

# HOROLOGICAL TIMES™

ADVANCING THE ART, SCIENCE & BUSINESS OF HOROLOGY

August 2011



AMERICAN WATCHMAKERS-  
CLOCKMAKERS INSTITUTE

**This Month's Focus: *What's New***

**New Equipment, Tools & Techniques**

***Air Pressure and Timing***

**New Shock Spring Removal Tool**

***Making A Rack Striking Mechanism***

**The Last Wind-Up**

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# your new awci membership poster is enclosed!

## **IMPORTANT ANNOUNCEMENT:**

### **YOUR NEW AWCI MEMBERSHIP POSTER IS ENCLOSED**

We are pleased to announce the development of a new annual membership poster. We encourage you to post this in your customer entrance area. This will announce to your clientele and vendors that you are part of an organization of industry professionals who adhere to a set of ethical principles and technical standards.

This new poster is both a certificate of membership and a marketing tool for your business. By placing this in a highly visible area, you'll be relaying a series of strong messages to your customers:

- You are a current member in the national association for industry professionals
- You support a set of business ethics and technical standards
- You take pride in your profession

Beyond this literal statement of membership, when you proudly display your participation in an industry association, it instills confidence in your customers. It also speaks volumes about the value you place in your reputation, integrity and professionalism.

### **How to Use This Poster**

#### **One-Piece Design:**

To keep this process simple for our variety of members, we have developed one piece that can be used by either a watchmaker or clockmaker. Just display the side of the poster that applies to your business. This 8" x 10" size is designed to fit standard frames and acrylic stands.



#### **Customized with Current Information:**

We have customized this with your name and the current membership year. Early in 2012, you will receive a new membership poster to reflect your continuation as an AWCI member. We hope this will be an ongoing service we can provide to our members on an annual basis.

#### **If You Need Further Customization:**

Contact us if you have had a name change, or if you need both a watch and clock poster to fully represent your business. We will be happy to accommodate your needs! If you would like a larger poster, we can provide a 12" x 16" size for a nominal fee.

### **2011 Membership Posters Brought to You by Sy Kessler Sales, Inc.**

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Sy Kessler Sales, Inc. has provided the funding for these 2011 posters which are free to all members. We thank them for their assistance, not only in funding the printing and distribution, but also in providing the art and design for this new endeavor. As a not-for-profit organization, we depend on sponsors like Sy Kessler Sales, Inc. to help support the broad range of services we provide to our members.

*Interested in sponsoring the 2012 Membership Poster? Contact Amy Dunn, AWCI Marketing Director: [adunn@awci.com](mailto:adunn@awci.com) or 866-367-2924, ext. 307*





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# a message from the executive director

BY JAMES E. LUBIC, CMW21



This month's *Horological Times* discusses new products and changes in our industry. I would like to take this a step further and let you know about the upcoming changes to AWCI that will also affect you as a member.

As we all know, August is a when AWCI holds its Annual Convention and Educational Symposium. Next year, we hope to have a new name for this annual event. You can visit our FaceBook page and search "American Watchmakers-Clockmakers Institute" to read some of the names that have been proposed in the last few months or propose one of your own.

I realize the convention is most likely taking place when you receive this issue. That being said, I'm looking forward to seeing the results of our new convention agenda. Over the years, the convention has transitioned from a two and one-half day Affiliate Chapter Meeting and Board of Directors Meeting to a full, five-day convention that is not only about the business of the Institute, but also about education for our members. Product Demos, a Trade Fair, technical presentations and our first ever Swap Meet are peppered into the meeting schedule during this five-day gathering of professional watchmakers and clockmakers.

Enclosed is your copy of the new AWCI membership poster. You can read more about this on page one of this issue. We plan to provide this to each of our members when they renew their membership each year. I would like to thank Sy Kessler Sales for sponsoring the printing of this project. This is a new, innovative way that our members can proudly display their membership in AWCI.

In this issue you'll see the new media delivery systems that have been installed in the watchmaking classroom. Thanks to Rolex USA and the Rolex Challenge Grant, we were able to upgrade this room to 21<sup>st</sup> Century Training Standards.

In the next few weeks, we will begin renovating our other classroom and enlarging our polishing room. When this renovation is complete, we will have a polishing room large enough to house five double-

spindle stand-alone polishing machines, support six to eight students in a new watch technician training room, and six to eight clockmaking students.

I would like to thank Arbe Machine Manufacturing and Jules Borel & Company for facilitating the donation of the Arbe, DC-CFSD920, 2-spindle, 1100 cfm Polishing Machine. This is a very welcome addition for our soon-to-be-completed new polishing room and will be an excellent tool for our members to learn to use when attending our new polishing course later this Fall.



## AWCI new members

**Welcome to these new or reinstated members!**

### Australia

Jeffrey Addison

### Ohio

Sean P. Conlon

### California

Richard L. Allbery

### Oregon

Daniel Roddy

### Canada

Wlodzimierz Sucharzewski

### Pennsylvania

William Philip Balistreri  
Cameron S. Bowser, Jr.  
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*The focus of this issue is What's New in Equipment, Tools and Techniques for the watchmaking and clockmaking industries. This editorial segment covers a range of developments over the past few years from new cleaning equipment and environmentally-friendly solutions to new tool sizes and polishing compounds. Additionally, AWCI has installed the latest-technology instructional equipment at the AWCI Academy of Watchmaking in Harrison, Ohio. This equipment will help take the quality of the continuing education and certification process to new heights.*

*Do you have a topic for the 2012 edition of "What's New?" If you have a new product coming to market, or something newsworthy pertaining to tools, supplies or methods, be sure to contact our editorial staff at:*

Amy Dunn, Editor, *Horological Times*  
[adunn@awci](mailto:adunn@awci)

## Hermle North America Prepares to Release Nine New Floor Clocks

Since 1922, the Hermle family has supplied the clock industry with almost everything clock related from Hermle's two factories in Germany and their U.S. factory in Amherst, Virginia. Since opening in 1978, Hermle Black Forest Clocks has manufactured grandfather clock movements for the North American market.

Over the most recent decade, Hermle has added a full line of finished clocks made in Germany that has been complemented by clocks assembled in the U.S. The clocks assembled in the U.S. are constructed with what Hermle considers the finest mechanical movements and accessories from their factories.

Early in 2011, Hermle reorganized its worldwide sales efforts. With the goal of better representation in



Hermle German-made mantel clock (left) and Hermle German-made wall clock (right)

North America, a name change was in order. Hermle Black Forest Clocks was the official "old" name. The "new" name, Hermle North America, was the new name chosen by the North American sales division formed in 2011. The assembly plant and sales office in Amherst serves the North American market with the full line of Hermle-branded products.



U.S.- assembled Hermle grandfather clock

An exciting line of nine new Hermle floor clocks are now being released by Hermle North America. Their "Made in North America" line of floor clocks can be pre-ordered starting in August 2011. The clocks will ship in early October 2011.

With their new line of floor clocks, Hermle is responding to calls from customers who are demanding products that support jobs at home. Hermle North America has carefully chosen partners that keep this goal in mind. They carefully select only the finest solid oak, cherry, and maple from the forests of the U.S. where the wood is cut and milled by U.S. labor.

In addition to the nine new floor clocks by Hermle, there will also be four floor clock kits marketed by Hermle's sister company, Emperor Clock, LLC. The Hermle wooden cases are assembled in Canada and



# What's New

New Equipment, Tools & Techniques



Hermle North America factory workers



U.S. Hermle factory

sent to the Hermle factory in Amherst for final inspection and assembly. Hermle states they use only the finest German Hermle-manufactured mechanical movements and clock accessories in all of their high-quality clocks. For information visit: [www.hermle-clock.com](http://www.hermle-clock.com) or [www.emperorclock.com](http://www.emperorclock.com).

## New AuRACLE AGT-1 Gold Tester by GemOro

GemOro has unveiled its new, patented AuRACLE handheld electronic gold tester. The company states it is one of the most reliable, user-friendly gold testers available. It is simple to use and gives fast, immediate test results. It tests the full range from 10K-24K and platinum, as well. There are a few easy steps to identify non-gold, gold plate and gold filled. This tester uses no dangerous acid, no messy gel and no staining chemicals. Simply touch the pen probe to gold and the LED accurately indicates karat. The pen probe provides approximately 5000 tests. It offers portable 9V battery power and is available from all GemOro dealers worldwide. For more information contact a GemOro dealer or view online at: [www.gemoroproducts.com](http://www.gemoroproducts.com).



GEMORO Gold Tester

## What's New in Polishing

In the past few years, specially-formulated Menzerna polishing compounds have become popular for producing a high-grade finish on the major brands of luxury watches. These leading-edge compounds for the horology industry are available in coarse, medium and fine grades. The product is available in affordably-priced 250 gram bars. It will produce satin and high gloss finishes on stainless steel and yellow



# What's New

## New Equipment, Tools & Techniques

gold, and it's ideal for use with newer polishing techniques utilizing felt wheels and variable speed motors.

Jeff Silver, from MenzernaUSA tells us that, "Menzerna works closely with the manufacturers to develop compounds that meet their quality standards, a process that could take many months and is improved upon over time."

Jeff Silver adds, "Cheaper compounds may cost less per pound, however, they ultimately cost more when looking at the total process expense. Also, if you use compounds with wide particle distribution you can end up with unattractive swirl marks in your polishing. Our premium compounds have tight particle distribution which helps produce a high-grade finish."

The use of these more expensive, high-grade compounds may be worth the additional cost due to the potential savings in labor and material. The company states their high-grade, technically-advanced products overall are designed to make the polishing process faster with less use of material. Dan Cassidy, of Cas-Ker Co., a supplier to the horology industry notes, "We're now carrying the high-grade Menzerna polishing compounds that are recommended by the luxury watch brands. Many watchmakers think it's heads above the rest when it comes to polishing performance."

Menzerna produces all types of polishing compounds which are utilized on everything from RV's to musical instruments. They are best known for their product line made for the high-end sports car market.



## Phosphor Debuts Phosphor Appear™ Watch with Mechanical Digital Technology

New Watch Line Incorporates Swarovski Crystals and Micro-Magnetic Mechanical Digital™ Technology

American watch brand, Phosphor, announces the launch of its newest innovation—The Phosphor Appear™ line. The company states that Phosphor Appear are the world's first mechanical digital watches utilizing their proprietary Micro-Magnetic Mechanical Digital™ (M<sup>3</sup>D) technology.

The Phosphor Appear watch uses miniature-sized rotors adorned with Swarovski crystals that revolve to reveal numerical or chronological information. With each changing minute, an electrical pulse generates

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# What's New

## New Equipment, Tools & Techniques

an electromagnetic field that changes the position of the crystals on the face of the watch to elegantly display the passing time, while producing a distinctive sound unique to the Phosphor Appear digital watch line.

"In the last 20 years, we've seen a proliferation of technologies that have enhanced our lives in a million different ways, but many of these have bypassed the watch category," Phosphor's Managing Director, Donald Brewer said. "The Phosphor Appear line is changing that, using technology to create an elegant and distinctive fashion timepiece."

While the current line of Phosphor Appear watches are adorned with crystals, M<sup>3</sup>D technology allows for any number of materials, such as precious metals, woods or ceramics to be affixed to the rotating segments, creating the possibility for an endless number of unique watch faces.

