheating from short-circuiting, which could cause the batteries to pop open, potentially resulting in eye damage and more.

2. Obviously, service technicians should be extra cautious when performing high-volume battery replacement of stock watches and other devices, and when replacing multiple batteries that might not be fully spent! With volume, there is clearly an increased risk of mass short-circuiting, fire and small explosions. Additional caution to better manage these risks should be taken.

3. Due, in part, to their higher voltage, CR type lithium batteries pose a greater risk, and this level of risk is also highest when dealing with high-volume replacement of batteries which might not be fully spent. Never store such batteries jumbled together without insulation between each cell in one container, inside of a building or near combustible materials. Instead, store such batteries outside, a safe distance away from any structure, and never where accessible to small children.

4. When dealing with high-volume replacement of button and coin cell batteries which might not be fully spent, and ALWAYS when dealing with lithium cells, the following is required:

- Be sure to comply with federal, state and local regulations.

- Separate lithium batteries from other button and coin cell batteries immediately (directly) after removal from devices. The actual recycling work for lithium cells is generally performed at a separate location from where the silver oxide batteries are recycled. Currently, there is no recycling value paid for these lithium batteries; in fact, they represent a relatively minor cost to the watch-battery recycler. However, lithium batteries contain "Perchlorate," which is known to be a danger if it enters the drinking-water supply; therefore, it is advisable to also send these batteries to your recycler.

- After batteries are removed from devices, the partially-spent silver oxide batteries, and all lithium batteries, should have their terminals covered. This can be accomplished by placing cells individually into small plastic zip-bags, or by affixing them to a piece of 1.8 mil acrylic adhesive tape, such as the

Figure 2

how to safely store and transport batteries for recycling

BY HENRY KESSLER

material often used for shipping boxes (see Figure 2). Or, use an equally secure or better insulator. For the example pictured here, a two-foot long piece of two-inch wide tape is placed within reach of the service technician. As the technician removes batteries, they should be affixed to the tape, allowing about ½ inch of excess tape to surround each battery. After the tape is full, another strip of tape should be placed over the first strip, sealing the spent batteries between the two strips of tape, before being added to the spent battery storage container.

5. As a rule, only transport spent batteries jumbled together that you are confident are fully exhausted, and only after completely covering the terminals of all CR lithium-coin cells, and all cells that you feel may not be fully exhausted. When handling the spent batteries, it is recommended that you wear safety goggles and latex gloves. To insure batteries are fully exhausted, it is common practice to stir the mix of batteries 2-3 times over a period of several days, while checking to make sure the container is not warm prior to transport.

6. Batteries which have become outdated, or are no longer compliant for sale due to mercury content, should always be transported in original, unopened packaging to insure against mass shorting.

7. Double-bag all spent batteries prior to placing them into the shipping container. Limit the contents of any one carton to 50 pounds. Eliminate any open space inside the carton to insure that it is not possible for the contents to shift around inside before sealing the carton for transport.

8. Prior to shipment, be sure to place a warning on the outside of the box, such as the one pictured here (see Figure 3). This warning must be printed on the outside of the shipping container in contrasting colors, incorporating the following precautionary text: "PRIMARY LITHIUM BATTERIES FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT" in a font that is at least ¼ inch tall – or ½ inch tall if the container weighs 66 pounds or more.

9. If your shipment contains 24 or more lithium batteries, and it is shipped via air, the parcel must also be marked with special procedural instructions, indicating what must be done if the package is damaged; i.e: "LITHIUM METAL BATTERIES. DO NOT LOAD OR TRANSPORT PACKAGE IF DAMAGED. If damaged, double-bag contents, securely rebox and re-label for transport." The phone number for the recycler must also be listed for further instructions. Since there are times when ground shipments are diverted to air cargo, we include this warning shown here on all shipments of 24 or more lithium batteries (Figure 4).

Figure 3: 4.5" x 1.5" label; font is 1/4" in height

Figure 4:
- **Dimensions: 120 x 110 mm (4.75" x 4.35")**
- **Border color: red on a contrasting background**
- **Pitcogram colors: Glass, batteries and flame can be black**

10. The following "Shippers Declaration for Lithium Batteries" must be printed on the packing list accompanying the shipment, that states: "CAUTION: This package contains Lithium Metal Batteries, and must be handled with care. Flammable if damaged. If the package is damaged it must be quarantined, inspected and repacked. For further information, call (insert the phone number of your recycler)."

11. Select sturdy shipping containers capable of withstanding a drop-test from 4 feet without bursting. For guidance, review the suggestions published

by UPS:www.ups.com/content/us/en/resource/ship/packaging/guidelines/how_to.html

12. Spent batteries have often been stored and transported with little regard for safety, and it is only good fortune that there have been so few reports of fire or damage. *Recycling spent batteries can be lucrative, yet the risks are very real, and caution should be exercised.*

13. Carefully select a reputable recycling/refining company. If not, you could inadvertently harm the environment while never receiving payment. There is also the possibility of downstream liability, should your spent-batteries be indiscriminately discarded on the streets or waterways. Confirm that your refiner maintains proper licensing, permits and insurance.

Notice: The procedures described and information contained in this article are a compilation of procedures and information provided by leading battery manufacturers, watchmakers, jewelers, trade associations, freight companies and select governmental agencies. The author, various contributors, and AWCI make no representation or warranty regarding the content of this article, and will not be held responsible for any consequences resulting from the procedures or information contained herein. ♦

References:
The U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration
www.phmsa.dot.gov/pipeline

Renata SA
www.renata.com/cms/index.php?id=6

Panasonic Industrial Company
www.panasonic.com/industrial/batteries-oem/oem/primary-coin-cylindrical/index.aspx

California Department of Toxic Substances Control
www.dtsc.ca.gov/HazardousWaste/Perchlorate/

National Electrical Manufacturers Association
www.nema.org/

BY JACK KURDZIONAK, CW21

SIXTEEN YEARS AND COUNTING

This month's Workshop is the 181st consecutive article in this series and begins the sixteenth year I have written this column. When the late Buddy Carpenter, AWCI's president in 1996, asked me to write this column, I never imagined that I would still be writing for *Horological Times* in 2011. Over the years I have received numerous letters, e-mails, and comments, as well as thanks from our members who read this each month. I need to thank all of you for your support and encouragement. Writing this column has permitted me to assist our members in learning more about our profession, and that in itself is reward enough for the time spent each month preparing these few paragraphs. Also, I have been additionally rewarded by enhancing my own knowledge of our profession as I prepare each article.

I know we have many members with a treasure trove of knowledge that could be shared with all of us. I see many posts on internet chat rooms written by our members who display their knowledge and writing skills to those audiences. Why not share that same gift right here in the pages of *HT*? If you do, you can be assured it will be well received and appreciated.

UNWELCOME NEWS FROM ETA

A few days ago, we were informed that effective January 1, 2012, ETA will no longer supply the modules (circuits) for most of the quartz watches they manufacture. They will continue to furnish a limited supply of the circuits for the other models not included in the January 1st cutoff date. They will also continue to supply circuits for older discontinued models on an "as available" basis. That is, until June 30, 2013, after which they will no longer supply any modules. They will continue to supply complete quartz movements for repairs.

ETA gave no rationale for the policy changes in their carefully-worded and brief news release. We will have to see how our members adapt to this policy change from a major supplier of Swiss quartz movements.

Do You Know The Answer?

A BRAIN TEASER

A watchmaker recently received a new, 11 ½ ligne, 3-hand calendar movement that was consistently losing several minutes per hour. He was baffled at first until he carefully considered the possibilities and solved this problem. Here is exactly what he knew to be the facts:

a. This movement had not been altered since it left the factory. Our watchmaker was performing warranty service for this recently purchased watch.
b. The timekeeping as shown on the Witschi Expert II was flawless in all positions as it actually was displaying chronometer quality time.
c. The Witschi showed this movement to be a 28,800 beat-per-hour movement and the balance frequency was spot on.
d. The balance amplitude was well within factory tolerances when fully wound and after 24 hours and in all positions.
e. The driver cannon pinion friction was good and it was free to turn upon its post.
f. The hands were securely fastened to their respective posts.

After carefully considering what could be wrong, our watchmaker was quickly able to solve this mystery. He located the single source of the problem, eliminated it, and the watch immediately kept excellent time. What single fault did the watchmaker discover was wrong with this movement? If you think you know the answer, please email it to jackkurdz@gmail.com. The correct answer will appear in the January, 2012 column.

