# HOROLOGICAL™ TIMES

**VOLUME 34, NUMBER 1, JANUARY 2010**

*Official Publication* of the
*American Watchmakers-Clockmakers Institute*

**EDITORIAL & EXECUTIVE OFFICES**
American Watchmakers-Clockmakers Institute (AWCI)
701 Enterprise Drive
Harrison, OH 45030
Toll Free 1-866-FOR-AWCI (367-2924)
or (513) 367-9800
Fax: (513) 367-1414
E-mail: awci@awci.com
Website: www.awci.com
Office Hours:
Monday-Friday 8:00 AM to 5:00 PM (EST)
Closed National Holidays

Managing Editor & Advertising Manager
**Donna K. Baas**

Associate Editor & Design Associate
**Katherine J. Ortt**

Executive Director/Education & Technical Director
**James E. Lubic, CMW21**

Operations Director
**Thomas J. Pack, CPA**

Watchmaking Instructor/Certification Coordinator
**Thomas D. Schomaker, CMW21**

Membership Coordinator
**Sharon McManus**

Education Coordinator
**Daniela Ott**

Receptionist/Technical Support
**Sally Landis**

IT Director
**Jim Meyer**





*HOROLOGICAL TIMES* (ISSNO 145-9546) is published monthly and copyrighted by the American Watchmakers-Clockmakers Institute, 701 Enterprise Drive, Harrison, OH 45030-1696. Subscription price for the public is $137.00 per year ($8.50 per copy). Members subscription is $70.00 which is included with annual dues of $137.00. Periodicals postage paid at Harrison, OH 45030 and additional entries. POSTMASTER: Send address changes to *HOROLOGICAL TIMES,* 701 Enterprise Drive, Harrison, OH 45030




# CONTENTS



**COVER**
This month's cover features the Seiko Spring Drive Chronograph SPS001



# President's Message

**By Mark Butterworth**

I wish to take this occasion to wish everyone a very Happy New Year. There is always something about putting up a new calendar that gives us hope. We hope things will be better. We make some New Year's resolutions. The late physicist Carl Sagan once stated there was only one thing he could guarantee about the future—given enough time, all things change. In our business world as well as the scientific one, the key phrase is "adapt or die." Another great physicist, Albert Einstein stated, "The definition of insanity is to continue to do that same thing but to expect different results." If we have changing business conditions, we need to try to predict if these are temporary due to the current economic recession, or if there are permanent changes that have occurred.

As an example in the clock world, we went through a period of thirty years from 1970 to 2000 in which sales of mechanical clocks flourished. After that time, not only did clock sales slow, but there was a change in the mix of mechanical and quartz in the wall and mantle clocks. Today, about 80% of the sales are quartz. Part of the explanation is that there was a great improvement in the sound of the chiming quartz units. It is also true that the quartz is less expensive. However, I think there is also a generational difference in that many simply do not want to take the trouble of winding, adjusting, and maintaining the mechanical clock. What does that mean for us? If we are retailers, it means we recognize there is a change in demand. Folks will still want clocks, not just to tell the time, but as pieces of furniture or accent pieces. They may just not be mechanical clocks and we may need to stock our shelves accordingly. As repairers, our world is still bright, just different if we are willing to adapt. There are many customers wanting to have the mechanical clocks they already own restored or repaired whether they are antique or modern. It goes without saying that many of the clocks which had quartz units at the time of purchase will have need for our service either because of the expensive original cost or that fact that it may have sentimental meaning. We have a new class of candidates for our business. These are people who may have been given a 31-day clock as a gift, inherited the depression-era electric, or love their mechanical clock [case] but do not want to fiddle with its winding or maintenance. Maybe they are not physically able to do so any longer, or financially able to do the needed repairs. Do we act as a purist who refuses to do nothing other than a restoration of the existing unit, or do we adapt to the wishes and sometimes needs of the owner of the clock by doing some type of quartz retrofit?

This is a time to reflect on our business practices, to ask ourselves if there is anything that made sense 1, 2, or even 5 years ago that no longer is valid or justified under current conditions—our lease agreements, mall space, advertising, telephone, etc. This is the time to look at our expenses line by line to see what, if anything, should be changed. Are there types of repairs or services we perform that really are not profitable? This may be the opportunity to do some time studies to find out how many hours are actually spent at a given task and if we are charging accordingly. We need to ask if there is a demand for some type of service we are not providing but could be profitable. It might be outside our

Continued on page 15.

# Executive Director's Message

By James E. Lubic, CMW21

I hope everyone had a wonderful Christmas and Holiday Season. Now it's time to get to work on those New Year's resolutions. If you had trouble coming up with any resolutions for this year I would like to help you with some ideas.

If you don't do so throughout the year you should look at your pricing structure for repairs. Make a resolution to monitor what your turndown rate is on various repairs that you quote to customers. Many of you may know this already, but for those of you who don't…a good rule of thumb when monitoring your turndown rate on repairs is 20/80. You want to set your prices so that 20% or 2 in 10 customers walk out your door without leaving the repair because the price you quoted is too high in their opinion. I know watchmakers and clockmakers want to be heroes and repair everything that walks through the door, even though we all know better. Don't be a hero be a smart business person. Don't be afraid to set your own supply and demand line. If your backlog is too long using the 20/80 approach, jump it up to 30/70. You might be surprised at the results.



Take some time to clean up your shop, and get organized. Trade those shoe boxes in for proper cabinets. You will feel much better about yourself and your business. Don't be shy about projecting a professional image through your appearance. Invest in one new piece of equipment for your business. It could be a computer, computer upgrade, software, or test equipment. Stay current with technology. Someday you will want to retire. A clean organized and up-to-date business can easily be sold to supplement your retirement. A dirty, disorganized, outdated business usually ends up closing and the contents selling for pennies on the dollar, and that just isn't right when you've worked so hard for all those years.

Reward yourself and take a vacation this summer, how about August 4th through 8th to Covington, KY/Cincinnati, OH for the AWCI 50th Anniversary Annual Convention and Educational Symposium. The Convention Committee is busy putting together another fantastic Convention. Soon we will have all the details here in the *HT*.

Get certified, or upgrade your current certification. If you're hoping to upgrade, hopefully you have already registered to do so. The Twenty-First Century Certified Watchmakers (CW21) exam has become the industry standard. Those of you with Rolex spare parts accounts will need to become AWCI CW21s by December 31st of 2010. Don't procrastinate as we can examine 120 per year, meaning space is going to be limited. I encourage you to add certification to your to-do list for 2010. Please see the certification exam schedule on page 33, or on the web at www.awci.com

Twenty-First Century Certified Clockmaker (CC21) exam is also available. You can read the Clockmaker's Standards & Practices at www.awci.com. There you will learn about what is required and how the exam is administered. If you have any questions about clockmaker certification please e-mail me at jlubic@awci.com, or call me toll free at 866-FOR-AWCI (866-367-2924), extension 310.

Continued on page 15.

# Questions & Answers

By David A. Christianson, CMW21, FAWI

**Question**

I can't find any information on this Longines pocket watch. I hope you can help.

*Andrew Ohr*
*Wallingford, CT*

**Answer**

Your Longines pocket watch is a later version of the earlier Longines L20B movement that was originally produced about 1870-85. But I imagine you are as much interested in the honors listed on the inside cover (the cuvette) of the case as you are of the watch itself.

By 1889 the Longines Company had won a number of gold medals at several international exhibitions and observatory timing competitions. In 1889 Longines received the Grand Prize at the Paris Exhibition. Longines celebrated these impressive achievements by placing images of them on their watch cases to remind the buyer that the watch they had purchased was a fine quality watch from an award-winning, internationally renowned watch manufacturer. Your watch was not the winner of the Paris competition, but was made by the same company that had made the winning watch.

From your photograph your watch looks like it is cased in a niello case. Niello is a black or dark blue background highlighting an engraved pattern. A mixture of lead, silver, copper, sulfur and ammonium chloride is fused into a deeply engraved silver watch case by firing in a furnace to give a distinctive contrast to the engraved pattern (much like enameling). It can be used on other metal cases, but is usually done on silver. Niello cases appeared in the early 1900s about the time that Art Nouveau and Art Deco were popular. Longines was noted as a prominent designer and marketer of niello. From this information alone I can date your watch to early 1900s.



# Countdown to the Fiftieth

By Terry Kurdzionak
Convention Committee Chairman

Happy New Year everyone! 2010 marks the 50th anniversary of the AWCI. We will officially celebrate at our annual Convention and Educational Symposium, August 4-8, 2010.

In 1960, The Horological Institute of America merged with the United Horological Association to form the American Watchmakers Institute. The Board of Directors voted to change the name to the American Watchmakers-Clockmakers Institute in 1992. The acronym, AWI, was the official reference for the organization until 2004 when the Board of Directors voted to change it to AWCI.

The annual convention will return to the Greater Cincinnati area to bring the celebration back to the region where the organization got its start. Our convention committee is working closely with the event planners from Stellar Meetings and Events (NJ) to put on a convention, educational symposium and vendor fair to satisfy the needs of all of our members.

Mark your calendar now. Look ahead to set aside time from your work to attend this convention. If you think it will interfere with your family time, then bring the family. There will be many activities for all to enjoy.

Each succeeding issue of the *Horological Times* will detail more information about this important event. Stay tuned!

# 35 mm Precision Work Spindles

By J. Malcolm Wild, FBHI

Reprinted Courtesy of the BHI *Horological Journal* (June 2009)

The 35 mm work spindle was brought to my notice by Derek Pratt. These are often termed as de-mountable spindles or quills and were used in the Swiss toolmaking industry. Work is held in either the chuck, collet or faceplate and can be transferred from machine to machine without the necessity of removing the work from its work holding, therefore complete accuracy would be maintained. Figure 1 and Figure 2 show the quill holder mounted on the Schaublin 70 lathe. Originally a special headstock was supplied which was shorter and gave more room for the cross slide and tailstock, Figure 3. Note the drive from the headstock; a catch plate with driving pin is fitted to the rear end of the spindle shaft and a slotted faceplate mounted on the Schaublin 70 lathe headstock, Figure 3a. This arrangement ensures there is no sideways thrust on the spindle/quill when in position. The original Schaublin drive was similar to an Oldham coupling, (i.e. a male and female key arrangement). You will see there is a space between the carrier to allow room for the end of the drawbar. It had always been my belief that the bed of the 70 should have been made another 50 mm longer, which would have been an advantage, giving more room for the cross slide, tailstock, etc. Various 35 mm diameter work spindles were produced, some with plain nose and machined to accept standard collets such as W8 and W12. Others had the collet facility plus the spindle nose threaded to accept chucks.

Other sizes of quill were available. The 25 mm spindle was used on the vertical slide in conjunction with the Isoma microscope, Figure 3b. Also on the lever feed tailstock the barrel can be replaced with a high-speed spindle for the precision drilling where higher accuracy of contra-rotating of work and drill is required, the spindle being driven by the overhead drive, Figure 3b.

Another more expensive variation was the faceplate with dogs. This was a standard accessory for the Hauser Jig Borer No 1, Figure 4. As with the faceplate and pump center supplied with watchmakers lathes, this accessory is most useful when working on watch plates for jeweling, etc. At least four machines that I have seen have the facility of accepting this particular size of spindle, the Schaublin 70 Lathe (already shown in Figure 1), the Aciera No 1 Milling Machine, the Hauser No 1 Jig Borer and the Dixi Wheel and Pinion machine. Figure 5 shows the Aciera No 1 Milling Spindle with the spindle mounted in the horizontal position with a notched plate fitted for dividing. This spindle also takes the worm and wheel dividing attachments. In Figure 6 the spindle is mounted vertically

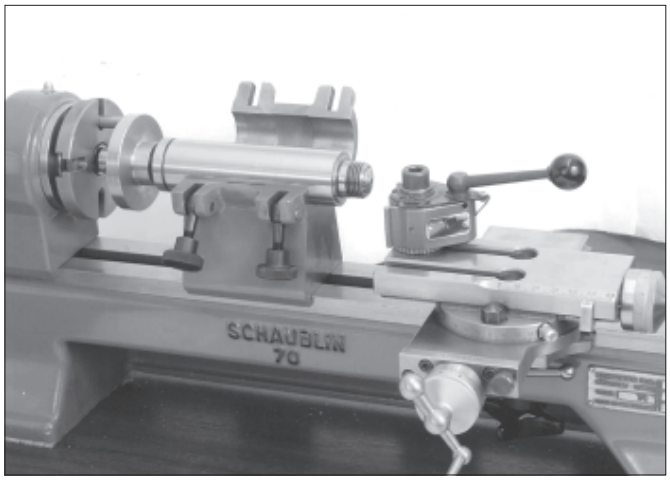



*Figure 1*

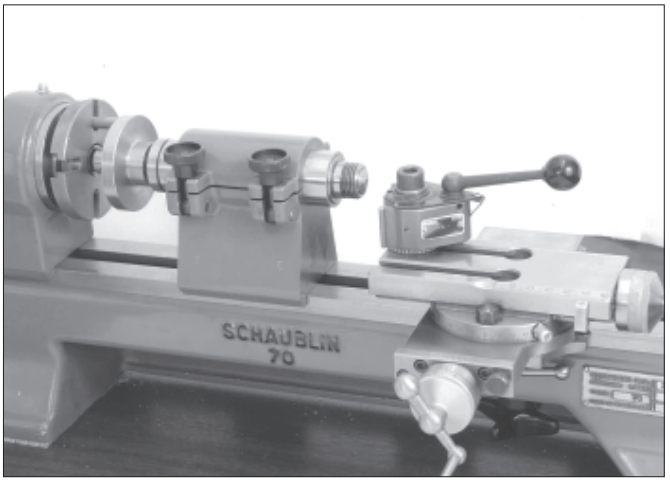


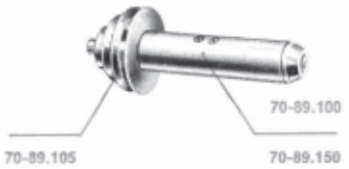

*Figure 2*

## BED ACCESSORIES (CONTINUATION)

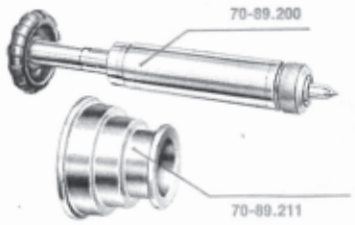
**Hinged quill holders,** height of centre 70 mm (2¾")
(fix on bed by means of 2 eccentric clamping pins)

| Item No. | Bore dia. mm (in.) | Length mm (in.) | For quill item No. (see below) | Weight kg (lbs) |
|---|---|---|---|---|
| **70-89** | 25 ( .985) | 100 (3¹⁵/₁₆) | 70-89.100<br>70-89.150 | 2.300 (5.071) |
| **70-89.010** | 35 (1.378) | 100 (3¹⁵/₁₆) | 70-89.200 | 2.300 (5.071) |


**70-89.100 Quill of 25 mm (.985") dia. for maximum speed of 4000 rpm with spindle for collets type B 8** (see page 35)
(fits in quill holder 70-89 above)
2-groove pulley 70-89.105 for round belt dia. 6 mm (¼")
Diameters of pulley steps: 44/55 mm (1¾/2³/₁₆")
Supplied with:
1 drawbar for collet type B 8
Weight: .640 kg (1.411 lbs)




**70-89.150 Quill of 25 mm (.985") dia. for speeds of up to 15 000 rpm** with spindle for collets type B 8 (see page 35) mounted on precision taper-roller bearings (fits in quill holder 70-89 above)
2-groove pulley 70-89.105 for round belt dia. 6 mm (¼")
Diameters of pulley steps: 44/55 mm (1¾/2³/₁₆")
Supplied with:
1 drawbar for collet type B 8
Weight: .640 kg (1.411 lbs)