The basic "time" mode features a 12-hour display with the hours positioned above the minutes on the face. The watch face also offers a "seconds" mode and

"off" mode showing an entire face of crystals with no time display. For more information see: [www.phosphorwatches.com](http://www.phosphorwatches.com).



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# What's New

New Equipment, Tools & Techniques

## A Sticky Subject

This new multiple-roll tape dispenser holds several rolls up to a total width of four inches. The tape is positioned at four different levels for easy access to the exact roll you want. It's ideal for various widths of polyimide protection tape.

It has a handy cutter bar in front. The footprint size is 5" x 9" and is designed for rolls with 3 inch cores.

Call your local parts supplier for more information on this durable multiple-roll tape dispenser.



## Powerful, New Effica E1 Ultrasonic Cleaning Machine

L&R Manufacturing Company, a leader in ultrasonic and mechanical cleaning for over 80 years, has just announced the newest innovation in ultrasonic cleaning for the jewelry industry. This unique locking mechanism automatically locks the lid at the start of the adjustable cleaning cycle and remains secure throughout cleaning, thus assuring consistently effective results.

Also included in this groundbreaking design is a new internal redesigned drainage system that will drain solution out of the tank 65% faster than conventional systems. The Effica E1 features a unique removable hinged lid allowing the unit to be completely closed while cleaning. This hinged lid assures quiet operation and can be easily removed and used as a drainage tray for items after the cleaning process is complete.

## Discover Our Timely Solutions from Zenith

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### Zenith 405 "Epi-Kote" Epilame Solution

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Evaporates fast without any oily film and leaves delicate hair springs perfectly clean and dry. Contains No chlorinated or brominated solvents. Mild pleasant odor - no ammonia fumes. Safe for the environment and it's Non-carcinogenic. Watchmakers and Clockmakers are no longer subjected to dangerous and unpleasant fumes.

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# What's New

New Equipment, Tools & Techniques

Included with each machine is a newly designed stainless steel basket that features a raised bottom allowing ultrasonic sound waves to properly pass through the bottom of the basket to clean the parts more thoroughly. A new drainage pattern was created for better energy flow during the cleaning cycle. The Effica E1 is available with or without heat.

For more information visit: [www.LRultrasonics.com](http://www.LRultrasonics.com).



Powerful Effica E1 Ultrasonic Cleaning Machine

## What's New in Cleaning Solutions, Solvents and Coatings

### New Techniques • New Products

By P. Bilello, President, Zenith Solutions, Inc.

Watchmakers and clockmakers are always asking, "What are the latest techniques for cleaning watches and clocks?" Many watchmakers and clockmakers were exposed to dangerous and unhealthy cleaning solutions in the past.

Some watchmakers used cyanide, while others used ammonia. In some instances, highly-flammable solvents like benzene were used. It was common practice, in fact, for watchmakers to make their own solutions by purchasing ingredients from a local hardware store.

Instructors at various watchmaking schools are also asking chemists, "What are the new techniques for cleaning delicate watch and clock parts? They want to be current with the latest information on safe and effective cleaning solutions. Instructors also want to make certain they're teaching students about the latest products and methods for utilizing these products. Additionally, instructors want to be reassured that students will not be exposed to dangerous and harmful chemicals, including ammonia fumes, when using the new cleaning solutions.

The industry has asked for new, better-performing, safer solutions. Thanks to modern chemistry, manufacturers are now delivering. Below are some of the latest products and new techniques from Zenith that are now answering these industry demands.

### New Cleaning Solutions

The new chemicals and solvents available for the cleaning process today are environmentally friendly and safe with no fear of health hazards. Two examples are Zenith Solutions Formula 67 Cleaner which is "ammoniated without the ammonia odor," and the rinsing

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# What's New

## New Equipment, Tools & Techniques



Drizebrite & Formula 67

solutions that are odorless and leave no oily film after evaporation. The new cleaning solutions cleanse better than the old cleaners because they contain high solvency ingredients and micro-molecular chemicals that wash away debris and oil from delicate watch and clock movements.

### New Epilame Coating

There are new epilame coatings that, when applied to specific watch and clock parts, will make the watch or clock last longer. For specifics on the process, watchmakers and clockmakers should contact the manufacturer to obtain instructions and procedures for the proper application of the epilame coating. Most distributors carry epilame coatings, including Zenith Solutions Epi-Kote, which is available in various sizes.

There is one new, improved technique for applying Epi-Kote which involves the use of a "Soak and Coat Jar." This uniquely-designed jar is the ideal method for immersing and coating delicate parts that require total coating protection.

### New Hair Spring Cleaner

The newest and most effective hair spring cleaner on the market, in my estimation, is The Ultimate Hair



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[www.watchandjewelryreview.com](http://www.watchandjewelryreview.com)

#### Watch & Jewelry Review

is published 10 times per year. It is the only trade magazine in the United States devoted to watches and clocks, and we have added a separate jewelry magazine in every issue. Get the one complete source of industry news and features, including eight annual directory issues.



# What's New

New Equipment, Tools & Techniques

Spring Cleaner from Zenith Solutions, Product 505. It is environmentally friendly and safe to use. This product does not contain any chlorinated or brominated solvents. In the past, watchmakers could be exposed to carcinogenic solvents or highly flammable, obnoxious chemicals when cleaning hair springs. In the old days, watchmakers and clockmakers would use sawdust as an absorbent to remove oil from coils of hair springs. This process required much time and tedious manual labor.



New Hair Spring Cleaner

## The Latest Trends: More Environmentally-Friendly Products

Richard Livesay, Livesay's Inc.

“As an industry supplier, one of the trends we’re seeing is the move to newer environmentally-friendly products and more economically-sized packaging. This includes everything from low-toxic cleaners and non-ammoniated ultrasonic soaps, to LED lighting in product showcases and 0% mercury button-cell batteries.” [www.livesaysinc.com](http://www.livesaysinc.com)

The new technique for cleaning hair springs is simple: Dip the hair spring into a glass jar containing The Ultimate Hair Spring Cleaner, then remove it and allow to air dry for 15 to 30 seconds. By using Product 505, the watchmaker can be reassured that all the oil entrapped between the tightly coiled hair spring wire is completely dissolved and removed.

Yes, there are new products and new techniques available to the horological community. I suggest that watchmakers and clockmakers ask their distributors, “What’s new?” every time they place an order.

When they read about new products, as in this publication, they should try them and “prove to themselves” whether the products and/or new techniques will actually improve the performance and accuracy of their timepieces. [www.zenithsolutions.net](http://www.zenithsolutions.net)





# What's New

New Equipment, Tools & Techniques

## New Sizes of Tools and Supplies in Demand for Today's Larger Watches

Joel Held, President, Twin City Supply

"During the last couple of years, the new styles of wristwatches are markedly larger in size. To accommodate removal of the case backs, replacing gaskets, watch bands, and sizing of the bands, we've added new tools and supplies for the watchmaker's use. There are new larger sizes of case openers for removing screw back cases up to 55 mm. Additionally, there are now available case back gaskets as large as 42 mm. For these larger watches we now carry watch bands ranging from 6 mm to 30 mm. Spring bars, screw lugs, crystals and other supplies are also now being produced in larger sizes."



## If Time is an Issue, This Latest Technology Serves You Well:

### *Chronoscope X1 (G-2)*

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This is new to modern timing machines—once the movement is placed on the automated (head) microphone, it will enable you to switch between programs while the time process remains uninterrupted. Tolerances can be present to alert you of a problem or issue. It will display and print in a highlighted manner (to draw your attention and direct you towards

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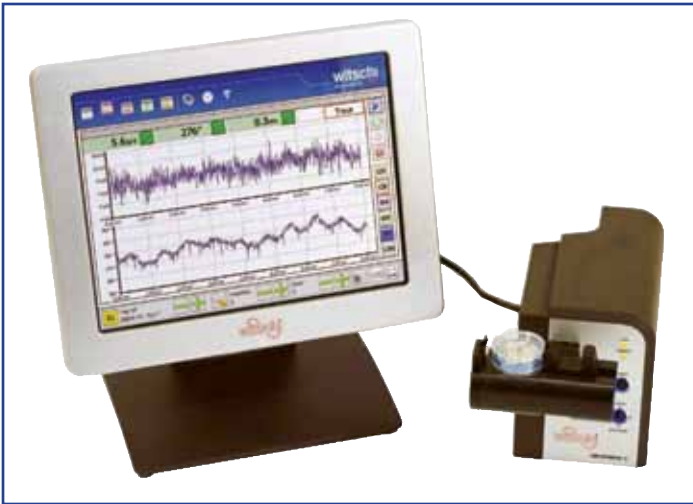
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# What's New

## New Equipment, Tools & Techniques



the problem area.) The scope is displayed in a large size for a very detailed examination. This also allows you to freeze and view up to eight beats for study and comparison (see Figure 1).

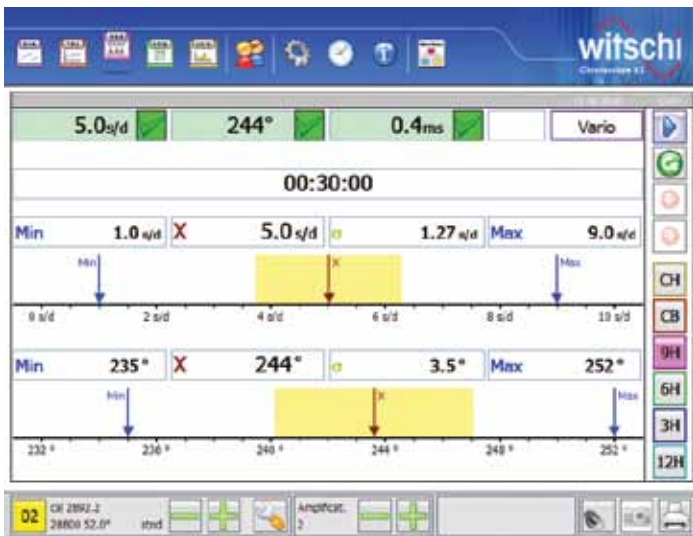


Figure 1

### Features:

- Color touch screen
- Capable of testing coaxial escapements (special programs)
- Capable of testing AP escapements (special programs)
- Long-term testing up to 100 hours (4+ days) for the Trace and Vario models (see Figure 2).
- Allows switching between the Trace and Vario modes while the measurement process is running

- Results can be displayed in seconds per day or 1/10th of a second per day
- Lift angle is adjustable for 10° to 90° and changeable by the 1/10th of a degree
- Allows for 99° preset programs that can be customized by the user
- Has built-in flash drive of 1 GB, 2 USB ports, 2 UART ports and a slot for a Mico SD-memory card, 32 MG - 4 GB
- Monitor has more pixels per inch for better clarity and better contrast

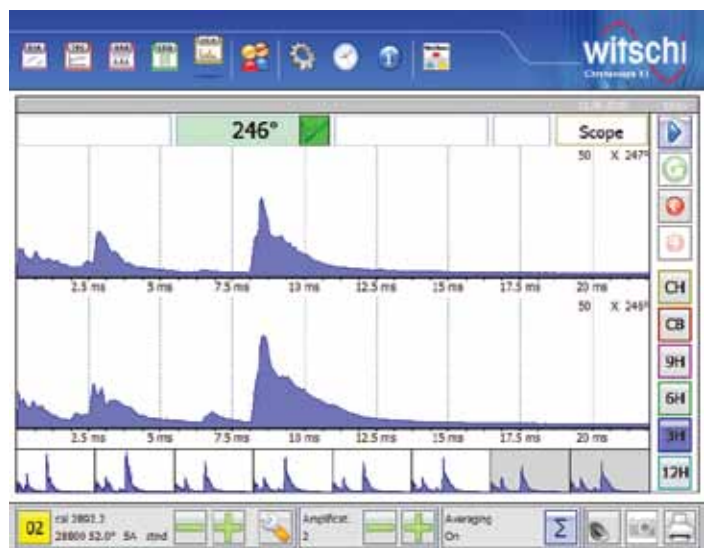


Figure 2

Another great feature is that the watchmaker can input customer contact information and save it, along with the testing results, to a file. The USB port is also located more conveniently on the side of the monitor instead of the bottom. All in all, this new timing machine is precise, convenient, and packed with helpful features.