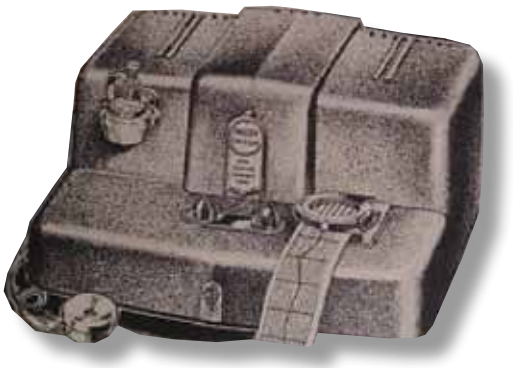
BY JACK KURDZIONAK, CW21

SWISS FRANC VS. U.S. DOLLAR

Last summer the value of the Swiss franc was approaching $1.35/franc, over double what it was a few years ago, and for a while it seemed that Swiss goods were going to be priced out of the American market. The somewhat good news is that the franc's value

has backed off somewhat so that it is now about $1.10/franc. Better than, but not nearly as favorable as it was in the recent past. Swiss products are still at premium prices when contrasted to items originating in almost any other country. One commentator, when discussing the recent decline in the value of the franc, said it felt "as good as having a five ton elephant standing with his foot on your chest to hold you down, move away only to be replaced by a 1000 pound moose." It may be better, but still not very comfortable.

PAULSON TIME-O-GRAF



THE PAULSON TIME-O-GRAF

Dick Dorer from Texas recently sent a copy of the 1949 Southwestern Horologist and Jeweler's convention souvenir book. On one page of the book, the Henry Paulson Co. was advertising their Time-O-Graf watch timing machine for only $490. One might be tempted to think, wouldn't it be nice if only we could return to "the good old days" when equipment was low cost and built to last like an army tank. The Paulson machine's technology was advanced for its day as it utilized a quartz crystal as its timing standard and provided a continuous feed, paper tape printout. The Paulson machine's printout provided two sets of data: beat error and instantaneous rate. Were things really that good in "the good old days?" I am not fully convinced that is true.

In the fall of 1949, I entered the first grade and can remember that my father earned about $45/week in a trade with a similar pay scale to the watchmakers of that era. It took the entirety of a watchmaker's salary for eleven weeks to pay for the Time-o-Graf. Paulson and their competitor, American Time Products, sold thousands of timing machines to the watchmakers of that era in spite of the cost. Additionally, the machines were large and heavy and took up so much bench space they required a separate table. Today's machines are small enough to keep on a watchmaker's bench and their weight is measured in ounces rather than pounds. The 1949 cost of $490 is equivalent, adjusted for inflation, to $4,495 in 2011, which actually made it more costly than a new machine purchased today.

Paulson and all of its contemporary competitors are out of business, having been replaced by a few Swiss and German companies that manufacture timing machines. A watchmaker can purchase, for less than $4000, a machine that performs more functions and takes up far less bench space. A basic timing machine will display rate, beat error, and balance amplitude on an easy-to-read LCD screen for an infinite number of beat rates and lift angles. Measuring parameters can be varied as needed and the integrated speaker amplifies escapement noises to aid with the analysis of the watch's condition. For a few more dollars, a printer is available to provide a permanent record of the timing results. For approximately the same amount of money, in terms of inflation adjusted value, the timing machine you use today is a better bargain and far more versatile than the 1949 model Paulson Time-O-Graf sold in "the good old days." ♦

BY ROBERT D. PORTER, CMW

A TIME-SAVING SHOP AID FOR CLOCKMAKERS

Developed for Clocks with Mounting Brackets

You'll find this simple and easy-to-build shop aid makes it easier to quickly and accurately position the mounting brackets on a repaired or replacement clock movement. With this method, the center wheel arbor and winding arbors will line up with the original case mounting brackets and the winding holes in the clock case and dial. This procedure makes it easier to reinstall a clock movement into the case after the movement service or movement replacement is ready for the final installation back into the clock case. Each shop aid is made for a specific movement.

This example was made from scrap ½" plywood to fit a Hermle 340-020 movement that is replacing an old Seth Thomas A401-003 floating balance movement. (See Figure 1.) Please note, this aid must be made prior to disassembly of the movement being serviced or replaced. Fresh masking tape should be used to transfer the location/outline of the clock's case brackets to the shop aid for each new job. The original mounting brackets are outlined with a Sharpie™ pen so the repaired or replacement movement brackets can be positioned correctly as in Figure 2.

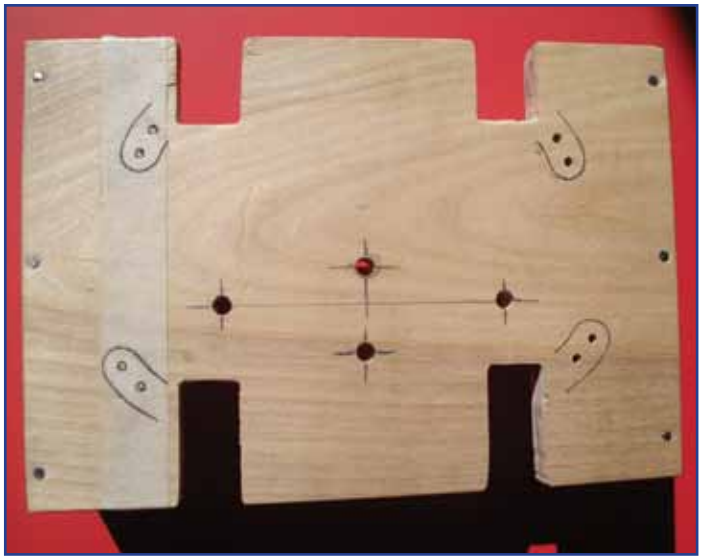


Figure 2

The base measures 7 ½" by 5 3/8". The side support pieces are 2 ¼" tall. The four slots allow access for a nut driver to tighten and adjust the mounting brackets as shown in Figure 3. The location of the four slots is determined by the location of the movement's post nuts. The base can also be made longer allowing the shop aid to be used with a clock stand, or it can be clamped to a work table.

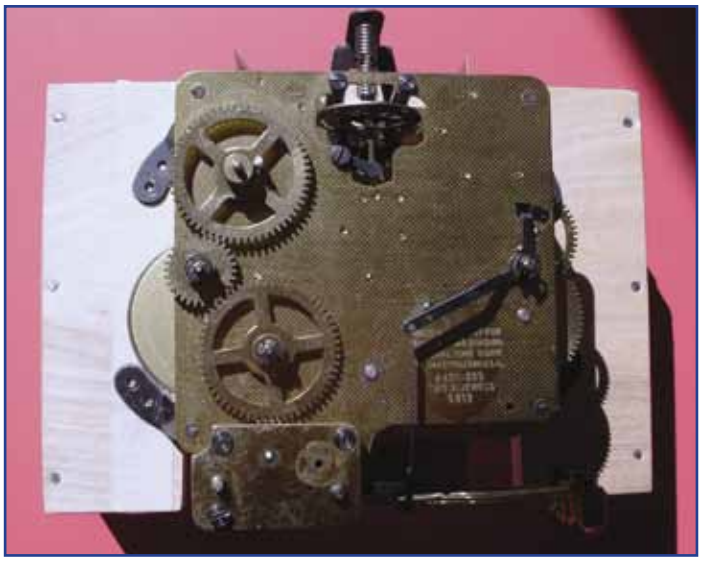


Figure 1

Figure 3

To position the holes for drilling their location: Measure the hour wheel cam and drill a hole the same diameter through the plywood base as shown above. Use a black felt-tip marker to coat the end of each winding arbor. Push the movement into the base so the arbors mark the exact drilling location. Measure the winding arbors across the diagonal and carefully drill the holes the same size for a precise fit.

The movement shown in Figure 4 is now in position for outlining or adjusting the brackets. ♦

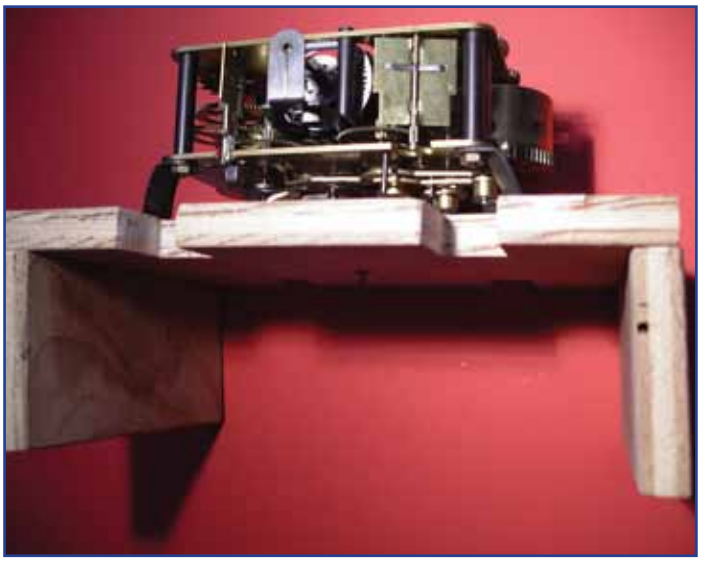


Figure 4

BY JAMES P. BORTON

Building of the Overcoil Hairspring and the Timing Results, Part 1

Many modern watch manufacturers produce movements that utilize flat hairsprings with regulating pins. These watches perform well and are becoming more common than watches with overcoil hairsprings. This trend is no surprise as technology is producing improved alloys for hairsprings and balances, at lower cost, and they are less affected by temperature changes than in the past. Also, the manufacturing cost of hand-formed overcoil hairsprings is far higher than the flat alternative.