**70-89.200 Quill of 35 mm (1.378") dia. for maximum speed of 3000 rpm** with spindle for collets type W 12 (fits in quill holder 70-89.010 above)
Supplied with:
1 male centre 70-25.001 (see page 22)
1 drawbar 70-89.205 for collet type W 12
1 protective nut 70-25.180 for spindle nose (see page 28)
(without pulley—see accessories below)
Weight: 1.100 kg (2.425 lbs)

*Figure 3a*

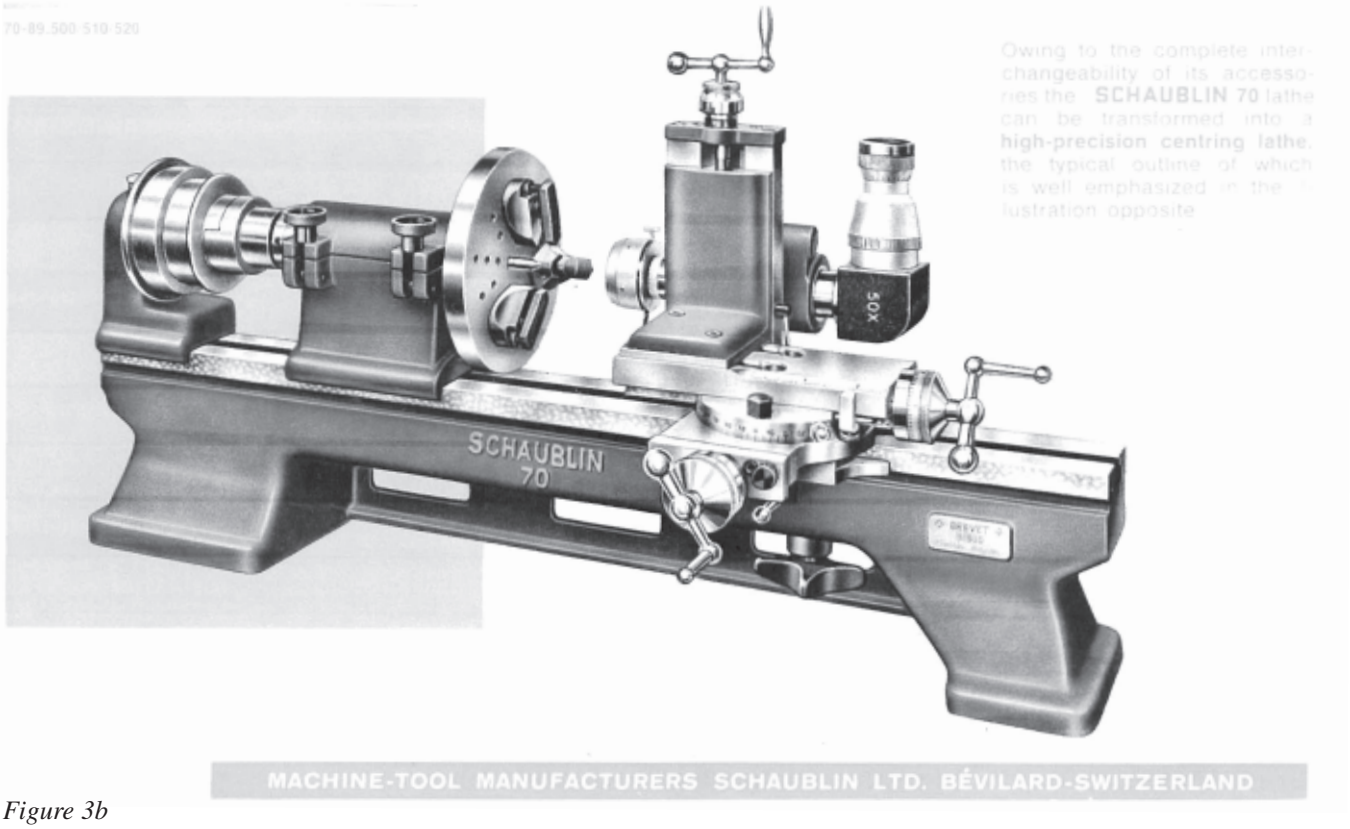



*Figure 3b*

with the 3-jaw self-centering chuck. Dixi manufactured a very neat wheel and pinion cutting machine, which is shown in Figure 7. Again this machine had the facility for holding a 35 mm quill. The machine shows the hinged headstock. Note the head on this machine can be swung 90º to present the work in the vertical plane.

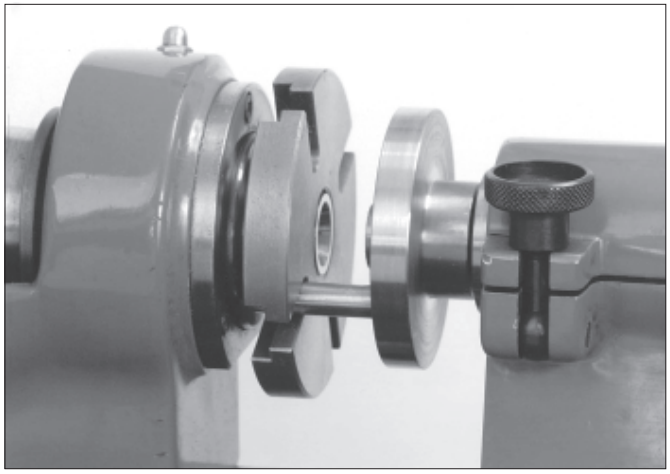


*Figure 3c*

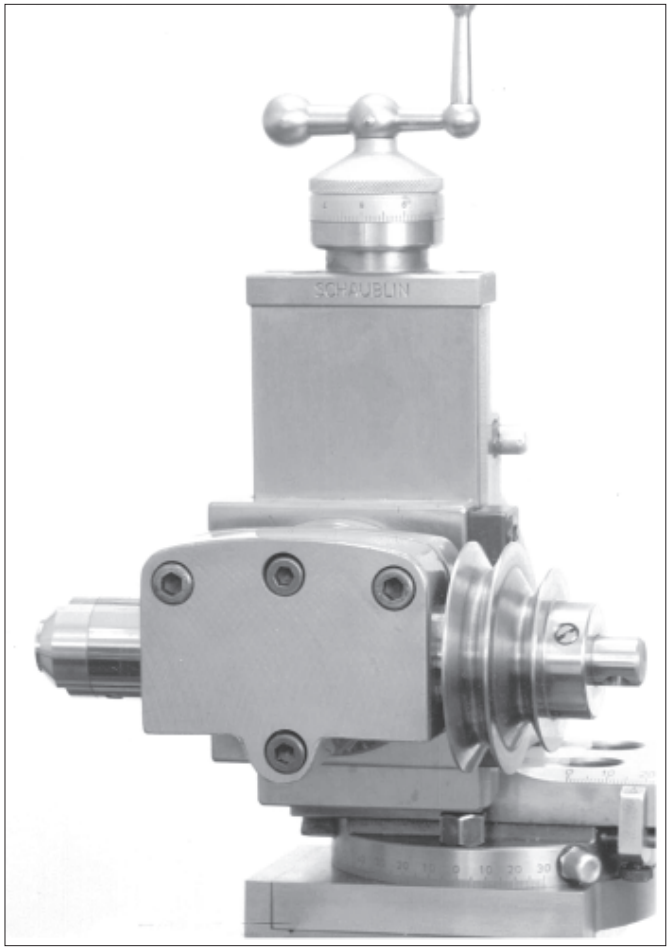



*Figure 3d*

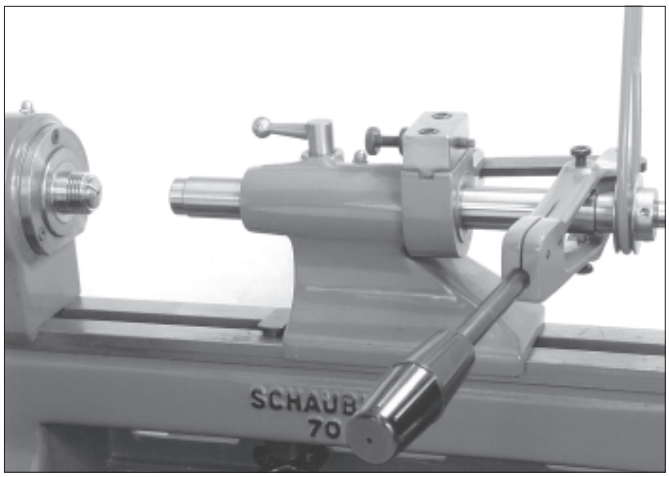



*Figure 3e*

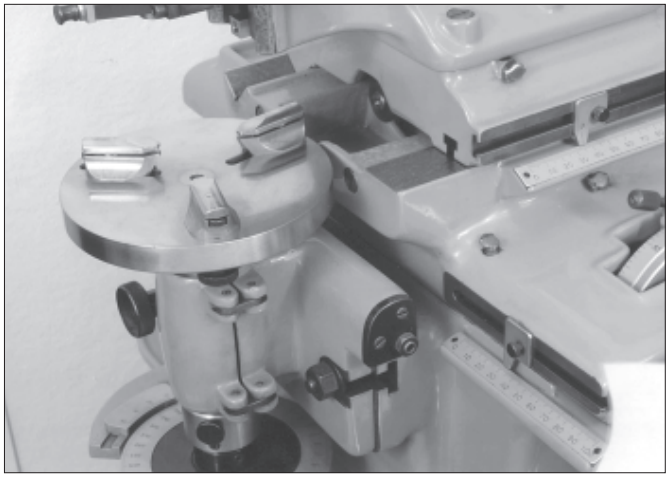


*Figure 4*

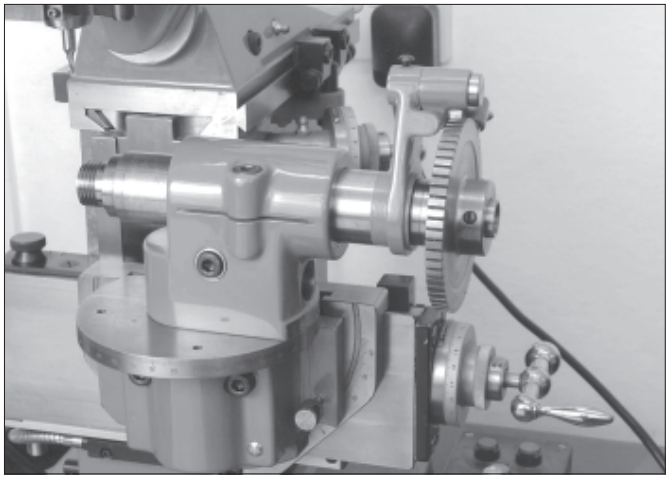


*Figure 5*

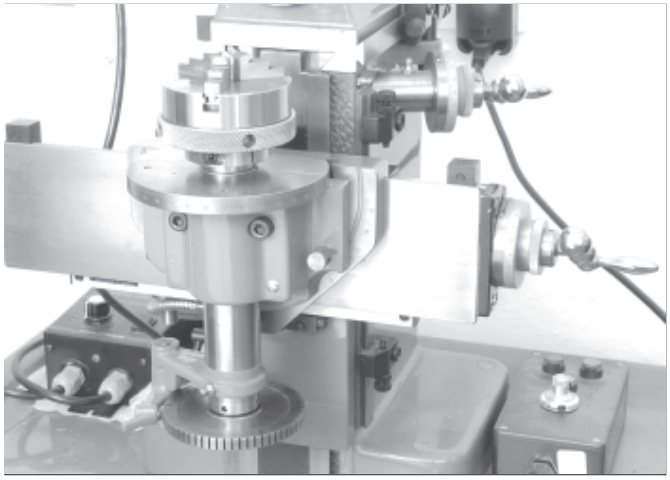


*Figure 6*

*Figure 9*

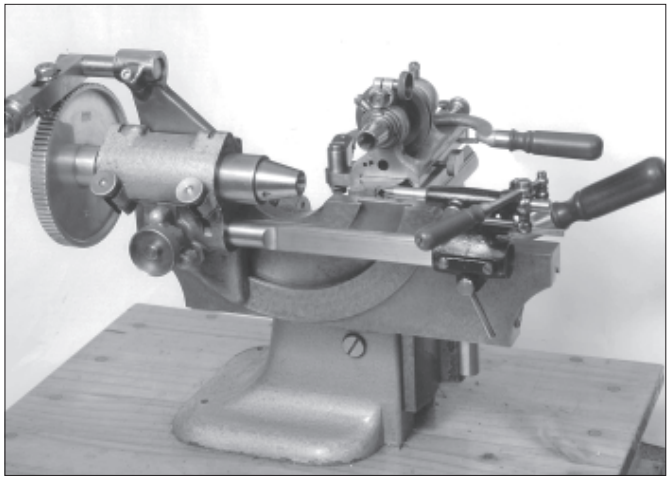


*Figure 7*

For anyone carrying out accurate machining, making parts for watches and clocks, this system is ideal. Obviously now machining methods have moved on, CNC machining has taken over for mass production, but for anyone working in a small machine shop carrying out jobbing work this is an excellent way to produce accurate components. Turning, milling and drilling can be carried out without removing the work.

The Quill Holder shown in Figure 1 and Figure 2 and manufactured by Schaublin is no longer available.

Sometimes these can be found on the second-hand market. The 35 mm spindles are still available, manufactured by Gepy and others, but these are extremely expensive.

With this in mind I made a small batch, which worked out much cheaper than their Swiss equivalent. Figure 8 shows the component parts; both inner and outer shaft were hardened and ground, and the bearings are combined needle and angular contact. These bearings were used on the Aciera Quill that I manufactured some three years ago.

They can be pre-loaded and small in diameter and make an excellent spindle, Figure 9. A threaded nose, the same as the Schaublin 70, was included to enable chucks and faceplates to be used and a drawbar was also made up to suit W12 collets.

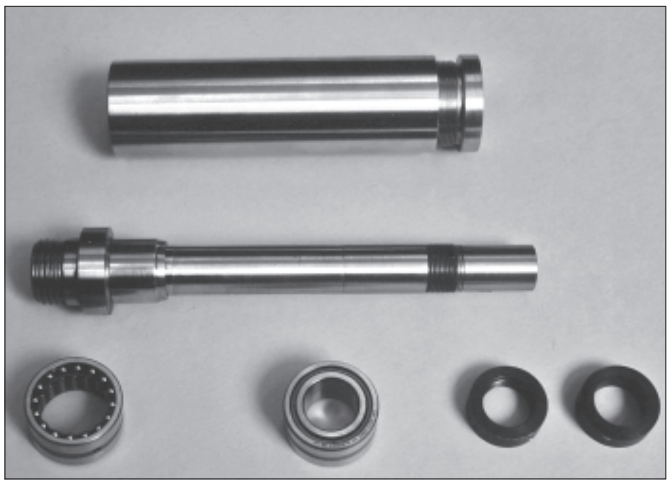


*Figure 8*

# Breitling Chronograph Push Button Repair Technique

By Dale LaDue, CMW

Author's Preface: It is common practice to replace broken or worn parts when available. Cost is always a factor and replacement is certainly efficient and less costly in most cases.

If I repair a worn part of a bridge, mainframe, or any integral component that can be purchased independently or through factory or authorized service facilities, I am demonstrating a technique. Parts replacement is watch repair. Sending a watch back to the factory is watch repair. Making a part is watch repair. Nothing in this realm of watch repair can compare to the satisfaction of machining a part correctly. The process of using your mind to ponder the situation, your hands to direct the tool and your eyes to scrutinize and gauge your progress to completion are the culmination of learning and developing techniques.

I believe those who find my articles interesting are not concerned that the part may or may not be obtained, but the technique to solve a problem.