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# What's New

## New Equipment, Tools & Techniques



## AWCI'S New Classroom Technology

Instructors at the AWCI Academy of Watchmaking are using some exceptional new technology to improve the quality of our instruction. This recent watch classroom upgrade makes every seat a good seat for viewing and comprehending a topic. Instructors can produce better quality visuals, which they can control from anywhere in the classroom. This gives instructors more freedom to walk around the room and work directly with individual students.

### Here's what's new:

#### Two 55" LED/LCD Flat Panels

These are strategically placed so that one screen serves the first rows of students while the second provides optimum viewing for the back rows. These two screens, combined with our central projection screen, give us the capacity to display four different images at once.

#### Two High-Lumi Projectors

These projectors help boost the color and brightness of visuals on the flat panels to provide exceptional clarity and detail.

#### Electronic Dry Erase Board

This tool allows instructors to draw over top of PowerPoint presentations and other visuals for a more interactive style of teaching.

#### Remote Hand-Held Drawing Board

Instructors can take this device around the classroom to individual students for demonstration purposes. This allows more personalized instruction.

#### Touch Screen Digital Switcher

We can instantly flip back and forth between images through our touch screen and software.

#### Internet Display Capabilities

For real-time information, we can access and display the Internet. This helps when we need access to technical guides and the AWCI website.

#### Document Presenter

We can project documents instantly, eliminating the need for the time-consuming processes involved in producing transparencies and scans.

#### Bench Camera and Microscope

The instructor's bench now has a new high resolution camera and there's a new adapter for a microscope that allows us to better demonstrate disassembly, assembly and more in real time.

#### Arbe Polishing Machine

Thanks to Arbe and Jules Borel, we also now have a new Arbe DC-CFSD920 high-end polishing machine for our students.

AWCI would also like to thank Rolex USA and the Rolex Challenge Grant participants for making all this new classroom technology possible.



## The Latest in Ultrasonic Cleaning Units

By Manuel Yazijian, CMW21

Ultrasonic - (derived from the two Latin words ultra = greater than/beyond/excessive and sonic from the Latin sonus = of or relating to sound)

I know many of you are in my shoes as a one-man show. But whether you're one person, or an operation with several technicians, the need is the same for a tough, efficient unit that will quickly clean wrist dirt or polishing compounds off watch cases, bracelets and most medium-sized clock parts. When shopping for a unit, some questions that came to mind were:

- How well is it going to clean filthy watch bracelets?
- Does it heat the solution sufficiently?
- Is it going to fit my needs?
- How well is it made?
- Where is it made and how well-known is the company?
- How much is it going to cost?
- Does it have good after-sales service support?

Having been in the watch repair profession since 1985 and having used many types and brands of ultrasonic tanks, I thought I'd give Elma's new series of ultrasonic cleaners a try. Elma, headquartered in Singen, Germany, has been in operation since 1948. They have been making a plethora of machinery and instruments supporting the watch, clock, and jewelry service and manufacturing industries. I felt reassured with this acquisition.

### Brief overview of design and operating principle

In an ultrasonic cleaner, the item to be cleaned is placed in the tank containing an appropriate solution. In a water based solution, a liquid cleaning agent (detergent) is added to help break down the surface tension of the water. Special ultrasonic transducer systems create strong vibrations within the cleaning bath, using the combined effects of high and low pressures. When a certain level of vibration is reached, the compound structure of the liquid breaks down.

In this process, tiny vacuum bubbles are created. Their dimensions are in the range of nano-millimeters. Bubbles implode near the surfaces of items to

be cleaned. The implosions produce a pressure jet directed against the surface, and this pressure jet is what removes the dirt particles.

### Factors for effective ultrasonic cleaning

1. Frequency of the ultrasonic waves (how many kilohertz)
2. Cleaning medium (water or organic-based solutions)
3. Temperature of cleaning solution
4. Cleaning time
5. Cleanliness of chemical solution

### The immediate needs

1. A rectangular unit, versus square, to allow the placing of watch bracelets in a horizontal position for maximum cleaning potential.
2. Deep enough to allow oddly-shaped units to be fully submerged without touching the bottom. (e.g., a larger, integrated watch-case and bracelet or some clock parts.)
3. Ability to heat the solution quickly to reach optimum cleaning potential.

### Secondary, yet also important

4. The various features and ease-of-use of functions.
5. Sound or noise generated by the machine.



Figure 1: Elma Ultrasonic Elmasonic-S40H



# What's New

New Equipment, Tools & Techniques

While most ultrasonic cleaning tanks are built on more or less the same basic principle as described above, newer units have some cool features which come in quite handy and optimize cleaning power. I chose the unit made by Elma Ultrasonics, the Elma-sonic S40H (Figure 1).

Let's consider the most obvious feature, the tank itself. It is made of cavitation-resistant stainless steel. The inside dimensions are: (The working dimensions indicate the top line for the liquid inside the tank.)

- Total height from top rim: 15cm (5.90")
- Working height from liquid fill line: 12.3cm (4.90")
- Total length at top rim: 23.7cm (9.40")
- Working length at liquid fill line: 23.0cm (9.05")
- Total breadth at top rim: 13.6cm (5.35")
- Working breadth at liquid fill line: 12.7cm (5.00")

### How is this different from older-generation units?

If you still have the old-style ultrasonic unit with the mechanical timer knob then you're in for a surprise. (In older models, once you turn it on, you must wait until the timer stops or you're subjected to the hum of the ultrasonic.)

### An overview of some of the new features I really value

1. Electronic timers vs. mechanical timer knob
2. Visual display of set time with L.E.D. lights
3. Visual display of set temperature with L.E.D. lights
4. Visual display of actual temperature of bath with L.E.D. lights
5. Sweep function (indicated with L.E.D. light)
6. De-gas function, manual and automatic (indicated with L.E.D. light)



Figure 2: Control panel of unit

## New Sizes Elma Ultrasonics!



Feature-rich ultrasonic cleaners offer great results in a variety of sizes to fit your shop's needs

Features	E	S
Cavitation resistant stainless steel tank	x	x
Dry-run proof ceramic heating for faster cleaning	x	x
Set to permanent or short term operation	x	x
Lid reduces noise and acts as drip tray	x	x
Knob controlled tank drain	x	x
Sweep functions	x	x
Pilot lights show timer and heat are on	x	x
Choice of sweep or regular ultrasonic action		x
LED lights show temperature & time remaining		x

Stock #	Tank Size I.D.	Price
---------	----------------	-------

#### E Series

VIB-E60H	11.8" x 5.9" x 5.9"	\$ 673.00
VIB-E120H	11.8" x 9.4" x 8"	866.00

#### S Series - More powerful

VIB-S40H	9.4" x 5.4" x 5.9"	\$ 759.00
VIB-S60H	11.8" x 5.9" x 5.9"	945.00
VIB-S120H	11.8" x 9.4" x 8"	1397.00

VIB-S40H shown



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7. Synthetic non-conductive handles for the safe transportation of the unit, even when heated
8. Synthetic non-conductive cover – reduces noise and acts as drip tray
9. Cavitation resistant stainless steel tank
10. Dry-run proof ceramic heating
11. Heated tank for faster cleaning – can set between 30°C/80°F ~ 80°C/176°F
12. Set to permanent or short-term operation
13. Knob-controlled tank drain
14. Automatic cleaning start when set temperature is reached

**I will explain some of the above points in further detail**

1. Electronic timers versus mechanical (Figure 2). This method eliminates unnecessary continuous functioning of the unit and removes the guesswork in determining how many minutes to leave it on. This model has a time scale indicating the number of minutes the machine will operate. As seen in the picture (Figure 3), it will operate for 10 minutes.

One of the down sides of the older generation mechanical timers was, once you turned the timer knob and you accidentally overshoot the needed cleaning time, you had no other choice but to wait until the operating time was completed.

Users sometimes turn the knob backwards to turn off the ultrasonic. Some say this is safe; others say it is not. Either way, a better method had to be found. Also, the mechanical timer knob was not always accurate. With newer units, the above issues are a problem of the past. All you do is turn the time selector knob to the desired time (in minutes) and push the (START/STOP) button. If the item is cleaned quickly, push the (START/STOP) button again and the ultrasonic will stop (Figure 4).



Figure 3: 10-minute operating time.



Figure 4: Start/Stop button.

The infinity symbol  $\infty$  (at top of minute scale) indicates the unit will function continuously. For safety reasons, however, the unit will automatically switch off after 12 hours of continuous operation.

2. Time and temperature. These selections are separate from the START/STOP button. As seen in the picture below, (Figure 5), you can set your desired temperature and time via the rotating knobs and simply press the start (play) button. When the actual time is “played out” it will stop on its own. If you wish to stop it before the timer “plays out” simply press the START/STOP button again.



Figure 5: Time and temperature selection.

There are two L.E.D.'s that are lit in the temperature section on the right—the top L.E.D. indicates the desired temperature that is set and the one immediately beneath it is the actual temperature of the cleaning solution. This flashes incrementally until the set temperature is reached.

3. Sweep action of ultrasonic. This is for more uniform cleaning (avoidance of low pockets of inactivity).

If you have used the older generation of ultrasonic tanks, you may have experienced situations where, even when placing the item in the center of the tank,



# What's New

## New Equipment, Tools & Techniques

after a certain amount of operation, the item still has not been cleaned in a uniform fashion. One of the reasons for this is the creation of “dead zones” in the tank. If several items have been placed for cleaning, pressing the sweep button will definitely offer superior cleaning action by ensuring a sweeping action of the waves all throughout the tank. (Figure 6)

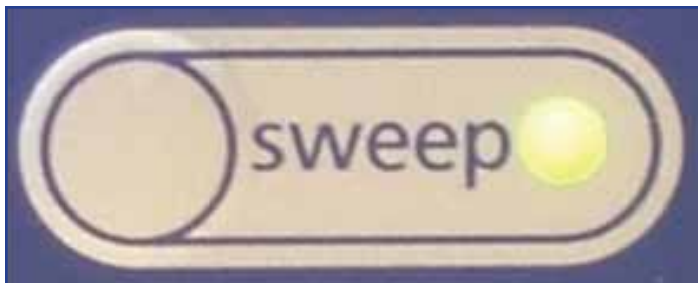


Figure 6: For sweep action.