This study will first give a brief explanation of the differences between overcoil and flat hairsprings. Next, the overcoil will be assembled step by step. Finally, the overcoil will be shown to be a more isochronous oscillator than the flat hairspring through timing analysis in the same watch.

The coils of a flat hairspring lie in a single plane which includes the vibrating point near the regulating pins and pinning point at the stud. The gaps between the regulating pins and the hairspring are very small. When oscillating, the hairspring is only briefly away from either regulating pin beginning just before the dead point and ending just after the dead point. This means the hairspring has an effective vibrating point just behind the regulating pins toward the stud. In fact, the vibrating point is at the regulating pin (when touching a pin) and at the stud (when not touching a pin). The effective vibrating point is just an average between the two actual vibrating points determined by how much time is spent on each while oscillating.

Amplitude decreases in the watch with dropping torque as the watch runs down. With lower amplitude the oscillator moves more slowly through the lift angle where the vibrating point is at the stud. This longer time with the vibrating point at the stud causes the oscillator rate to slow, resulting in a loss. This loss is typical in watches with regulating pins. The amount of the loss and amplitude range where it occurs are affected by the space between the regulating pins. Close regulating pins will show a small loss starting at lower amplitudes as the watch runs down. In contrast, wide regulating pins will show a greater loss starting at higher amplitude with the loss increasing more sharply as amplitude drops farther. For this reason regulating pins are an “enemy of isochronism” and must be kept close to minimize their effect on rate.

When the hairspring “breathes” its natural vibration has it expanding outward and contracting inward evenly around its axis as viewed from above the balance bridge. This is not possible with a flat hairspring as the outer coil is pinned at the stud and trapped between the regulating pins. When vibrating outward, the outer coil opposite the regulating pins/stud expands farther away from the axis than the fixed regulating pins/stud. This carries the hairspring center of gravity off the axis in the same direction. Conversely, when vibrating inward, the point opposite the regulating pins/stud contracts farther in towards the axis than the fixed regulator pins/stud. This carries the hairspring center of gravity off the axis towards the regulator pins/stud. This effect would still be seen even without the regulating pins, as the hairspring is pinned at the stud.

This oscillating poise error of the hairspring causes gains and losses according to position and amplitude. It also applies ever-changing radial force on the balance staff that translates into varying friction between pivots and jewels, depending on amplitude and position. Both errors caused by a changing hairspring center of gravity have a destabilizing effect on rate and are also “enemies of isochronism.” Furthermore, additional errors related to regulating pins, such as an off-center hairspring between regulating pins or non-parallel regulating pins, have a negative impact on isochronism through the amplitude and position range.

In 1795 Abram-Louis Breguet came up with a solution to many of the rate problems inherent to flat hairsprings. His solution was the overcoil hairspring. It is also commonly called the Breguet spring as it is his invention. In the overcoil design a terminal curve is formed that is on a second level above the flat spiraling coils. This overcoil is formed by raising an arc

BY JAMES P. BORTON

(180˚ - 200˚) before the vibrating point with a vertical bend of approximately 45˚. Next, an identical, but reversed, leveling bend approximately 20˚ closer to the vibrating point is made. The arc is then shaped into a terminal curve with pinning point above the "flat" coils. The pinning point is now above the level of the flat coils and the terminal curve is shaped so that it can flex above the flat coils allowing them to expand and contract freely and concentrically. The flat level of coils breathes with even expansion and contraction around the axis and is evident when viewed from above. With even breathing, the center of gravity of the hairspring stays on the axis while oscillating so poise errors do not occur and isochronism is greatly increased.

After Breguet introduced the overcoil, mathematical solutions to the terminal curve were calculated by M.L. Lossier and M. Phillips. Both developed curve profiles that are named for them and are in use today. The Lossier and Phillips curves were both calculated for several different terminal curves where the vibrating points are positioned at varying distances between the axis and outer coil. Charts were developed and printed in many sizes to accommodate different diameter hairsprings. Also, identical but mirrored charts were created for left-coiling and right-coiling terminal curves. With the proper chart and two known variables (Hairspring radius – R and vibrating point radius - r) a terminal curve profile can be formed using the chart as a template. Thus, overcoil hairsprings can be formed to fit in most watches, even those initially designed for flat hairsprings. The Phillips curve and charts will be revisited later in the study and used to develop the overcoil for the study watches.

Overcoil hairsprings are incorporated in watches with and without regulating pins. To maximize the isochronous potential of an overcoil oscillator, the vibrating pinning point to the stud is precise and regulating pins are not used. The balance is said to be "free sprung." Any minor rate adjustments are accomplished by changing the moment of inertia of the balance by moving mass on the rim toward or away from the axis of rotation.

building of the overcoil hairspring and the timing results

BY JAMES P. BORTON

Study A

For the first part of this study, an overcoil hairspring will be assembled and formed using specified components of a manufactured caliber. The hairspring will be mated to the balance, installed in the serviced movement and tested for isochronism on a timing machine. A caliber using no regulating pins will be utilized to minimize variables and provide the clearest picture of the performance of the overcoil oscillator in the watch.

Building the Overcoil Hairspring

The unassembled factory hairspring ends with an inner coil that is smaller than the collet and must be modified (Figure 1). If very close to the collet, the final turn of the hairspring could potentially contact the collet when vibrating inward and affect rate stability.

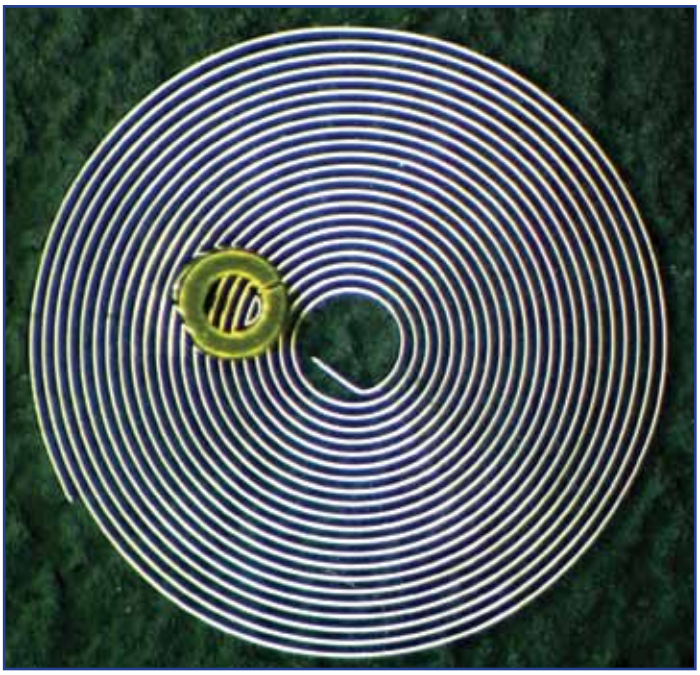


Figure 1

Approximately a 3/4 turn is removed from the inside and the tongue is reformed to pin into the collet (Figure 2). The collet is then pressed onto a smoothing broach where it can be easily handled to insert the hairspring tongue and taper pin. The taper pin is inserted with entry and exit portions on the same side of the hairspring (Figure 3). This causes the hairspring to tilt where it contacts the pin. Before seating the taper pin, it is confirmed that the hairspring has stayed level with the collet where it exits (Figure 4). At this point, it can be easily adjusted if necessary as the taper pin is not yet fully inserted. If it has twisted in the collet and is pinned that way, leveling will be more difficult.

