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COVER

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President's Message

By Joseph Juaire, CW21

Camaraderie

As I write this, the plans and preparations are in full swing for our annual convention in Providence, Rhode Island. As you read this, the convention has already occurred and it's history and memories are fresh and rewarding to those of you who were fortunate enough to attend. A great thing about professional conventions is that everyone who attends is most certainly able to take at least one great idea, hot repair tip, new friendship, supplier contact, or other positive experience back home to the workshop and allow it to grow and become a gift that makes your life better.

It is true that one of the greatest benefits to belonging to a professional organization is the camaraderie of like-minded people who understand your professional language and are eager to help each other become more fluent in that language. Here in the Minneapolis/St. Paul area where I have operated a repair shop, my competition is actually an asset. I've been able to run quickly to my "competitor" to get that rare part that would take forever to find otherwise. I've also had my "competitors" run to my shop to get that rare part or "second pair of eyes" to keep a good customer happy. I've been told that this is very rare and not seen in most industries. We are and have always been a very unique industry and this is just one positive example of that. Not only does this help our customers, but it also helps our individual and regional reputation. If we continue to support each other, we all become valuable, highly paid professionals both by definition, and by reputation.

The AWCI has always placed high importance on educating its members. Besides the forums, the magazine articles, the school in Harrison, the CW21/CC21 exams, or the roving teachers and officers to your local meetings, there is that all-important education received when you network with your fellow members. If you were at the convention, I hope you networked with your fellow members.

If you were not able to attend this year, I hope you can plan to come next year. The 2010 convention will mark our fiftieth year and our golden anniversary. We are already planning to make it a very special occasion for everyone. The convention will be held August 5-8, 2010 in Cincinnati, Ohio. We are attempting to get all Past Presidents, Fellows, and leaders in our great organization to attend for what will prove to be an amazing gala event that you will not want to miss.

Executive Director's Message

By James E. Lubic, CMW21

AWCI is a volunteer driven, not-for-profit membership organization consisting of a 12-person Board of Directors, 12 committees, 21 Affiliate Chapters, 24 Industry Advisory members, and 12 schools. Every year at this time we solicit the membership for volunteers to lend their expertise to AWCI. Again this year we are appealing to our membership to get involved. The only requirement is that you are a current member, have access to e-mail, and you are willing to give some time to the organization.

Please go to our homepage at www.awci.com and click on "AWCI Committee Volunteers" complete the form and click "Submit by E-mail", or see page 35 of last month's (July) *HT* for a complete list of committees, and a sign-up/committee request form. You can photocopy the page, fill it out and fax it to us at 513-367-1414, or simply e-mail your choices to me at jlubic@awci.com

Your requests will be delivered to the AWCI President. The President assembles the committees and submits his committee choices to the Board of Directors for a vote within 30 days of the annual convention per the AWCI Constitution and Bylaws.

When assembling the committees the President will also consider the goals and objectives of the various committees as they relate to the Institute's strategic plan. As these goals and objectives are met, the strategic plan is updated and new goals and objectives are put in place. To see a current list of the committees, along with their goals and objectives, please go to the AWCI website at www.awci.com, click on "About" and then click on "Committees".

If you would like to get involved with AWCI on a more local level please refer to our list of Affiliate Chapters, which is also posted on our website under "About" then "Chapters" in the drop down menu. The various Affiliate Chapters are also looking for volunteers.

If you prefer to work on your own and would like to volunteer for the organization, we are still looking for members who would like to prepare short PowerPoint presentations that we can post on our website. These presentations should be technical in nature and refer to one aspect of watch or clock repair, not a complete overhaul or restoration.

If you have any questions about volunteering for AWCI please feel free to contact me.

On a different topic, I would like to thank all the companies and individuals who advertise in the *Horological Times*. We are thankful for your continued support. As a member, please be sure to let these folks know that you appreciate their support as well. When you place an order let them know that you saw their ad in the *Horological Times*.

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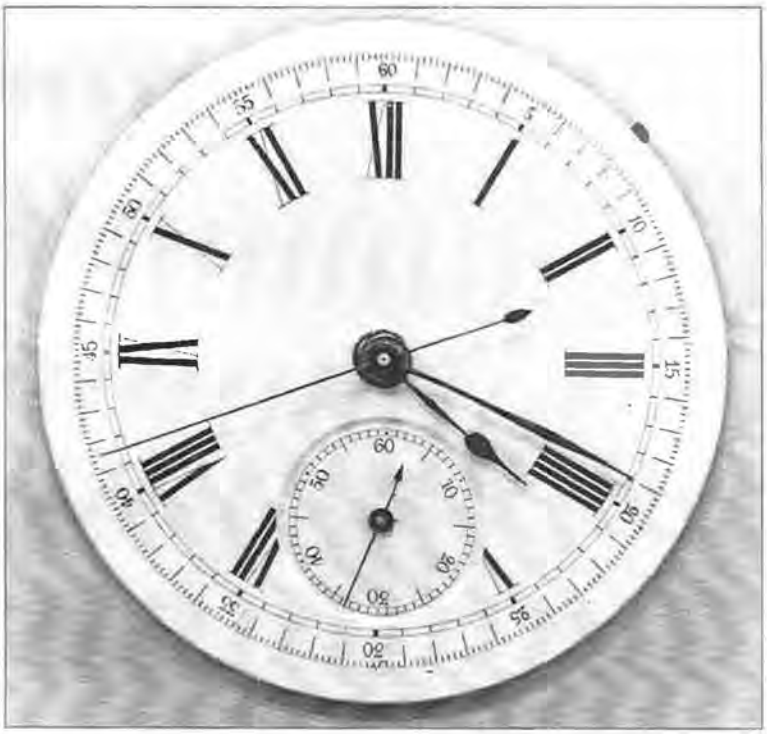
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Questions & Answers

By David A. Christianson, CMW21, FAWI





Question

Is this watch American? Do you know who made it?

Michael L. Stafford
Peoria, IL

Answer

Your chronograph pocket watch was made by Marc and Emmanuel Didisheim of St. Imier, Switzerland, probably around 1890. Gene Fuller dated a similar movement (#148761) as circa 1900, but I think it, too, should have been dated a bit earlier.

Marc and Emmanuel Didisheim (sometimes misspelled as Ditisheim) came to St. Imier from France and established their company there in 1850. In 1884 the company registered the name M & E Didisheim along with their trademark: M & E over D on a shield, just as your movement illustrates. "The Nassau" was one of their model names. Hipp. Didisheim of 88 Nassau Street in New York (probably a relative) claimed to be the sole importer of "The Nassau" watch in North America. A similar watch can be found in the 1896 wholesale watch and jewelry catalogue of the A.C. Becken Company.

The unique feature of the M & E D watches was that they were made for the American market and were made to fit the American-made watchcases. During this period the consumer would buy the movement and the case separately and the watchmaker/jeweler would then fit the two together.

References

Pritchard, Kathleen H. *Swiss Timepiece Makers: 1775 - 1875*, pp. D-30 to D-31.

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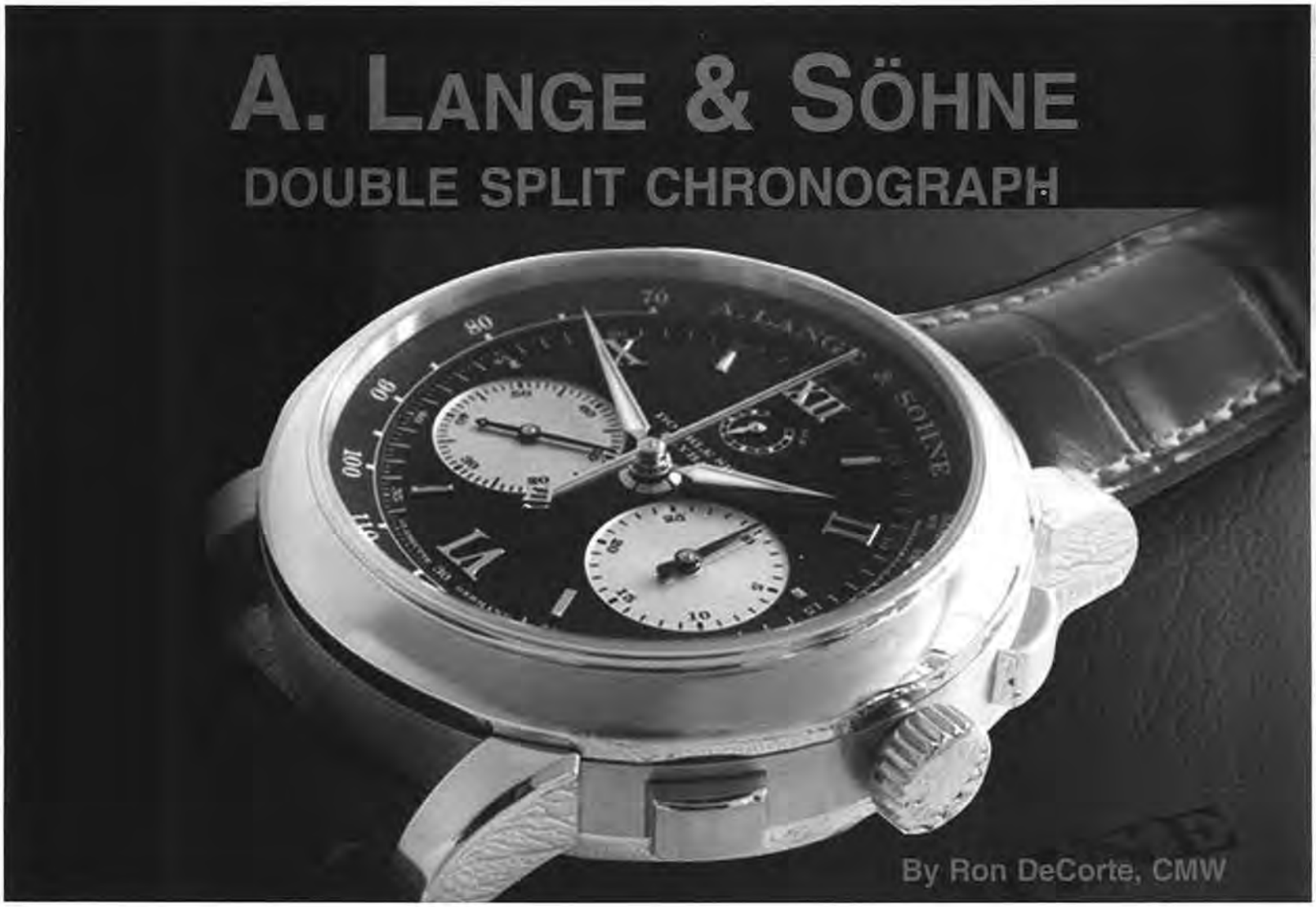
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A. Lange & Söhne

Double Split Chronograph



By Ron DeCorte, CMW

A. Lange & Söhne is not the largest watch manufacturer and they prefer to keep it that way. Nevertheless, in name and by way of reputation, they are among the titans of the watch world. Precision is an attitude at their base of operations in Glashütte, Germany that becomes ever more evident with every step you take past the A. Lange & Söhne doors.

The A. Lange & Söhne Double Split chronograph marks the evolution of a classic watchmaking complication. Basically, the Double Split is a chronograph meant to record periods of time, events, with great precision. In the mid-1800s the idea for a split seconds chronograph emerged. This mechanism allowed two events to be compared via the same watch. This is useful for any kind of racing activity. But there was one drawback to all these previous split chronographs: they could only record comparative differences of one minute or less. If you had two events that might elapse over the course of more than one minute, you had to mentally keep track of the minutes. By way of contrast, the Double Split allows a comparative record of two events to be precisely generated for up to 30 minutes.

Sensibly, the Double Split has two sets of chronograph hands for recording two separate events, or only one event



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if that is your requirement. At the center of the dial are the usual hour and minute hands, and concentric to these are two chronograph seconds hands. To the lower left are two chronograph minute recording hands sharing the same chapter ring (sub dial). The seconds' recording hands are of different colors - the upper white and the lower gold - while the minute recording hands are also of two different colors (blue and gold). Contrast to the respective dials, and sub dial colors, is the reason for this.

As it is with all split chronographs, there is a third push piece involved in the operation. Besides the usual two push pieces located at 2 o'clock and 4 o'clock, a third is located at 10 o'clock (Figure 1). It is this third button that


Figure 1

controls the "split" action of the chronograph. Pushing the button at 2 o'clock sets the chronograph to action, with both seconds and minute recordings synchronized with each other, a typical way of recording a single event. Now a simple push of the button at 10 o'clock stops one of the seconds and minute recording hands to record the first event, and another push brings all the chronograph recording hands back into synchronization. This process can be repeated as many times as required.