4. Manual or automatic degas. This feature allows for quicker cleaning.

Most tap water contains dissolved air. For best ultrasonic cleaning action, the water must be de-aerated, or degassed. When we boil water, and as the water temperature increases, the water cannot hold the dissolved air, so we see bubbles forming and escaping. This is one method for degassing water.

The other method is by “vibrating” water to allow the air bubbles to escape. When we make a new batch of solution, the water used contains plenty of dissolved air. In order to degas the cleaning solution, it is customary to operate the ultrasonic to allow degassing to occur. This could take anywhere from a few minutes to half an hour or more for proper degassing to occur—depending on existing water temperature, type and amount of cleaning agent used. etc.

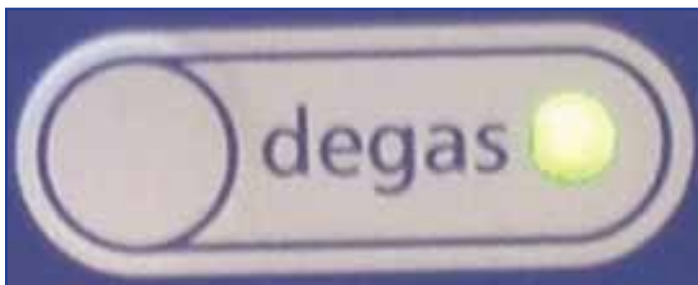


Figure 7: Degas button.

When time is of the essence, this unit has an added feature which will quickly degas the solution by al-

ternating the ultrasonic waves to achieve a quick degas. Pressing the degas button is all that is needed (Figure 7).

This is achieved with the unit generating short bursts of ultrasonic waves – thus allowing for a quick degas. Alternately, the automatic degas feature can be used by first pressing the START/STOP button followed by keeping the DEGAS button pressed for just over two seconds. The unit will operate in DEGAS mode for 10 minutes and then switch off. \*The Degas and Sweep features cannot be operated at the same time.

5. Operating temperature. Temperature is between 30°C/80°F ~ 80°C/176°F.

There are times when a much higher temperature is desired for faster and more effective dirt busting action. This unit can easily reach near boiling temperatures. In fact, after cleaning a case and bracelet in a solution above 60°C/140°F, one has to be careful as it is quite hot to the touch. Heating above a certain level speeds up cleaning, as well as helps kill certain pathogens.

6. Synthetic (plastic) cover.

At first, I was a bit skeptical about a “plastic” cover, but I quickly realized the engineers at Elma had recognized a need for a change from conventional design. The following are some advantages of a synthetic cover.

- Acts as a noise dampener. Most metal lids are shaped such that they act as a soundboard, or the equivalent to a diaphragm of a speaker. The last thing needed is for the ultrasonic tank to amplify the noise in a seemingly quiet workshop.
- Serves as a drip tray for the basket when turned upside down (for placing the cleaning basket when removing cleaned items as in Figure 8).
- Being a poor conductor of heat as well, it helps save power by minimizing dissipation of heat from solution and periphery of tank. This helps keep the solution temperature constant, as well as minimize heat transfer to the rest of the room it is placed in.

7. Automatic start of cleaning when set temperature is reached.

One more arsenal in more effective ultrasonic cleaning is that a solution is evenly heated. Without a well-



# What's New

New Equipment, Tools & Techniques



Figure 8: Cover inverted acting as drip tray.

mixed solution, the heat will rise to the surface of the bath. This will cause an imbalance of temperature inside the cleaning bath. To counteract this effect, the unit is equipped with a “mixing” feature that guarantees the optimum mixing of the cleaning liquid.

### OPERATION:

1. Turn the unit on
2. Select the required cleaning time
3. Set the temperature knob to the desired temperature
4. Keep the START/STOP button pressed for more than two seconds

The ultrasound is activated for operating periods of approximately 5 seconds each, with one minute breaks in between until the set temperature is reached. After that, the ultrasonic will run for the set time.



Figure 9: Drain Closed.



Figure 9B: Drain open.

### 8. A knob-controlled drain tank.

This unit has an intelligent design where a knob on the side of the tank allows you to drain out the old solution in a breeze. Simply connect a hose to the elbow tube and allow liquid to drain down the sink by turning the knob (Figures 9A and 9B).

	Mains Voltage A.C. (V)	Ultrasonic frequency (KHz)	Power consumption Total (W)	Ultrasonic power Effective (W)	Ultrasonic peak Max (W)	Heating power (W)	Tank Capacity (L)/(Qt)
S40H With heater	110-120 220-240	37	340	140	560	200	3 Liters 3.2 Quarts

### TECHNICAL DETAILS

#### Conclusion

Overall, I am very pleased with the cleaning power, operation and design of this unit. I also like some of the useful improvements and innovations that have been incorporated into this ultrasonic tank. I recommend this unit if you are looking for a workhorse and not a toy. It definitely helped with cleaning results, as well as shortened cleaning time considerably.

With regards to serviceability and after-sales support, Elma is a very progressive and supportive company—service and parts are available in the U.S. through their dealer network, as well as independent service support. Replacement parts are also available.

I am glad to see there are still companies making continuous advances in the field of ultrasonic cleaning—it sure makes my job easier.



# What's New

New Equipment, Tools & Techniques

## Some important Do's and Dont's

### 1. DO — Change the solution regularly.

Not only will a dirty solution lose its cleaning potential and prevent items from being cleaned properly, the dirt and debris settling at the bottom of the tank will prevent the proper transmission of ultrasonic waves throughout the tank! (One shop I visited kept adding more cleaning detergent to the dirty solution. When we poured out the old solution, there was about ¼ inch of sludge at the bottom of the tank!)

### 2. DO— Place the unit in a separate soundproofed room or in soundproof cabinet.

Ultrasonic sound waves are not a natural sound that is supposed to be heard by the human ear. The long-term effects of ultrasonic waves on the human ear are not well known or extensively researched. Some dental hygienists have complained of hearing loss although the search for this cause is currently inconclusive. One thing is for sure, constant exposure to the sound of an ultrasonic tank is very annoying, to say the least.

### 3. DO NOT — Stick your hand in the solution while it is operating!

It is advised not to submerge any portion of your body in the fluid of an operating ultrasonic tank. It is believed ultrasonic wave action can cause skin irritations, drying and cracking of skin, joint damage, long-term arthritic conditions, as well as unknown effects on bone structure.

### 4. DO NOT — Don't put any objects directly on the bottom of the tank!

The transducer(s) which is made of piezoelectric crystals (ceramic) is secured to the bottom of the tank. This gets quite hot usually as a result of operation, as well as the heating of the tank via the heating elements. When a heavy object is placed on the bottom of the tank, the waves cause it to vibrate and these vibrations can eventually lead to the creation of hairline cracks in the transducer unit, thus causing a malfunction. This can be avoided by ensuring the items are suspended in the middle of the tank.

### 5. DO NOT —Use a solid type of cleaning agents (e.g. powdered soaps)!

Solid detergents will eventually settle out in the bottom of the tank and impede the proper transmission of the sound waves from the bottom transducer. It is preferable to use the manufacturer-recommended guideline when using cleaning agents. Many choices are available depending on the task at hand.



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BY JACK KURDZIONAK, CW21



## **BASELWORLD IMPRESSIONS, PART 3**

As I look back to my first visit to BASELWORLD in 1994 and compare it to BASELWORLD 2011, it becomes immediately apparent that numerous changes have taken place over the past seventeen years.

In 1994 and for several subsequent years, the Basel management made a conscientious effort to encourage Americans, especially the purchasing agents for American watch and jewelry stores, to attend the Basel fair. At that time, the fair management had an American public relations firm advertising the fair in the USA and provided free admission tickets to the fair for any Americans who wished to attend. They even provided a 15 Swiss Franc voucher at no charge that could be exchanged for lunch at the fair.

One year, we even negotiated a parking pass to park our rental car in the very small parking lot adjacent to the main fair building. When we mentioned our good fortune to a few vendors, they complained that even they, who paid thousands of francs for their display space, could not park anywhere near the fair.

Gradually, the perks disappeared. First, the free parking, next the free lunch, then the free Basel tram pass, and finally the free admission were all withdrawn one by one. Now there is no American public relations firm advertising the fair and no free giveaways. All arrangements to attend the fair are now made online and they all cost money.

One year in the late 1990s, after the fair closed, the destruction and construction crews went immediately to work. The destruction team demolished the entire main building except for the old façade. Then the construction crew built an entirely new and much larger building attached to the original façade. It was complete and ready to use in time for the next year's fair.

By the early 2000s, the fair had grown so large that it had to expand to another huge building about a mile away from the main exposition center. Now, there are plans to expand the main exposition area even further with construction beginning right after BASELWORLD 2012. They expect it will be ready in time for BASELWORLD 2013.

The logistics of the entire operation of BASELWORLD is a truly amazing example of Swiss precision. Although Basel is a congested old European city, the week-long fair gives the visitor the impression of seamless efficiency. No matter where visitors stay in or around Basel, the trains, busses, and trams take all from their lodgings to the front door of the fair with no hassle.

Driving to and from the fair is a possibility, but it can be very challenging for visitors. Most visitors use the excellent public transportation to get around. Street parking is virtually impossible and this year, the parking lots were charging 35 Swiss francs (about \$42) per day. That was in addition to the 60 franc daily admission charge to enter the fair. Visitors who purchase a Swiss Rail pass before leaving the USA can ride the train, bus, and tram system, not only in and around Basel, but all over Switzerland for the cost of the pass alone.

A few years ago, we had a rental car, so we visited Bienne, the home city for Omega, Glycine, Rolex, Mido, and many other companies. We found a street parking spot and left the car there for a little over the one hour limit and received a parking ticket for 40 Francs. The ticket was issued in German and unreadable by myself, who assumed, incorrectly, that the car rental firm would pay the ticket and issue a bill to me when I got back to the USA.

As they say in German, "keine chance, Jack" (no way, Jack). It did not happen and I conveniently forgot about the ticket. Two years later, I was stopped at Swiss customs when I attempted to re-enter the country. The officer politely asked me if I ever was in Bienne and received a parking ticket. "Yes", I answered, and he asked me to wait while he called two Swiss policemen. When they arrived, I jokingly asked if I would be jailed for this and they smiled and said, "keine chance, Jack." Then they asked if I had any Swiss cash with me...which I did. They not only charged me the cost of the parking ticket, but an additional 50 francs penalty before issuing a re-

# from the workshop

BY JACK KURDZIONAK, CW21

ceipt that allowed entry into Switzerland. It was an interesting lesson in Swiss efficiency. Since then, we have been very careful not to violate any Swiss parking regulations.

We stopped by the Glycine booth this year to visit with the owners of the company only to learn that the firm had recently been sold to new owners. The former owner (Katrina) was there to introduce us to the new owners. This was to be her final appearance at the fair. Glycine is only one of many firms that have undergone changes in management and distribution since our initial 1994 visit. Some have disappeared while others have been sold or consolidated.