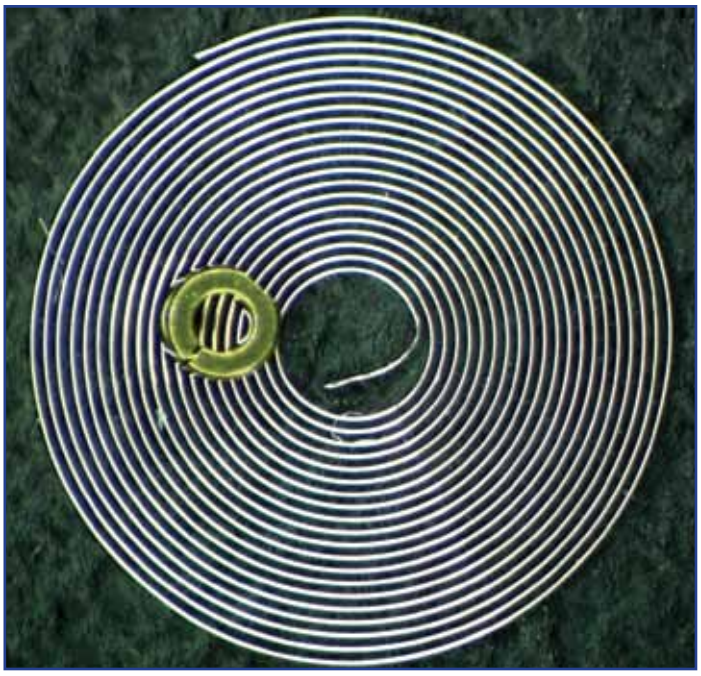


Figure 2

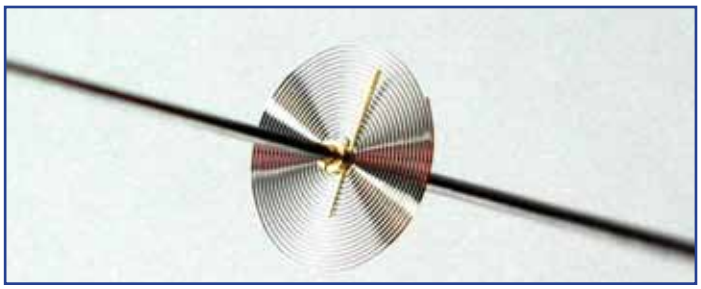


Figure 3

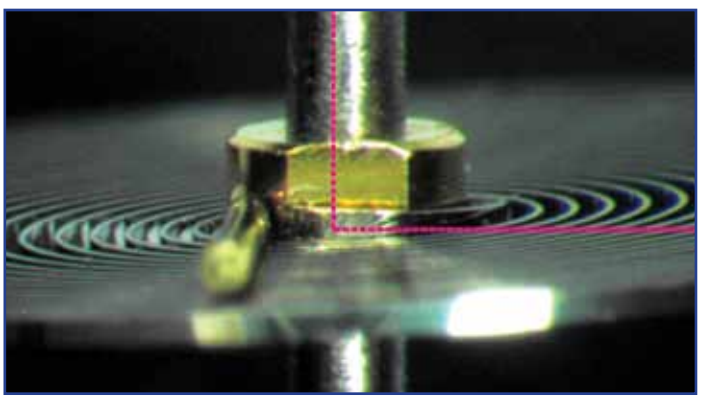


Figure 4

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The broach is then clamped horizontally in a bench vise with the collet, hairspring and taper pin just to the side of the jaws (Figure 5). The taper pin is vertical with the lead end pointing upward.

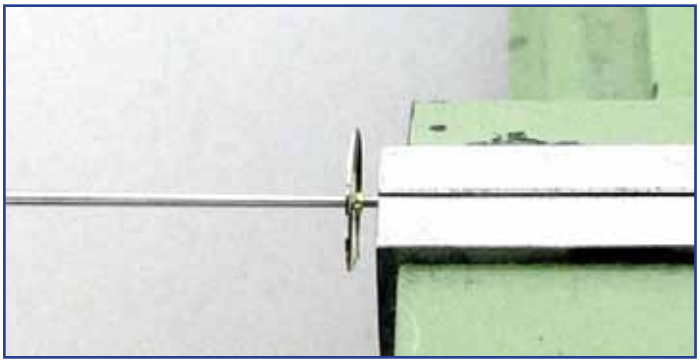

Figure 5

Next, 90˚ cutting tweezers are held vertically on the top of the vise with the tips lightly gripping the taper pin (Figure 6). While applying enough pressure to hold (but not cut) the pin, the tweezers are tilted, which pulls the pin tightly into the collet. With this method, any slip or breaking of the pin while pulling will not damage the hairspring or collet. Also, if the tweezers cut through the pin before fully seating, the pin can just be gripped again at a lower, wider point closer to the collet and pulled through in the same manner.

Figure 6

With the taper pin fully seated, the ends are cut away and the entire hairspring returns to level with the collet. The rough ends of the pin can be carefully shaved away with a razor until they will not touch the inner coil as it vibrates inward.

The hairspring is now ready to be leveled and centered. If the previous steps are executed properly, the hairspring will only need minimal leveling and centering, and all manipulations will be made where the hairspring exits the collet.

The hairspring is installed onto the balance which has been staffed, trued and poised with the roller table installed. The balance is then placed in a truing caliper where it is spun and the level and centering errors of the spring are seen (Figure 7).

Figure 7

The level is corrected first with slight manipulation near the collet pinning point. Once level, the centricity of the spring can be seen clearly on the spinning balance (Figure 7). When centered, the turns of the coil will move smoothly away or toward the center of the spinning balance with no visible wobble. Just as in leveling, the manipulations for centering are made very near the collet pinning point.

The application of the oscillator is Rolexcal. 1570 with a frequency of 19800 BPH (2.75 Hz.). All components are factory specific. The hair spring is a temperature compensating Nivarox 1 (Figure 8A/8B).

Next, the complete balance (minus stud) is placed on a vibrating tool and the 2.75 Hz. counting point is located and marked. The excess coils outside the vibrating point are cut away from the hairspring leaving approximately 3 millimeters behind the marked stud location. This excess will aid in precise pinning to the stud at the vibrating point and will be removed later. The hairspring is then removed from the balance to form the rise bend, leveling bend and terminal curve of the overcoil.

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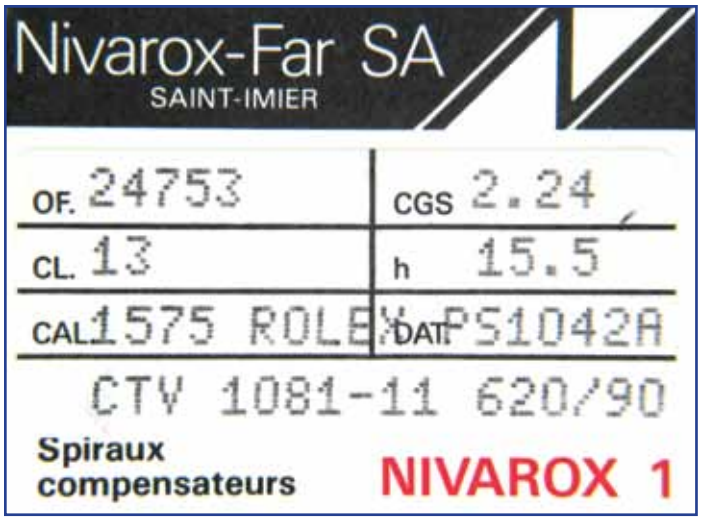

Figure 8A

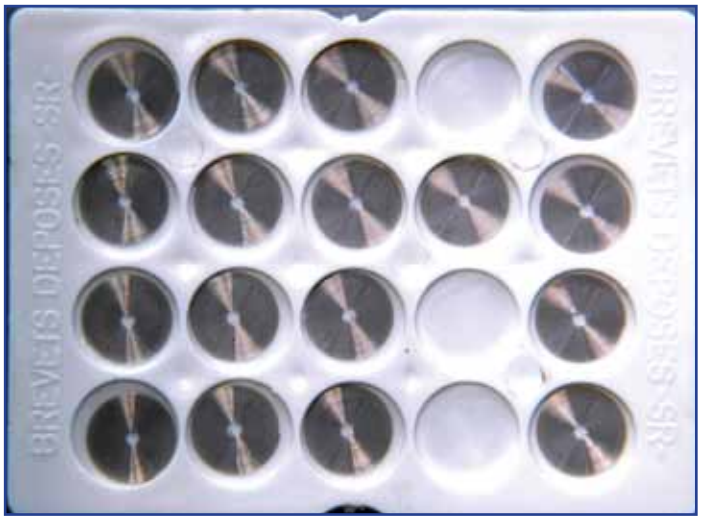

Figure 8B

The Phillips Terminal Curve chart is used to determine the number of the curve found in the caliber 1570 and will be the template for terminal curve formation (Figure 9). Curve number (N) is found in the lower left corner of each box. What first must be determined are the hairspring radius (R) and the regulating pin radius (r). However, in this case (cal. 1570) there are no regulating pins so the radius (r) is the distance from balance axis to pinning point in the stud. Careful measurement of the hairspring and bridge gives these values:

R = 3.00mm Curve Number Formula: N = 100r / R
r = 1.95mm = 100x1.95 / 3.00
= 65

Thus the curve number for the cal. 1570 is 65. This simply means that the vibrating point on the formed

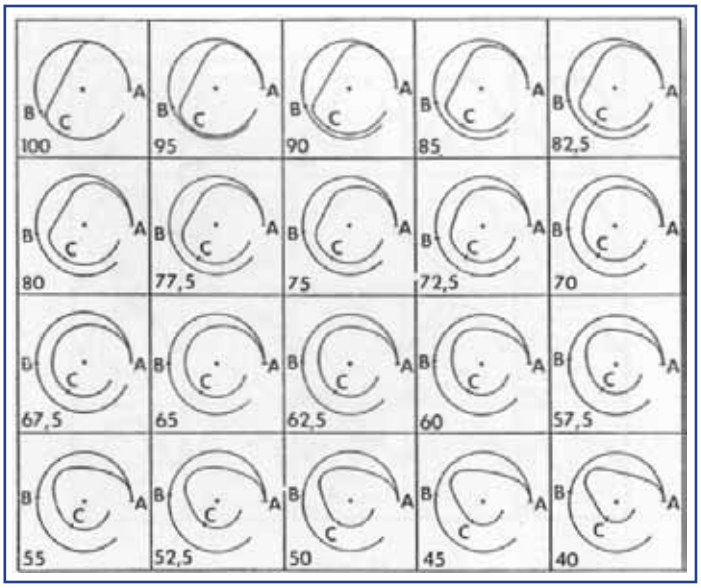

Figure 9

curve is 65% of the distance from the balance axis to the outer coil of the hairspring. The chart shows 20 vibrating point positions ranging from 40% to 100% of the distance from balance axis to the outer coil.