But it is not merely the ability to record multiple events within split seconds and minutes that makes the A. Lange & Söhne Double Split special. An ingenious double clutch mechanism, controlled by two small hammers and

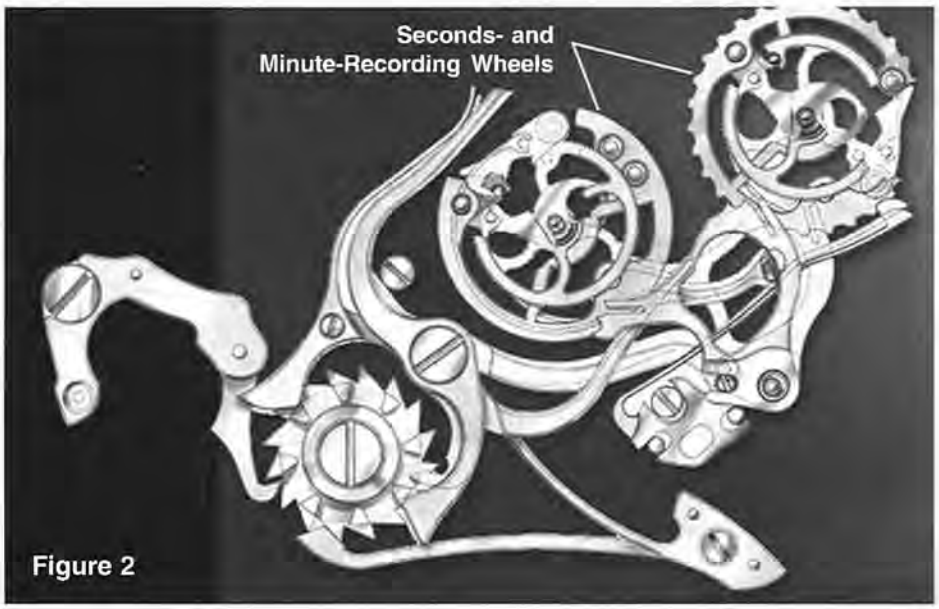


Figure 2

two small heart-shaped cams, ensures the A. Lange & Söhne Double Split will not suffer any of the liabilities all other split chronographs have faced.

In Figure 2 we get an overview of the split mechanism. The seconds- and minute-recording wheels can be stopped and started again while the main chronograph continues to function. The central seconds wheel has very fine and barely visible teeth at its perimeter, while the minute recording wheel has 30 coarser teeth because the double split has a 30-minute counter on the dial side. Also notice the cutaways. These details show the position and movement of the various parts when the split has been activated and has recorded an intermediate event, while the solid color details show the same parts while they are operating in synchronization with the main chronograph function. We will explore the

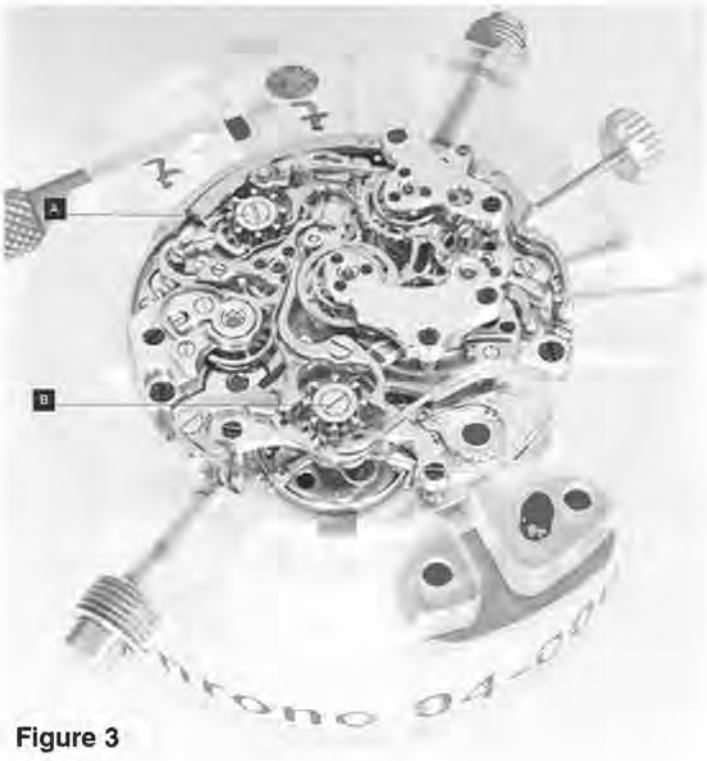


Figure 3

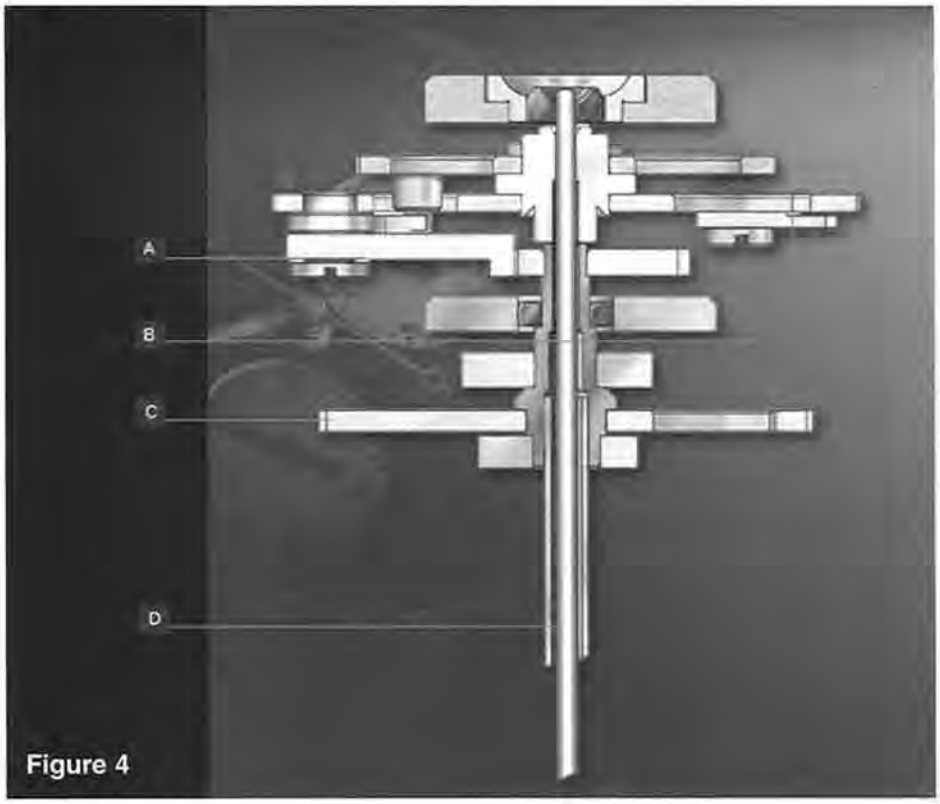


Figure 4

individual components in much greater detail as we move along.

The double split requires two column wheels to operate the main chronograph functions and the split functions (Figure 3). At "A" is the main chronograph column wheel. Look closely because it is more of a crown that turns at precise increments, as desired, by each press of the main chronograph function buttons, thus starting, stopping, and resetting these functions. Now have a look to see that column wheel "B" is responding to the owner's requirement to stop and record a secondary event (the split recorder). These operations are the basic part of every split seconds chronograph.

Now we "split" from the ordinary and examine two very special features of the Double Split chronograph. In order to record two separate events—seconds and minutes each—there needs to be two chronograph seconds hands and two minute-recording hands. Rather than spread hands all over the dial in a cluttered array, A. Lange & Söhne has chosen very wisely to keep like-minded hands together in central locations.

To explain the first special feature, I'll address Figure 4. There is the convenience of recording two events via this mechanism—one for the seconds and another for the minutes. At "A" is a hammer (shoe) and at "B" is a heart cam. These two components constitute a clutch system that engages and disengages the two separate recordings of events. (We will examine this function in more detail later.)

At "C" is a pipe (tube) that carries either a minute-recording hand or seconds-recording hand. Remember that there are two of these mechanical marvels in the watch. And "D" is a shaft that passes through the pipe and carries another corresponding hand.

The split control mechanism has been removed for easier viewing and understanding in Figure 5. When the split mechanism is called upon, by pressing the split button on the case, pressure is applied to shaft "A" which in turn pulls hook "B" that rotates crown wheel "C" 1/16th of a turn, and jumper spring "D" holds the crown wheel stationary. Two arms, "E" and "F" form a set of scissor arms. These scissor arms will grab and stop the split-seconds wheel (you can see this very clearly in Figure 2) when called upon to record an intermediate event.

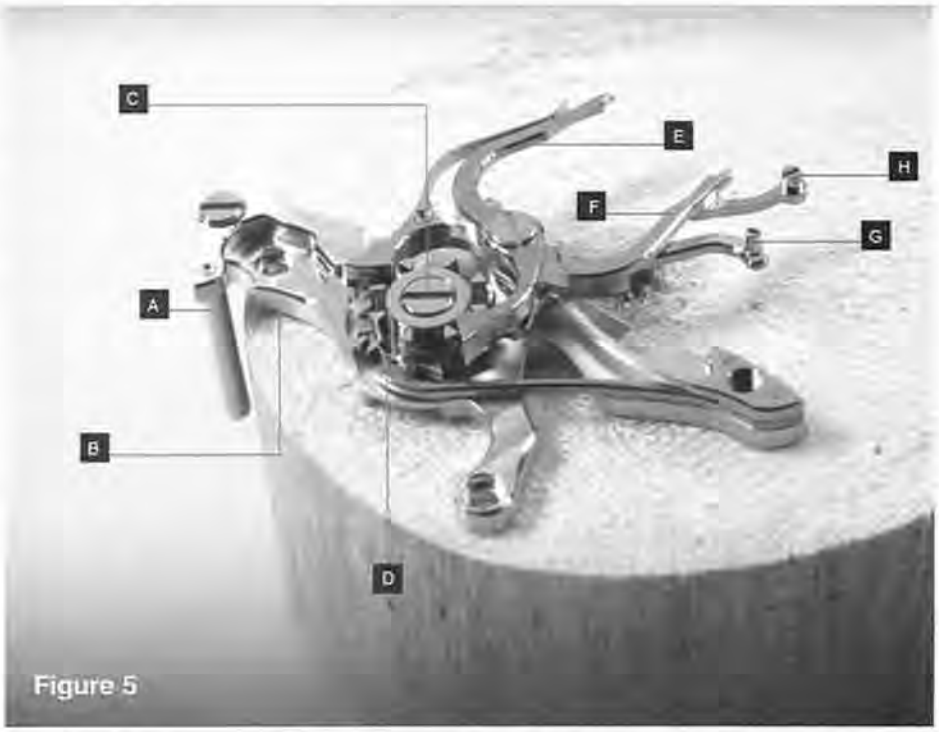


Figure 5

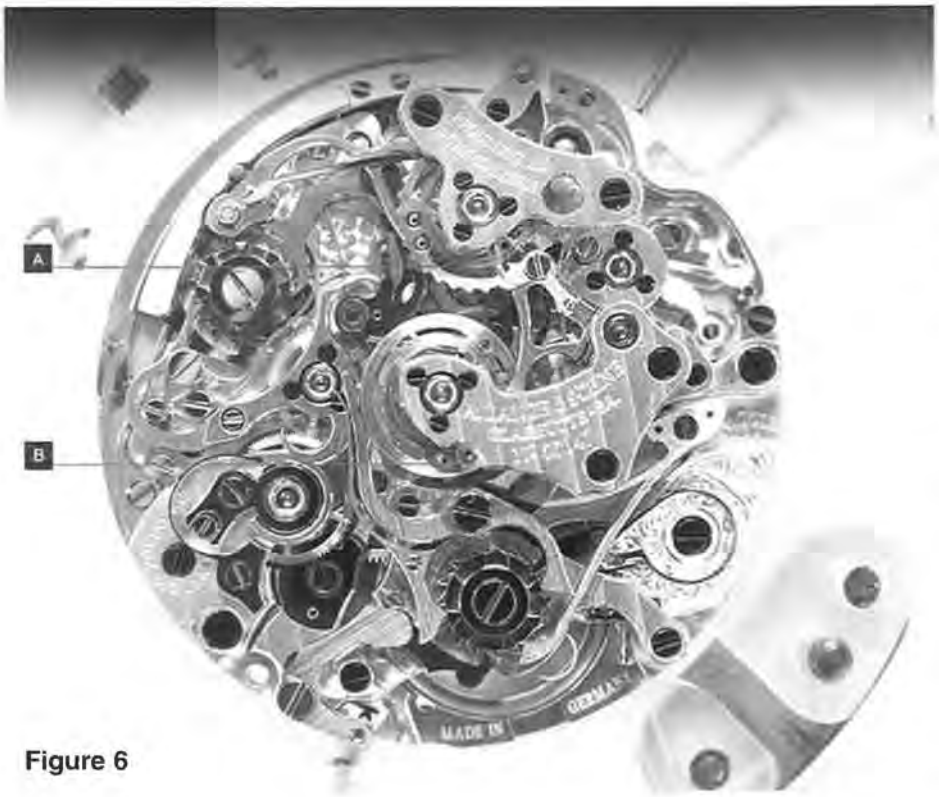


Figure 6

This action must be very swift in order to stop the seconds hand at a fraction of a second but also gentle enough not to unsettle the hand so it shows a false reading. It is, I can attest, a very fine skill to adjust the proper operation of a split chronograph. Stopping the split-seconds hand is the first operation that must be accomplished in the Double Split, but not the only. The two pins "G" and "H" will be responsible for the clutch actions that will be examined towards the end of this article.

I save the most interesting aspect of the A. Lange & Söhne Double Split for last. As mentioned earlier, each set of chronograph recording hands, minutes and seconds, must be either coupled together (as in recording a single event) or decoupled (as when the split function is called to action for a secondary event). And, when the split function is called out of action, the recording hands (minutes and seconds) must again become instantly and perfectly synchronized with their counterparts. This latter point is extremely important.