In the past year alone, Davosa has been sold, while Oris, Glycine, and Fortis have changed U.S. distributors; and that's just to name a few. Each year, Swatch Group's presence at the fair has grown so that it now seems to dominate the ground floor of the main building. (If you have never been to Europe, you are probably not yet aware that the first floor of any building is what we here in the U.S. would call the second floor. The ground floor in Europe is called floor 0 and all above are numbered in ascending order.)

In 1994, there were numerous clock companies along with a plethora of tool and equipment suppliers at the fair. Now, only a handful of clock companies display at the fair and most of them are makers of individually made, very expensive clocks. The German clock companies no longer display at the fair. At one time, an entire building was devoted to tools, supplies and heavy equipment. For various reasons, that



area is now reduced to one floor of a single building. Even with the reduced number of vendors, you will still find well-known firms such as Witschi, Roxer, Greiner, Bergeon, Grobet, etc., that have wonderful displays to easily tempt any watchmaker who visits that area. Watchmakers, who visit the fair, must visit the tool and supplier displays at BASELWORLD and, of course, be equipped with a notepad to enumerate all of the tools they need to order. (Please see the three photos taken on the tool supplier floor that include a Bergeon display, a modern watchmaker's bench, and AWCI member Gerhard Loitz who was speaking with two colleagues.)



Next year's BASELWORLD will take place March 8-15, 2012. You need to make plans now rather than later if you decide to visit BASELWORLD. Although Basel's hotels are notoriously expensive, forget about booking one at this late date. They are usually sold out for Baselworld several years in advance. We always stay in a small village hotel several miles away from Basel itself.



# from the workshop

BY JACK KURDZIONAK, CW21



The smaller hotels are very clean, most serve continental breakfast as part of the room rate, and most often have public transportation a few steps away. (See the photo of Peter Weber getting breakfast ready at his Landgasthof hotel in the village of Kappel.) If English is your first and only language, do not let that deter you. Almost everyone in the city of Basel can speak some English and many others outside of the city have some familiarity with English.

One time, we were in a grocery store in the French speaking city of Vallée de Joux, attempting to read the labels on some packages of smoked salmon to see if they were ready to eat without cooking. We asked if anyone in the store spoke English and we were immediately introduced to a young man, perhaps just out of high school, who spoke fluent English. He graciously helped us with our selection of salmon, cheese, bread, and wine for our evening meal. (Check out the photo of the Lazy Creek Ranch we serendipitously discovered in the small Swiss village of Fulenbach.) Maybe it is owned by a Texas transplant?



There is no way for us to forecast the future value of the U.S. dollar vs. the Swiss Franc as we plan our future visits to Switzerland. Next year's visit may be even more expensive than it was this year, or it could be lower in cost. No one knows for sure. One thing is certain however, we will all be a year older on our next visit to BaselWorld and even older if we delay the visit for several years. If you decide to visit BASELWORLD or Switzerland and have any questions I can possibly answer, please do not hesitate to email me at: [jackkurdz@gmail.com](mailto:jackkurdz@gmail.com). I will do my best to assist with your travel plans whether it's to BASELWORLD or any part of Europe I have visited. ♦



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## Modern Operation in Historic Setting Gives Business a Boost

### A Passion for Horology

Whether it's on the phone or in person, the first time you hear David Berghold speak you'll recognize his passion for horology. The owner of The Last Wind-Up became fascinated with watch and clock repair while attending the South Kent School in Connecticut where an after-school club was offered. The club's volunteer teacher was Adolph Amend, Jr., one of the first members of the National Association of Watch and Clock Collectors.

Berghold says the deciding moment for his career came when Amend brought in a briefcase full of pocket watches. Berghold recalled, "We opened the backs, and we were all looking at them, and that was just it—I saw a treble hook set and I had to get one. I wanted to figure out how to take it apart and put it back together."

Berghold began to visit antique markets and flea markets with Amend on weekends. He'd pick up a timepiece, take it back to Amend's place, and "do the clean and oil on it." He remembers the first one was an 1880s Hampden watch they didn't have time to get back together. So instead of cracking the books, that night in his dorm room, Berghold put the Hampden back together. "I showed it to Amend the next day and he comment was, 'You did good.' That started the addiction."

An important business lesson Berghold learned early on was from his father, however, who worked in the financial industry. He remembers excitedly telling his dad how he picked up a watch worth \$350 for just \$120. "The watch isn't worth \$350 until you sell it for \$350," replied his father. Lesson learned.

### Taking the Passion on a Journey

Berghold also met Dana Blackwell, who left a lasting impression on him. Blackwell was curator of the American Clock and Watch Museum in Bristol, Connecticut. He also revitalized the E. Howard Clock Company as vice president, and rubbed elbows with Henry Fried. Berghold then took his passion to London where he apprenticed with an English watchmaker.



Chandelier, drop ceiling and upgraded display lighting create a warm and inviting showroom image.

Back in the United States in 1986, Berghold continued to pursue his career. He walked into Christies Auction House in New York and simply asked for a job. The director, Jonathon Snellenberg, offered to take him on as an intern. That was all he needed to hear as he launched into his newest position. Later, Berghold moved to Boston and completed his college degree in philosophy before setting up a small watch and clock repair business.

While visiting his parent's ranch near Bozeman, Montana, he was drawn to the store front of Bozeman Jewelry. Shortly thereafter, he decided to move west and The Last Wind-Up business was born.

## Establishing Roots and Growing the Business

The move to Montana in 1990 seemed a formidable risk at the time. The combined rent for his new store front and a small apartment was nearly triple what he was spending in Boston. He worried if there would be enough repair work and retail business in Bozeman for him to make it fly. "It was a challenge," ad-



The Last Wind-Up owner, Dave Berghold, restoring and repairing watches.

mitted Berghold. "It was one of those things where I said: 'Nothing ventured, nothing gained.' You have to take a risk."

By 1995 he had built a staff of three who shared his passion and dedication to the craft. But the limited space, combined with the work volume, created tight working quarters. "We were cramped," Berghold said. "The three of us were having lunch on one TV table." He expanded by building a separate garage with a work studio on top. And during these lunches, Dave and an employee came up with a concept to



Jeana Kroes was the first CW21 watchmaker in Montana at the bench of The Last Wind-Up.

manufacture and sell complete watches. They co-founded a separate company called the Montana Watch company.

In 2009 Berghold brought in Jeana Kroes to put her Rolex USA experience and WOSTEP certification to work at The Last Wind-Up bench. Kroes was the first CW21 watchmaker in the state of Montana. Berghold continued to grow by attracting customers through his store front on East Main Street and through an effective website.

## Streamlining the Repair and Restoration Operation

In 2010, Berghold realized his off-the-shelf envelope method for accepting and tracking repairs was antiquated and needed updating. Enlisting the help of a programmer, Dave made a small investment to put The Last Wind-Up repair form online. "This software has made it possible to accurately track all repairs, whether they come from walk-in customers or from any part of the country," Berghold said.

### In a few clicks, customers input and obtain information on their repair:

1. From home page of [www.lastwindup.com](http://www.lastwindup.com) click Repair Form icon.
2. Input info and click Submit Request.
3. Receive e-mail confirmation and shipping instructions.
4. E-mail confirmation is sent upon arrival of timepiece for estimate/repair.
5. Watch repair technician sends detailed estimate of work and cost via e-mail.  
Customers choose to accept or decline.
6. When work is complete, invoice is automatically e-mailed for payment.



Manager, Jill Yoder, easily tracks orders and repairs via computer.

Each e-mail communication contains useful information about the process and instructions on what customers should do next, or how the Last Wind-Up is handling orders. Once the invoice is sent via e-mail, the customer is also offered several payment choices including a secure online payment option. Order information is automatically entered into the database for easy tracking during the repair process and for future communications and marketing efforts.

## An Organized Repair Process

During the repair process, all timepieces are kept in heavy-duty zip-lock bags with the repair form. Job number, customer name and contact information can be seen through the bag. All jobs have a plastic container that fits securely to a wall-mounted hanger keeping it simple to see and locate a job on a moment's notice.



Customer timepieces are kept in clear plastic bags and wall-mounted for easy tracking during repair process.

The plastic bins are also used to store other material, such as a compartmentalized movement tin, a new replacement bracelet or strap, or any additional parts. Different large bins are used for watches requiring estimates and watches ready for repair work.

The online web form is updated when a job is started. Watches are assigned to a specific bin through completion of the work. When the work is done and the job has been invoiced via the online form, the watch is kept in the safe while awaiting payment and pick-up by the customer. "The system makes it simple and quick to track or look up past repairs," Berghold said. "With a few strokes of the keyboard, repair information is available to any staff member, assuring transparency and fewer interruptions for our watchmakers and clockmakers."

## New Operation with Historic Charm

After 20 years in the same location in Bozeman, Dave Berghold moved The Last Wind-Up down the street to the location of the old Bozeman Watch Company. The building was substantially more spacious with much of the infrastructure already in place. It houses his repairs and retail stock and provides plenty of room for his staff of six.



Wall cases display mantel clocks (opposing walls) and vintage grandfather clock (center). Antique display cases also serve as customer counter.

"The traffic in our expanded location has been phenomenal," said Berghold. "Our store window is substantially bigger and our showroom has breadth to it." Berghold's renovations combined their modern processes within the historic setting. They brought their turn-of-the-century showcases with them and complemented the look with a brilliant chandelier.



The 1880s Tower Clock displayed in the southwest window of The Last Wind-Up often draws a crowd.

Berghold says people are commenting on the new showroom look. They're asking where he got the new show-cases—they don't recognize them from the old location.

Berghold believes the image in the showroom builds the customer's image of the business. He recently bought a tower clock to restore with plans to place it in the southwest corner window. It needs a

fan, strike, levers, weights and a pendulum. He and a friend have already restored the 1880s tower clock in the front window. Berghold notes, "I just had the feeling that the mechanics of it, the proportions and the intrigue of it would be a customer magnet." More new lighting is scheduled to better display the mantle clocks. Antique floor cases will soon be outfitted with low-watt LED lighting to reduce heat buildup and lower their energy consumption.



Tidy work area.

In the watch repair rooms, stainless steel walls help reduce dust. Drop ceilings with good lighting and ventilation make them warm and inviting. Creating the same cleanliness and order in the workshop area was integral in the move to the new location. "If the business showroom is untidy and lacking order, then, in all likelihood, so is the repair facility," says Berghold. "In an effort to gain a greater respect from your

customers, the showroom should be as polished and orderly as the workspace for service."

The Last Wind-Up makes every effort to keep time with changes in the industry, from upgrading their timing machines and tooling to streamlining their organization of parts and material orders. They also believe a strong internet presence is key to future business success: It projects a positive message to the world while they enjoy the quality of life and work in a picturesque Montana town. ♦



Long-term staff contributes to the success of The Last Wind-Up (L-R: From left to right: Diana Weber-Bookkeeper, Lynda Livingston-Sales, Jim Arens-Clock Technician, Jill Yoder-Manager, Jeana Kroes-Watchmaker, Dave Berghold-Owner & Watchmaker).

### A Fascinating Repair Request

One of the more interesting repair requests was for two 1850s watches recovered from the S.S. New York which was sunk in the Gulf of Mexico during the Mexican-American war. One watch was a Continental Fusee, the other was a gold-cased English Fusee. "One arrived in a Tupperware with saline solution," said Berghold. "It just fell apart. Every screw, hinge, mainspring or hairspring almost disintegrated upon contact."