In each case, they are all formed with the same size hairspring where the pre-bending vibrating point is B, and post bending vibrating point is C. The starting point of each curve is A and the total degree measurement for all completed curves is 240˚ (A to C). Also, point A is the beginning point for the overcoil terminal curve so it is also the point where the vertical leveling bend ends.

The chart shown (Figure 9) is made for left-coiled curves. Charts are also printed in reverse for right coiled curves. Both are also made in incremental sizes to match various hairspring diameters. In the case of cal. 1570, the left-coiled chart of 6mm diameter springs is used (R = 3.00mm). The spring is laid on curve 65 with the vibrating point on B. From there, the form of the curve can be seen and duplicated (Figure 10). A preformed factory 1570 overcoil hairspring was laid on curve 65

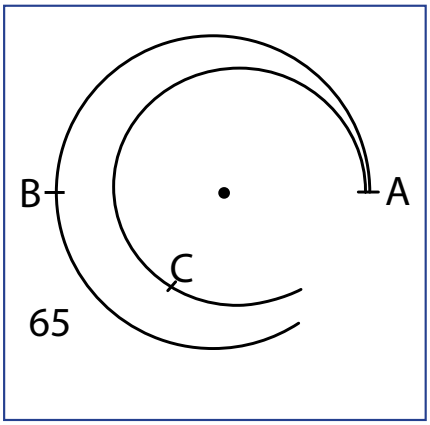

Figure 10

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for comparison, and the match was confirmed.

It is worth noting that curve number 100 shows a vibrating point that lies on the outer coil of the hairspring. This would be a useful curve for converting a flat hairspring watch to an overcoil using the stock locations of regulating pins and stud.

It may be useful to look ahead to Figure 15 to aid in visualizing the rise and leveling bend locations. The terminal curve begins at A where the leveling bend ends. The rise and leveling bends occur in a range of approximately 20˚. The vibrating point B and point A are 180˚ apart so the rise bend should be located 160˚ CCW from the vibrating point B.

To aid in locating and forming the bending points, a tool is made with reference angle markings and a center post to hold the spring. A plug with post is pressed into a glass aperture plate and paper with the relevant angle graduations is fixed under the glass (Figure 11). With the tool, the hairspring is held centered and the degree measurements can be accurately found on the spring for bending points (Figure 12).

The first (or "rise") bend is made at 160˚ CCW from the vibrating point. To make this vertical bend, 90˚ tweezers are carefully dressed with a roughed surface inside to firmly clamp the hairspring without

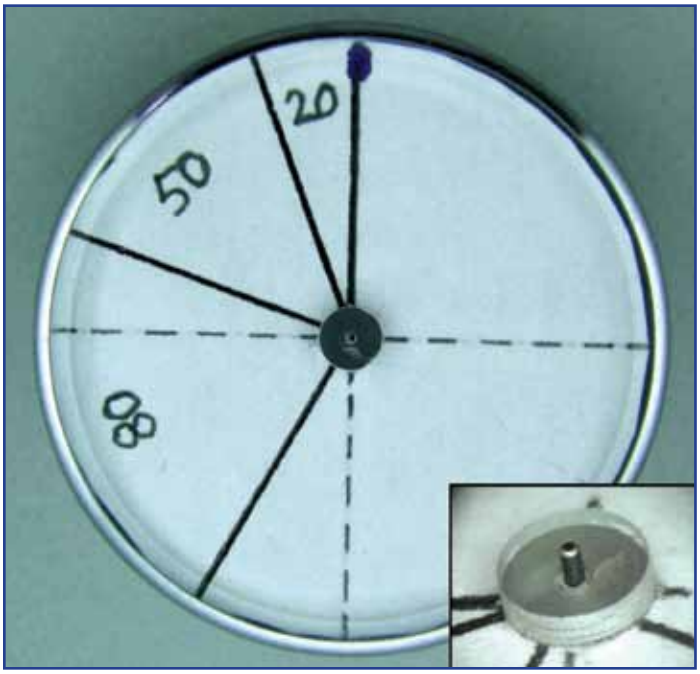

Figure 11

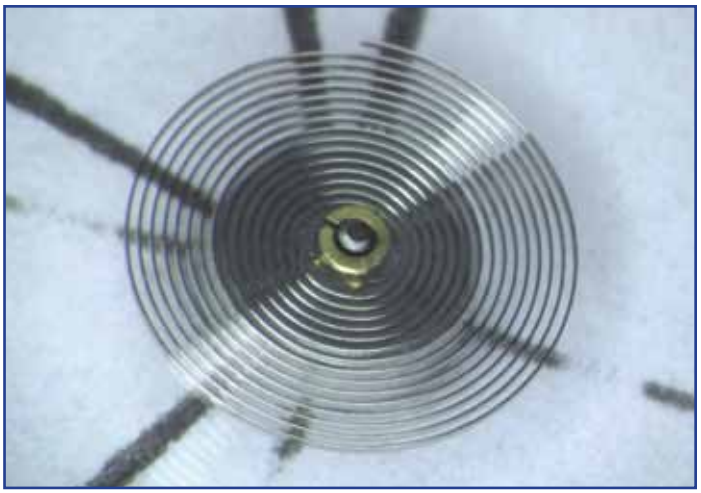

Figure 12

slipping. A piece of soft bench mat is fixed to a riveting block to assist in the bend formation. The hairspring is gripped at the bend point and pressed with a "pulsing" action into the soft mat material over an opening in the riveting block. The tweezers drive the spring at the bend point into the soft material above the opening (Figure 13). The hairspring gradually flexes vertically on either side of the tweezers, forming an even vertical rise bend. It is important to progress slowly with light pulses so that no stress cracks form. An angle of approximately 45˚ is sufficient for the bend, and anything greater could over stress the spring causing cracks. The second (or "leveling") bend is made 20˚ closer to the vibrating point in the same manner. This brings the remaining end curve back to parallel with the rest of the coils.

This bend requires a different orientation where the body of the hairspring hangs over the edge of the block to prevent damage to the rise bend (Figure

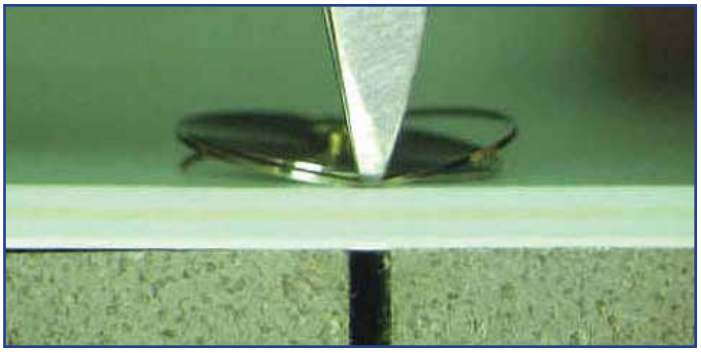

Figure 13

14). This bend is made at a point that will leave a gap between the flat coils and overcoil curve equal to 1x the height of the hairspring (Figure 15).

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Next are the horizontal bends that form the terminal curve. This curve will position the stud properly and give the hairspring the geometry to breathe evenly

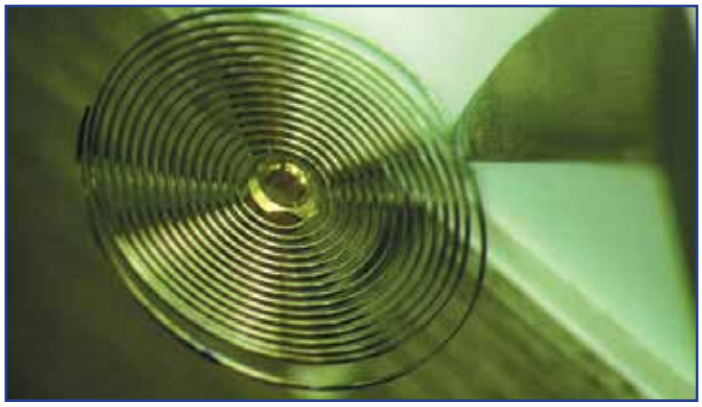

Figure 14

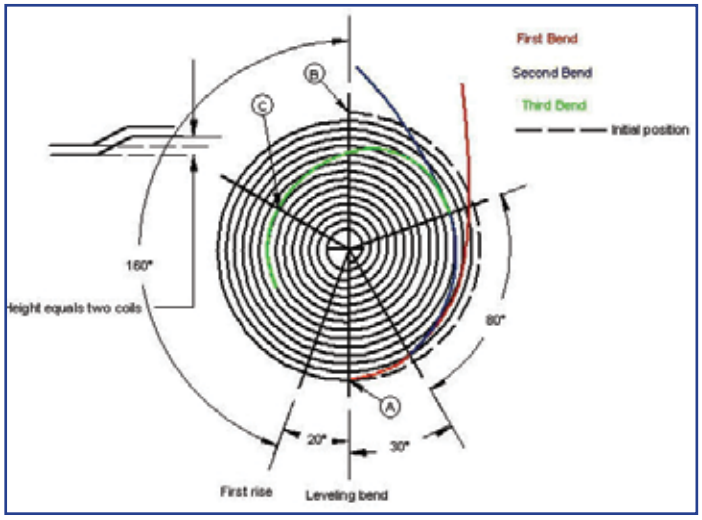

Figure 15

all the way around keeping the center of gravity on the balance axis while oscillating. These bends can be made by holding the spring with the 90˚ tweezers where the bend is to begin. Another set of lightly clamped tweezers are then drawn along the length of the hairspring with a slight twist in the direction that the curve is to be formed. The process is much like curling a ribbon with a scissors.