In order to record two separate events, there needs to be a pair of clutch systems, one for minutes and one for seconds. In Figure 6 we can see these clutch mechanisms, "A" is for the minutes and "B" for the seconds recording. Their function will become clearer in the following drawings.

In Figure 7 are the hammers "A" and heart cams "B" as mentioned earlier. In the upper drawing, the minutes- or seconds-recording hands are in synchronized mode, coupled since the hammer is in direct contact with the heart cam and held there semi-rigid via the force of the spring. In the lower drawing, they are not synchronized, uncoupled since the hammer has been held apart from the heart cam. Think of it this way, in the upper drawing, you are strolling along with your friend, synchronized, but suddenly your friend needs to stop while you keep on moving (lower drawing). At a further point down the way you agree to get synchronized again with your friend. Magically, at the touch of a button, your friend is at your side again. When the hammer falls to the heart cam, there is no other possibility since the heart cam is eccentric and cannot avoid the path of least resistance.

Something more. All split chronographs suffer a liability when the split function is being used, the hammer is in constant contact, dragging, around the heart cam. The A. Lange & Söhne Double Split has avoided this drag factor by totally decoupling the hammers and heart cams while the split function is in use.

Going back to the operation of the clutch systems, once the split-seconds

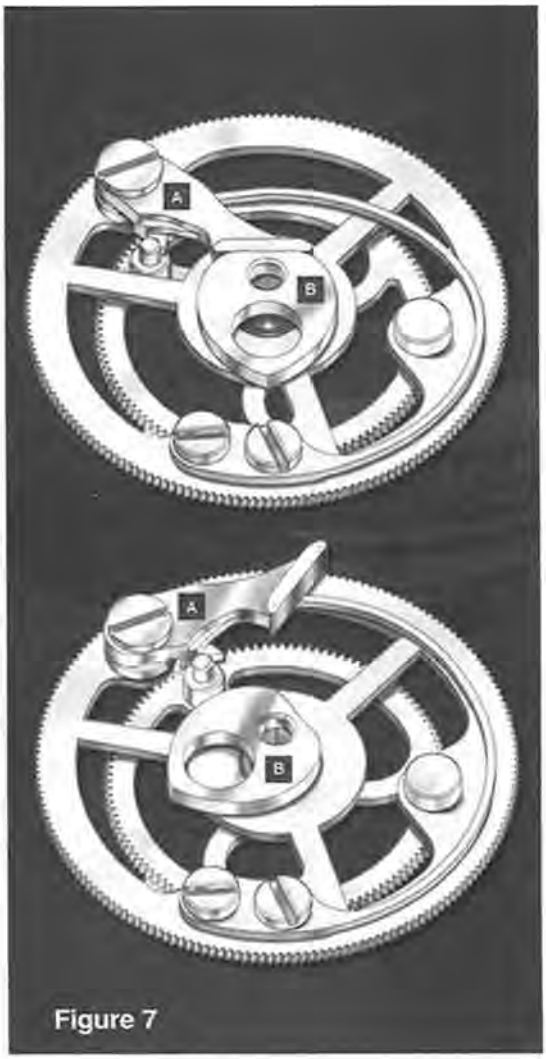


Figure 7



Figure 8

About the Author

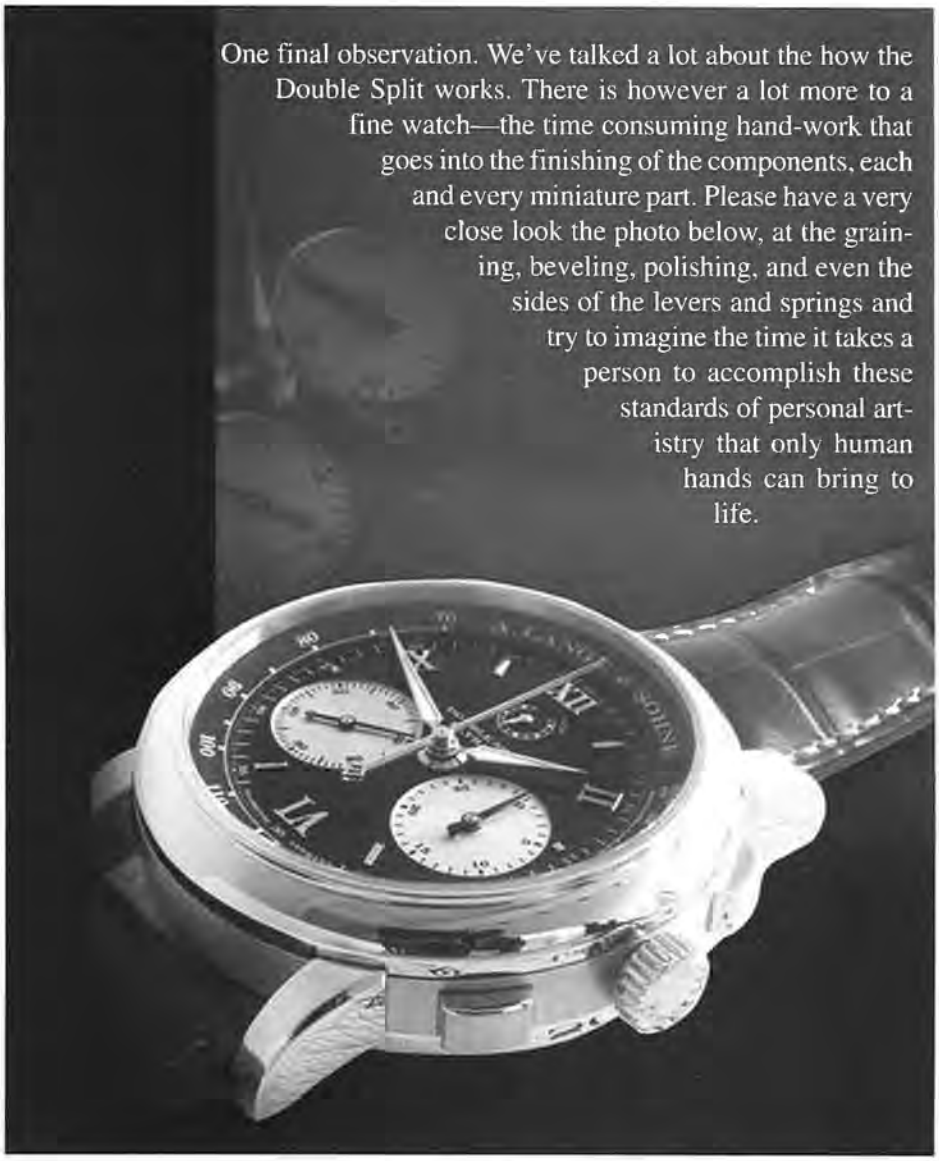
Ron DeCorte is an Independent Watchmaker who has conceived and created his own unique watches, and worked extensively with other distinguished watchmakers in Switzerland. He was president of the American Watchmakers-Clockmakers Institute (AWCI) in 2000 and 2001, and was awarded the AWCI Lifetime Achievement Award in 2003. He specializes in the restoration of mechanical watches, writes extensively regarding horological issues, and lends advice to the micro-mechanical arts. All photographs contained in his articles, unless otherwise noted, are made by him on location and without the use of studio techniques.

Text and photography by Ron DeCorte

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wheel has been grabbed and stopped by the scissor arms, the clutches must be disengaged in order to stop the flow of power to both the split minute and seconds hands. This must happen after the scissor arms do their bit, but only a fraction of a second later. So here, in Figure 8, we get a view of the clutch mechanisms and their engagement and disengagement operation. "A" is the lever that controls the engagement/disengagement of the clutches. There are two sets of three teeth (B and B^1) at either end of the lever "A" that are responsible for hooking onto the very fine teeth of the clutch release wheels C and C^1 and turning the wheels in a counterclockwise direction about 30 degrees and thus disengaging both clutches instantly and simultaneously. Of course, when the split button is pressed again, the scissor arms release the split-seconds wheel, the clutches are engaged, and the split hands (minute and seconds) are instantly in perfect synchronization with their partners that have been happily recording the main event undisturbed. Imaginative and ingenious indeed!

One final observation. We've talked a lot about the how the Double Split works. There is however a lot more to a fine watch—the time consuming hand-work that goes into the finishing of the components, each and every miniature part. Please have a very close look the photo below, at the graining, beveling, polishing, and even the sides of the levers and springs and try to imagine the time it takes a person to accomplish these standards of personal artistry that only human hands can bring to life.



By Mark Butterworth

The Modern German Clock Movement

Part 81

Retrofitting a Grandfather Clock with Chiming Quartz

The clock repairperson is sometimes faced with situations in which difficult decisions need to be made, balancing the needs of the customer with what we believe to be a proper "repair." In this instance the clock is a modern clock belonging to the widow of an old friend, now deceased. The widow recently moved to an assisted living facility. She has MS and is unable to wind the weights of the clock or make adjustments to the time as needed. She loved to see the clock running and hear it chime as it reminded her of her late father who had made it for her. I had done other clock work for them over the years including replacing quartz movements. She asked if something like that could be done with her clock. It turns out there is a new movement on the market that sounds very close to a tubular chime clock. It is sold under various names including the Quad. It plays four tunes—Westminster, Ave Maria, bim-bam, and single hammer on gong sound. Andy Trosen, our manager, took the movement over to her for a listen. She loved it and wanted it installed in the clock. He brought the case back to the shop for our first retrofitting job.



Figure 1. Original clock before starting work



Figure 2. Clock with dial, weights, pendulum removed; original unit modern Urgos UW32 series.

The clock is shown complete (Figure 1) with original Urgos movement before commencing on the project. The dial (attached to wooden board), weights, and pendulum are then removed (Figure 2). The Quad movement is attached to the dial board (Figure 3). For a realistic look, the fillers are removed from the shells, and the shells are then hung from the original chains from an 1/8" piece of plywood cut to sit on top of the original seatboard (Figure 5). The chains are simply screwed to the underside of the

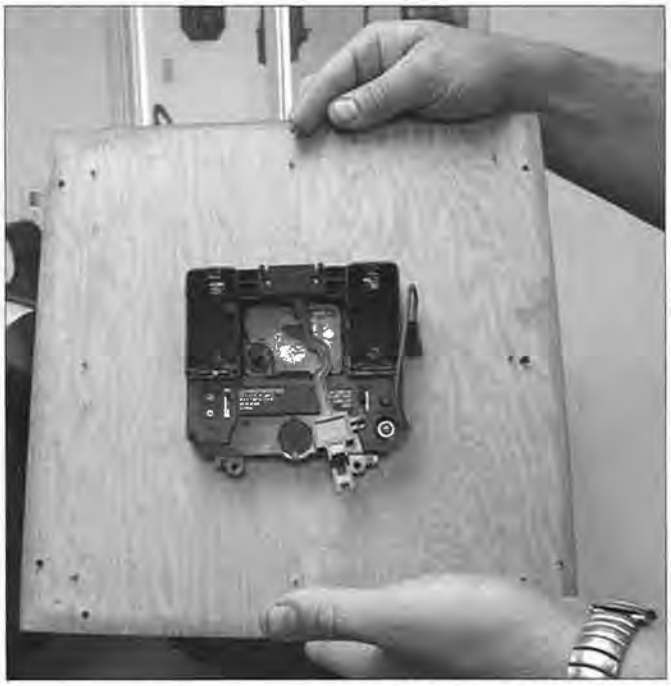


Figure 3. New Quad movement attached to back on wood dial backing.



Figure 4. 1/8" thick plywood with chains screwed to underside



Figure 5. Chain assembly on top of original seatboard with chains through slot

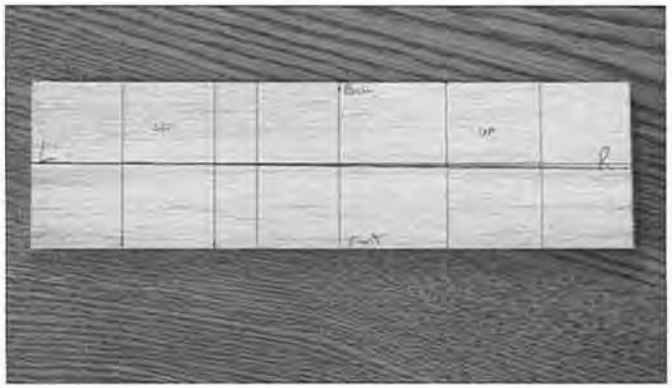


Figure 6. Marking out position of chain wheels on plywood board.