As a young watchmaker, I learned the basic techniques at Gem City School of Horology. However, the writings of Henry Fried, Jesse Coleman, William Samelius, William O. Smith Jr., Orville Hagans, Archie Perkins, Robert Porter and other AWI technical writers broadened my knowledge. AWI/AWCI bench courses furthered my skill levels.

The current vintage watches will be antiques, and today's modern watches will be vintage watches and considered unrepairable by factory service centers. I sincerely hope that a technique I use on an available part will be utilized by a watchmaker 30 or more years from now on an unavailable part.

*Dale LaDue*

A Breitling chronograph was brought into my shop to have a missing chronograph push button replaced. Figure 1 shows a fine example of a 1960s or 1970s vintage watch. A closer look at the push button, Figure 2, shows the gasket that seals against a cap. The cap and internal return spring were missing. The only push buttons I had were the serrated style, which have internal O-ring gaskets that seal against the push screw shaft and the button tube.


*Figure 1. A Breitling vintage chronograph missing a push button cap and spring*

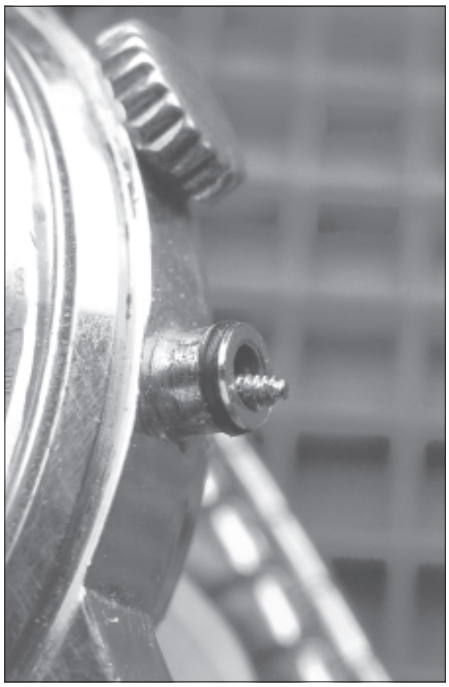


*Figure 2. A close view of the case tube and its gasket*

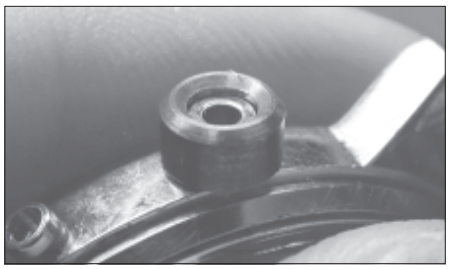


*Figure 3. A bronze clock bushing was bored out to slip over the tube gasket.*

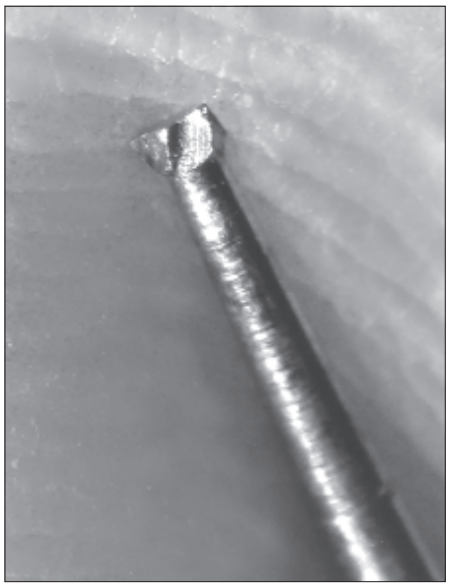


*Figure 4. The top half of an old round dental burr was ground away.*

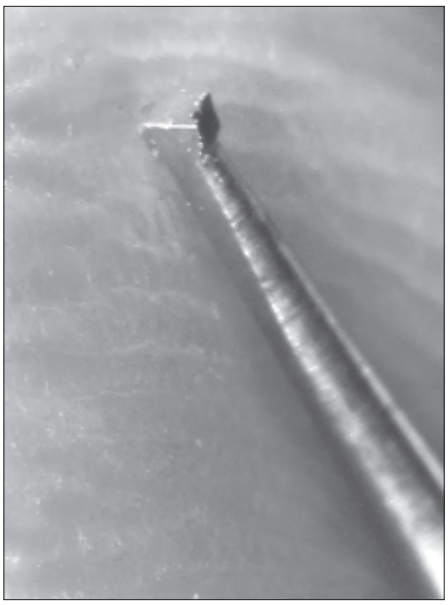


*Figure 5. One side was also ground away to create clearance while boring the inside wall.*

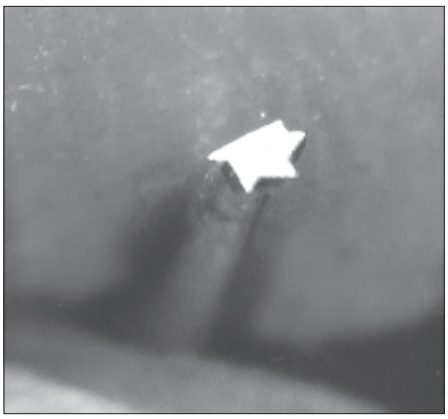


*Figure 6. A top view of the altered burr*

I carefully tried to remove the original tube but it was held securely without any indication that it was screwed into the case.

I decided to use the existing tube and alter a cap in my stock assortment of push buttons. A bronze clock bushing was bored out to fit tightly but move smoothly over the tube gasket, as shown in Figure 3.

I used a round dental burr approximately 0.75 – 1 mm in diameter. Figure 4 indicates the width of the burr as compared to a human fingerprint, which has a width between the groove that average 0.5 mm in width. I altered the burr by grinding the ball in half horizontally then lengthwise to expose a cutting edge (Figures 5 and 6).

A serrated cap was mounted in the lathe and the boring "burr" was held in the slide rest as shown in Figure 7. The internal serrations are evident in close-up Figure 8. The serrations were removed by boring down to the roots leaving a smooth inner surface and an ample wall thickness (Figures 9 and 10).

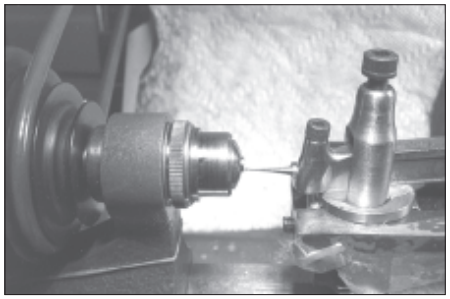


*Figure 7. The burr was held in a table rest.*

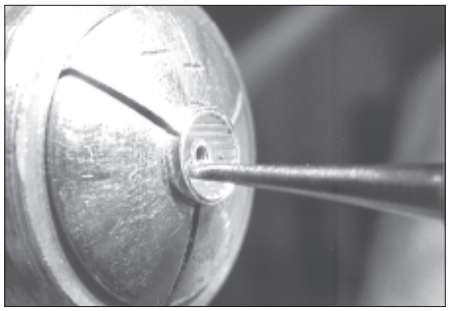


*Figure 8. A close view of the burr inserted in the cap and adjusted to cut on center.*

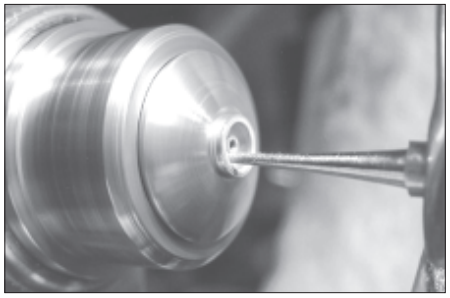


*Figure 9. Very fine cuts were taken to remove the internal serrations.*

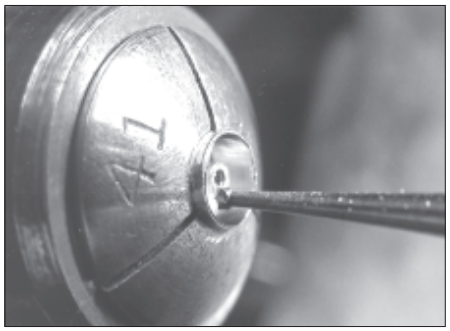


*Figure 10. A fine cut finish was created inside the cap.*

A mandrel was turned true on a brass rod that the bronze clock bushing could be firmly pressed on and held true, Figures 11 and 12. The outside diameter of the bushing was turned down true to the inside diameter of the cap, Figure 13. The button cap was frequently tested for a firm slip fit until it would slip about halfway onto the sleeve, Figures 14 and 15.

A fine tweezer was used to wedge the sleeve and button cap off the mandrel as shown in Figure 16. Notice in Figure 17, the substantial wall thickness of the cap and the sleeve, which when combined will provide adequate structural soundness.

A piece of transparent tape was put over the die plate of a staking tool to protect the cap end from becoming marred. The sleeve was coated with red

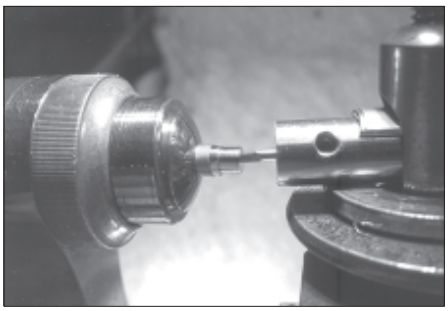


*Figure 11. A mandrel was turned true to a diameter that fit firmly inside the bronze bushing.*

*Figure 12. The bushing was pressed onto the mandrel.*

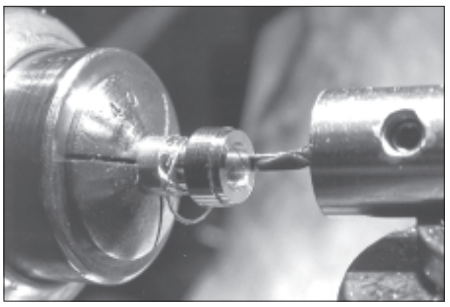


*Figure 13. The bushing outside diameter was turned down true to a press fit inside the new cap.*

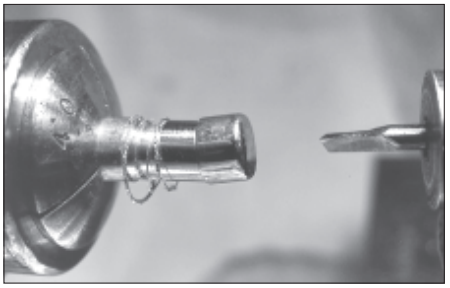


*Figure 14. The sleeve was tested for fit in the cap.*

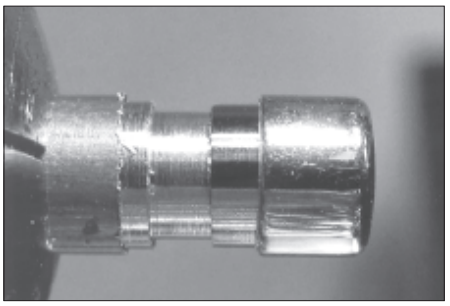


*Figure 15. A final test fit of the sleeve and cap*

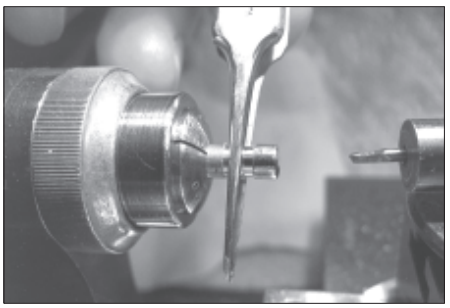


*Figure 16. The sleeve was removed from the mandrel by wedging fine tweezers between the brass rod and sleeve.*

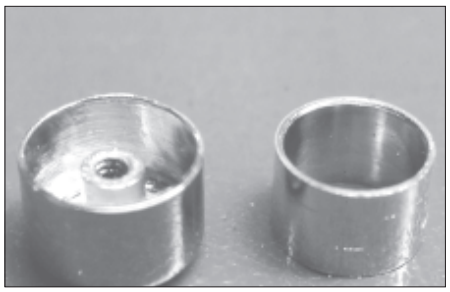


*Figure 17. A view showing the substantial thickness of both the cap and sleeve.*

*Figure 18. Red threadlocker was applied to the sleeve as it was pressed in place.*

*Figure 19. The sleeve was fully pressed into the cap.*

permanent threadlocker and immediately pressed into the cap with a stake as shown in Figures 18 and 19. The assembled cap and sleeve was inserted in a properly sized collet in the lathe. The extra length of the sleeve was then turned flush with the cap lip, Figure 20.

Previous to inserting the sleeve into the cap, the inside surface was polished. Figure 21 depicts a toothpick being slit

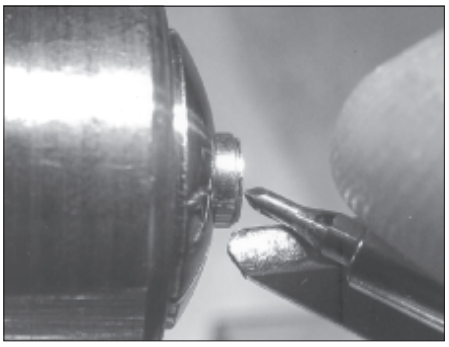


*Figure 20. The sleeve was slightly longer and was turned flush with the cap.*

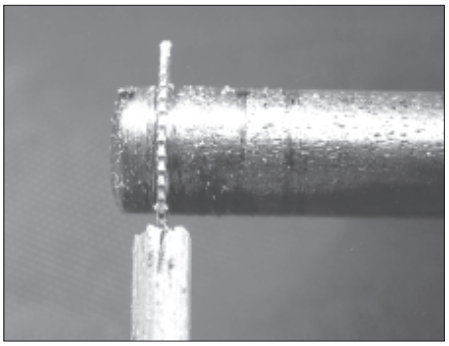


*Figure 21. Before inserting the sleeve into the cap, a toothpick was slit using a circular saw on a mandrel.*

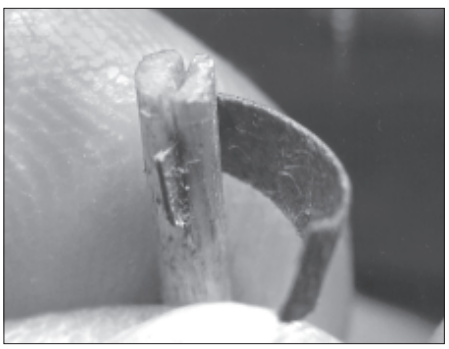


*Figure 22. A strip of 4/0 emery paper was superglued in the slot.*

by a saw on a mandrel, which could have been accomplished with a fine blade jeweler's saw as well. A small strip of 4/0 emery paper was superglued in the slot and wrapped around the end, Figure 22. The coiled strip was inserted in the cap and the lathe was spun in the direction of the coil, Figure 23. The polished inside surface is shown in Figure 24.

The new pusher spring was too large to fit inside the original tube, Figure 25. I found a spring from a large diameter spring bar that fit inside the tube.