The Rolex 1570 overcoil design was studied and a drawing showing the specific bend positions and final geometry of the end curve was created (Figure 15).

Instructions for Terminal Curve Formation

1) First bend (rise) 160˚ CCW from vibrating point B.
2) Second bend (leveling) 20˚ CCW from first at point A.
3) Push hairspring at second bend until overcoil crosses first coil at the 30˚ mark.
4) Push hairspring at the 30˚ mark until overcoil crosses over third coil at the 80˚ mark.
5) Push hairspring at the 80˚ mark until overcoil crosses over the seventh coil.
6) Reshape remaining arc to position it over the seventh coil. Initial vibrating point B should now be at C.

With the terminal curve formed, the hairspring is pinned to the stud at the vibrating point using a stud table. The taper pin is then trimmed. Any adjustments to the hairspring made necessary from the stud pinning are now done. A bare main plate makes a handy tool for seeing the oscillator from all sides for adjustment, and this allows for cleaning separate from the movement. The clean oscillator and bridge are installed into the freshly-serviced movement and the watch is demagnetized.

If the overcoil is formed properly the hairspring stays on plane and is centered while oscillating at varying amplitudes. The center of gravity stays on the balance axis and no lateral forces are put on the pivots by the hairspring. This will be seen as a steady rate in all positions at various states of wind. Of course this state of perfect isochronism is only theoretical as influences such as friction and escapement disturbances can be minimized but not completely eliminated. They affect the oscillator as resistances and impulses that vary with changes in position and amplitude. Temperature has little to no effect in the short period of testing time in a controlled environment. External shocks will not occur on the test equipment. Poise errors of the balance and hairspring have been minimized and regulating pins are not present.

Testing

The testing is done on a Witschi Wicometre Professional with Micromat P automatic microphone. A 40-second stabilization time between positions is used. The automatic testing cycle provides consistent testing parameters and eliminates human error found in manual testing. Testing is done consecutively through each state of wind.

building of the overcoil hairspring and the timing results

BY JAMES P. BORTON

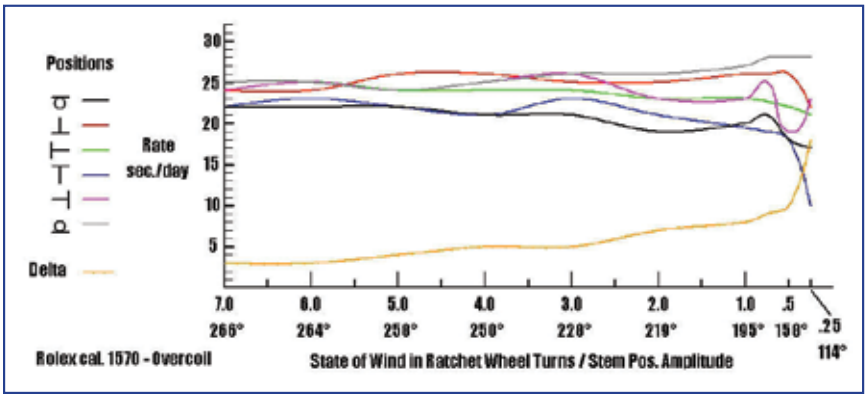

Figure 16

To standardize and simplify the testing, rate measurement was taken at 7 states of wind based on ratchet wheel rotations (W) where 7W is fully wound and 0W is fully unwound. All 6 positions were measured at each wind state. The measuring began with 7W and was repeated at 6W, 5W and so on ending with 1W. The results were graphed and the maximum rate variation between any two positions (delta) was extracted and graphed as well through the full range of wind. Because rate variation between positions is the focus, daily rate is not considered. The 6 position rates are placed in a positive range on the graph for convenience and only the differences between them is considered. The delta through the range of wind is, however, accurately shown by the seconds/day graduations on the y-axis. (See Figure 16.)

Poise errors of the balance and hairspring have no effect in dial positions. The dial position rates will still be graphed and considered in delta calculation. Amplitude shown at each state of wind is the average of the 4 stem positions only. At 220˚ the gain and loss caused by poise errors are equal and cancel out. Additionally, as amplitude passes through 220˚, the effect of poise errors reverses — a gain becoming a loss and a loss becoming a gain.

Results

The rates were better than expected with a full wind delta of 3 seconds (Figure 16). The delta only increased to 5 seconds at a state of wind less than half wound (3W). At a wind state of only 1W, the delta still had only increased to 10 seconds. Due to these results the state of wind was reduced more to see where the rates would finally deviate greatly. At 0.5W, the delta began increasing sharply and reached 18 seconds at 0.25W. At this state, the amplitude is 114˚ in stem positions and 150˚ in dial positions. The watch is barely running and delta is still remarkably less than 20 seconds.

The timing results show that a very small delta is achievable with the free-sprung balance. This small variation in rate increases slowly through unwinding and provides accurate timekeeping far beyond the standard specification of -24 hours.

The static timing results are not a certain indication of performance on the wearer's wrist. On the wrist, the watch with an automatic module would stay near fully wound, providing consistent high torque and amplitude and thus, a more stable rate. However, the watch would also be exposed to external shocks, temperature changes, magnetic fields or other variables that could destabilize the rate. ♦

Results: There are many reasons for such "isochronous" performance, but most notable are these:

Poise – The centers of gravity of the balance and hairspring are very near the balance staff. Error here would be seen as a gain and loss at opposite stem positions, especially at amplitudes below 180˚.

Depth of Locking – Pallet stones were adjusted for minimum lock and therefore escapement disturbance of the oscillator during unlocking was minimized.

Endshakes – The balance, pallet and escape wheel endshakes were minimized. This makes for minimum variation of engagement between escapement components and thus uniform escapement disturbance through varying positions. Also, small balance endshake provides the most uniform friction between pivots and jewels through varying positions, as well.

Lubrication – Watch was freshly serviced with proper lubrication of the escapement and oscillator.

The assembled 1570 oscillator. © James P. Borton, 2010

BY JORDAN FICKLIN, CW21

Tips for Working with the Rolex 300 Clasp Pin

Watchmakers who work on Rolex pieces every day are most likely intimately familiar with the new bracelet and clasp designs. For those watchmakers who only perform occasional repairs, however, there are a few things to know about the new design.

The older stamped clasp design was a very simple design that was very easy to adjust and repair, and it worked flawlessly for decades. The new design (300 series) is more complicated, extremely sturdy, and is sure to work for even longer. Should you need to disassemble one of these clasps, be sure to take careful note of how the pieces are arranged, as it can be a little frustrating to reassemble one of these.

The biggest construction change (aside from the machined body) is that components not held together by a spring bar are held together by a friction pin with a star-shaped head. Evidence of this is extremely difficult to detect even under high magnification. The pin grips very tightly and it requires a lot of force to remove it. In addition, removing it the wrong direction will cause significant damage. The best case scenario would be the pin enlarging the hole, preventing the use of a factory pin to reassemble the bracelet. Worst case scenario will result in the tongue of the clasp breaking off. In fact, the pin is in there so tight that if you don't properly support this tongue, you can actually snap it off when punching out the pin.

The star-shaped portion of this pin is located on the same side of the bracelet as the 9 o'clock position of the dial when it is attached to the watch. This will be the bottom of the clasp when the clasp is open and positioned so that the Rolex logo is upright and facing the watchmaker with the blades on the left, and the body of the clasp is to the right. You should drive the pin out from the 3 o'clock side of the bracelet towards the 9 o'clock side with the tongue of the blade firmly supported.