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Figure 7. Height of hook ends about 1½" from seatboard

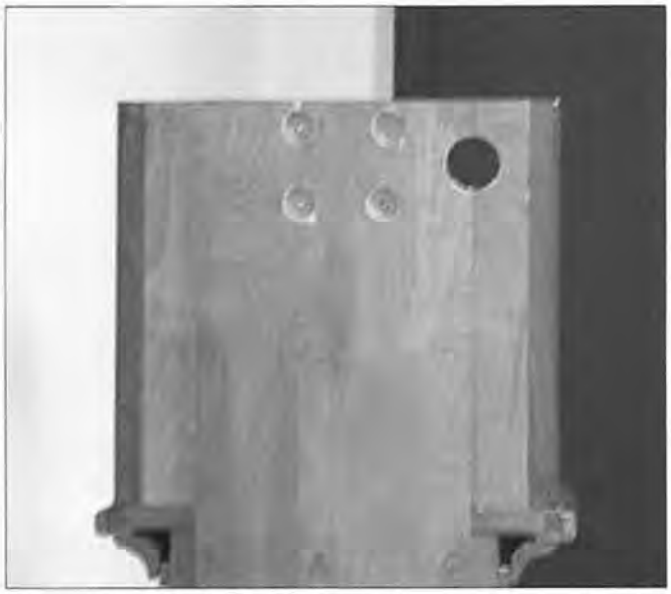


Figure 8. Hole drilled in backboard for speaker sound quality



Figure 9. Speaker installed along with pendulum swinger unit

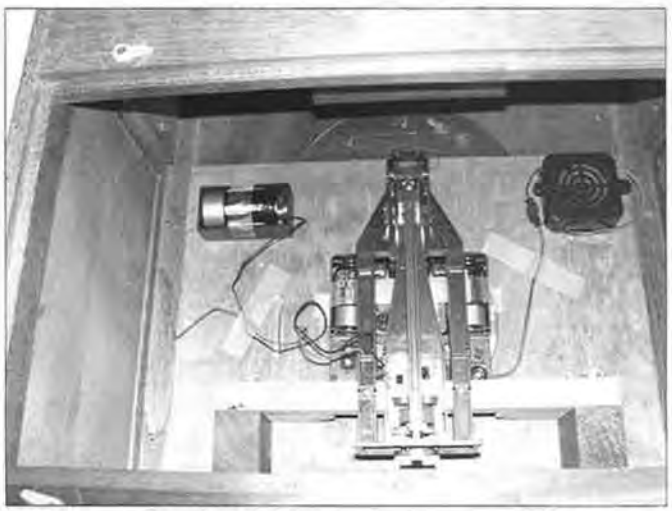


Figure 10. Closeup of swinger unit and battery pack placement.

wood with light-duty wood screws (Figure 4). For best effect the chain board has the lines drawn to be in approximately the same position as the chain wheels of the original movement as shown in Figure 6. I recommend the hook end of the chains to be hung about 18" from the board (Figure 7) so the hanging weight shells do not obscure the pendulum bob. A hole is drilled in the backboard (Figure 8) to mount the speaker so the sound has best volume. The speaker is shown mounted on the backboard and the Quad unit has an E-Z connection to attach it to the speaker. To have the pendulum at a realistic distance farther back in the case, a time and pendulum unit was attached to the rear portion (Figure 9), as the pendulum was extremely light. The movement front is to the rear and



Figure 11. Shells and pendulum installed

attaches to the board shown via its fixation collet. For a heavier pendulum we recommend a more heavy-duty pendulum swinger attached to the seatboard (Figure 10). The pendulum and weight shells are now installed (Figure 11). The collets are removed from the original hands (Figure 12). The hubs are cut from any pair of I-shaft quartz hands (Figure 13) and superglued to the original hands (Figure 14). The clock is now completed and from appearances and sound very few individuals would not know the clock has been transformed (Figure 15). My friend was thrilled and ironically just this morning of the writing has passed away.

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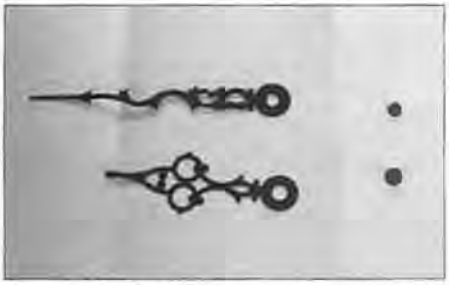


Figure 12. Collets removed from hands.

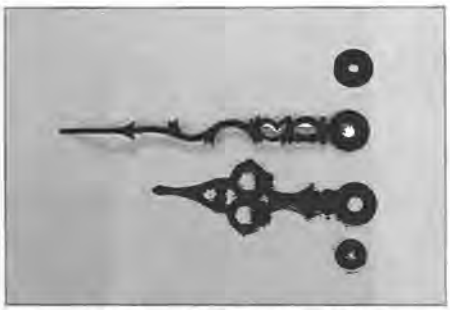


Figure 13. Original hands with hubs cut from standard I-shaft quartz hands.



Figure 14. Hands with quartz hubs superglued on centers.

We make every effort to follow the dictum "first do no harm." Surprisingly, nothing about the job in this instance could not be undone and returned to original. All the parts were saved and given to the customer. Certainly I would never advocate changing every clock in the world to quartz. However, we must also remember that to the customer, the "clock" is mostly what is seen: the face, hands, pendulum, case. The clock is a working piece that loses far more meaning by not working than by keeping it original.

Final thought: *"We are what we repeatedly do. Excellence, then, is not an act, but a habit."—Aristotle*



Figure 15. Clock completed looks like original.

PARTS MESSAGE BOARD

The American Watchmakers-Clockmakers Institute **Parts Message Board** is available on line at **www.awci.com** Click on the Parts Forum in the Top Links box. Guests are free to browse our topics and posts but only validated AWCI members will be able to actively post messages and communicate with one another via private messaging.

The purpose of this board is to aid our members in finding watch parts, clock parts and tools. This board is not open to generic advertising posts; therefore, web addresses and e-mail addresses should not be included in public messages.

Bulletin Board

RESPONSES

New England Watch Co.

Jacob Montgomery, West Manchester, OH, was looking for information on this New England Watch Co. movement. Jack Smith, Warrenton, NC, responded with the following information: In a 1935 Marshall-Swartchild catalog the movement is identified as #5301A, 0 size, series Z.





Do you have information regarding this month's requests? Do you need information about one of this month's responses? If so, send your information or requests to: *Horological Times* Bulletin Board; 701 Enterprise Drive; Harrison, OH 45030-1696; Toll-Free: 1-866-367-2924, ext. 307; Phone: (513) 367-9800; Fax: (513) 367-1414; E-mail: dbaas@awci.com

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Measuring Machines for Watch and Clockmakers

Part 2

By Greg McCreight

Let's start with some brief explanations of what makes up a modern video measuring system. The item to be measured is viewed on a video monitor or computer screen, or in the case of dual screen systems, two computer monitors or one video and one computer monitor. Dual screen systems use one screen for imaging and the other for the software and control icons. However set up, the quality of the monitors is very important. A normal flat screen TV will work with a video camera; however, it will not give the same resolution as a commercial video monitor. The same thing is true of the computer monitor; the higher the resolution the better.

The cameras incorporated into a measurement system can be analog or digital. These cameras are matched closely to the monitor's parameters; it's better to buy a system with its original monitor and camera, than to make one up from parts. There is endless information on the Internet that gives the technical requirements for matching video components. In most cases a video camera connects to a computer card on software-driven systems and the cross hairs or reticles are generated by the software. In a DRO measurement system your camera plugs into a cross hair (line generator) box and it plugs into a video monitor. Whether your system uses a DRO or a computer readout, your measuring stage will have measuring scales (linear encoders) that mount to the side of the stage. They can be external or internal. The scales plug directly into the back of the computer or through an interface to the computer. If a DRO box is used they plug into it. You may have XY or XYZ DRO readouts. Let's clarify the cross hairs I keep mentioning. You must have reference lines to move images against to measure them. A cross hair generator does this by projecting lines on a video screen. They can be single or double line pairs horizontal and vertical, and of course a set of cross hairs. You can also purchase video micrometers that work in the same way by generating lines. They are calibrated to your display and provide on-screen measurement. Just put the lines on either side of your image and read the measurement. The drawback is if you change magnification you need to re-calibrate. Some systems allow you to store calibrations at different magnifications. If so, you need a magnification system that has detents that click or flip to fixed positions to be effective. A zoom magnification will not allow you to return to the exact magnification repeatedly. The cross hairs in the video systems we will show are for placing against the object to be measured as a reference or marker. The stage is then moved and the part's other side is brought to the line on the monitor and a measurement reading is taken. Now the question, is the line exactly against the part? Needless to say there is always error! When we take a sharp line, bring it to the edge of a highly magnified image, with quality optics, proper lighting (very important) we are maximizing our accuracy. On more advanced systems edge detection is used by a complicated formula of enlarging pixels on the screen to detect the absolute edge of line and object. Edge detection is normally for computer systems.

Let's take a look at Figure 7. This is a Ram Optical Instruments "Omis". It has measuring stage movement of 4 x 8 inches. To the left is its video monitor showing an escape wheel and white lines from the line generator, which is



Figure 7

sitting on top. Also on top of the monitor is a QC-200 made by Metronics. You may have noticed one also next to the Hauser M1 in Figure 2 (see July 2009 *HT*, page 10). These serve as the DRO readout on both machines, but they are much more than just a readout. These are measurement computers. They allow entering of points at any location you select by placing the cross hairs over a geometry on an image and picking it. For example, move your stage to place each corner of a square under the cross hair, enter each point, press line and a graphic will appear in the QC-200 window of a square. By selecting geometry in this fashion, lines, circles, angles, etc., CAD drawings can be made giving measurements, locations and other features. This data can also be exported to SPC (Statistical Process Control) and into CAM (computer-aided machining) programs to run CNC machines. They have many more functions, but its beyond the scope (sorry) of this brief article to cover it.

Figure 8 shows another Ram Optical System, This one is shown with a computer screen and a large video monitor. By using a video splitter we can use a video micrometer as mentioned earlier or a computer-based video measuring system. The video micrometer shown is a Boeckler



Figure 8

system. This "Omis system" came equipped with a factory computer using "Automap XYZ" software. We grew rather fond of it until a hard drive crash shut it down. The cost to purchase another computer loaded with the software (original software) was around $5,000, more than I had any intention of spending on a used, older machine. We contacted all the major players in video

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Figure 9



Figure 10

measurement software and found most retrofits would run up to $10,000. Finally we found a product that would do all the geometric-based measurement, archiving, CAD interfacing to AutoCAD and other CAD programs we wanted, and for a much-reduced price. After receiving it we were terribly disappointed and had to ask for a refund! My last ditch effort was a company in China, being very cautious due to the obvious communication problems with technical support. I tried a software download and was quite pleased at the reasonable price. The package included an encoder card to connect to their measuring scales, a video card, manual, and of course software. We had the system working in a few hours. It has edge detection, several measuring probes; these allow you to chose certain shapes on an image for input to a program. The easiest example is a circle tool that automatically measures the diameter and finds the edge of a round entity in an image. An entity in this example could be a jewel or screw head. For those curious, the complete system was $1000 U.S. Even with it being low cost it still comes with a 100-page manual, and takes a while to learn. Do not be put off; the most used and simple measurement functions can be learned quickly.

Figures 9 and 10 show a full-blown CNC measuring system. This is a Nikon VM 150. It uses two monitors, one for viewing and another to view the software, control icons and part program as you build it. This machine uses joystick controls to move all axis of motion. The joystick has ultra fine resolution for sub micron movement. The microscope has several lighting functions controlled by the software, with light coming from fiber optic cables from light sources in the base cabinet. The software has advanced features that allow for programming the stage movement. One can, as described earlier, generate programs from picking geometry on the part; this can generate a motion program that runs the stepper motors in the stage to automatically measure identical parts. As wonderful as it is to see the machine move itself through an elaborate measuring sequence, it really does me no good whatsoever! As we know in watch and clock restoration/making, how often do we ever make the same part twice! The software is quite complex and almost any 2D part can be measured. It is a joy to use.

I must again relate a story to show again the hazards of buying slightly outdated technology. I set up the microscope in workshop #2 called the "hole" by my wife. It's called a basement by normal people. It had to go there because we all fill every available spot in our main workshops first. I soon discovered several missing parts. Once again, I knew they were there when it was shipped as we had pictures to inventory all critical parts. So we began to look for help. Once again, no one really cared that a clockmaker wanted to restore this 10-year-old instrument. I did however get a call back from a Metrology Dealer in Cleveland, Ohio, or from one of his application engineers I should say. He informed me his company had sold the machine originally and he was willing to come and inspect it at least. I gave him instructions to find me. When he showed up he was surprised to find it was my home and could not understand why anyone would have such a thing in the basement. On the way down the stairs he asked what we were going to do with such an exotic piece of equipment. I explained I was in the clock repair business and wanted it to measure parts. He stopped dead at the bottom of the stairs and said, "Really, I trained to be a watchmaker at Gem City College." I knew I had my man! In a few weeks all needed parts showed up in a box. He knew of a damaged machine that a forklift had gone through!

I will now conclude this lengthy drawn out treatise on measuring, I will not say to how many decimal points we can accurately measure now, just that we have improved. The machines are calibrated (checked) with a Levi

precision glass scale traceable to N.I.S.T., and I can tell on each machine that its measuring accuracy is better than I will ever need for the work I do. This is all we set out to achieve. To say that we can measure to 0.0001 inch is to invite debate (endless debate). It's really relative. Mechanical, electronic errors, temperature, etc., will always be issues.

For further reading, Internet searches for Non Contact Measurement, Video Measurement, and CMM will turn up endless reading. I might also recommend these titles for those interested:

Handbook of Dimensional Measurement, Francis T. Farago

Precision Hole Location, J. Robert Moore

Holes Contours and Surfaces, Richard F. Moore and Fredrick C. Victory

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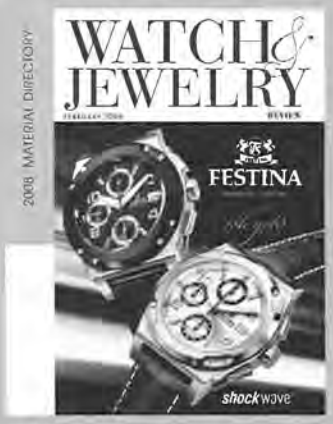


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Vintage Watch Repair Techniques

Part 4
Crown and Case Tubes

By Dale LaDue, CMW

The screw down crowns and case tubes for Rolex® watchcases, vintage 1940s and 1950s, are obsolete. Many of these watches are now being worn by another generation who appreciate mechanical watches. Hopefully, these proud owners will recognize the value and benefit of proper general servicing and maintenance.