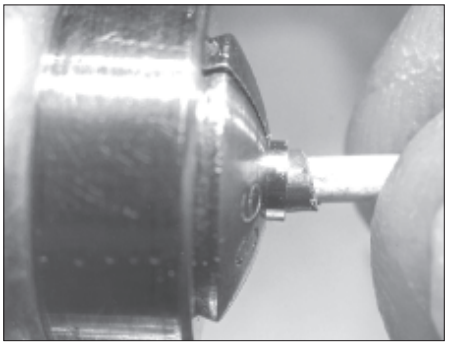


*Figure 23. The emery paper was coiled around the toothpick and inserted inside the sleeve as it spun in the lathe.*

*Figure 24. A view of the polished inner wall of the new cap*

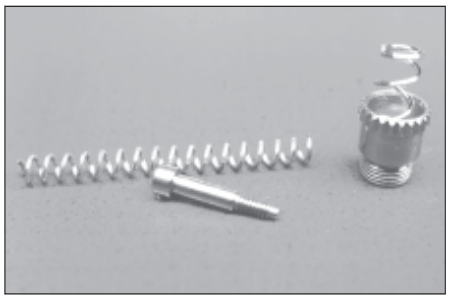


*Figure 25. The unused serrated tube and spring next to the push screw and spring from a large diameter spring bar*

*Figure 26. The spring inside diameter was too small.*

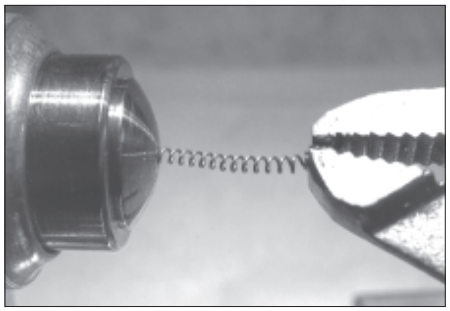


*Figure 27. The spring was uncoiled.*

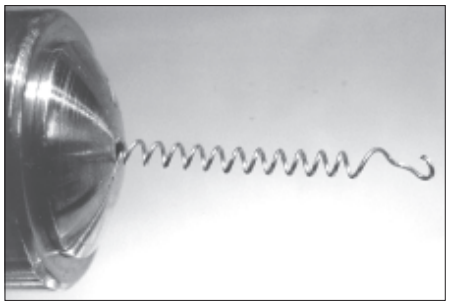


*Figure 28. The spring inside diameter was increased.*

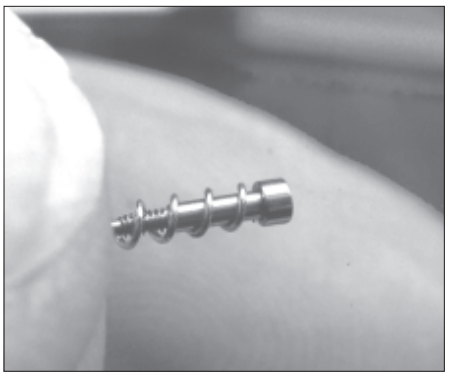


*Figure 29. The push screw inside the spring*

*Figure 30. The relative positioning of the new spring and screw*

However, it did not fit over the pusher screw, Figure 26. I was able to open the diameter enough to fit over the screw shoulder. The spring end was held in a collet in the lathe head and the other end was held in the jaws of pliers, Figure 27. The lathe was turned by hand in the direction that would uncoil the spring. Figure 28 shows the spring uncoiled and Figure 29 shows the pusher screw shoulder slipped into the spring coils. The spring was cut to the proper length. Figure 30 depicts how the spring, screw and tube relate to each other, albeit the serrated tube is shown. The end coils were bent down flat to prevent cut ends from binding or cutting into the cap or tube. The new cap and its screw and spring were tested for a smooth fit and positive function. Figure 31 shows the new cap installed on this fine example of a vintage chronograph.

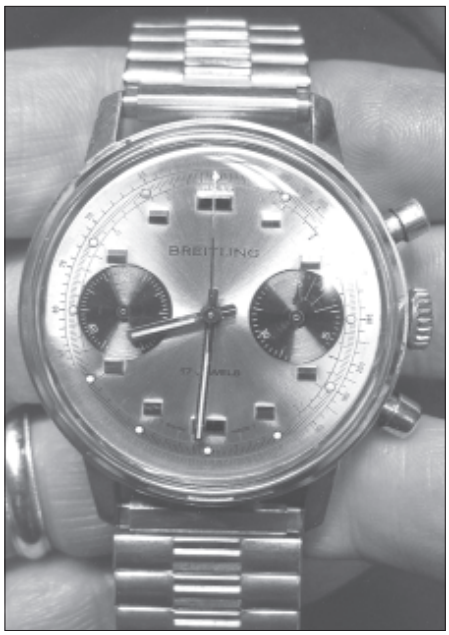



*Figure 31. The finished cap installed on the Breitling chronograph.*

## President's Message
Continued from page 2

normal routine, such as the clock repairer offering battery changes on quartz watches. Yes, it might require some tooling and instruction, but if this is not offered in your service area, the payout could be good. Maybe it is the watchmaker offering movement change-outs on clocks. The current saying is "think outside the box." It may be that not all or even any of the brainstorming ideas will make sense to your situation, but as Thomas Edison once stated, "At least we know what does not work."

Hopefully some of these thoughts will cause us to rethink and, if nothing else, reconfirm our business practices.

## Executive Director's Message
Continued from page 3

If you haven't already done so, contact each of the AWCI member benefits providers. Get a quote for health insurance from Health Benefits Provider, (800) 450-3040, get your own website through Walker Development's Site Creator. They can be contacted at (513) 753-6610. Contact First National for a quote on processing your credit card transactions. If you don't presently accept credit cards, First National can get you started. First National can be contacted at (800) 354-3988. We also have a partner providing business insurance, and shipping programs for you and your customers' valuables. New Jersey-based Dowell Insurance Agency, Inc., and Integrated Assurance Solutions (Dowell/IAS) can be reached at (201) 794-7144. Go to www.awci.com for more information on these benefits and others that are offered only to AWCI members and designed to save you money. Almost every member I have talked with who has taken the time to look into these various benefits has been able to save themselves money. You owe it to yourself to take advantage of these benefits.

Also remember to thank our *HT* advertisers when doing business with them, because we as AWCI members appreciate their support.

Oh, and don't forget that annual physical. Here's wishing you a Happy, Healthy, and Prosperous New Year!

Livesay's

# Commercially Available Hole Gages

By Bill Nelson

I enjoyed reading Laurie Penman's recent series of articles on the theory, design, and manufacturing of small hole measuring instruments. If you are interested in this type of measuring device, but don't have the time to build your own, then I would like to make you aware of a commercially available instrument. (I have no connection with the manufacturer.)

The Kwik-Chek hole gage has been around for many years. It was originally made by the Hamilton Watch Company. I currently own five of these instruments (see photos) and they were each made by the Hamilton Watch Company or one of its successor organizations. Tracing the history of the manufacture of these instruments has revealed the following sequence: 1) Hamilton Watch Company, 2) Hamilton Watch Company, Industrial Products Division, Lancaster, PA, 3) Hamilton Watch Company, Allied Products Division, 4) Datcon Instrument Co., East Petersburg, PA, 5) Kwik-Chek Gage Co., East Petersburg, PA, 6) Kwik-Chek Gage Co., Vero Beach, FL, 7) Kwik-Chek Enterprises, Sebastian, FL. This may not be an absolutely correct history, but it is all the info I have been able to find.

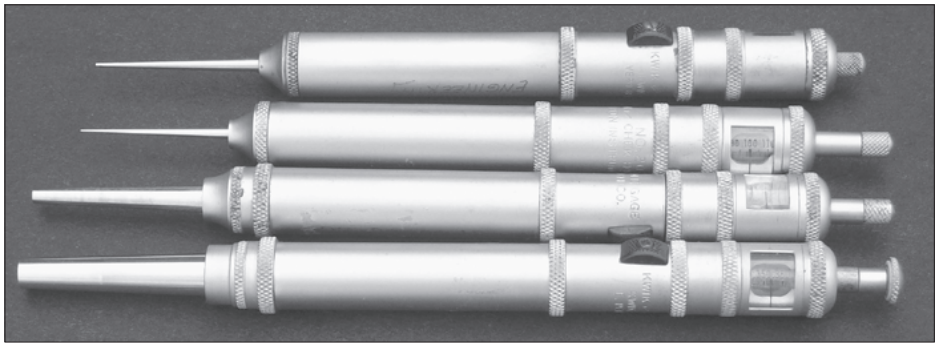


*Figure 1*

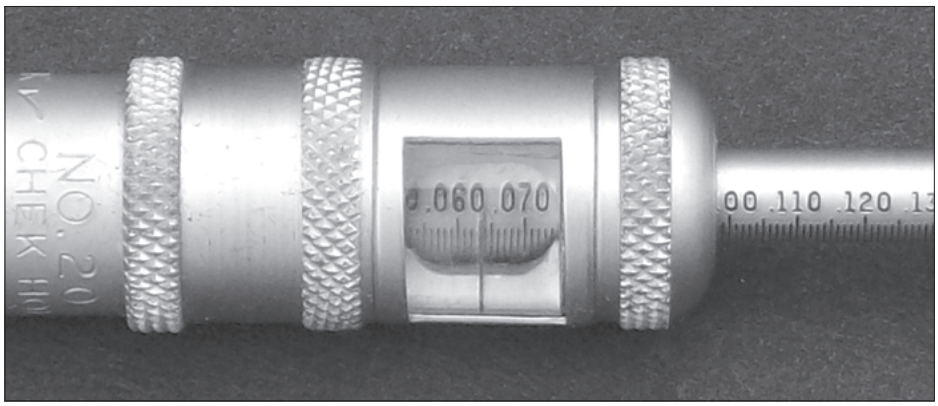



*Figure 2*

Figure 1 shows four of my instruments with the measuring needles extended. The black button is the clutch button. On the right side of the picture you will see the crystal magnifier window. This allows the scale to be easily read.

These instruments were originally made for the watch and clock manufacturing trade but have found many other uses as the years have passed. I first became aware of them in the 1960s. I was employed as a tool and die maker in a precision metal stamping company and we used them to check small holes in our inspection department. Seeing the Hamilton Watch Company name on them was interesting to me because of my hobby of restoring clocks and watches. Other uses include special versions built to inspect the injector orifice for fuel injectors. They are very handy in the engineering department for prototyping and reverse engineering activities. Kwik-Chek hole gages are very easy to use and calibrate. They are available in various models to measure a range of hole sizes as follows:

| **Model #** | **Hole Size Range** |
|---|---|
| Model 10 | 0.010" - 0.028"/0.25 mm - 0.70 mm |
| Model 20 | 0.025" - 0.130"/0.60 mm - 3.30 mm |
| Model 30 | 0.130" - 0.255"/3.30 mm - 6.50 mm |
| Model 40 | 0.255" - 0.380"/6.50 mm - 9.50 mm |

The scale is graduated in 0.001" or 0.02 mm. It will be either inch or metric (they are not dual scale).

Figure 2 shows the magnifying lens. The gage is very easy to use. The small black button on the side of the instrument releases the clutch and allows the tapered needle to snap into the extended position. Insert the needle into the hole being measured and slide the barrel slowly down the needle until it rests on the face of the work. The clutch automatically locks the scale securely at the exact diameter reading. Remove the gage from the work and read the scale. The built in crystal magnifier permits easy reading of the scale to the nearest 0.001" or 0.02 mm. The needle is pushed back into the barrel to prevent accidental damage when not in use. The gage comes with a setting master that allows fast and easy calibration. A knurled nut on the gage is loosened and adjusted while using the setting master.

Some of the features of these gages are:
1. Low skill requirement for fast and accurate measurements,

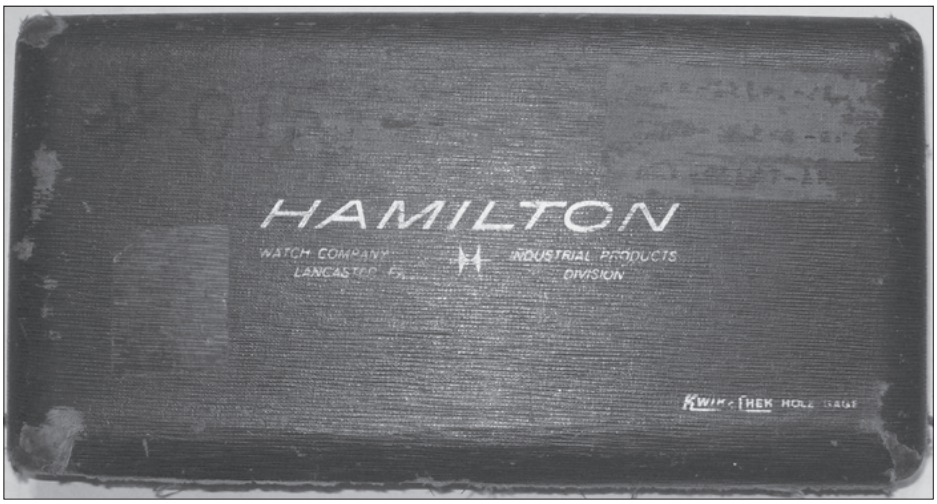



*Figure 3*

2. Simple calibration (easy to use setting master comes with each gage),
3. Magnified direct reading scale,
4. Hardened and chrome plated precision ground tapered needle,
5. Positive clutch – locks needle and scale at exact dimension of hole being measured,
6. Portable – convenient pocket size and weight are ideal for easy use (one gage can cover the measuring range of a complete set of gage pins).

Figure 3 is a case made by Hamilton Watch Company Industrial Products

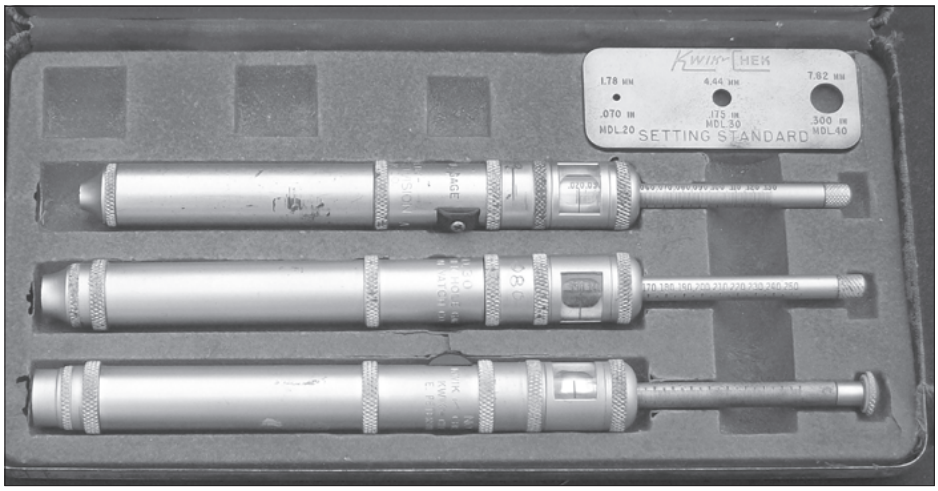



*Figure 4*


*Figure 5*

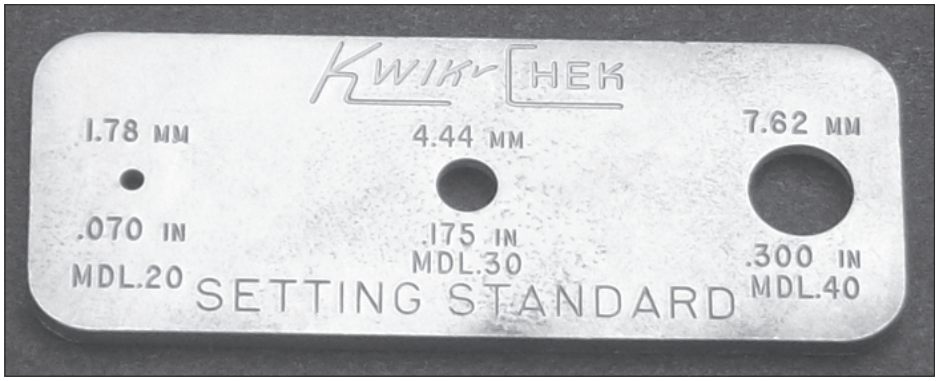



*Figure 6*

Division. It holds three of the hole gages and a calibration/setting master.