I have found this task to be very difficult with a normal bracelet pin punch and plastic block. In my experience, this pin is so tight that a stainless or blued steel pin will bend or break. When removing this pin I use a large, flat stump in my staking tool positioned just off to one side of a straight 1.0mm straight stake (Figure 1). The sturdiness of this stake is very effective in driving out the pin. I support the blade of

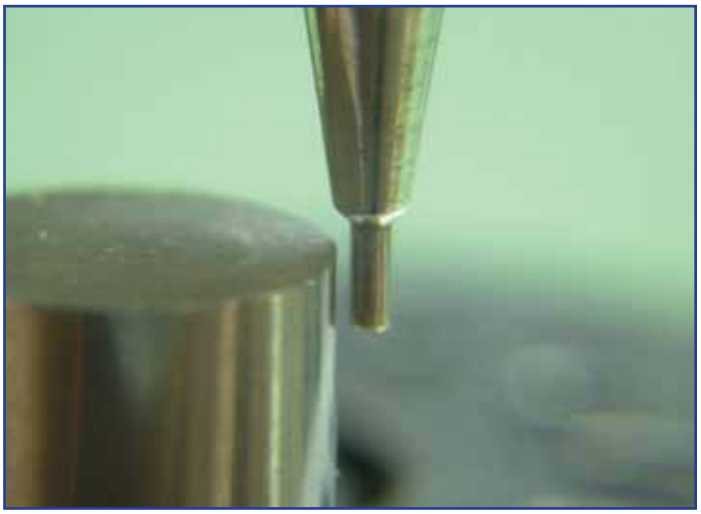

Figure 1

the clasp on the stump and drive out the pin using the stake (Figure 2). If you are using a stump with a polished surface, you should protect it with a vinyl sheet. (Whenever you use hardened steel tools, it is a good idea to wear safety glasses and to take great care). My straight stake is long enough and allows just enough clearance so that the pin can be driven out without any risk of bending or breaking the stake (Figure 3). If your stake has a faster taper

Figure 2

tips for working with the rolex 300 clasp pin

BY JORDAN FICKLIN, CW21

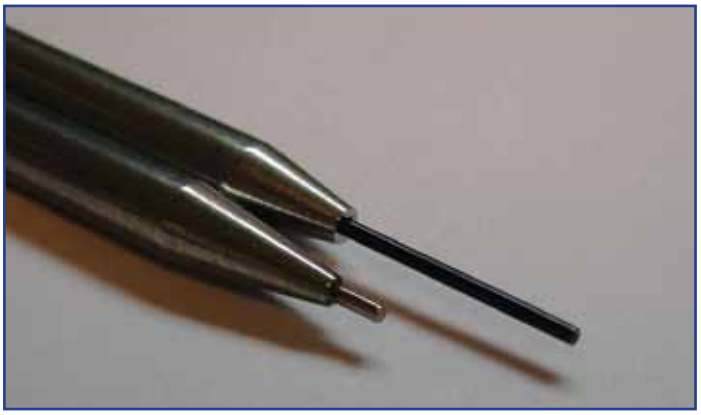

Figure 3

you may not find you have adequate clearance to perform this operation (Figure 4). You could alternately use a blue steel pin inserted into a flat stake with a hole, but it may bend or break. To reassemble the bracelet, follow the reverse procedure. You only need to move the pin until the star-shaped portion is free. It will gently push out once that connection is broken. ♦

Figure 4

BULLETIN BOARD SEPTEMBER 2011

Looking for Claude Reeve Original Clocks or Clock Designs

Claude B. Reeve of Hastings made at least 50 original clocks. One of his notable early models was the "Model Engineer Musical Clock" (1956).
J. Malcolm Wild, FBHI, is looking for any of the Reeve originals—or to speak with anyone who has constructed clocks from Reeve designs. This information is needed for a clock he is working on currently. (Please contact AWCI with your information.)

Need Parts List for Bulova Accutron 2186

Member Charles Burnett is searching for a parts list for 2186 with part numbers and any technical bulletins relating to removal and replacement of dial disks. Observation (without further disassembly) indicates the dial side differs little from other models with the exception of a bridge that supports the long dial side center wheel.

Please Help Identify this Movement

A member would like help identifying the vintage movement pictured below. It is from an 8-day wristwatch, the plate diameter being 30.4mm. He also needs to locate a center wheel to suit.

Please contact the *Horological Times* assistant editor if you can assist with any of these parts: jbilodeau@awci.com 866-367-2924, ext. 302.

DID YOU KNOW? You can get immediate feedback for the parts and info you need on the *AWCI Technical Discussion & Parts Forum*? Just go to www.awci.com and sign up to participate.

questions & answers

BY DAVID CHRISTIANSON, CMW21, FAWI

QUESTION:
I have a Geo Bransgrove London Pocket Watch and would like more information on it. I am assuming it is from the 1700s, but am unsure as I can find no further information regarding this watch.

Jonathan Morales,
Olympia, Washington

ANSWER:
The hallmark in your watch case tells us that the case was made by Thomas Bligh & William Linsley of 16 Great Sutton Street in Clerkenwell (WL/TB mark) in 1799 (the letter D mark). The case was assayed as sterling silver (the lion passant mark) at the London Assay Hall (the crowned leopard mark).

The movement is a common verge/fusee movement of the period with the equally common Tompion regulator and a rather whimsical grotesque mask engraved on the balance cock. As with most verge/fusee movements of the time, the movement has no pivot hole jewels.

The signature "George Bransgrove of London" does not appear in any of the lists of London watchmakers, which leads me to believe the signature is that of the retailer, wholesaler or distributor of the watch.

BY DAVID CHRISTIANSON, CMW21, FAWI

This is an intriguing account provided by the author of this regular column.

QUESTION:
An apparently English pocket watch by Thomas Russell & Son came across my bench recently that reflects an interesting story.

David Christianson,
Kendallville, Indiana

ANSWER:
Thomas Russell is listed as a watch manufacturer in 1848 and became arguably Liverpool's finest watchmaker at the time. In 1859 his sons, Thomas Robert and Alfred Holgate, joined the firm and the name changed to Thomas Russell & Son. In 1867, the firm split into two enterprises: Thomas Russell & Son, as a watch & chronometer manufacturer, as well as a wholesaler and importer of Swiss watches; and Russell, Ltd., as a retail jeweler. By 1870, they were both listed as makers to the Queen. By 1938, the watch firm became known as Thomas Russell Son Watch Company, Ltd. In 1994, both the retail side and the watch trade side of the original company closed their doors for the last time.

The movement in this watch turns out to be made by the Buren Watch Company of Buren, Switzerland (1932-1966). More specifically, it is a 43 millimeter (16-size) caliber 690, Model VN, specifically made to fit into an American case. According to La Classification Horlogere, it was in production in the 1930s. The watch movement is cased in a yellow gold-filled hunting case made by the Illinois Watch Case Company of Elgin, Illinois (not related in any way to either the Illinois Watch Company or the Elgin Watch Company). The case was embossed with the signature, "Thomas Russell & Son," by the case company for the firm of Thomas Russell & Son. The dial and movement are clearly marked "Swiss made." But this was not always the case with English-imported Swiss watches. With this information I can date this watch in the mid-1930s.

Times changed between the turn of the century and the 1930s when quality Swiss-made movements became more acceptable in England as the English watchmaking industry began its decline. To illustrate this change of attitude we can look at H. Williams, Ltd., of London. In 1916 H. Williamson, Ltd., a watch wholesaler/manufacturer advertised that they owned a watch factory in Buren, Switzerland, making the factory in Buren the only Swiss watch factory under English ownership and therefore they could claim that their watches were English-made watches (instead of Swiss imports, as they actually were). Alan Shenton reported in *Pocket Watches: 19th & 20th Centuries*, that even with this justification, they were still "accused of contravening the Merchandise Marks Act by using Swiss-made parts in their 'English-made' watches. They lost the case, details of which made feisty reading in the Horological Journals" at the turn of the century. H. Williamson, Ltd., of London owned the Buren watch factory from 1898 to 1932 at which time it became the Buren Watch Company.

BY WES GRAU, CMW21

In my quest for communication from the chapters, I received some interesting historical information from one of our senior members. I'd like to explain some historical aspects of guilds and affiliate chapters which our senior member has shared.

A guild is an organization of men and women engaged in similar work having a common interest. There were craft guilds in Europe going back as far as the Middle Ages. A guild brings workers together to consider problems of mutual concern and devise ways to solve them. Guilds include both the master craftsman and the apprentice or journeyman. They have also been friendly societies caring for their members in times of adversity.

As an example, the first American Guild in our industry was the New Yorker Uhrmachers Verein, organized on March 26, 1866 by German watchmakers in New York City. In their constitution and by-laws, they stated the group was interested in improving their knowledge through seminars and by sharing technical data. In the 1930s the group reorganized as The Horological Society of New York. In 1892 a group of Chicago watchmakers formed the American Horological Society. And in 1917, a group near St. Louis formed the Associated Watchmakers of America. Other similar groups were formed and eventually were gathered into two main groups, the United Horological Association of America (UHAA) and the Horological Institute of America (HIA). In 1937, the UHAA became a sustaining member of HIA. Through World War II, groups were mostly inactive with business being conducted only when necessary.

After the war, HIA grew into a powerful national organization with 2800 members and 20 guilds. One of these guilds was the Japanese guild with around 100 watchmakers as members. This group of Japanese watchmakers was later one of the charter members of the American Watchmakers Institute (AWI) when it was formed. The UHAA also continued to grow during this period. One of their conventions was attended by 800 individuals. Their activities were the foundation for the development of state and local guilds which grew to 69 affiliate chapters by 1956.