The modern Rolex® crowns and tubes do not fit the vintage cases. Suppliers used to sell case tubes with the proper thread for the old style cases and threading that matched the modern style crowns. However, I have not been able to obtain them.

My solution to converting these older style cases utilizes a bronze clock bushing and a tap that is designed for chasing the modern tube threads in the watchcase. These taps are sold by material suppliers and are readily available.

A bronze bushing was selected that was larger than the threaded opening in the case, and the hole in it was smaller than the tap diameter. The bushing was long enough to be colleted in the lathe, and have enough length protruding that matches the full depth of the case threads. The bushing was turned down approximately to 3.15 mm (3.12 mm to 3.21 mm) diameter. I used the case threads as a die and created a roughly threaded tight-fitting sleeve as shown in Figure 1. The tap for the modern Rolex® case post is for the 5.3 mm crown and tube. The bushing was bored out to approximately the root diameter of the tap threads,

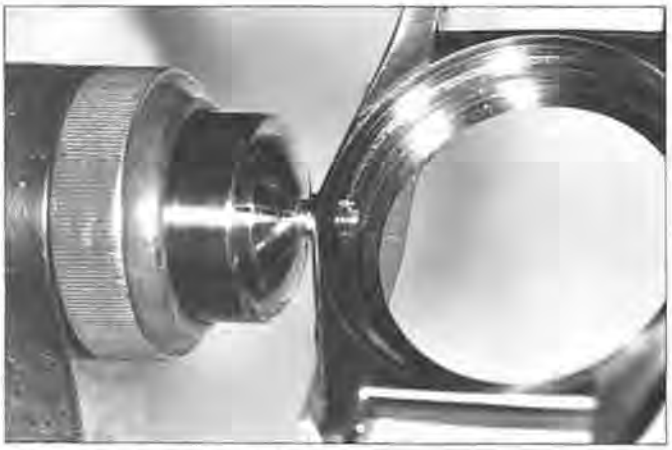


Figure 1. A bronze clock bushing was mounted in a collet then turned down to 3.15 ± mm, and the case threads were used as a die.



Figure 2. A commercially available tap that matches the modern case tube was used to thread the bore of the bushing.

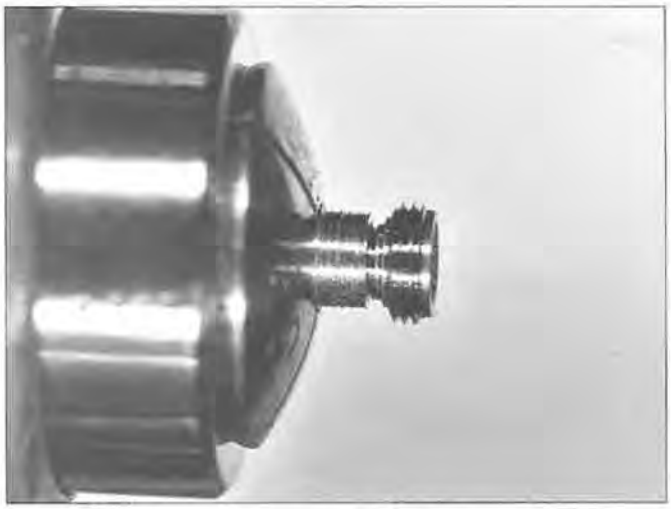


Figure 3. The case tube was tested for fit.

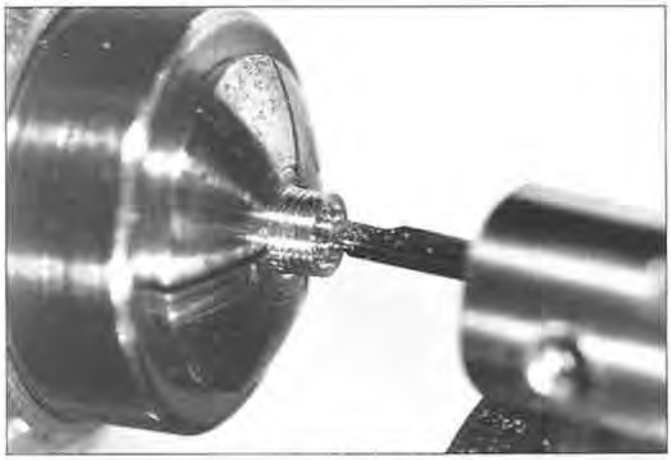


Figure 4. A seat was bored out to fit the crown tube shoulder.

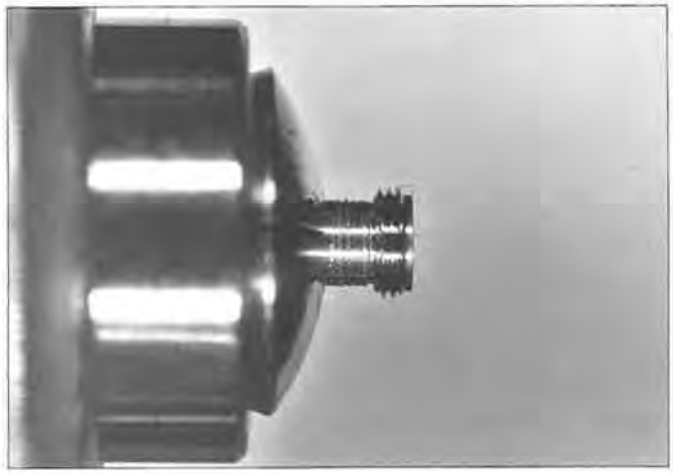


Figure 5. The case tube was then tested for a proper fit in the seat.

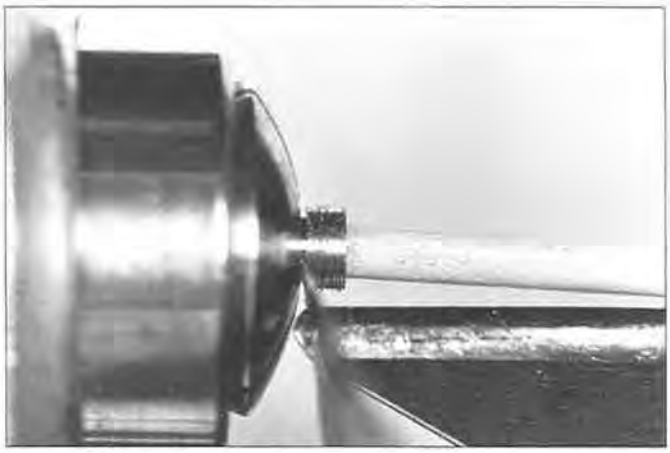


Figure 6. The sleeve was parted with a razor blade used as a parting tool.

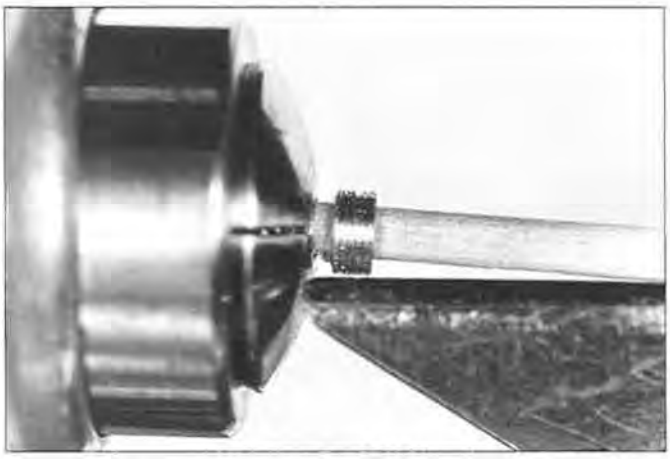


Figure 7. A toothpick captured the parted sleeve.

and then the threads were cut as shown in Figure 2. The new tube was tested for fit as shown in Figure 3. If you notice, there are two shoulders on the tube starting just after the case threads, Figure 3. A relief was cut for the first shoulder to enter as shown in Figure 4, and Figure 5 shows the tube fully seated in the sleeve. A piece of pegwood was inserted into the bronze sleeve as it was parted in Figure 6, which captured the sleeve in Figure 7.



Figure 8. The bronze sleeve was inserted into the case using the modern case tube and its inserting tool.

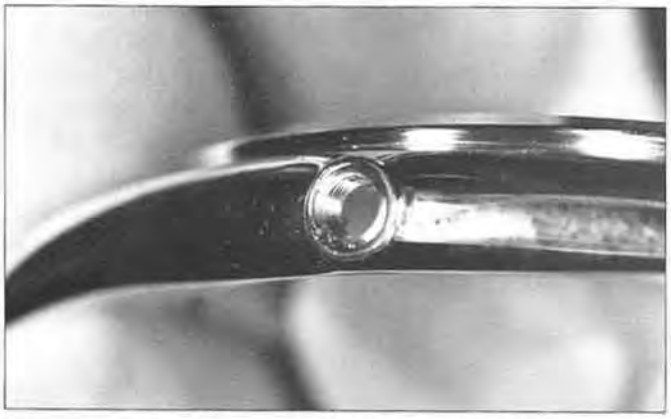


Figure 9. A view of the sleeve tightly locked in place



Figure 10. The modern case tube inserted and locked in place with removable threadlocker, if desired.



Figure 11. The finished tube and crown in place



Figure 12. The process was repeated on the second case as shown here and in Figures 13 and 14.



Figure 13



Figure 14

The case tube was then threaded into the sleeve. A Rolex® tube wrench with serrations that fit the 5.3 mm tube was used to thread the close-fitting bronze sleeve into the case, Figure 8.

Threadlocker was used to hold and seal the sleeve in place, Figure 9. The case tube was removed and the threadlocker was allowed to set. The case tube threads on the tube and in the sleeve were wiped clean of any permanent locker solution. Figure 10 shows the case tube in place. It was held and sealed with threadlocker. Figure 11 shows the finished product. Figures 12, 13, and 14 depict the same process used on another case. The 700 series movement without its automatic mechanism is shown in Figure 15 and in its case in Figure 16. The 620 series movement is shown in Figure 17 and its case in Figure 18. (Please turn to page 26 for Figures 15-18.)

Editor's Note: Rolex recommends Green Loctite® 270 for securing case tubes to the case and crowns to stems.

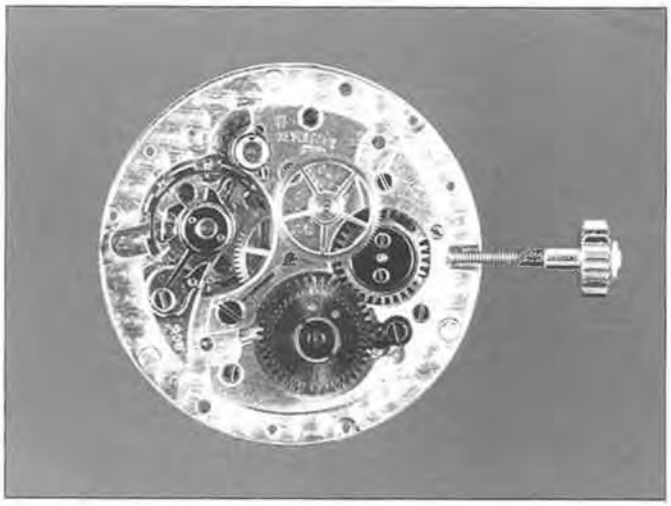


Figure 15. The Rolex® cal. 700 movement

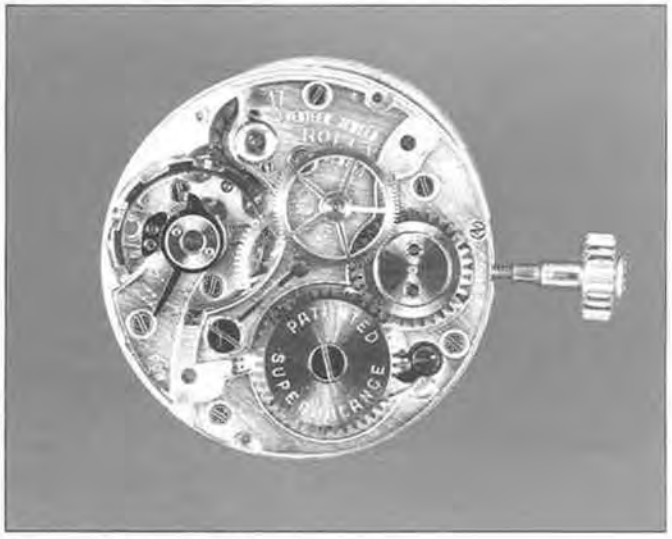


Figure 17. The cal. 620 movement

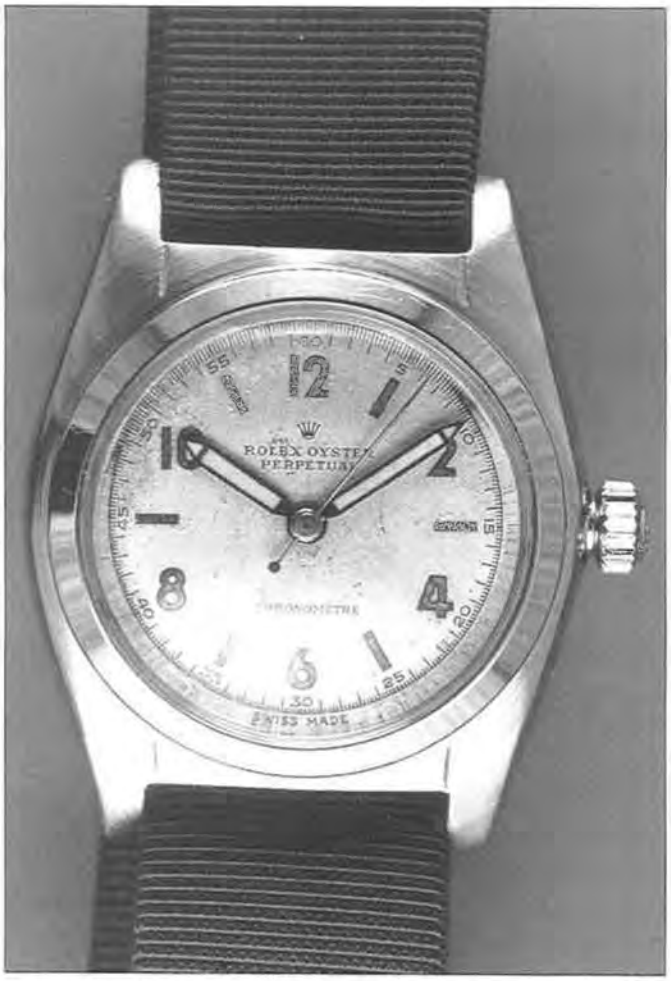


Figure 16. The cal. 700 cased with its new tube and crown.