Figure 4 shows the same case open with three hole gages and a setting master.

Figure 5 is a Datcon Instrument Company case with a Datcon Instrument Company hole gage. Figure 6 shows a close-up of the gage calibration standard.

Laurie Penman has pointed out the usefulness of this type of gage in his excellent series. I am just bringing to your attention a commercially available product that was originally used in the watch manufacturing trade. Many of the readers might not be aware that these are available.

I wish to thank Bobbie Lynn, the current owner of Kwik-Chek Enterprises for sharing some of the history of the company with me. Also, for graciously giving me permission to use material from some of the company technical bulletins and advertisements. She has been manufacturing these gages for twenty-nine years. She was employed by James I. Anthony who bought the company from Datcon Instrument and moved it to Florida. She purchased the company from him when he retired in 2001.

For more information, the company website is www.kwikchekgage.com. All photos are my own and show the five instruments that I currently own and use.

## About the Author

Bill Nelson MS, CmfgE, is Vice President of Global Machine and Tool LLC of Rhome, Texas. He has over 45 years of precision metal working experience in tool engineering, tool and die making, and model making. Manufacture and repair of watches, clocks, and complicated mechanisms is a lifelong hobby.

# New Members

**Alabama**
Kuhn, Billy—Florence, AL*

**Arizona**
Wengjen, Peter—Mesa, AZ

**California**
Manachian, Berge—Glendale, CA
Tak Lam Shing—San Francisco, CA*

**Colorado**
Frakes, Marlin E.—Littleton, CO

**Connecticut**
Wheeler, Wallace H.—Glastonbury, CT

**Georgia**
Latini, Carl C. Sr.—Columbus, GA

**Illinois**
Dyrkacz, Charles—Des Plaines, IL*
Paxson, Dale—Westchester, IL
Serna, Leonardo—Chicago, IL

**Kentucky**
Schloemer, Matthew—Park Hills, KY

**Massachusetts**
Gallant, Richard—Gloucester, MA

**Minnesota**
Bogut, James W.—Maplewood, MN
Colt, Joseph—Saint Paul, MN
Dean, Andrew—Saint Paul, MN
Dowden, Amy Rose—Oakdale, MN
Matchett, Steve—Saint Paul, MN
Olsen, Jordan E.—Saint Paul, MN
Reber, Tyler A.—Forest Lake, MN

**New Hampshire**
McEwen, Kip—Nashua, NH

**New Jersey**
Cohen, Arnold—Garfield, NJ*
Karas, Michael—Harrison, NJ

**Oklahoma**
Jennerjahn, Judd—Tulsa, OK

**Pennsylvania**
Kroman, Josua—Lancaster, PA

**Texas**
Cooper, Russell—San Antonio, TX

**Wisconsin**
Malmquist, David L.—Washburn, WI*

**Canada**
Metcalfe, Ron—Brampton, Ontario

**IAB Member**
C.R. Time Company—San Antonio, TX

***AWCI welcomes back these individuals who have chosen to re-instate their membership.**

By Jerry Faier, CMC21

# Education Notes

Happy New Year and best wishes for a more successful 2010! If you survived 2009, you have much to be *really* thankful for as our country and planet continues its forward, but crazy, path. Let us all hope and pray for a future that is low in inflation, high in growth and solid in employment for us *and* our customers!

It is clear that we never know our future, only our past, and we should be ever so thankful for our current situation as that is truly, our only present!! Even at that, if we are to grow as a profession, we can never stop our growth, thinking we have mastered the past so we can relax and wait for whatever is coming next. In my collection of quotes, comes one from one of Steven Segal's movies, "Under Siege." He said, "Chance favors the prepared mind!" I like that idea! It doesn't mean we cannot enjoy our past accomplishments but it actually reminds us that we must be prepared for the future if we are not to be either knocked down or left out. I have talked to many of our members this last year about business and how they could build a stronger operation in this economy. When questioned further, it was apparent that many had become so specialized that when the market slowed, the tougher but often more profitable jobs could not or would not be undertaken. I get questioned frequently as to why my business (and others like me) seems to be really growing in this "market slow down." The answer is simple. Never (repeat that: NEVER) close any doors by saying that I can't make any money doing that job, or those products were never meant to run anyway. My favorite comment for the electric chiming clock (and this is a direct quote) from a competitor: "Those products are nothing but a *fire hazard* and *never worked* well to begin with!" I am not aware of any known cases where a clock started a fire, even one that had completely stopped but the coil was still getting 110VAC for months. What is more, I have my own family history with one of these products that ran for my entire childhood without needing repairs of any kind. (This places the clock at about 35 years of age by the time I left home.)

So why do these kinds of stories develop? The truth be known, it's probably because of knowledge, skills and dispositions, or lack thereof! If you don't know how to handle something, the tendency is to first save face and keep your position. When this type of product becomes a major part of your offerings, you have just cut your volume and thus, your income. Is it any different for watchmakers? Not at all. If your shop is getting 40% quartz watches, you better learn as much as you can about quartz watches so you can capture as much of that business as possible! You say you don't do quartz work? I feel sorry for you, if that is all that comes to your door for repair. Besides, they are not that hard to work with. If it were me, I would learn everything about quartz watches that I could so that I could impress the customer with my expertise and then maybe they would bring in those heirlooms that I *really* want to work with.

When I first started business, I used to get a lot of cuckoos and I thought if this was all there was in the clock business, I was not long for this trade. However, I was patient, did the work, charged what I needed to survive and grow, and studied and learned as much about cuckoos as I could. I found the best suppliers, the best support knowledge, the best everything I could. I took courses and read anything and everything I could to do this type of product as effectively and profitably as possible. What happened? After they brought in the cuckoo, came the kitchen clock then grandma's old black mantel, then came the call for the home grandfather. And? Business grew and so did I!

You see there is a perception in the public about trades like ours. It seems they feel we should all know about everything "new" before they trust and test us with their heirlooms (yes, even quartz watches—remember the Pulsar before Hamilton? – these will be and are becoming heirlooms—as well as cuckoos). To me that's just fine.

Something simple before the challenge begins. I like that! Besides, I look at it as business growth. I can't do all that work this week anyway. Why not have more work waiting for when I want it? In the area where I work (Glendale, AZ), we have several merchants (who sell "stuff") that are always complaining about the city

sponsored programs for the holidays. They say it never brings in customers who want to buy right now. How shortsighted! I use these occasions to hand out my cards, talk about what I do (I like to make things—a competitive edge for me) and just relate to the customer. Anywhere from 2 days to 6 months later, here they come with their clocks and yes, even their pocket watches. You see, I built the trust first, then came the easy stuff and with them came the stuff that really pays—and I am not afraid to charge what the project is worth. I do not charge on the value of the product. That is the customer's decision. Mine is to be able to deliver the quality back to the customer when they have entrusted me with their products! I am happy that I don't have to pay for all that my city does for me. I really couldn't afford to do all that promoting and marketing!

Can you afford spending thousands of dollars to promote your shop? The most successful marketing of my shop seems to be by word of mouth. Somehow, that seems to be my best investment. Now, when I can bring the knowledge, skills and dispositions to them, I have them hooked that my shop is the place to come. Can you tell me a better way? I'm always happy to learn new ways that will mean better income and a stronger client base. By the way, I don't do pocket watch work any longer (I did them for 15 years)—too many clocks to do. What I do is a historical sketch and try to refer them to others who are set up to handle the type of work they need done. In many cases, that means someone who can make the missing or damaged pieces. Since in many cases materials are no longer available, where will these people go to get these products back running to their original qualities? I see this as another opportunity for those who like making things. By not taking on a job that I cannot properly complete, I try to pair up the customer with someone who can. That makes the customer think of me more as a professional and that's what I want! Think about it. If perception is all we can market and quality is all we can really deliver, how do we best achieve this? It is a choice. Rather than begin this month's comments with the negatives of what's happening now, I am sure most of you have heard of the New York office closings of yet more manufacturers. They haven't gone out of business but people's lives and professional accesses are being challenged yet one more time. Industry has begun what I saw as, hopefully, a new generation of support. But, beware, as they too are totally subject to the economy and may not be able to continue *or* could disappear altogether.

We cannot tell the future. What will you do then? No parts, no support, no records? Who will support *you* then? Who will *you* support? What will you need to grow *your* business? How much more knowledge, skill and dispositional work will be necessary to keep *you* where you are today? With inflation and a meandering offering of work to our shops from the public, will what you have today be enough to beat inflation tomorrow? One last economic rule for you to consider: If you don't exceed Inflation's costs each and every year, then you are losing money and your business will ultimately fail. Just a thought for the New Year—"chance favors the prepared mind!"

By Wesley Grau, CMW21, Chief Examiner

# Certification Relevance

There still is a segment of watchmakers who feel the CW21 is not relevant to vintage or antique watches. Many watchmakers request a different test for those who work on older products. I would like to address this current thought with some information regarding components of the exam and how it relates to the proficiencies of the watchmaker overall. Much of this information is extrapolated from the Standards and Practices for Watchmakers document, which is available at www.awci.com. When you arrive at the home page, click on Services, then education, and finally certification. On this page you can download the complete Standards & Practices document. Putting aside the product that is used for examination purposes, let's look at some of the areas that the exam is designed to assess about the abilities of the watchmaker.

A watchmaker, regardless of the age of the product he encounters, must show that he possesses the necessary basic skills to carry out the required. The exam is designed to assess these necessary skills so the technician, client, employer, industry personnel, knows that the individual possess these necessary skills. These skills are interlaced throughout all the components of the exam. Because of the high rate of damage to movements during training and testing, it is essential to use movements in which spare parts are readily available. Once the skills are validated through the use of modern watches then there can be another level of training with examination that emphasizes additional skills needed for specific skills encountered with vintage and antique watches. The watch portion of the education committee is developing this particular test currently, CMW21 examination, which should be ready to unveil in a pilot form soon. The CMW21 will test watchmakers at a level to show the necessary skills, of parts manufacturing, technical drawing, and theory relevant to manufacturing obsolete components.

It is essential to good training to progress in levels. When I was in horological school, we didn't touch watches for some time, but crafted tools and components. This was so we could develop basic visual skills, dexterity, and auditory skills that would be needed for the next training level. Even during higher horology training in Switzerland, we start course work by tool preparation. Training in steps is crucial, building on basic skills to achieve another level. This is true of all training, and if the basic skills are not developed properly, then there is no foundation for building. Now let's take a look at the components of the CW21 examination.

The theory portion has questions from ten categories of study, which are diagnosing, lubrication & bearings, basic knowledge & nomenclature, case components & water resistance, automatic winding systems, horological calculations, timing, escapements, quartz, chronograph systems. The questions have been piloted prior to their scoring relevance to ensure that they are assessing the examinees knowledge accurately. With the exception of quartz watches, the questions assess knowledge needed for individuals who work on vintage and antique watches. Keep in mind that quartz watches have been in use for over 30 years, and many fall into the vintage and collectable arena.

The micromechanical portion is very relevant to the watchmaker who works on antique and vintage watches. It deals with the knowledge and abilities that pertain to proper replacement of a balance staff—included in this are skill sets involving proper lathe techniques, balance truing and poising, hairspring manipulation, mechanical measuring and recording, technical drawing, as well as overall cleanliness. These skills are foundational, and if executed properly, will help the horological individual to move to additional skills set required for more complex restoration projects.

The quartz portion deals with proper servicing of a quartz movement, as well as understanding of unique analysis and measuring of electronic components. The examinee needs to become familiar with a basic quartz watch and how to measure and record electronic data. In addition, assessment is made on basic servicing techniques such as cleanliness and lubrication. Since this component involves an entire watch, handling of components without damaging, and aesthetics of hand alignment are essential. Recording pre-existing conditions of the watch, decasing movement and recasing without damage are essential.

The automatic portion deals with proper servicing of an automatic watch, as well as unique knowledge and skills that pertain to the automatic system. These unique areas include proper servicing and lubrication of the mainspring barrel and mainspring, as well as the automatic device that makes this category of mechanism unique. We also use this component to test the escapement and timing skills of the individual. All of which deal with general basic skills of a mechanical watch, which are needed for any watch regardless of its age.

The chronograph portion deals again with proper basic servicing techniques of mechanical watches as well as unique knowledge and skills that pertain to chronograph mechanisms. Chronograph mechanisms have been around many years, and there are unique skills needed to be able to properly diagnose and adjust them. Because the candidate is given a complete watch, assessment is made of general skills in the escapement, timing, cleanliness, handling of components, as well as visual aesthetics of the completed product.

There are many aspects of horology, but it is essential that those engaged in the servicing of watches possess certain basic knowledge and skills. The CW21 exam is designed to test these skills so the industry at large can be assured that the individual is at a certain level of competency. Then if the person wishes to specialize, further training can be pursued. Again I would like to take this opportunity to mention that we have seen signs of improvement in the basic skills of the watchmakers who have sat for the examination process, and there is a difference with those who take the time to prepare for it. Preparation includes but is not limited to review of the suggested study material, attending a current bench course of either AWCI or current manufacturer, becoming familiar with the Standards & Practices document and its contextual statements, and having another certified member assess an example of your work. Remember if you have any further topics you would like addressed, you can send them to wgrau@awci.com

# Making the Hole Sizing Instrument

## Part 4

### Instrument Completion and Brass Dial Winding Hole Repair

By Laurie Penman

At the time of writing my workshop, together with my household goods and about one thousand books are still sitting on a quayside in the USA. Consequently I cannot yet illustrate my columns with fresh photographs, I apologize.

The present article has to be finished with drawings instead of showing the instruments used on my grandfather clock (stranded on the quayside).

There are two occasions when the diameter of a hole has to be measured accurately, one is when a pivot has been broken and lost, or the whole arbor is missing, the second is when a hole is worn and the original diameter needs to be established. If the pivot shows no sign of having been filed, the original hole diameter should be used, rather than the repairer's opinion of what it should be. Let me explain that: The clearance between pivot and pivot hole is different for different styles of clock movement. For instance the clearance used in American mass-produced movements is quite large and that used in British shop regulators is quite small, chronometers even smaller. If they are altered by a repairer so that an American movement has less clearance than it should, or the regulator has more, either clock will be damaged. Without the evidence of an original hole diameter, the repairer has to use experience as a guide.

The actual use of the instrument is very simple. It is placed over the hole that is to be measured and then the probe is screwed down until it lodges in the hole when the body is pressed hard against the clock plate. The diameter of the hole is the same as the largest diameter of the probe that is exposed and it can either be measured by reference to the number of turns of the screw that have been made, or by using vernier or micrometer to measure it directly. Every turn of the screw increases or decreases the exposed diameter by 0.001" and I have made marks on the flat of the probe for every fourth (1/8") turn to make it easy to count them.

Note that it is important to probe the hole from the inside surface of the clock plate so that any chamfer or oil cup does not interfere with the proper measurement. Again, let me point out that a probe of this acuteness will locate in the remains of the original hole when dealing with a worn bearing. In other words the instrument measures the original diameter so long as it is only wear that has affected it.

That is enough for hole measurement, I would now like to deal with hole correction of another sort.