Restoration wasn't financially feasible so he suggested cleaning things up to display in shadow boxes. During cleaning Berghold found the steel hands had left an imprint on the metal dial which coincided closely with the time the ship had sunk.

## Making a Rack Striking Mechanism

BY LAURIE PENMAN

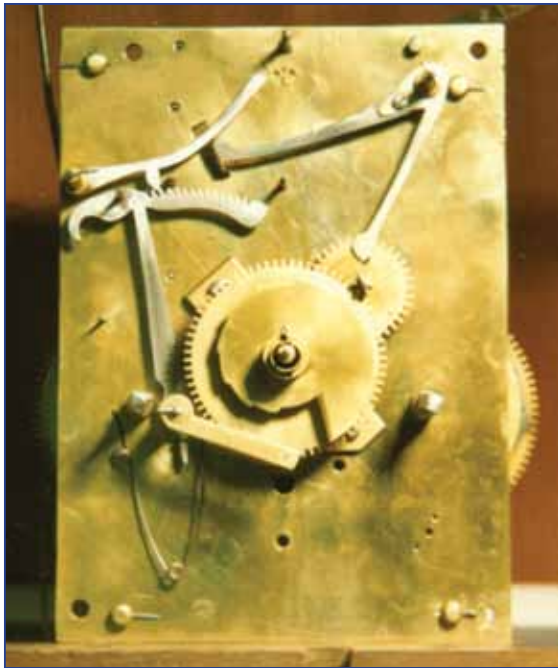


Figure 1

The striking system of a clock movement is frequently damaged on an antique clock, and its parts can sometimes be lost. That's why one of the exercises in my Correspondence Course is the design and manufacture of a complete set of frontwork for rack striking clock forms. Since these parts cannot be purchased from a catalog and installed on an old clock, this exercise is equally useful for making a clock from scratch.

The style I will discuss is the type that is stopped by the gathering pallet, typically seen on long case movements (Figure 1) or tall clocks, not exclusively, of course, and in modified form on large 19<sup>th</sup> century mantel clocks. (An apology is due for this particular photograph. Although I have hundreds, probably thousands of clock photographs, this is the only one of a simple long case movement's frontwork. It dates from the 1970s with a camera that was made for

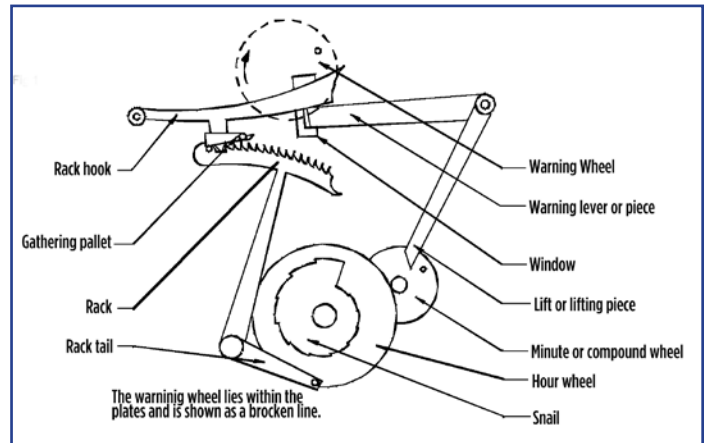


Figure 2

snapshots, but not adept at close focusing.) Figure 2 shows the general form and names the parts of the mechanism. Figure 3 demonstrates the technique by showing the parts at three points in the operation:

1. The first is with the train locked.
2. The second is at warning, when the lift has allowed the rack to swing over and register the tail on the snail.
3. The third is when the warning has released and the gathering pallet begins to ratchet the rack back to the stop position.

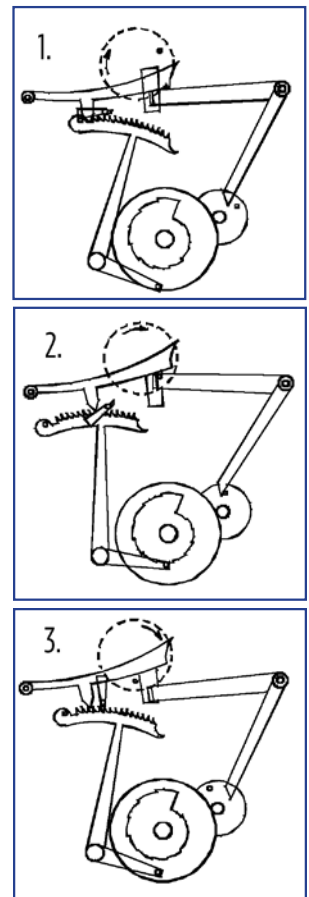


Figure 3

This is now what must be achieved by the geometry I design into the new parts. I am constrained by the space available on the plates when designing from scratch. What is often more difficult is that I am also constrained by the design of the original parts that remain when making a replacement. However, an even worse realization is when one becomes slowly aware that what remains was not what the original maker installed!

I do not need to worry about the details of the gear

# making a rack striking mechanism

BY LAURIE PENMAN

train. If the minute hand goes around twenty-six times a day, or the gathering pallet does not match its revolutions to the warning wheel, there is nothing the rack can do to put it right. Conversely, if the rack striking assembly does not perform its own functions properly, it cannot be blamed on the train.

If the warning piece and its blade are in the correct position when the gathering pallet has come free of the stop pin at the end of the rack, then it is the fault of the train if the warning pin does not quite catch. I will ignore the train completely while making the rack mechanism and I will produce a finished scale drawing before I attempt to make anything in metal.

Figure 4 shows a clock front plate with the positions of winding arbors, center arbor, warning wheel and gathering pallet arbor already established. I design the trains and plates first. If, in the course of designing the striking system, I discover that a pivot hole lies directly under one of the frontwork posts, there is usually enough flexibility to shift the intended position of the post without compromising the train or frontwork. You will find that my decisions will probably need to be changed as the various parts are drawn up, but I have to start with the most inflexible dimensions, the maximum and minimum radii of the snail.

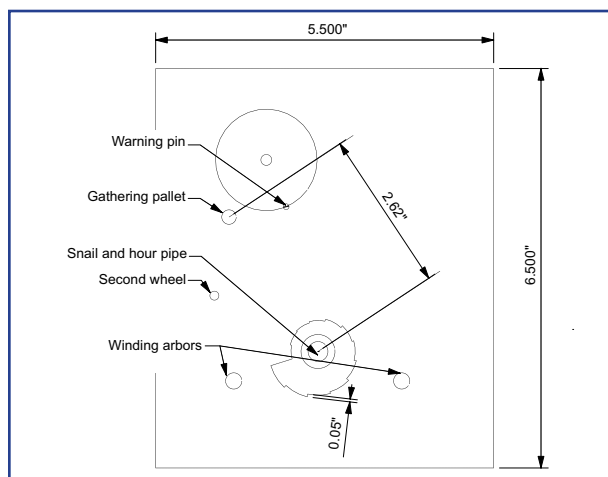


Figure 4: The given position of existing posts

The smallest radius cannot be less than the radius of the hour pipe. Unless the rack tail can lodge its very edge on the 12 o'clock position (by making the tail pin as a bent-up part of the rack tail), it must be much larger. As a result of designing and building the movement myself, the diameter of the hour pipe is 0.550", a radius, therefore, of 0.277".

I intend to use a rack tail pin that is about 0.1" diameter. To take the shock of dropping onto the snail for the next two-hundred years or so, I am going to place its center 0.15" from the tail edge. To make sure that the pin rests on the snail at 12 o'clock and not on the hour pipe, I add 0.15" to the radius of 0.277", making it 0.427". I add some room for clearance to make it 0.44". The radius of the plateau for 12 o'clock is 0.44" (Figure 5).

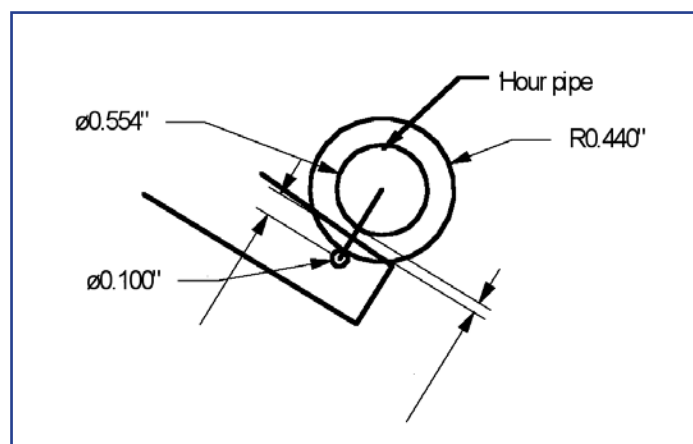


Figure 5

How large can I make the 1 o'clock radius? If I make it close to the root diameter of the hour wheel teeth, the clock will probably stop every time that plateau comes up to the pinion of the compound gear because it hits the pinion leaves. At the same time I would like it as large as possible because the increments from one plateau to the next will be a decent size.

If they are small, the ratio between the radius to the top of the rack teeth (from the post it swings on) and the radius to the tail pin will need to be larger than is comfortable. This ensures the rack teeth are not too small and that a large ratio won't multiply any error on the snail. A 3 : 1 ratio between rack tip radius and rack tail radius multiplies any error by three. A ratio of 2 : 1 only multiplies by two, of course.

I have only just started and already you can see that I have to plan ahead and, if necessary, modify the small decisions made to this point. I expect I will need to make changes, and consequently, I start with several copies of the drawing showing the unchangeable dimensions (winding centers, center arbor, etc.). However, since I have a well-behaved computer-aided drafting program, I can work very accurately and avoid rubbing out lead pencil marks.

# making a rack striking mechanism

BY LAURIE PENMAN

The very largest I can make the 1 o'clock radius of the snail would be to the root of the hour wheel teeth, say 0.685". However, I would like a little space between the 12 o'clock plateau and the root of the gear teeth. I have two radii 0.44" and 0.685". The increments (the step from one plateau to the next) will be their difference, divided by eleven. You may ask, why eleven? The step between 12 and 1 is a big one, so there are only eleven small increments, and the big one is equal to eleven increments:

$$0.685 - 0.44 = 0.245$$

$$0.245 / 11 = 0.02227 \text{ (an unhelpful figure)}$$

I cannot change the 0.44" very much, but 0.41" would help. This first calculation becomes:

$$0.685 - 0.41 = 0.275$$

$$0.275 / 11 = 0.025"$$

(I assure you - this is a fluke)

The snail can now be drawn up with a minor radius of 0.41" and a major one of 0.685". The radii will get small, from 1 to 12 by 0.025" at every step (Figure 6).