Figure 18. The cal. 620 cased with its new tube and crown.

Chelsea Clock Honors U.S. Navy Personnel at Pentagon

Chelsea Clock Company of Chelsea, MA, presented to the U.S. Navy three custom-made and engraved Chelsea Clocks to honor the Navy personnel involved in the successful rescue of Captain Richard Phillips of the Maersk-Alabama from the Somalia pirates. The clocks were presented directly to Chief of Naval Operations, Admiral Gary Roughead. The clocks were offered by Chelsea Clock to recognize the heroism and valor of the crewmen aboard the USS Bainbridge and the USS Boxer, and the always present heroism and valor of the entire U.S. Navy. Admiral Roughead accepted the clocks on the Navy's behalf at his Pentagon headquarters.

The Chelsea Clocks are well known throughout the maritime world as sailors have counted their watch with the distinctive chime of these clocks since the early 1900s. Chelsea has a long and storied history with the U.S. Navy, making thousands of Ship's Bell clocks for use on Navy ships. Handmade of solid forged American brass, molded and shaped in their factory in Chelsea, MA, the clocks were hand engraved with the message:

"This Chelsea Clock is presented by The Chelsea Clock Company to Chief of Naval Operations Admiral Gary Roughead to Honor the Heroic Efforts of the Men and Women of the U.S. Navy in the Rescue of Capitan Richard Phillips of Maersk-Alabama from Somalia Pirates, April 12, 2009"

"It is an honor and a privilege to accept these clocks on behalf of the U.S. Navy," said Admiral Roughead as he admired the clocks. He noted the long relationship between the Navy and Chelsea Clock. The USS Bainbridge and the USS Boxer will each receive a personally inscribed clock to display on the ship. Additionally, the clock presented to the U.S. Navy and CNO Admiral Roughead will eventually retire to the U.S. Navy Museum.

JK Nicholas, CEO of Chelsea Clock presented the clock to Admiral Gary Roughead. "We need these occasions to take note of extraordinary actions of our military. We felt compelled to acknowledge the huge success of the mission and pay homage to the bravery of the men and women of the U.S. Navy, said JK Nicholas. It is a privilege to stand here today in Admiral Roughead's office and we hope this token of our appreciation says thank you to all the military for all you do for us every day and especially to the U.S. Navy for their preparedness. To the armed forces it is their job; to us it is a life time of peace and security."

Chelsea Clock is America's oldest clock company, operating since 1897 in Chelsea, Massachusetts. Chelsea manufactures premium clocks for the luxury gift market, the marine and government markets as well as for corporate awards and recognition programs.



JK Nicholas, CEO of Chelsea Clock, Admiral Gary Roughead, Chief of Naval Operations, and Anthony LaChapelle, Chelsea COO during a private dedication ceremony at the Pentagon on June 30th.

2009 Recipients of The Harold J. and Marie Borneman Greenwood Memorial Fund



Okmulgee Institute of Technology: (L to R) Jason Ziegenbein, Instructor; Joe Shin, student/fund recipient; and Jason Champion, Instructor.



Lititz Watch Technicum: (L to R) Gary Biscelli, Instructor; Herman Mayer, Principal; James Borton, student/fund recipient; and Michael Pahl, Instructor.

The AWCI ELM Charitable Trust is happy to announce the 2009 recipients of The Harold J. and Marie Borneman Greenwood Memorial Fund. The recipients are: Joe Shin, Oklahoma State University Institute of Technology, Okmulgee, OK; James Borton, Lititz Watch Technicum, Lititz, PA; Katie Benezue, Bishop State Community College, Mobile, AL; Colin Britton, Gem City College, Quincy, IL; David McConnon, North Seattle Community College, Seattle, WA; and Theodore Bettein, Saint Paul College, St. Paul, MN.

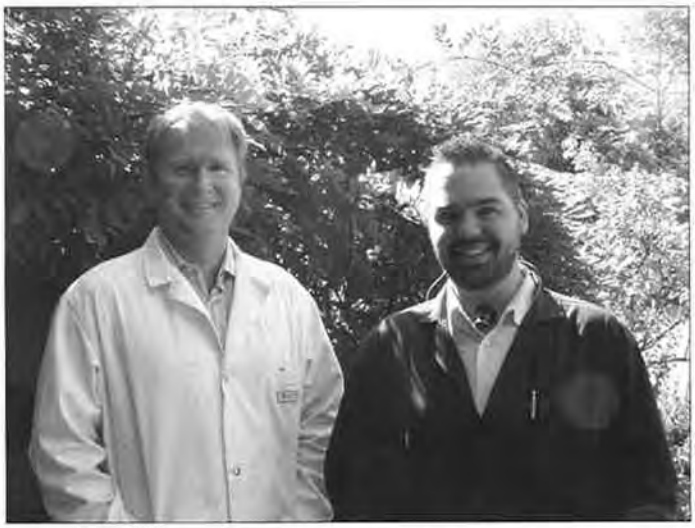
The Harold J. and Marie Borneman Greenwood Memorial Fund of the New Hampshire Charitable Foundation was set up to assist watchmaking students. The Fund is maintained by the New Hampshire Foundation. The Foundation distributes the interest earned by the fund annually to the AWCI ELM Charitable Trust. The ELM Trust distributes the fund equally to the schools/students that meet the directives given in Article IV, Section 4 of the ELM Trust Bylaws. The recommendation, made by the REC instructor, may be based on financial need or exemplary student achievement as determined by the instructor.



Bishop State Community College: (L to R) Katie Benezue, student/fund recipient and Stephen Lange, Instructor.



Gem City College: (L to R) Colin Britton, student/fund recipient and Jim Hush, Instructor.



North Seattle Community College Watch Technology Institute: (L to R) Erik Gresseth, Instructor and David McConnon, student/fund recipient.



Saint Paul College: (L to R) Janelle Juaire, Instructor and Theodore Bettein, student/fund recipient.

Repivoting

Part 3

By Laurie Penman

The arbor is now ready to be drilled for a new pivot. There is no need to anneal it because this modern arbor is quite soft. Had it been an early 20th century or 19th, 18th or 17th century arbor I would have heated the end I wanted to drill to red heat and then buried it entirely in dry chalk or sand so that it would cool very slowly.

There are a couple of points to note about annealing and drilling, and they are:

1. Since the pinion will be heated to red it will develop scale, which can be prevented by coating the pinion with Keepbryte™ by the Kasenit Company. However, this comes in large containers of two or three pounds with enough content to last the average clockmaker a couple of hundred years. Boric acid works very well and is available from most pharmacies. The method is to heat the steel gently until, when dipped into the boric acid powder, it melts it and collects a cocoon. Keep heating and dipping until the area to be heat-treated is fully covered and none of the bright steel is exposed to the atmosphere. Once this is achieved the metal is heated to red heat—this has to be judged by the steel on each side of the protected area—and after allowing a "soaking" period of ten to fifteen seconds for pinions less than ¼" outside diameter to half a minute for steel that is ½" diameter, quench the piece in water. This hardens the steel and removes most of the boric acid coating immediately. Any remaining coating can be washed away in water using a toothbrush. It is not normally necessary to protect plain diameters in this way, because it is easy enough to spin them in the lathe and polish the surface. However, if the piece is highly finished and accurately polished before heat treatment, then coating in boric acid powder before hardening is important.

2. Not all 19th century pinions are made from a simple high carbon steel. Metallurgy was not a science but more a matter of experimentation. Families of steel makers had "recipe" books for the steels they made and frequently the recipe made mention of "earths" that were thrown into the melt (many pinions and arbors were cast, particularly in France) at various times that were judged by the color of the flames and behavior of the molten metal. The earths were ores of different elements and might be anything. Not all of them would necessarily be useful alloying elements, but nickel, chrome and manganese would certainly produce very useful steels. Unfortunately they would often produce steels that did not respond in the usual manner to heat treatments and heating to red and slow cooling

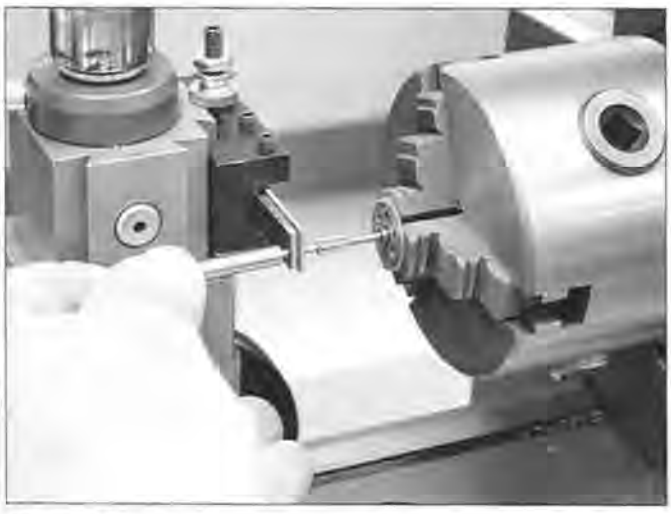


Figure 24

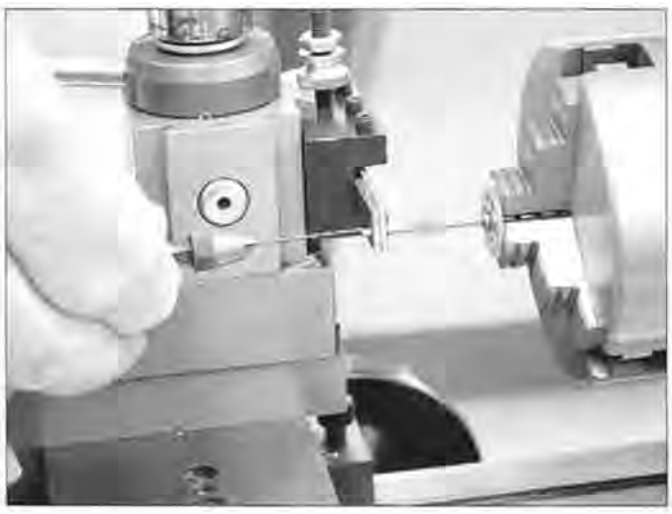


Figure 25



Figure 26

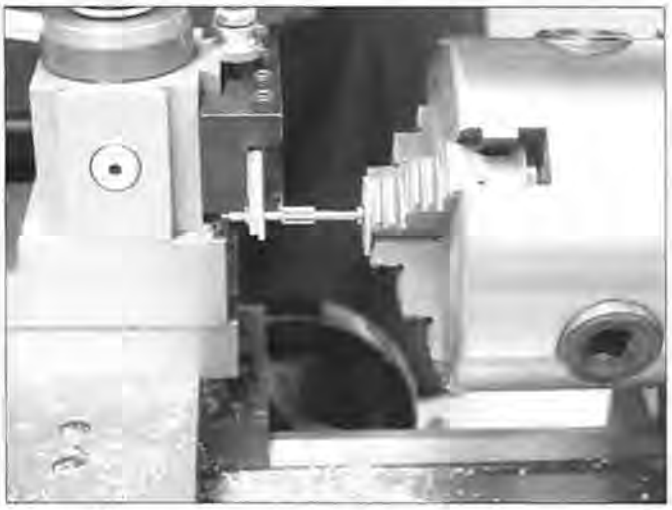


Figure 27

a nickel/chrome steel is not a guaranteed way of annealing it. If a steel cannot be annealed it will be too hard for a high-speed steel (HSS) drill to deal with. Tungsten carbide can often drill hard steel, but it needs to be in the form of a straight fluted or flat sided drill for diameters less than 1/16", twist drills will break very easily because any variation in load on the tip of the drill causes a small twist against the helix, which becomes very slightly longer and increases the load on the point. Snap! Use pivot drills that are made with straight flutes or flat sides.