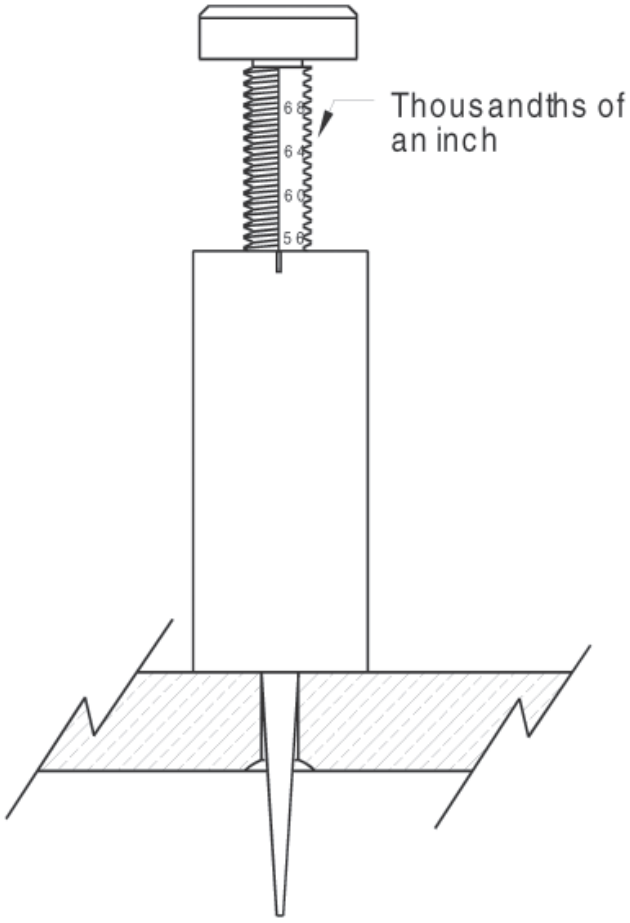



*Figure 1*

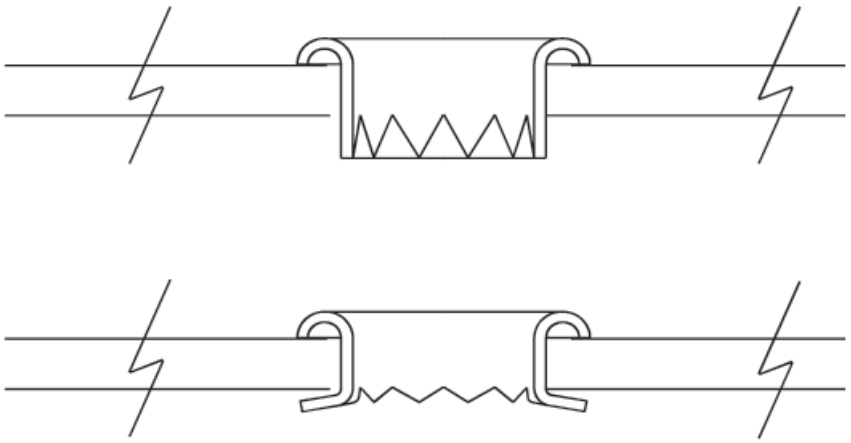


*Figure 2*

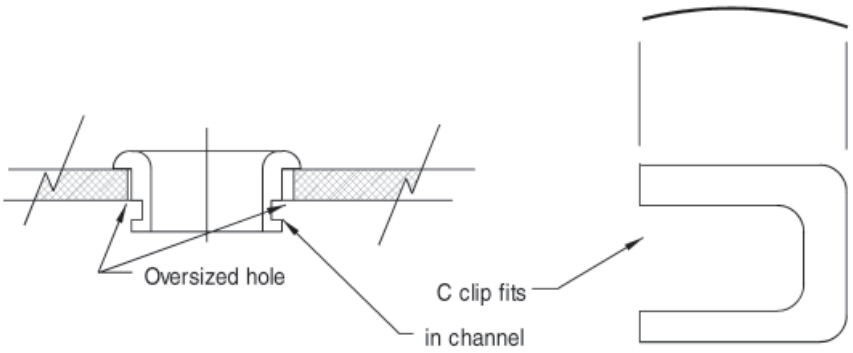



*Figure 3*

It often happens that provincial clocks (even quality antique clocks sometimes) suffer the indignities of a "marriage"—a strange dial attached to the movement. Sometimes this happens because the original dial was lost or badly damaged, but not infrequently because the new dial has the name of a well-known maker or a London address. How come a dial bearing a famous name is floating around without a movement? Most frequently because it is a forgery! In nearly all cases the new dial is intended to increase the value of the clock. Rarely is it a matter of legitimately replacing a badly damaged dial.

Since the dial of an eight-day, antique long case clock has holes for the winding arbors as well as the hand pipes the repairer has to match holes in an existing dial with the winding arbors in the movement. There is almost always a difference in the positions. With a great deal of luck the differences are small enough to be overcome by opening up the dial holes slightly, whilst moving them to center on the arbors. More often, any attempt to adapt the dial to the movement results in obviously oversized holes with the winding square so far off center that it is difficult to introduce the winder, or ugly, misshapen holes that make it clear that the clock is a marriage. Nor much can be done for painted dials if the difference in hole centers is great. Large brass grommets can be fitted, but commercial grommets are not usually big enough to be useful. These grommets are made of brass with a deckle edge that is inserted into the dial plate and then expanded on the back (Figure 2). Turned grommets (Figure 3), which are held in place with a springy "C" clip, will cover for a difference of about an eighth of an inch, but they will definitely be larger than normal. Nevertheless, the result is smart and does hide a certain amount of damage.

Brass dials are slightly easier to deal with and the modification can be well disguised. However, I will come to that after discussing some other clues to marriages. My main reason being that this is a job that I have carried out before and I can illustrate the operations with photographs that at the moment are not available.

Recasing is a form of marriage that can occur quite legitimately, often for reasons of fashion. A movement can be put into a more "up-to-date" case simply because the owner prefers a more modern style. This can result in modifications to the movement. I once saw a Tompion bracket clock with a quarter striking movement. The new case was a little shorter and narrower than the original and as a result the bells fouled the inside of the case, so the clockmaker (not Tompion) moved the bell stand leaving the mounting holes in evidence. The pendulum was a half-second one and hung low in the new case, so a slot was cut in the base for the pendulum bob to swing in. Such a slot is not unusual, clockmakers had to make their movements conform to

the dimensions of fashionable cases and the alternative to redesigning a proven and reliable movement was to make a slot in the bottom of the case—or even miss it out altogether. Clock cases with these slots are not necessarily marriages. The case that the Tompion had been put into had another clue to its re-use. It had been made for a different movement and the rubbing marks of the pendulum bob on the rear door did not match the length of the existing pendulum. There were other clues, unoccupied screw holes in the woodwork for instance and if I had the opportunity to make a full examination, the brass dial bearing Tompion's name would undoubtedly have shown that it had been moved. It may not even have belonged to the movement. The further you dig into a mystery of this type, the more surprises you can expect.

The movements of antique bracket clocks sit on a seatboard, which usually rests on the bottom of the clock case. The seatboard often consists of a board fastened to two upright pieces of timber running across the board from front to back. A marriage of movement and case frequently shows uprights that have been reduced in height with a saw, or increased in height by nailing on wooden strips. Sometimes the modification is a lot less subtle with the seatboard removed and the movement left hanging on the dial posts. Long case clocks have a similar arrangement. The boards that form the sides of the trunk are extended to form "cheeks" and the seatboard sits on, or is screwed, to these. Modification by sawing or nailing on wooden strips is similar to the modifications of bracket clocks and is a lot more obvious because sawing these cheeks without dismantling the trunk is difficult and certainly beyond the competence of the sort of person who mangles clocks in this way. The saw cuts are usually irregular and not parallel. The movement frequently carries the marks of marrying it to a second dial.

There are only three or four holes provided in a movement for mounting an hour dial and they should match the pillars in the dial plate or sub-plate exactly. A subplate is an iron or cast iron plate that comes between a painted dial and the front plate of the movement. This arrangement was adopted because whilst a clockmaker was perfectly capable of riveting mounting posts into a brass dial received from a dial maker, a stove-enameled dial presented a different problem because the baked enamel (these were not vitreous enamel dials and the temperatures of baking were considerably lower) covered the riveted end of the post. Any attempt to fit posts to the dial would damage the paint.

Subplates should not have extra holes with no posts to fit in them, no oval holes and no posts that have been bent so that they enter the holes. The same is true for brass dials; no spare holes in the movement plate, no bent dial posts and no vacant holes under the chapter ring. Any of these is evidence of a marriage and, quite frankly, by an incompetent workman, a skilled clockmaker could manage it without leaving obvious signs.

The question arises as to whether marriages are legitimate or not, but I have no doubt that when the deed has been done it is legitimate to make the result look decent. A nicely finished brass dial with "turned" winding holes looks very ugly after a repairer has filed them out, leaving rough oval holes. Marriage or not, the appearance of the clock and its value is much improved by correcting the damage. Next month I will detail the method of carrying out this correction. Hopefully with photographs of the clock that had this face lift.

# AWCI-ELM Trust Donations

The Trustees of the AWCI Education, Library and Museum Charitable Trust would like to recognize the following people for their donations to the ELM Trust:

Terence D. Albers
Barry J. Baker
Bishop State Community College
Kenny Raphael Casso
Douglas M. Cochrane
Tom Dunn
Rafael E. Esquivel
Glenn D. Gardner, CMW
Joe Goncalves
Asim M. Gunalp, CW21
Justin Harrell, CW21
Emil Heyler
Steven Kivel
Telex LeBlanc
Doug W. Meakins
Michael E. Moore
Stanley A. Mueller
Todd E. Murray, CMW
Jong W. Na
Robert L. Ockenden, CMC
Michael F. Pahl
Robert Palmer
Edgar H. Peacock, Jr.
Anthony Pierri
Frank Porcella
Allison L. Rider, CC
Surinder Singh
Jimmy D. Smith, CMW
John H.J. Sykes
David Berch Toothman
Terry C. Trost
Thomas K. Walker, CMW

By Jack Kurdzionak, CW21

## A Better Year

Last year, 2009, will have left a lasting impression on most people, regardless of their nationality or occupation. The worldwide business recession impacted every industry, some more so than others, but nonetheless almost every citizen of the world was aware of the recession. Terry Kurdzionak and I visited a number of watch-related firms in Switzerland this past November. During our visits, our host at each company initiated a conversation about "The Crisis", as they referred to the sudden and severe downturn in worldwide watch sales that occurred over the past 18 months. Each of our hosts was anxious to hear any positive news we were able to convey from the American market. Although the watch industry no longer dominates Switzerland as it did a few generations ago, it is nonetheless still an important component (about 10%) of their national economy. For those in watch-related industries, it is 100% of their businesses and these folks are intensely interested in the future of the watch business. They explained to us that Swiss watch exports to the USA declined by 30+% last year commensurate with a similar decline in U.S. Swiss watch sales. They asked us about the condition of the watch repair business in the USA. Although Switzerland experienced a steep decline in finished watch exports, the exports of spare parts, watch tools, and repair supplies declined far less. Although hard numbers are difficult to obtain, we shared with them our sense that businesses that offered watch repair as well as watch sales weathered the recession far better than those that depended upon retail sales only.

Now that 2009 is history, we can optimistically look forward to 2010. The U.S. stock market bottomed last March before beginning a major recovery during the remainder of the year. The automobile industry has had a major overhaul and car sales have begun to climb along with housing sales that are doing the same. Retail sales reports are again showing a positive trend. The business people we spoke with in Switzerland were optimistic that the worst of the recession is behind us, and that we will again see stability, coupled with sustainable growth, in the watch sales and service businesses. Now that we have met the challenges of the past year, we will be able to meet the New Year with a renewed sense of strength and wisdom that only comes by coping with adversity. Best wishes for a happy and prosperous New Year.

*Jack Kurdzionak*

## Pyramid Watch Repair Company

Every watchmaker has comebacks. They are the unavoidable consequence of repairing watches. Comebacks can be attributed to watchmaker error, watch component failure, customer error, or just plain bad luck. All of us in the business of watch repair accept the fact that comebacks occur and we try our best to satisfy the legitimate claims of customers with watches that fail to perform as well or for as long as we promise they will. However, a new comeback scam was recently brought to this writer's attention, which will illustrate the length that some dishonest customers will go to obtain a free watch repair. This scam goes far beyond what most of us have ever dealt with in our own businesses.

The watchmaker repaired an automatic watch, ETA caliber 2824-2, for his customer in June of the past year. The watch tested well and was delivered to the owner who paid for it with a major credit card. About a month later the customer returned the watch for warranty service with the complaint that it had insufficient power reserve. "No problem" said the watchmaker, "Please leave it and I will check it out for you". The watchmaker tested the watch for several weeks, even wearing it himself for part of the time. He found nothing wrong with either the power reserve or the timekeeping. He returned the watch, asking the owner to try it again, and if it was not satisfactory, please let the watchmaker know of any problems. This seemed to be a reasonable resolution of the issue. Reasonable, that is, until the customer protested the repair charge to his credit card company. The customer asserted that the watch never ran correctly and furthermore he did not wish to return it again to that "Incompetent watchmaker" for any more warranty repair. The credit card company dutifully issued a refund to the customer and charged back the repair charges to the watchmaker. The watchmaker filed a rebuttal stating the facts, as he understood them, with a repeated offer to honor the warranty if the repair was truly unsatisfactory. The credit card company again billed the customer and paid the watchmaker. That, thought the watchmaker, resolved the problem with that customer.

A few months went by and the customer again protested the charge and did so with a receipted bill from a third party that he called a "Competent watchmaker/jeweler". The customer's claim included a new bill with charges for a mainspring, barrel, hairspring, complete rotor, and escapement work along with a complete overhaul of the

movement. It all seemed reasonable to the layperson at the credit card company so the credit card company again refunded the customer's money and charged it back to the watchmaker.

The original watchmaker had previously replaced the barrel and mainspring, tested the escapement, and knew that ETA 2824-2 hairsprings as well as the trademarked rotor on this particular watch are not available. Because of those inconsistencies in the new bill, the customer's claim immediately became suspect to the watchmaker. Upon further examination, the "Competent watchmaker/jeweler's" location was in a nearby upscale residential suburb with no retail jewelers listed in the phone directory. The watchmaker researched the "Competent watchmaker/jeweler's" location. It was in the part of town zoned for single-family homes, only! Ever more curious, the watchmaker called the town hall to ask if there was any business registered at that address. "Absolutely not and none is permitted" was the answer from the town clerk. The next step was to Google the "Competent watchmaker/jeweler's" phone number as shown on the suspect bill to find the phone listed as a non-business land line registered to a man with a jewelry supply website. The website listed two offices. One located in his private residence and the other in Cairo, Egypt. Our watchmaker again notified the credit card company and cited the strong possibility of a fraudulent claim on the part of their credit card holder. For the second time the money was restored to the watchmaker's account and charged to the customer. The watchmaker believes this will end this particular saga. He is hoping the customer returns the watch to him for further warranty service so that he can ask a few pertinent questions.

This scenario demonstrates that anyone with a computer can manufacture a phony bill for just about anything. During our school days, we were always told not to believe everything you read. Well, that still holds true, and even more so today, with the proliferation of computers and websites. Also, everyone in business who accepts credit cards needs to understand that the credit card companies will almost always side with the customer in a dispute, and it is the business owner's responsibility to be able to rebut an unjustified claim with facts as the watchmaker was able to do. Otherwise be aware of paper companies such as "Pyramid Watch Repair" with a nearby office in Cairo, Egypt.

*Jack Kurdzionak*

## Strange Screw

The ETA 2824-2 automatic movement, with a date feature, is one familiar to most watchmakers. It is used by a multitude of brands as their basic auto winding movement, and rightly so. It is moderately priced, straightforward to repair, and once repaired properly, delivers superb overall performance that translates into excellent timekeeping and long-term reliability. If you have serviced this movement, you probably have noticed one screw, with a uniquely shaped head that is found on the underside of the automatic bridge of this movement. That screw (part reference 51141) as shown in the accompanying photo secures the automatic device lower bridge (part reference 1141) to the upper bridge. No part of any watch is ever specially shaped without a purpose. What is the purpose of the special shape of this screw? And, in addition to securing the lower bridge, what is the other purpose of this screw?