UHAA's representatives attended the HIA's conventions to begin discussion about the unification of the two groups. After close to 19 years of informal discussions, the two groups finally met in May of 1957 to formalize plans. At the charter convention June 18-19, 1957 in Chicago, there were delegates from 30 states including two delegates from Canada, ultimately increasing the charter membership from 1,835 individuals to 4,000.

In 1964, since there was no national convention, each affiliate chapter was invited to send a representative to the Board meeting. At the 1969 annual Board meeting AWI's Affiliate Chapters offered their suggestions to the AWI Board. In June of 1971 the first Affiliate Chapter Director, Mel Schmidt of Minnesota, was seated on the AWI Board. In 2000 there were 29 AWCI Affiliate Chapters and 10 years later in the year 2010 there were 21. There was a marked increase in Affiliate Chapter involvement during the years AWI was actively providing traveling bench courses. In those years the emphasis was on new technologies coming to market, e.g. Accutron, quartz, etc.

In closing, I would like to thank Fred Burkhardt for providing me with this information on our history. I would also like to ask members for input with any suggestions that might help the Affiliate Chapters provide benefits to AWCI members. Be sure to send me information about successful programs from your Affiliate Chapter: wgrau@awci.com

SHARE YOUR PHOTOS AND INFO ON YOUR MEETINGS WITH US!

To share information or events about your local Affiliate Chapter meetings, please contact: Jennifer Bilodeau, Assistant Editor, jbilodeau@awci.com 866-367-2924, ext. 302.

Minnesota Clockmakers Guild Events

The Minnesota Clockmakers Guild (MCG) held their October, 2011 meeting hosted by Jim Fiorentino's Black Forest Cuckoo Clock Museum. At the November meeting participants will hear about the repair of round three plate New Haven movements from Paul Engebretson. Richard Zielike will discuss the proper coordination of chime and bell train settings.

One of the walls full of cuckoo clocks at Jim Fiorentino's Black Forest Cuckoo Clock Museum.

Large air-stream calliope with animated dancers at the Fiorentino shop.

Clock Building Class Starts December 10, 2011

MCG is also holding a clock building class where participants can learn the skills and processes used in making clock plates and parts. This is a chance for you to learn how to make your own skeleton clock. You'll also learn hands-on techniques used in making other clock parts for repairs.

The clock is designed around the Hermle 340-021 movement with an 11 cm pendulum. You will need one of these movements for the wheels and pivots of the time train. (Ask fellow members for old units or check at flea markets and antique stores.)

Michael Dempsey, the class developer, has agreed to join MCG for one of the sessions and share the building process with us. The classes will be held in Hudson, Wisconsin at Paul Engebretson's shop on days that are agreeable with those participating. If you wish to register for this clock building class contact: Dean Ziegenbein, MCG Secretary, 952-322-4776, dpz72@hotmail.com.

Time For Laughs

A man died and went to Heaven. As he stood in front of the Pearly Gates, he saw a huge wall of clocks behind him. He asked, "What are all those clocks?" St. Peter answered, "Those are Lie-Clocks. Everyone on earth has a Lie-Clock. Every time you lie, the hands on your clock move." "Oh", said the man. "Whose clock is that?" "That's Mother Teresa's," replied St. Peter. "The hands have never moved, indicating that she never told a lie." "Incredible," said the man. "And whose clock is that one?" St. Peter responded, "That's Abraham Lincoln's clock. The hands have moved twice, telling us that Abraham told only two lies in his entire life." "Where's my Congressman's clock?" asked the man.

"It's in my office. I'm using it as a ceiling fan!"

LVMH: Watches and Jewelry Division Posts 26% Growth

LVMH Moët Hennessy Louis Vuitton has announced An increase in revenue for the third quarter of 2011. Recorded revenues of €16.3 billion ($22.4 billion) during the first nine months of 2011, an increase of 15% over the same period in 2010. Organic revenue growth was 15% after the currency impact was compensated by the structural change, notably the consolidation of Bulgari. With organic revenue growth, the third quarter showed a continuation of the year's positive trend. The momentum continued in Asia, Europe and the United States, while Japan returned to growth over the period.

Revenue by business group

In million euros	First 9 months 2011	First 9 months 2010	% Change first 9 months 2011/2010 Reported	Organic*
Wines & Spirits	2 306	2 148	+ 7 %	+ 11 %
Fashion & Leather Goods	6 189	5 464	+ 13 %	+ 15 %
Perfumes & Cosmetics	2 311	2 246	+ 3 %	+ 10 %
Watches & Jewelry	1 212	687	+ 76 %	+ 26 %
Selective Retailing	4 378	3 713	+ 18 %	+ 19 %
Other activities and eliminations	(93)	(48)	ns	ns
Total	**16 303**	**14 210**	**+ 15%**	**+ 15 %**

** with a comparable structure and constant exchange rates.*

The company reports its Watches & Jewelry division recorded organic revenue growth of 26% over the first nine months of 2011. The third quarter was marked by the successful public offer for the outstanding minority shares in Bulgari which is performing well across all product categories.

TAG Heuer enhanced its feminine product offering with a new jewelry extension to its Formula 1 line and has expanded its presence in Asia. Hublot continues the successful roll-out of the Classic Fusion collection. Driven by the excellent progress of its El Primero and Captain ranges, Zenith continues to demonstrate the strong appeal of its high-quality chronographs. The other jewelry brands, Chaumet, Fred and De Beers continued their positive momentum through their own store network.

Chelsea Clock Announces Two Appointments

Robert Ockenden, CMC21, Named Director of Repair & Restoration

Robert "Bob" Ockenden, who is an active AWCI member and frequent lecturer at AWCI national conventions, has joined Chelsea Clock as Director of Repair & Restoration. For more than forty years, Bob has been a nationally known and respected voice in the clockmaking industry. Bob has also served in various capacities on the Education, Strategic Planning, and Certification committees for AWCI. Prior or joining Chelsea Clock, Bob owned and operated Valley Clockworks, Inc., a Minneapolis-based shop specializing in the restoration of antique timepieces.

Douglas Mauch Named Vice President of Operations

Douglas "Bruce" Mauch has also been appointed as Vice President of Operations for the 114-year-old Chelsea Clock company. Mr. Mauch has held various positions at Chelsea Clock, most recently serving as Vice President of Supply Chain and Materials Management at the company.

Chelsea Clock was founded in 1897 in Chelsea, Massachusetts and is the oldest clock company in America. The chimes of the well-known Chelsea Clock Ship's Bell have long alerted U.S. Navy sailors and worldwide mariners to the time during their "watch." Today, Chelsea Clock continues to produce a broad range of nautical and heirloom quality clocks, from classic reproductions to contemporary timepieces. For more information visit www.chelseaclock.com.

AWCI 21st Century 2011 Certification Exam Schedule

Please visit AWCI's website for complete information.
December 5 - 8, 2011 - OSU Institute of Technology, Okmulgee, OK
December 12 – 15, 2011 - St. Paul College, St. Paul, MN

AWCI Academy of Watchmaking Class Schedule 2012

All classes qualify for 5 CEU's

Jan 9 - 13	Basic Quartz Watch Repair
Jan 30 - Feb 3	Modern Automatic Watches
Feb 13 - 17	Modern Mech. Chronograph 7750/7751
Feb 20 - 24	Advanced 21
Mar 5 - 9	Polishing & Refinishing
Mar 12 - 16	Balance Staffing & Timing
Mar 19 - 23	Advanced 21
Apr 9 - 13	Lever Escapement
Apr 16 - 20	Advanced 21
May 21 - 25	Advanced 21
Jun 11 - 15	Basic Watch Repair
Jun 18 - 22	Advanced 21
Jul 16 - 20	Polishing & Refinishing
Jul 23 - 27	Advanced 21
Aug 27 - 31	Advanced 21
Sep 10 - 14	Advanced 21
Sep 17 - 21	Modern Mech. Chronograph 7750/7751
Sep 24 - 28	Modern Automatic Watches
Oct 15 - 19	Advanced 21
Nov 12 - 16	Advanced 21

AWCI advanced 21

In 2012, AWCI will offer all CW21 holders a special series of continuing education courses focusing on the service procedures of specific high-grade mechanical watches. Look for more information coming soon.

5-day block: $875.00 * 3-day block: $525.00 * All classes held in Harrison, OH

TO REGISTER FOR CLASSES OR EXAMS, please call toll-free 1-866-FOR-AWCI (367-2924), ext. 303 or e-mail Daniela Ott: dott@awci.com.

SIGN UP EARLY!
We reserve the right to cancel a class if there are less than six participants signed up 30 days prior to the first day of class, so we encourage you to wait before making travel or hotel arrangements until this deadline has passed. If in doubt, please contact Daniela Ott at 866-367-2924, ext. 303. Should a class be cancelled due to lack of participation, the fee will be returned the same way you paid (i.e., credit on your credit card or check). Or if a class is offered again later during the year, you have the option to transfer to that class. You can also transfer the fee to another class if space is available. Information is available online at www.awci.com. This schedule is subject to change. Seats may become available for the classes; please contact AWCI to be added to waiting list.

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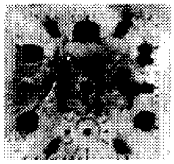

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