I made the centering tool on the Sherline, hardening and tempering the cutting bit to dark amber, and now it is ready to use. This a very simple matter of lodging the hollow cone over the end of the arbor (Figure 24) and pressing that centering bit with one finger as the chuck revolves at about 500 rpm. The result is a small dimple in the end of the arbor, which is quite sufficient to lodge the point of the twist drill. The drill was held in a pin chuck (Figure 25) that had its stock supported loosely in the tailstock drilling chuck. This ensured that the drill bit was held parallel to the center line of the arbor, while I advanced it with finger pressure (Figure 26). It is the same technique as would be used in a watchmaker's lathe.

A drilling about four times as deep as the diameter of the drill bit was made ready for the insert that was to be used as the new pivot, which was cut from a length of pivot wire. This is variously advertised as "Pivot Wire", "Wire Assortment—Staff and Pivot", "Wire Assortment—Pivot" and "Blued Steel Wire Assortment". All of them are hardened and tempered to blue or dark amber. However, the quality of the surface will vary and may need to be polished. It really is too hard to burnish with a hand tool. Finish with an emery paper of 2,500 grit, the finest grade of crocus paper or diamantine/aluminum oxide crushed with oil onto a tin or zinc polisher. This is the method found in most of the old books and it works well, the only problem is that tin or zinc polishers are not readily available, Gazeley suggests a gun bronze polisher. (I hope I have remembered that correctly.) As alternatives, I suggest aluminum bronze, gunmetal or admiralty brass. Phosphor bronze is abrasive with little islands of phosphide scattered amongst the grain structure. Polishing will be carried out after inserting the pivot (Figure 27).

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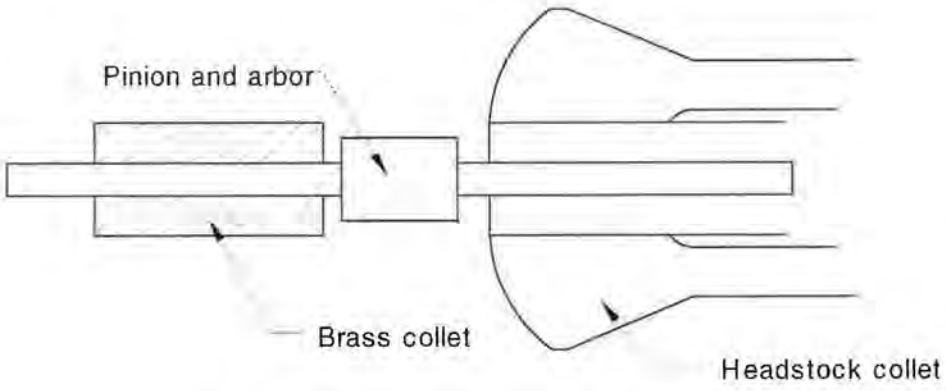


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The assembled arbor and brass collet slide into the headstock collet

Figure 28

The old method of making an insert was to drill a parallel hole and make the insert slightly tapered. The idea was to hammer the insert into the hole and measure the changing outside diameter of the arbor; 0.002" change in diameter was suggested as being acceptable, but it is a method that I have never cared for, particularly where very old pinions and arbors are concerned. There is no doubt that it works, but there is always a danger of the strained metal cracking at the time of insertion or in service. I much prefer a cyano-acrylic adhesive such as Loctite®, not only is there no risk of splitting but if necessary the pivot may be removed by heating over a soft blue flame (spirit lamp) until the adhesive smokes and can be smelled, this is around 1500 to 2000 C—low enough not to affect the temper of a pinion. It is a material that I have used since the 1960s and been aware of for long enough for it to be judged "old fashioned", but I have not found anything more effective. I described the use of an adhesive for this job quite fully in July, so I will not go over it again except to say that it is important to make sure that the drilled hole is absolutely clean. Immerse it in a degreasing solvent and then "peg out" with a sliver of hard wood. Do not use a soft wood for this. It is very likely to break off inside the hole.

This method of steadying the arbor for drilling cannot be used for turning an eccentric insert because the steady is mounted in the tool post and there is nowhere for a turning tool to be positioned. The most effective way of tackling this is to make a brass collet (Figure 28) that has been drilled out to fit the arbor and turned at the same setting to make the outside diameter suitable for a headstock collet. The outside diameter of the brass collet must be larger than the pinion and it is almost certain that the wheel will not fit in the space behind the headstock collet. The wheel will have to be dismounted! There is a final word of caution to be given. Although most pinions and arbors are machined to be concentric originally, not all arbors are in that situation. Always check. If the pivot is well away from the pinion a small inaccuracy may be acceptable, if it is close to the pinion, the latter can be held in the brass collet and the protruding arbor will be short enough not to vibrate while turning the insert.

AWCI Correspondence Course in Clock Repair

Based on the original correspondence course written and administered by Laurie Penman, AWCI's resident clock instructor, this course is constructed to provide information and instruction in a manner that is immediately useful in both learning and practicing clock repair. The course contains 16 lessons. At the completion of each lesson you will receive comments and suggestions from Laurie Penman, and a pass or fail grade. Those who achieve a pass grade in each section will receive a certificate of completion. Mr. Penman will be available to answer questions or offer suggestions to each student.

The AWCI Correspondence Course in Clock Repair package contains all the material and information necessary to successfully learn the fundamentals of clock repair, including *The Clock Repairer's Handbook* by Laurie Penman.

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Contact Nancy Wellmann, AWCI Education Coordinator
E-mail: nwellmann@awci.com
Phone Toll Free 1-866-367-2924, ext. 303 or (513) 367-9800

Twin City Supply Holds Grand Opening of their New Expanded Showroom!

Twin City Supply, a 4th generation, 80-year-old Watch Material & Jewelry Supply distributor located in Minneapolis, Minnesota, recently held a Grand Opening Open House in honor of their new expanded showroom. The opening of this showroom (their 5th) increases their space by over 50%. This additional space has allowed more products to be displayed, giving customers more choices. More inventory has been brought out of the warehouse, including complete displays of hand-held tools such as files, pliers, tweezers, buffs, and larger equipment such as steamers, rolling mills, torches, and dust collectors. In addition, more findings, gift wrap and boxes, clock parts, resale items including watches (Timex, Acqua, Carriage and Casio), Zippo products, and watchbands (Watchband Headquarters and Gilden) are now on display. "Customers may come in needing just a specific tool or part, and may leave with several items," says Joel Held, co-owner. They love to browse and be able to hold and compare products instead of just ordering out of a catalog."

Each of the 5 showrooms are themed to a specific product line or area of interest, such as: The Watchmaker & Clockmaker section; Items for Students; The Resale Showroom; even complete Jewelers & Watchmakers Bench setups; and there is even a room known as the Closeout/Used Tool Room, which is very popular! Customers can find overstocked items, discontinued items, and many used items, including lathes, staking sets, timing machines, and more at extremely discounted pricing.

During the grand opening week, door prizes were given away and there were special gift bags given out, many of them containing items donated by vendors and manufacturers. "Our partner vendors really stepped up and sent us many nice items for giveaways. Their contributions really helped the event to be successful," said Lois Held, owner. Customers enjoyed extended hours on Thursday, July 9th, being able to shop in a relaxed setting after work, as Twin City Supply kept their doors open until 7:30 PM. Light snacks & refreshments were also served.

For more information, catalogs, or to place an order, please call 800-328-6009, e-mail TwinCitySupply@msn.com or you can also shop online: www.twincitysupply.net





By Jerry Faier, CMC21

Preparing for the CC21 Examination

Continued

I find it humorous how many times over the years, graduates of schools—High Schools, Junior Colleges, and Universities—all say the same thing when they graduate. "Thank goodness I'm through with all that studying!" The reason this seems so funny to me is that unless you are willing to become a hermit, live on the edge of the world or on the streets, you never stop learning. You can't afford to! As life throws curve balls at us, we have to dig in and start learning how to hit them. Either that or go out of business. A psychologist friend of mine some years ago said, "Life was NOT a dress rehearsal." How really true that is, even today. We are all set with life challenges but when you throw in financial upsets as well, our life begins to spin. Ben Franklin said, "The Lord helps those who help themselves." Where do we go when we can't find a solution? We study and start to learn what we have to do next. Every time your computer coughs, what do you have to do? Study and try again to see if you can figure out what you just did that upset the machine. It seems to me that life is a learning process and only when we stop learning, do we start to fail or lose our way. No field or discipline is immune to this. What will you do to help yourself grow and prosper in our current economy?

In our trade, we study, practice, study again and practice more until we have mastered the concept and the skill on which we are working. That's the only way we can perform as we need for our customers, who ultimately help pay our bills. Now, how do we get our customers to know that we have all those needed skills to do their job better than anyone else around? By now you should know how I feel. But ask others who have also gone through the certification process.

This month will cover the last two of the 10 performances that you are required to work with for the 21st Century Certified Clockmaker program. They are the 400-day clock and the American time/strike movement performances. Again, as in other performance tasks, these challenges examine a number of items, all at the same time.

The 400-day clock performance deals largely with escapement issues. Because you have already shown how to clean, do pivot work/bearing work and mainspring servicing, in this example we study your detailed knowledge and skill in dealing with the deadbeat escapement and its parameters as they relate to this type of clock. I have had many tell me they can't make any money with this type of clock but in all cases where I have had the opportunity to work with that individual, it was clear that they had a lot of problems with escapements and in general, the whole concept of this type of clock. In this instance, what we are examining is your ability to re-adjust an escapement such as this in accordance with the requirements for this type of product. If you understand escapements, then you should be able to adjust this one perfectly. We are not asking you to set up the clock to run, as there are too many shipping problems with these types of clocks. We also believe that if you can re-adjust the escapement, you should be able to set the clock in beat. There is also a set of questions that deal with various typical 400-day clock problems that you will need to answer as well. These questions cover the typical problems and challenges of this type of clock that can easily be written out. There are excellent reference books (check out the bibliography at the end of the S&P), which can be of immense help if you study them. The approach here allows the assessors to look with more detail at your ability to adjust an escapement, so that is why we chose this product. We also ask you to use the Terwilliger text to set up a requested new suspension unit. We give you the parts and the product that we want you to make up and it's your job to return the required product in good, usable shape. Be sure that you set your finished product in the described cardboard shipping device so that it does not get any twists or bends and that

the blocks are in the same plane as the fork when it is scored. Need more education? Take a course, study some books, and try adjusting an old junker to see if you can get the results. In any case, master the concepts and skills, and the products are easy to work with.

The last performance was the product that everyone in clock work seems to really enjoy. With an American strap movement (or modern facsimile) we require you to perform several operations to demonstrate your abilities with this ubiquitous product. Again, here you don't have to deal with cleaning or mainspring work but we will expect the escapement to be adjusted precisely (You remember—drops and locks?) and keep time and all associated parts are fit and adjusted properly and function correctly. We do expect cleanliness and neatness as you work, with no finger slop marks, over oiling, pliers' marks, etc. As in all other performances, top scores look like no one has been in the movement except the factory. If a lever is to fall in the middle of a notch, we expect it to do just that. If that lever is to be centered over the cam it works on, we expect to see that too. We expect the strike to stay in sync and count properly over the 4 - 5 day trial we do. Does the hammer lift on warning? (Oops! That's not good!) What about the warning? Is it correct for this type of product? You are required to replace one strike lever arm (our choosing), anchoring it as it was originally with the proper length, thickness and shape without pliers' marks all over your work. Typical stuff, if you do much with these types of products. Remember this is a test; do your very best work and show us what kind of a craftsman you are! We also have a question sheet with several questions that cover material that is easier to question rather than set up trial examples and ask you to manipulate items that are just as easily described. But the questions are thought provoking and require a bit of careful analysis, but nothing that you would not encounter with everyday work.

That's the total program. These are the 10 performances with which you can show us your skills. We tried to eliminate as much duplication as we could but with all that a clockmaker is asked to do and the variety on which he/she must do it, we most importantly want to know what you know. The Education Committee tried hard to develop an examination that would show this, be practical or relevant to what we do every day at the bench and if possible, be some fun. From what we learned on the pilot examinations we ran, I think we succeeded. The best part is that there is no argument about your abilities. If you can accomplish this program, the Committee truly believes that you will succeed in the trade whether at your home or in a commercial shop. Try it and see what your skill level is. But, be prepared before you sign up. It is not the mentor's job to educate you or get you ready for the assessment—that's up to you. Read the Clock S&P first so you have all your questions clear in mind as you start. Do your homework, study hard and practice, practice, practice. That should help with test jitters and your score level. Good luck!

One last thought. Recently, I have had the opportunity to talk to several businesses that are in real stress right now. They tell me that business is down so far they can't earn enough to pay their bills and may have to quit. After we discussed how sad that is, I start asking some basic questions. I thought you might welcome some of the knowledge that I gained from talking to these folks.