**Automatic device lower bridge screw ETA 2824-2**

If you think you know the answer to the two questions, please send them via e-mail to me, Jack Kurdzionak (bostonwatchco@gmail.com) or fax the answers to 781-438-6954. There will be a small prize for the member whose name is drawn from the list of those who correctly answered the questions by February 2, 2010.

## You Are Invited

Do you have a solution to a watch or clock repair problem that you want to share with our membership? Do you have a question about a repair problem you would like to ask? I invite you to participate in this column with your suggestions, questions, and comments. It is easy. Just e-mail me at AWCI <magazine@awci.com> or write using the old standby known as the postal service. You can even fax me at 513-367-1414.

I will do my best to help you help the membership. By sharing your questions and suggestions, all of our members can benefit from our combined knowledge and experience. The ideas, tools, techniques and products presented in this column are suggested by the author and contributing members and are not endorsed by any manufacturer, supplier, advertiser or AWCI itself.

# Affiliate Chapter Report

By Gene Bertram, CC

Don Ott died the Saturday after Thanksgiving. You probably didn't know him, but you probably know someone like him. He was a watchmaker, jeweler, and one of the founders of the Metro-St. Louis Watchmakers Association.

Don got into watchmaking in a strange way. When he was a boy, his kidneys were damaged in a football game tackle. The doctors didn't think he'd survive, and kept him in bed for more than six months. Don finally got tired of it, got out of bed and got on with his life. When he tried to enlist during World War II, he was classified 4F because of his kidney problems. When his employer found out about his classification, he fired him, and no one else would give him a job. The only opportunity Don could find was a watch and jewelry school, so he signed up. He studied hard, graduated, got a job and eventually opened his own store, which he ran with his wife for 40 years.

He had his first open-heart surgery in 1973, after which his doctor told him he needed to get more exercise, suggesting bicycling. According to his children, Don didn't just ride around the block, but ranged for miles. Often people would remark to them that they saw Don 5 or more miles away from home, riding on the river road. Earlier this year, his kids talked him into giving up his riding, fearing an accident. Don told me he was sad about it, but "The kids are right, at 87, I don't bounce very well anymore."

Past president of the Illinois Jewelers Association, Don also held about every office with the Metro-St. Louis Watchmakers Association. In addition he taught classes, gave presentations, volunteered for committees, and generally tried to be helpful. He was helping one of our members learn watchmaking up to the month he died. As another member once said, "Don has forgotten more about watchmaking than most of us know." It's an old line, but true nonetheless.

When I started in this profession some twenty years ago, I was one of the young guys. As my beard has turned gray and my body develops aches, I've seen many "old timers" retire or die. Many taught classes or wrote books, served on committees and encouraged others to do the same. Some could qualify as giants in the field; some played a quieter role. They helped make the chapters and our profession better, and passed the torch to us to do the same.

Don was always willing to help, always curious to learn more, and always willing to share. You probably didn't know Don Ott, but you probably know someone like him in your affiliate chapter. He was the personification of what affiliate chapters are about. He was a good watchmaker and jeweler, a good husband and father, and a good man. He will be missed.

# Bulletin Board

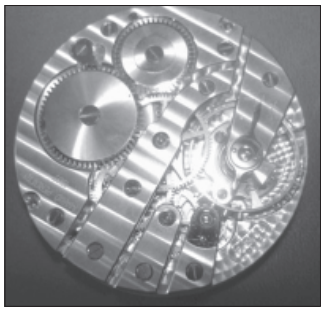
## ITEMS STILL NEEDED

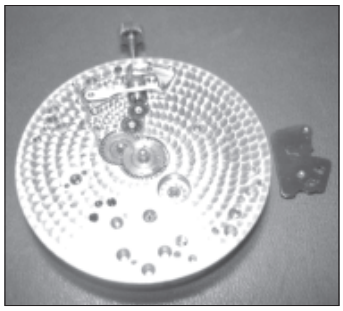
**Caliber and Setting Bridge**

Mario Perotto, Lake Ariel, PA, is looking for the following information on this watch. The movement diameter is 43 mm.

He is looking for:

1) The caliber number of the movement.
2) A possible source where a setting bridge could be purchased.





# Academy of Watchmaking Classes

**Thomas Schomaker, CMW21 Instructor**

AWCI is offering a series of 5-day watchmaking classes. Each 5-day block will cost $725; 3-day block is $435.00
For additional information call toll free 1-866-FOR-AWCI (367-2924), ext. 303 or e-mail education@awci.com

Class information is also available online www.awci.com

* Seats may become available for the classes; please contact AWCI to be added to the waiting list

| | |
|---|---|
| January 4-8, 2010 | Watchmaker's Lathe I |
| January 11-15, 2010 | Basic Watch Repair |
| February 1-5, 2010 | Servicing & Adjusting the Swiss Lever Escapement |
| February 8-12, 2010 | Balance Staffing & Timing |
| March 1-5, 2010 | Modern Automatic Watches |
| March 15-19, 2010 | Modern Mechanical Chronographs, Servicing & Adjusting |
| April 12-16, 2010 | Modern Mechanical Chronographs, Servicing & Adjusting |
| April 26-30, 2010 | Basic Quartz Watch & Quartz Chronograph Repair |
| June 7-11, 2010 | Watchmaker's Lathe I |
| June 28-July 2, 2010 | Basic Watch Repair |
| September 13-17, 2010 | Balance Staffing & Timing |
| September 20-24, 2010 | Modern Automatic Watches |
| October 11-15, 2010 | Basic Quartz Watch & Quartz Chronograph Repair |
| October 18-22, 2010 | Modern Mechanical Chronographs, Servicing & Adjusting |

*AWCI Watch Repair Course schedule is subject to change*

# 21st Century Certified Watchmakers Exam Schedule

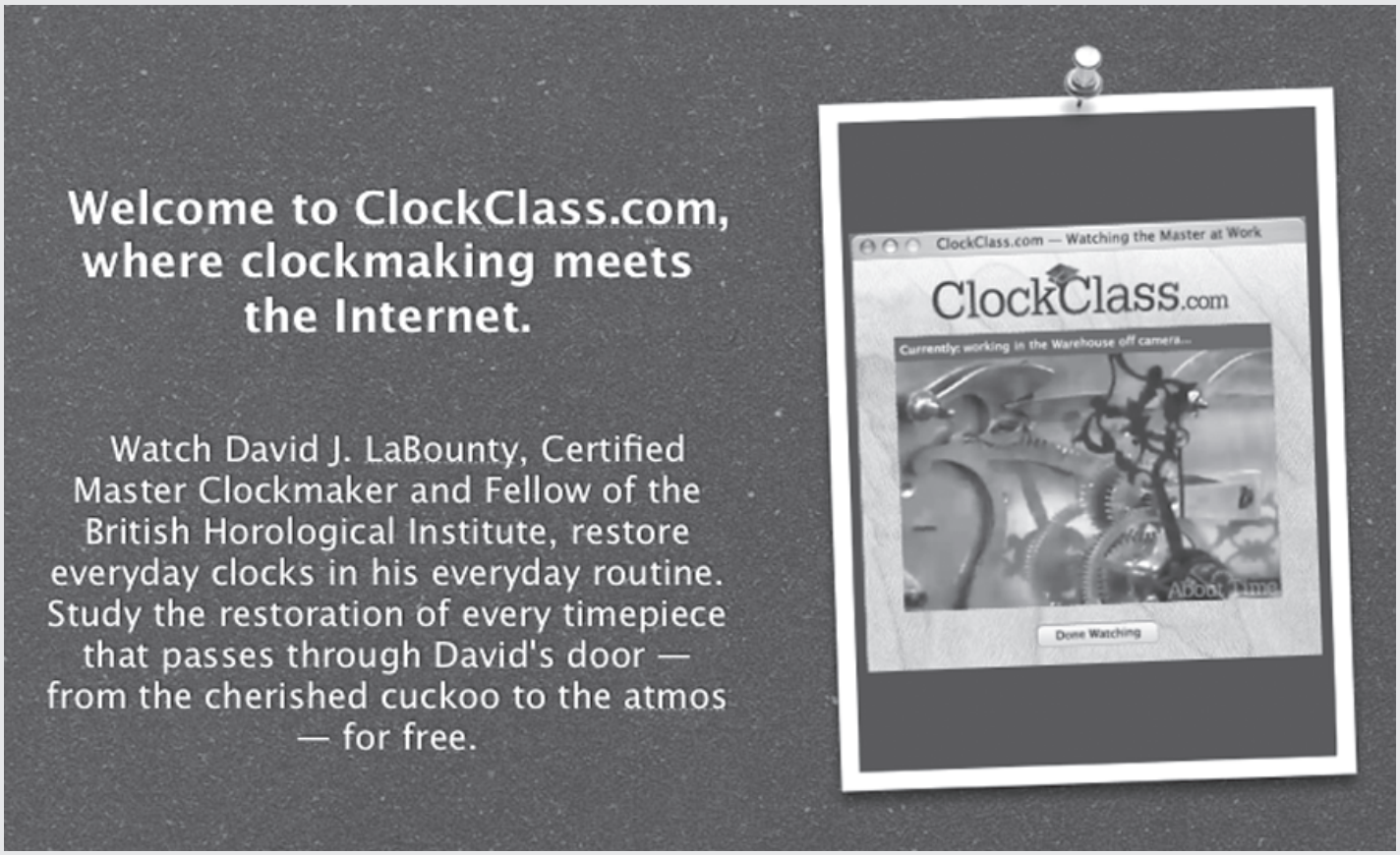
Visit AWCI's website for complete information on the 21st Century Certified Watchmakers Exam. To register for an exam or for more information call toll free 1-866-FOR-AWCI (367-2924), ext. 303 or e-mail education@awci.com

* Seats may become available for the exams; please contact AWCI to be added to the waiting list

| | | |
|---|---|---|
| January 19-22, 2010 | AWCI Training Facility | Harrison, OH |
| February 22-25, 2010 | AWCI Training Facility | Harrison, OH |
| March 22-25, 2010 | AWCI Training Facility | Harrison, OH |
| April 19-22, 2010 | AWCI Training Facility | Harrison, OH |
| May 24-27, 2010 | AWCI Training Facility | Harrison, OH |
| June 22-25, 2010 | AWCI Training Facility | Harrison, OH |
| July 19-22, 2010 | AWCI Training Facility | Harrison, OH |
| September 7-10, 2010 | Lititz Watch Technicum | Lititz, PA |
| October 4-7, 2010 | AWCI Training Facility | Harrison, OH |
| November 1-4, 2010 | AWCI Training Facility | Harrison, OH |

*AWCI Watch Certification schedule is subject to change*

# International Watch Collectors Society




# AWCI and ClockClass.com Partner for Training Program

# ClockClass.com

by David LaBounty, CMC, FBHI

Internet Training

Look for the link on AWCI's Home Page www.awci.com

One Hour Classes - $35.00 per

DVDs $30.00 plus shipping

**Visit www.clockclass.com for more details**

### GemOro Lite Loupe®

Sy Kessler Sales, Inc./GemOro Superior Instruments exclusively distributes the new Lite Loupe line of LED lighted 10x loupes for the discriminating professional diamond dealer or jeweler. The Lite Loupe features a modern, ergonomic thumb-curve design, perfectly balanced daylight and UV illumination, superior lightweight polycarbonate optics and unmatched style. Included is a necklace style loupe chain and is available in the original design, Italian enamel animal prints and with Swarovski crystals in an array of colors. The Lite Loupe may be privately labeled as a premium gift with purchase. For the name of a GemOro dealer near you, call: 800-527-0719 or e-mail sales@sykessler.com or visit www.sykessler.com.


### Interactive Presentation for Proofmaster S and Proofmaster M

Witschi has augmented its interactive presentations with the Proofmaster S and Proofmaster M leak testers. Witschi offers interactive equipment presentations to allow you to "try before you buy". In this way, any potential customers can become familiar with the functions and connection options of the unit. All functions are explained in detail and the user learns how to take full advantage of the possibilities offered by the device.

Advantage of equipment presentations:

- Immediate introduction to the functions of the device (1:1 demonstration)
- Basis for your decision before making a purchase
- Training module for practical use

Please visit www.witschi.com for more

### BASELWORLD 2010

BASELWORLD 2010 – The World Watch and Jewellery Show will be held Thursday, March 18 to Thursday, March 25, 2010 in the Exhibition Center Basel (Messe Basel). Hours are: Daily from 9 am to 6 pm (on the final day from 9 am to 4 pm).

For more information: www.baselworld.com or e-mail: visitor@baselworld.com

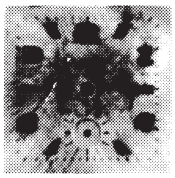
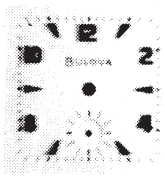
## Classified Advertising Regulations & Rates

Ads are payable in advance $1.00 per word, $1.10 per word in **bold** type. Classified display ads are $45.00 per column inch, 2¼" wide. Classified ads are not commissionable or discountable. Payment can be made by check, VISA, MasterCard, Discover, Diner's or American Express. The publisher may, at the publisher's sole discretion and for any reason and without notice, decline to publish or republish any ad, in which case any fees submitted or paid for such ads shall be returned or rebated to the advertiser. The publisher reserves the right to edit all copy. Price lists of services will not be accepted. Confidential ads are $15.00 additional for postage and handling. The first of the month is issue date. Copy must be received 30 days in advance (March issue closes for copy on February 1st).

***HOROLOGICAL TIMES***
701 Enterprise Drive
Harrison, OH 45030
Toll Free 866-367-2924, ext. 307
Phone (513) 367-9800
Fax (513) 367-1414
E-mail: dbaas@awci.com
www.awci.com

## TRADESMAN

**DIAL REFINISHING**

BEFORE AFTER

Quartz Conversions
Diamond Dial Conversions
Emblem & Name Personalization

Write for Brochures
**INTERNATIONAL DIAL CO., INC.**
58 W. SUGARTREE
P.O. BOX 970
WILMINGTON, OH 45177
(937) 382-4535

**LASER REPAIR**
Reconstruction of watch cases, bands (gold & two tone), antique mountings, diamond micro & pave' bead build-up in platinum & gold. All aspects of jewelry repair.
**Joel Lefaive (520) 579-8668**
**Tucson, Arizona**

**REPIVOTING - WRIST & POCKET WATCHES**
Custom made pivots for balance staffs, arbors, pinions. No part too small. Balance staffs and arbors made to factory standards. 40 years experience. Juliusz Dabrowski, J.D.Watchworks 210 Post St., Suite 506, San Francisco, CA 94108; (415) 397-0310; jd@jdwatchworks.com

**ATMOS**
Service/Repair
Warranty 2 Years Parts & Labor
**800-837-1545**
**Clockmaster, Inc. – Robert Good**
2537 So. Brentwood Blvd.
St. Louis, Missouri 63144

**POCKET WATCH & MARINE CHRONOMETER REPAIR**
General repair and restoration of antique and complicated watches. Custom parts fabrication including staffs, verge staffs, stems, levers, and springs. Located in Massachusetts. Matt Henning, CW (413) 549-1950; www.henningwatches.com

**IMPORTANT - NEW ADDRESS FOR LARRY BLANCHARD, CMW21**
**Now at: Palmer's**
101 East Sycamore St., Kokomo, IN 46901
Phone (800) 207-1251
Fax (765) 457-8517
E-mail: service@palmersjewelry.com
Continuing with service of tuning fork Accutron, vintage American and fine Swiss watches.