I mentioned the fact that this form of striking mechanism is similar to those found in bracket clocks (Figure 7). This photo shows a bracket clock that strikes quarters, as well as hours. The basic parts of rack, rack hook, lift and gathering pallet can be easily identified. ♦



Figure 7

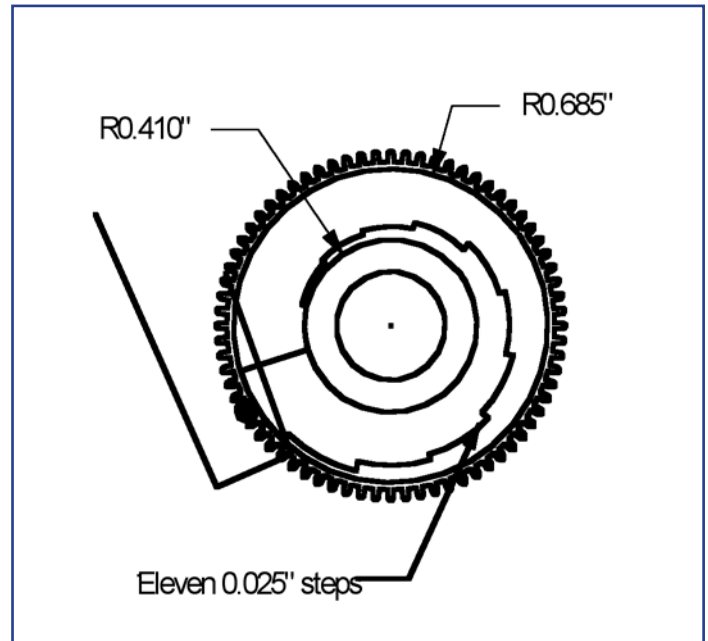


Figure 6

## WATCHMAKERS

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BY BRENDEN McDOUGAL

## How to Make Your Own Shock-Spring Removal Tool

In movement design, generally two types of shock springs are used with the balance. Either you open the prongs and the spring hinges out of the way or the spring is detached. This means you have to carefully rotate the spring with two pairs of tweezers, hoping that you don't accidentally flex the spring and launch it into the void. Using a shock spring removal tool will lessen time spent on the floor; as well as speed up your service.

Many manufacturers (Farr, Junghans, Kif, ETA, Seiko, Poljot) over the years have created this detached style of balance shock spring. You can find them servicing wristwatches of almost any age, from vintage 50s to many of the latest calibers. Tools are available from several sources that do a great job of installing and removing these springs. However, if you don't have the right size or style in stock, here is how to make your own shock spring removal tool:

When making any tool, material choice is very important. I chose 3 mm clear acrylic rod to make this tool for several reasons:

- 1) It is easy to find and inexpensive;
- 2) It is easy to machine by hand (especially if a lathe is not accessible);
- 3) It's light weight and hard; and
- 4) It can't scratch the movement.

There are many different materials that could work for this application. Just keep in mind that this tool uses pressure to flex the spring and rotation to remove it—the material you choose needs to be hard enough to withstand both of those forces. If the type of plastic you choose is too soft, it will leave a mess of abraded plastic in your cleanly serviced watch.

If you have the tools and equipment, brass and steel are also great choices for this tool. However, brass and steel both could scratch the movement. Each material has positive and negative attributes. Take

a moment to consider them all before making your choice.

The following instructions focus on shaping the functional end of the tool: the tip. The handle for the tool can be as fancy as a turned handle with a set screw or as simple as a length of rod with the finished tip still attached.

To start, part off a short piece of rod, long enough to comfortably hold in your hand.

Step 1: Form the tip of the rod into a cone. The cone should be roughly 5 mm long. Using emery paper (a fine to medium grit), hold the rod at a shallow angle with one end on the paper. Rub it back and forth while rotating the rod to form the cone. Periodically roll the rod on a flat surface, watch to see if the point wobbles as it rolls. The finished point should be roughly centered on the axis of the rod. Due to the rubbing action, the cone may be more rounded than sharp. This is not a problem. It is a non-functional surface; the surface finish and shape are up to you. (I left a rough surface finish so it would show up better in the photos; normally I would finish it with a much finer emery paper and oil.)

Take a moment and look at the original factory-made tool (as pictured with my versions, Figure 1); you can see it is made from a cylinder of steel, not a cone. I made the first generation of this tool out of acrylic with the same exact shape. I dropped it while using it during a service, and one of the prongs snapped right off. One of the drawbacks from using acrylic is that it is hard, which also means it is brittle. Using a cone shape strengthens the prongs, increasing their durability.



Figure 1: Step 1 & 2 – Raw stock, shaped cone, filed flat

# how to make your own shock-spring removal tool

BY BRENDEN McDOUGAL

**Step 2:** Form the flat on the cone. The cone needs to have a flat at the end that is perpendicular to its axis, roughly 1.60 mm in diameter.

This is easily measured using a purple screwdriver, since its width is 1.60 mm. I chose this size based on the original tool I was using as a guide. I know this spring comes in other sizes, however, all the modern ones I have come across use this size tool. Is it too big for the spring you want to remove? In that case, use a diameter that is slightly smaller than the spring you are trying to remove. Need two sizes? Use both ends of the length of rod; now you have a multi-purpose tool!

Shape this flat any way you like, I used a fine flat escapement file. Emery paper will work too, though if you use that, finish with an Arkansas stone and oil. This surface is the functional surface; it needs to be smooth and flat. Before continuing, form a dimple in the center of the flat using a prick punch, a stake, a pair of tweezers, anything that will guide the drill bits needed in the next step.

**Step 3:** Drill the center hole. Form a 1.00 mm diameter hole in the middle of the flat.

I found that the drill bit wandered easily when going straight to the 1.00 mm drill bit. Instead, take a smaller drill bit first and clamp it in a pin vise. I used a .55mm. Holding the piece in one hand and the pin vise in the other, slowly drill a hole, using the dimple as a guide, 1 to 2 mm deep. Then, repeat this step using the 1.00 mm bit. If you find that the hole is off center, don't start over; just go back and re-form the cone using the emery paper so that the hole is center. The important thing is that the walls around the hole are even, since this will form the prongs.



Figure 2: Step 3 – Drill center hole by hand

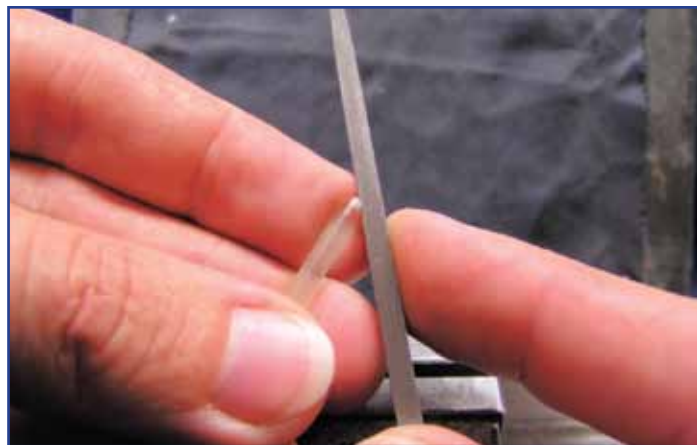


Figure 3: Step 4a – File into the center hole

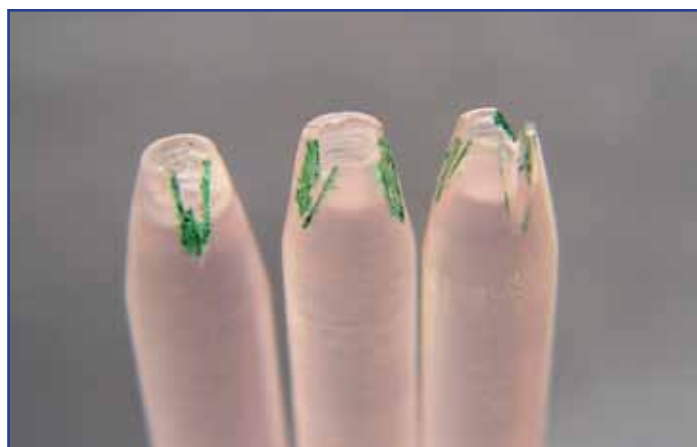


Figure 4: Step 4b – Three equally spaced grooves

Remember, if you are using a smaller size flat, the hole should be proportionately smaller.

**Step 4:** File the prongs. Form three equally spaced prongs by cutting three grooves into the cone.

Using a triangle-shaped escapement file tilted at a sharp angle, file into the center hole through the walls of the cone in three separate equidistant places on the cone's surface. Take short, careful strokes. I found that the file wanted to wander if it didn't bite into the cone right away. File enough to make a groove that makes a 'V' shaped cut into the center hole. Don't remove too much material as the tips of the prongs will end up being points. You want three nice and equal flats. The tool will still work if the prongs are not equally spaced. However, mapping out the three grooves with a sharpie beforehand will help keep the grooves equidistant.

Run the drill bit through the center hole to remove any plastic burrs that build up. Use your Arkansas stone on the tips to clean up any burrs.

Wash your newly finished tool with soap and water to remove any clinging plastic dust. You are done!

As you can see from the picture, the functional tips are shaped like the original. Test it out. If you find the cone doesn't quite fit in the shock jewel setting, take it back to the emery paper and thin the cone out a bit. Because your tool is plastic it will wear, so keep an eye on it. When you see wear, clean it up using the emery paper and file. It's as easy as sharpening brass tweezers.

Now you have another useful tool that will make your services more efficient. You will have a tool that will help you spend less time on the floor searching for that missing shock spring. Of course, you still have to get the spring from the movement to the container... good luck! Author Brenden McDougal is a first-year student at Lititz Watch Technicum in Lititz, PA. ♦



Figure 5: Comparison – Original tool, my acrylic version, my brass version



Figure 6: Final use – Line it up, push & rotate

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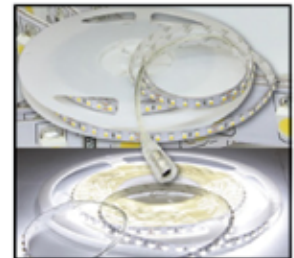


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BY JORDAN FICKLIN, CW21

## How Air Pressure and Timing Affect a Watch

Many things will affect the timekeeping of a watch. Among these are the “enemies of isochronism” which any watchmaking student can blindly spout off. For the record, the enemies of isochronism are: Temperature, Magnetism, Friction, External Shocks, Interference of the Escapement, Poise of the Balance, and Poise of the Hairspring. Overcoming these interferences is key in creating a watch that keeps accurate time despite all that a watch will endure.

Humidity can be another factor, but what about Air Pressure? Those who work with observatory clocks and regulator clocks will be familiar with these effects. The density of the air through which the balance travels will affect its motion.

Throughout this article I will express the density of the air in terms of air pressure as measured in bars. The ideal gas law states that  $PV=nRT$  where:

**P=pressure • V=volume • n=number of particles of the gas  
R= universal gas constant • T= temperature**

In this experiment, the density of the air was changed using a vacuum pump. The pump reduces the number of particles in the chamber while keeping the volume and temperature constant, thus changing the pressure. The pressure can be altered without changing the number of molecules. This can be accomplished by changing the temperature of the air, which introduces other factors into the experiment, including material changes due to temperature change, as well as molecule activity.

The effects on timekeeping (due to interaction with the air) would be similar as decreased molecular activity would still result in reduced resistance applied to the balance. It would be difficult to distinguish these effects from the effects due to material deformation caused by the change of temperature. Because I was able to maintain temperature as a constant, I demonstrate that the density of the air surrounding a movement has a definite effect on the timekeeping of clocks and watches.