CLOCKS
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When I asked them to tell me about their clientele, they said that everyone is their potential client but they don't know their age range, average income (this couples with disposable income), or how far they would travel to get their products repaired. When I asked what type of products they worked with, they said they sell a lot of clocks and they just fix the American stuff. When I asked why they did just American stuff, the answer should tell you a lot more. "You can't make anything on that junk cuckoo stuff; no one wants to spend the money. That 400-day stuff was never meant to run in the first place, so we don't waste our efforts on those. Electric clocks were nothing but a fire hazard when they were first introduced so we avoid those at all costs. When it comes to the modern stuff, all we seem to do is replace them and now few people want to spend that much on that stuff." Have you ever certified? "No, there's no need for that!" How sad. He cut off 80% of the products that now make my personal living, and they don't do them. He has no way to stand out from all the other clock fix-it shops in his area.

Since this article has so many clichés in it already, please indulge me a few more: When life gives you lemons, if you want to survive, you had better make lemonade! Don't tell me you can't make any money fixing cuckoos if that is all you get in your door. It's now your job to study cuckoos and learn to make money with them. Electric clocks used to comprise only 5-9% of my total business. Today with the kids inheriting grandma's old electric clock in a ship, I do about 25% of my business with these. For the last one, I even had to learn to tie new rigging. I impressed my wife but I dazzled the customer who paid well for all the work! We cleaned the case and the metal sails, serviced the electric movement, pulled and repacked the motor bearings of the original motor (Sessions type) and then retied all the rigging from photographs of the product from some of the reproduction catalogues I have in the shop. This project paid a few bills!

One of the reasons that I chose to go into this profession is that it offered the most diverse challenges to learn everything. I probably never will learn all that there is but it has been fun, it has been profitable, and mostly it has been a privilege to get to work with so many different kinds of products over such a large range of history. I have only one prejudice—green, the color of money! You see, I see it as we all have two choices. We can say, "No, I don't do those," or we can say, "I think I can help here," and study, study and study until we can. I choose to learn and grow. I chose to certify to stand out from my competitors. Maybe that's why I have always been busy—even in recessions (this is my 4th one)! I can only wish you the same fortune, and AWCI can help you make some of that good fortune! Check us out!



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Jules Borel & Co. Named Sole U.S. Distributor for Elma Watch Equipment

Jules Borel & Co. has been named the authorized and sole distributor for Elma watch equipment in the USA. The appointment fills the vacuum caused by the closure of Vibrograf USA operations in the U.S. marketplace.

"We selected Jules Borel & Co. as our sole U.S. distributor for watch equipment because of their excellent reputation for integrity, personal service and customer focus," said Miguel Bonillo, Elma GmbH & Co., Germany. "In addition to addressing the needs of our current customers, our agreement with Borel's provides the platform from which we look forward to expanding our USA presence."

A variety of Elma watch equipment is now available from Jules Borel & Co. including:

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Customers looking for information or wishing to place an order for Elma watch repair equipment should contact Gary Borel @ 800-776-6858 or Gary@julesborel.com

Jules Borel & Co. is a Kansas City, Missouri based wholesale supplier of watch equipment and materials. Founded in 1920 by a Swiss immigrant watch materials expert, Jules Borel & Co. supplies the watchmaking and jewelry industry with a wide range of tools, supplies, findings and watch materials. The company's reputation for innovation is well established and the Jules Borel Watch Parts Informational Database, developed by Paul Borel, is regarded as the industry's most comprehensive source for parts lists and parts interchangeability. With the company's central location, Borel serves clients coast to coast.

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The American Watchmakers-Clockmakers Institute (AWCI) Certification program is a culmination of the efforts of many dedicated horologists who realize the need for a standard in certification which addresses the technological changes in today's horological industry. AWCI, through the agreement of its expert members, in concert with business and industry, set forth the standards of performance required of the watchmaker/clockmaker of the 21st century.

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By Jack Kurdzionak, CW21

Speidel Has Closed

Speidel, a 105-year-old seller of watchbands and an icon of Providence, Rhode Island's jewelry industry, has filed for bankruptcy. Founded in 1904, Speidel was a major supplier of watch attachments, nationally known for the Twistoflex, a metal watch bracelet so flexible it could be tied into a knot without damage. For generations, the name, Speidel, has been so closely associated with watch bands that the brand name nearly became a generic term for a replacement expansion bracelet. When shopping for a replacement expansion bracelet for their watches, many customers would ask, "Do you have a Speidel to fit my watch?" The company was well run and for many years survived numerous business cycles in our national economy. It seemed that they would be in business forever, but forever is a long time. Within the past decade or so, Speidel has undergone several major restructurings. It was sold, resold and sold again. During this period Speidel closed its Rhode Island factory, transferring all manufacturing overseas essentially becoming an importer and distributor of watch bands. A few years ago it acquired the Providence Watch Hospital, a watch repair and sales business founded in 1940 which, with seven watchmakers and five technicians, serviced 55,000 timepieces annually.

All of that changed on June 26, 2009 with the bankruptcy filing. Speidel and the Watch Hospital had been scheduled to close for the annual two week vacation beginning that day. Instead of leaving for vacation as they customarily did, all forty-seven employees were notified that both businesses were closing effective that day and told not to return to work. According to newspaper reports, attorney Allan M. Shine is now running the company as its temporary receiver and the company's assets are now up for sale. When asked to comment about Speidel's future, Atty. Shine stated, "Right now as receiver, I don't have available cash or capital to operate the business, so the company's assets are going up for the sale in the next 90 days." At the time of this writing there is a strong possibility that the company will be liquidated and the Speidel name will become a footnote in the history of the American watch business.

Whether the bankruptcy was caused by bad business decisions, the current recession or Bernie Madoff is unknown. Speidel's most recent owner was Frederick N. Levinger, a jewelry industry professional who came out of retirement to acquire Speidel and the Watch Hospital just two years ago. A few months before the bankruptcy, Mr. Levinger's name had appeared in court documents listing him, along with many other investors who had lost large sums of money to the Bernie Madoff scam. Whether or not Speidel's demise can be directly connected to Madoff is open to speculation, but if it is, Madoff's Ponzi scheme will have had an effect on those of us in the watch repair industry that sell or repair Speidel's products even though we did not personally invest in his scam.

Jack Kurdzionak

"Just in Time"

The technique of "Just in Time" (JIT) inventory has been used by many Japanese manufacturers, most notably in their auto industry, with great success. In short, the just-in-time inventory technique is having "the right material, at the right time, at the right place, and in the exact amount", without the safety net of inventory. Although often thought of as a Japanese innovation it was in use here in the USA long before there was an auto industry in Japan. The Ford Motor Company utilized JIT when they were building the Model T car. In his book, *My Life and Work* (1922) Henry Ford wrote, *"We have found in buying materials that it is not worthwhile to buy for other than immediate needs. We buy only enough to fit into the plan of production, taking into consideration the state of transportation at the time. If transportation were perfect and an even flow of materials could be assured, it would not be necessary to carry any stock whatsoever. The carloads of raw materials would arrive on schedule and in the planned order and amounts, and go from the railway cars into production. That would save a great deal of money, for it would give a very rapid turnover and thus decrease the amount of money tied up in materials."*

Check a fifty-year-old Bestfit catalog. It lists thousands of balance staffs, stems, and mainsprings that were needed to service the many hundreds of watch movements in use at that time. There was no way that an individual watchmaker in a small city or town could stock the tremendous variety of spare parts required to service these movements. Yes, the watchmaker could stock some of the most commonly needed parts, but only a well organized and well stocked material dealer could be expected to supply almost every needed part from stock. The watchmakers purchased assortments of commonly needed stems, staffs, and mainsprings along with assortments of crystal and crowns. For all other parts, they needed to mail a postcard to the material dealer (no businesses had toll free numbers in those days and long distance calls were

prohibitively expensive) and wait for the order to be filled and delivered to the shop. Each watch repair, while awaiting a part delivery, had to be interrupted and set aside until the needed part arrived. Then the repair was completed, that is, if no further parts were required. This system could be thought of as "Just in Time, but very late". Things have not changed much in fifty years for many watchmakers other than they now may now order by phone, fax, or e-mail. There are still costly delays in the flow of work due to lack of spare parts.

The urban watchmaker of that period, for many years, most likely without even realizing they were following Henry Ford's lead, also utilized JIT in their watch repair shops. Downtown Boston's watch and jewelry repair businesses during the 1950s provides a good example of how JIT worked in almost every major city in the USA during that era. Boston had a downtown jewelry district with three "Jeweler's Buildings" in a single city block. Each one had eight floors and numerous rental suites on each floor. Those three buildings were occupied by hundreds of self-employed bench watchmakers and jewelers. These trades' people were supported by twelve watch material dealers and numerous jewelers' supply companies, several of whom were in each building. Most of these watchmakers did not even stock the commonly used parts found in watchmakers' shops outside of the city. The city watchmaker walked down the corridor and bought whatever he needed when he needed it. If a dealer was out of stock for any given part it was no problem. As a courtesy to their customers, material dealers would visit another dealer in the same building or in one of the other two buildings and either borrow or purchase the part. This was truly JIT inventory. There was a symbiotic relationship, beneficial to both watchmakers and material dealers. Watchmakers carried no inventory, had no funds tied up in stock, and always had spare parts available just in time as they were needed. The material dealers became spare parts specialists who earned a living working with and for the watch repair businesses in their respective buildings. This system worked for many years, but of course, nothing stays the same.

A British prime minister once observed, "Change is inevitable. Change is constant.", and change has come to city watchmakers. Their numbers steadily declined as they retired and passed on. As watchmakers disappeared, so did the material houses. Boston's twelve material dealers dwindled to one. There are only a handful of watchmakers and jewelers remaining in Boston's once vibrant "Jewelers Buildings". The business suites, many now converted to commercial condominiums, are still there. Some are vacant with for sale or for lease signs in their windows. Businesses that buy and sell gold, diamonds, silver, and jewelry now occupy the many places where watchmakers, supply houses, and jewelers worked for several generations.

We watchmakers are still here even though our downtown suppliers have gone. "Just in Time" parts availability is gone for us, but we still need some way to cope with our need for an adequate and immediate supply of spare parts. There will be more about this next month.

Jack Kurdzionak

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.

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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, contact Education Coordinator, Nancy Wellmann nwellmann@awci.com or call toll free 1-866-FOR-AWCI (367-2924), ext. 303. Class information is also available online www.awci.com

* Seats may become available in the full classes; please contact Nancy Wellmann (nwellmann@awci.com) to be added to the waiting list or call 866-FOR-AWCI (367-2924), ext. 303

Aug. 24-26, 2009	Timing of Precision Timepieces - Kari Halme, Instructor* **FULL***
Aug. 31-Sept. 4, 2009	Balance Staffing & Timing **FULL***
September 21-25, 2009	Modern Automatic Watches
October 5-9, 2009	Basic Quartz Watch & Quartz Chronograph Repair
October 19-23, 2009	Modern Mechanical Chronographs, Servicing & Adjusting **FULL***
November 9-13, 2009	Modern Mechanical Chronographs, Servicing & Adjusting **FULL***
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

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 contact Nancy Wellmann, Education Coordinator, nwellmann@awci.com or call toll free 1-866-FOR-AWCI (367-2924), ext. 303

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Aug. 31-Sept. 3, 2009	North Seattle Community College	Seattle, WA
September 8-11, 2009	Lititz Watch Technicum	Lititz, PA **FULL***
October 26-29, 2009	AWCI Training Facility	Harrison, OH **FULL***
November 16-19, 2009	AWCI Training Facility	Harrison, OH **FULL***
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
October 4-7, 2010	AWCI Training Facility	Harrison, OH
November 1-4, 2010	AWCI Training Facility	Harrison, OH

21st Century Certified Clockmakers Exam Support Classes

Laurie Penman Instructor

AWCI is offering a series of 5-day clockmaking classes to support the 21st Century Certified Clockmakers Exam. Each 5-day block will cost $725.
For additional information, contact Education Coordinator, Nancy Wellmann nwellmann@awci.com or call 1-866-FOR-AWCI (367-2924), ext. 303. Complete class information is also available online www.awci.com

Sept 21-25, 2009	Servicing the Modern Cuckoo Clock with Music Box
Sept 28-Oct 2, 2009	Servicing the Modern Westminster Chime Movement

Servicing the Modern Cuckoo Clock with Music Box

Sept 21-25, 2009 — Harrison, Ohio
Laurie Penman, Instructor

DESCRIPTION
Cuckoo clocks have several faults that are particular to the type. A full treatment of repairs and adjustments to the movement (including musical versions) and the repair of bellows for the flutes will be dealt with. As with any complicated clock there is interaction between the various functions and this will be dealt with as the class progresses through the detailed explanations.

PREREQUISITE
The student should have taken the basic turning class and be familiar with dismantling clock movements.

COURSE OUTLINE
For a complete course outline and tool list visit
www.awci.com/services/continue-edu.php

Servicing the Modern Westminster Chime Movement

Sept 28-Oct 2, 2009 — Harrison, Ohio
Laurie Penman, Instructor

DESCRIPTION
The modern Westminster chiming clock is another very popular clock. It is found as a spring driven movement in clocks of low to medium value and as a weight-driven movement in clocks that frequently cost more than $1000. Consequently it can form an important part of the clockmaker's business.

PREREQUISITE
The student should have taken the basic turning class and be familiar with dismantling clock movements.

COURSE OUTLINE
For a complete course outline and tool list visit
www.awci.com/services/continue-edu.php

Class fee is $725. For additional information, contact Education Coordinator, Nancy Wellmann nwellmann@awci.com or call 1-866-FOR-AWCI (367-2924), ext. 303

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