**CLOCK GEARS, BARRELS** and **PINIONS** made from your sample, **ARBORS** re-pivoted, teeth replaced in gears or barrels. All work guaranteed, fair prices fast turn around. Call Mike Loebbaka, 86 Mullens Lane, Saugerties, NY 12477; Phone: 800-411-4542, tictoc@oldandnew.com

**FENDLEY & COX**
**WHEEL AND PINION SPECIALIST**
1530 Etain Rd., Irving, TX 75060
RICHARD COX 972-986-7698
CMC, FNAWCC, CMBHI
www.fendley-cox.com

**IMPORTANT - NOTICE**
Timewise (formerly TANI Engineering)
MAINSPRINGS - Clock and Music Box
Custom Made. All Sizes. Brass Blanks
Ph: 330-947-0047
E-mail: twclock08@att.net

**DIAL REFINISHING CO. FAST SERVICE, FINEST QUALITY,** quantity works welcome. Specialize on changing dial feet positions to fit the quartz movement. Send your works to: **KIRK DIAL OF SEATTLE,** 112 Central Avenue North, Kent, WA 98032; (253) 852-5125

**HAMILTON ELECTRIC WATCH RESTORATION**
Expert, experienced service on all Hamilton 500 and 505 Electric watches. René Rondeau, P.O. Box 391, Corte Madera, CA 94976, Phone (415) 924-6534 www.hamiltonwristwatch.com

**VINTAGE POCKET WATCH RESTORATION**
**Thirty-two years experience, guarantee, free estimates. The Escapement, P.O. Box 522, Pooler, GA 31322; (912) 330-0866**

**MORGAN PIVOT POLISHER**
POLISH PIVOTS IN AS LITTLE AS 5-7 SEC.
FITS SHERLINE, MOST WATCHMAKERS & ENGINE LATHES.
MORGAN CLOCK CO.
800-805-2220 9-5 CST
MORGANPIVOTPOLISHER.COM


**ELECTRONIC INSTRUMENT SERVICE**
We are Factory Authorized Service for:
• **VIBROGRAF & PORTESCAP**
• **TICK-O-PRINT & L&R**
We service all makes of ultrasonics, all makes of watch rate recorders, and related equipment. 25 years experience.
190 Deepstone Drive San Rafael, CA 94903
**Used Equipment Bought & Sold**
**For Information**
**(415) 479-8960**

**DENNIS KAYE**
**108 Corgy Drive • Cary, NC 27513**
**888-363-9510**
**Porcelain Dial Restoration**
**Watch • Pocket Watch • Clock**
**Platform Escapement Repair**
**Atmos Parts & Service**
**400-Day Clock Repair**
**Kundo Coil / Electric Clock Service**
**Prompt Reliable Service . . . Guaranteed™**
**Large Supply of Watch Movements & Parts for LeCoultre, Wittnauer & Longines**
**Call Us or Visit dialrepair.com**

# ARTICLES FOR SALE

**Parts - Circuits - Movements**
Including but not limited to calibers **101.001, 201.001, 210.001, 940.111, 950.001, 959.001**. We also have parts for ETA, ESA, AS, FEF, FHF, UNITAS, FELSA and other calibers. bhswatch@gmail.com **(208) 676-8430**

**HAMILTON ORIGINAL MILITARY MATERIAL**
Supplying original factory material for the Hamilton Model 21 Chronometer, Model 22 Deck Watch & Military 16 Size Watch Models 23, 3992B, 4992B and 2974B As well as much material for the 950B & 992B Railroad Watches.
LARRY CRUTSINGER
P.O. Box 8514 Norfolk, VA 23503
757-650-9470 E-mail: detent21@aol.com
www.militarywatchmuseum.com

**DASHTO INC./TOM MISTER**
**PO Box 61894**
**Virginia Beach, VA 23466**
**http://www.dashto.com**
**Huge and everchanging selection**
**Used and new horological items**
**Sold by internet list only**
TOOLS/EQUIPMENT
MATERIAL ASSTS/PARTS
POCKET/WRISTWATCHES
WATCH MOVEMENTS
WATCH CASES & DIALS
WATCH BRACELETS/BUCKLES
MUCH MORE
**WE BUY & TRADE ALSO**
dashto@erols.com
http://www.dashto.org


**30+ years accumulation of discontinued & hard-to-find parts. E-mail request to Richard at: QltyWatch@aol.com PayPal Accepted**

**STUCK FOR A MOVEMENT?**
or a watch part? Call Don Kroker's Watch Movements. (559) 229-8423 or write 4325 No. 5th St., Fresno, CA 93726

**DOCTOR'S WATCHES** - beautiful German design, Swiss mechanical ETA movement, good price. Contact Mark Butterworth for info at (563) 263-6759 or bci@muscanet.com

***The Original* Troop-Balas Labs**
Silcon-7® Sealant $6.60
One-Dip Solution® $6.60
Crystal-Kleer® Rouge $7.25
KT-22 Microlubricant® $3.90
**www.troop-balas.com**
**800-423-3294**

**Regula and H. Herr Cuckoo Movements**
Complete selection. Also factory stopper new Hermle, Urgos, and Kieninger at 60% OFF our regular wholesale prices. Call Butterworth's (563) 263-6759.

Clockmaking & Modelmaking Books, Videos & DVDs by W. R. Smith, 8049 Camberley Drive, Powell, TN 37849. Phone 865-947-9671; www.wrsmithclocks.com


**A & B**
**WATCH PARTS AND TOOL SUPPLY**
**5 S. WABASH AVE SUITE 1207**
**CHICAGO, IL 60603**

**FULL SERVICE WATCH MATERIAL HOUSE**

- **VAST SELECTION OF WATCH MOVEMENTS**
- **COMPLETE LINE OF CRYSTALS - MINERAL FLAT, MINERAL DOME, PLASTIC HIGH AND LOW, SAPPHIRE FLAT, SAPPHIRE DOME, MAGNIFYING**
- **SPECIALIZING IN HARD-TO-FIND AND HAND CUT CRYSTALS**
- **HUGE VARIETY OF STRAPS AND BANDS**
- **WE CARRY A RANGE OF MAXELL AND ENERGIZER BATTERIES**
- **SPECIAL FEATURE: FREE GROUND SHIPPING ON ORDERS OF $100 OR MORE**

**TEL: 312-236-0190**
**FAX: 312-236-0191**
**ABWATCHPARTS@LIVE.COM**
**FURTHER INFORMATION AVAILABLE ON REQUEST**

# BUSINESS FOR SALE

## STORE FOR SALE


**Established Watch Repair & Sales Store**

- In business for 22 years, with many loyal customers
- Located in Concord, CA (San Francisco Bay Area)
- Please call (925) 689-2470 for more information

# SITUATIONS WANTED

**CLOCKMAKER**
20+ years experience, seeks employment or self-employed position or business partnership. Please reply to Box SW122009, c/o *Horological Times*, 701 Enterprise Drive, Harrison, OH 45030.

**WATCHMAKER/TECHNICIAN**
30 years experience
Horology School Graduate
Please contact John
jbuerger25@yahoo.com

## WANTED TO BUY

**ROLEX PARTS WANTED**
Buying Rolex crowns, crystals and material, new stock only. Also buying Rolex watches, bracelets and movements any age.
Call Paul at 978-256-5966
or e-mail Paul@pduggan.com

**JEWELRY WELDER WITH MICROSCOPE**
**wdharris2@verizon.net**

**WANTED WATCH BOXES**
Buy - Sell - Trade
We want most major brands. Also buying high-end jewelry brand boxes. **Doug Giard, 586-774-3684**

Top prices paid for karat gold scrap (any amount)! Also, buy filings, gold fill, sweeps, silver, platinum! Immediate 24-hour payment return mail! Ship insured/registered mail to: AMERICAN METALS COMPANY, 253 King St., Dept. HT, Charleston, SC 29401. Established 1960. Phone (843) 722-2073

**WE BUY WATCHES**
Rolex, Patek, Cartier, LeCoultre, Vacheron, Breitling, Audemars, Tudor and others. Modern or Vintage. **Doug Giard, 586-774-3684**


We also fit glass crystals to Openface, Hunting, and English chain drive watches. Complete watches, dials, movements, case springs for sale.

**G F Specialties**
**1-800-351-6926**
**P.O. Box 170216**
**Milwaukee, WI 53217**

**$$WANTED ANYTHING$$**
**Rolex - Cartier - Patek - Breitling**
**Panerai - Le Coultre**
**Vacheron - AP - Etc.**
Watches, Boxes, Dials, Links, Parts, Bands, Movements, Crystals, Bezels, Crowns, Clocks, Signs, Posters, Catalogs, Instruction Books, Polish Cloths, Wallets, Hats, Shirts, Promo Items, ANYTHING! **Doug Giard, 586-774-3684**

## WANTED!

Entire Watch Collections
Scrap Watchbands
Gold-Filled Cases & Scrap
Gold, Silver & Platinum Scrap

**Call Toll Free 1-800-208-2608**

Visit our website for more information
www.specialtymetalsrefiners.com

**Specialty Metals**

2490 Black Rock Tpke.
Fairfield, CT 06825
203-366-2500 - Local
800-884-7966 - Fax
sales@specialtymetalsrefiners.com
Member: Jewelers Board of Trade

**ATTENTION RETIRED WATCHMAKERS**
**Call us before you sell your parts, tools, and watches. We have helped over 175 watchmakers in the last eight years to dispose of their accumulations. When you're really ready to sell, we're ready to buy! Phone (229) 928-9092 or (727) 327-3306. Ask for Jeff or Nancy. E-mail: jeffnancy@mchsi.com**

# AWCI Member Websites

- **Have you always wanted a website for your business, or are you unhappy with your current website?**
- **Do you feel that your business needs more exposure to your customers?**
- **Do you want a website, but don't know where to start, and assume it would be a costly venture?**
- **Do you just not have the time to mess with it?**

## Go to: *awci.companysitecreator.com*

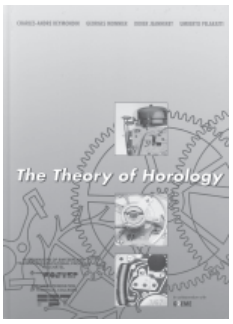
**AWCI and Companysitecreator have worked together to offer an opportunity to all members!**

**It literally takes just a few minutes to build your new site in 5 simple steps from start to finish.**

**Two packages are offered ($8.95 per month or $18.95 per month), and you are able to see your site before you decide to purchase.**

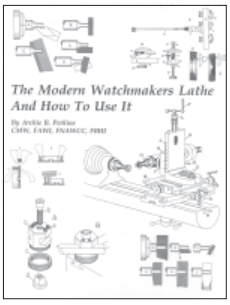
# Recommended Literature for AWCI's CW21 Examination

***The Theory of Horology***



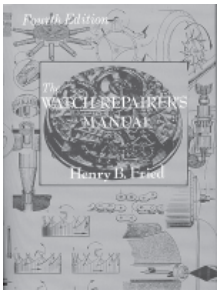

The Theory of Horology is a hardcover book with 360 large semi-glossy pages of 8" x 11½" and printed in full color. This book is a theory on horology pertaining to watches and clocks. This book is not a detailed guide of how to repair a watch or clock, but from the descriptions given and from the detailed line drawings of all types of timepieces, one can easily deduce methods of repair and re-assembly. *The Theory of Horology* is currently the "bible" of every novice and even the well seasoned watchmaker, clockmaker, and student. It ends with an eight (8) page section on exercises (with answers given of course) which is quite interesting.
**RETAIL: $194.95 AWCI MEMBERS: $175.46**

***The Modern Watchmakers Lathe and How To Use It***



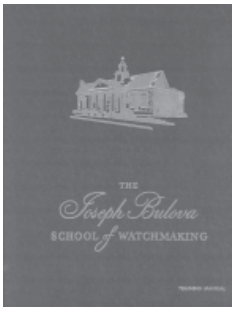

By Archie B. Perkins, CMW, FAWI, FNAWCC, FBHI
A course in watchmaking, clockmaking, and repairing would not be complete without adequate instruction and practice in using the watchmakers lathe as well as instruction and practice in using saws and files. When restoring antique watches and clocks, the restorer must be skilled in the use of the lathe, saws and files to make and alter parts to fit the mechanisms. Parts are not always available, or available to fit, and must be altered or made from raw materials. This book is intended to teach these skills and to serve as a textbook for schools as well as for students of on-the-job training programs and hobbyists. This book has more than 400 pages with 548 illustrations. These illustrations include 267 photographs and 281 hand made line drawings. All of these illustrations were made by the author. The book also has eleven tables. There are 25 chapters in the book. Each chapter has a summary, questions about material in the chapter, and a reference guide for further reading.
**RETAIL: $79.95 AWCI MEMBERS: $71.96**

***The Watch Repairer's Manual***




By Henry B. Fried, CMW, CMC, FAWI
This book is frequently used as the textbook for courses in watch and clock repair. It is ideal for individual study as well. Published in 1986, the 4th edition includes the six chapters on case setting and winding systems, motor barrels and jeweled main wheels, the verge fusee watch, repairing fusee chains, how to make a verge (staff), and the duplex escapement. A total of 26 chapters comprise this 456-page book, along with a glossary, appendices, many illustrations.
**RETAIL: $43.99 AWCI MEMBERS: $39.59**

***The Joseph Bulova School of Watchmaking Training Manual***




*The Joseph Bulova School of Watchmaking Training Manual* units include: Staking Balance Staff, Truing Balance Wheels, Basic Turning, Turning Balance Staffs, Stem Making, Burnishing Balance Pivots, Poising Balance Wheels, Hairspring Truing, Hairspring Vibration, Overcoiling, Watch Assembly, Mainspring Barrel Assembly, Friction Jeweling, Wheel Train Assembly, Escapements, Terminology, Finishing, and General Repair Information. The Joseph Bulova School of Watchmaking was the principal author and developer of *The Joseph Bulova School of Watchmaking Training Manual*. Size: 8½ x 11, 352 pages, hard cover.
**RETAIL: $54.95 AWCI MEMBERS: $49.46**

**PLACE YOUR ORDER TODAY!**
**Call AWCI 1-866-367-2924 ext. 301 or visit the AWCI website www.awci.com**

# Advertisers' Index



**Horological Times Advertising Policy**
The publisher reserves the right to approve all advertising copy and reject any advertisements not in keeping with the publisher's standards. The publisher may, at the publisher's sole discretion and for any reason and without notice, decline to publish or republish any ad, in which case any fees submitted or paid for such ads shall be returned or rebated to the advertiser. The publisher reserves the right to edit all copy. The advertiser and/or agency agree to assume liability for all content of advertisements printed. They will also accept responsibility for any claims or suits arising therefrom brought against the publisher.

# AWCI Staff Directory

James E. Lubic, CMW21
Executive Director
Education & Technical Director
1-866-367-2924 ext. 310
jlubic@awci.com

Thomas J. Pack, CPA
Operations Director
1-866-367-2924 ext. 311
tpack@awci.com

Thomas D. Schomaker, CMW21
Watchmaking Instructor/Certification Coordinator
1-866-367-2924 ext. 309
tschomaker@awci.com

Donna K. Baas
Managing Editor/Advertising Manager
1-866-367-2924 ext. 307
dbaas@awci.com

Sharon McManus
Membership Coordinator
1-866-367-2924 ext. 302
smcmanus@awci.com

Daniela Ott
Education Coordinator
1-866-367-2924 ext. 303
dott@awci.com

Sally Landis
Receptionist/Technical Support
1-866-367-2924 ext. 301
slandis@awci.com

Jim Meyer
IT Director
1-866-367-2924 ext. 323
jmeyer@awci.com

American Watchmakers-Clockmakers Institute
701 Enterprise Drive
Harrison, OH 45030
Phone: Toll Free 866-FOR-AWCI (367-2924)
(513) 367-9800
Fax: (513) 367-1414
E-mail: awci@awci.com
Website: www.awci.com
Office Hours: 8:00 to 5:00 (EST) Mon-Fri