Previously, I had a discussion about a problem with a customer (a retired experimental physicist). He had recently purchased a high end watch which was supposed to keep incredibly accurate time—and it did. It consistently gained 2 seconds per day; excellent timekeeping by most standards! Because of the consistency of the rate, the customer talked a watchmaker (not myself) into adjusting the watch just a bit slower so it would keep near “perfect” time. Upon opening the watch, the watchmaker discovered he did not have the necessary tool to adjust the timing bolts on the balance of this particular watch. He closed the watch back up, not having made any adjustments, and recommended that this gentleman contact the manufacturer about possibly adjusting his watch.

Over the next week, the physicist noticed that his watch was now gaining 4 seconds per day! His conclusion: Because Albuquerque is at a much higher altitude than Geneva, his watch was now sealed up with a lower density of air inside of it, allowing the balance to turn with reduced wind resistance, which caused a gain 2 seconds more per day.

I was confident in my knowledge of the enemies of isochronism, and I had never given air pressure any thought prior to this encounter. Additionally, I was certain that air pressure did, of course, have some effect on the watch, but that it would be negligible. I thought it was much more likely that the change in timing was due to a piece of lint that had landed in the watch, or the watch having become magnetized. Together, the physicist and I devised the following experiment.

Using tools I had at my disposal in my shop, I measured the rate of seven different watches while exposing them to different air pressures. To create an environment with distinctly different air pressures I used my water tester. I drained the water out of my Rolex 1050 (vacuum) pressure tester and placed the watch in the bottom of the glass vial. Watch cases were opened to allow the movements to be exposed to the changes in air pressure and density.

Because glass conducts sound very well, I was able to locate my timing machine (Witschi Professional) on the outside of the vial with the metal conduct of the mic touching the glass container. I obtained a good readout of the timing results (Figure 1). With this setup, I took a baseline reading at ambient atmospheric pressure; which on the day of my experi-

# how air pressure and timing affect a watch

BY JORDAN FICKLIN, CW21



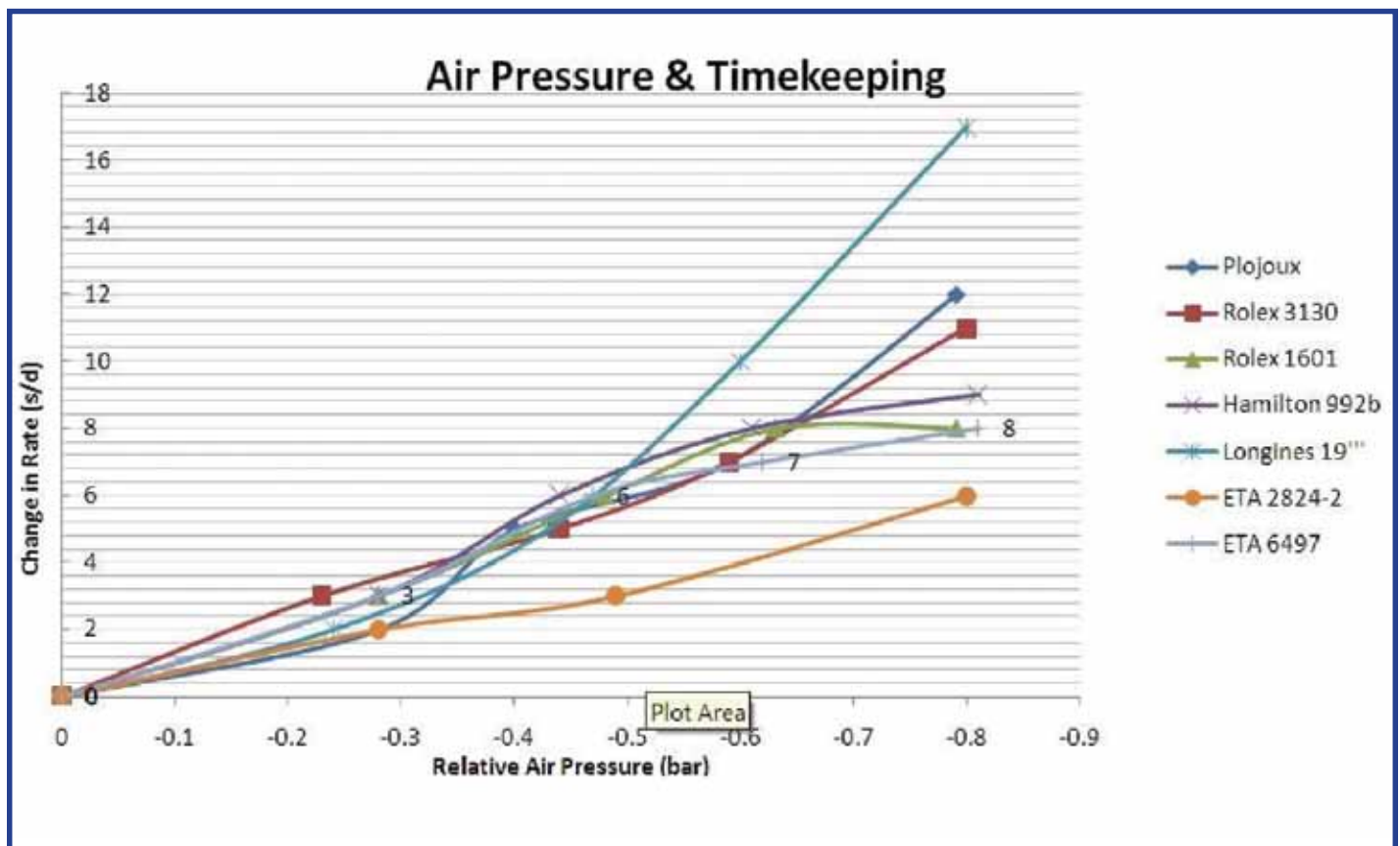
Seven different watch calibers were used in this experiment as summarized in the following table with their timing results. All watches were in excellent working condition.

As the air pressure was reduced inside of the chamber, the watch began to gain time at an increasing rate. Over the sampling of these seven calibers, the change in the rate of the watches was approximately linear in relation to the change in air pressure at an average rate change of approximately 12.6 seconds per 1 bar change in air pressure. It seems clear to me there is a definite correlation between air pressure (density) and timekeeping.

ment, was 30.1" of Hg, or approximately 1.02 bar. The temperature in my office was approximately 73° Fahrenheit and relative humidity was 18%. Because temperature, humidity, and gas mixture were all held constant, the change in air pressure represented a direct change in density of the air.

The results of the experiment were both dramatic and surprising. They are summarized in the following chart:

The factors affecting the rate in the watch are: Friction caused by the balance moving through the air, drag and turbulence. The two watches that exhibited the least change both had smooth balance wheels. The smooth balance wheels are more aerodynamic and there is less resistance, drag, and turbulence as they move through the air. Changes in the density of the air (air pressure) will have a smaller effect on them. I cannot explain the drastic change in the Longines watch.



# how air pressure and timing affect a watch

BY JORDAN FICKLIN, CW21

What do these results mean to us as watchmakers? At the very least, it is something of which to take note. In a well-sealed, water-resistant watch case, the air pressure will remain constant until the seal of the case is broken, equalizing the pressure inside the case and outside. Air pressure should have no effect on the timekeeping until the case is opened and should therefore not affect the customer. But, with dustproof or dress watches, any time the watch changes altitude or a storm moves in, this change would take effect immediately and affect the timekeeping of the watch.

If you do work for customers who live great distances from your workshop, and they live at a considerably higher or lower altitude, you may want to take these results into account, especially on high-grade dress watches and with extremely discriminating customers.

The difference in altitude between Albuquerque, New Mexico and Geneva, Switzerland is approximately 4,000 feet, and the difference in air pressure due to elevation change is 0.107 bar. Based on the results of the experiment, this translates into a difference in the rate of the watch of between 1 and 2 seconds per day, exactly as my customer experienced. A table with the absolute air pressure at different elevations is given at the end of this article.

An elevation change equal to that between sea level and Mt. Everest would result in a timekeeping change of approximately 10 seconds/day. More importantly perhaps would be changes in the other direction. Saturation divers will find that helium enters their watch case causing the pressure inside their watch to increase (this is why some dive watches have Helium Escape Valves).

Caliber	Description	Experimental Data	
Rolex 3130	28,800 bph with microstella timing screws on the inside of the balance rim	Relative Pressure(bar)	Change in timing (s/d)
		-0.23	+3
		-0.44	+5
		-0.59	+7
		-0.81	+11
Plojoux Pocket Watch	18,000bph Swiss Made Pocket Watch Movement with split bi-metallic balance with screws on the outside of the balance rim.	Relative Pressure(bar)	Change in timing (s/d)
		-0.28	+2
		-0.40	+5
		-0.59	+7
		-0.79	+12
Rolex 1601	19,800 bph smooth balance wheel with timing nuts on balance arms	Relative Pressure(bar)	Change in timing (s/d)
		-0.28	+3
		-0.48	+6
		-0.63	+8
		-0.79	+8
Hamilton 992b	18,000 bph pocket watch with Invar balance wheel and timing screws on the outside of the balance rim	Relative Pressure(bar)	Change in timing (s/d)
		-0.28	+3
		-0.44	+6
		-0.61	+8
		-0.81	+9
Longines 19 ligne pocket watch	18,000 bph swiss made pocket watch with split bi-metallic balance wheel and screws on the outside of the balance rim	Relative Pressure(bar)	Change in timing (s/d)
		-0.24	+2
		-0.43	+5
		-0.60	+10
		-0.80	+17
ETA 2824-2	28,800 bph 101/2 ligne swiss made wristwatch with smooth balance wheel	Relative Pressure(bar)	Change in timing (s/d)
		-0.28	+2
		-0.49	+3
		**	
		-0.80	+6
Modified ETA 6497 School Watch	18,000 bph pocket watch movement with smooth balance wheel	Relative Pressure(bar)	Change in timing (s/d)
		-0.28	+3
		-0.47	+6
		-0.62	+7
		-0.81	+8

\*\* It was difficult to get a good timing reading from this watch through the glass jar of the pressure tester.

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# how air pressure and timing affect a watch

BY JORDAN FICKLIN, CW21

I have no experience with saturation diving, and I don't know what kinds of pressures the insides of these watches will reach. Additionally, I have no way to test the watches with the appropriate gas mixtures (which would affect the density of the air). I am confident, however, that there will be some affect on timekeeping once the helium begins to penetrate the watch case.

In conclusion, the density (or pressure) of the air surrounding a watch movement will affect the motion of the balance and therefore, the timekeeping of the watch. Watchmakers should not stress over this fact, but should be aware of it should the question arise with discriminating customers. ♦

## Jordan Ficklin

A graduate of the Lititz Watch Technicum, Jordan has been a watchmaker since 2001. He received his CW21 in 2006 and now works for Beauchamp Jewelers in Albuquerque, New Mexico. Jordan has a BS in Computer Science from the University of Arizona. In addition to writing for the HT and serving on its Review Committee, he is the owner and principle contributor to [watchmakingblog.com](http://watchmakingblog.com)



Altitude Above Sea Level		Absolute Barometer		Absolute Atmospheric Pressure		
feet	meters	inches Hg	mm Hg	psia	kg/cm2	kPa
-1000	-305	31.0	793	15.2	1.07	105
-500	-152	30.5	779	15.0	1.05	103
0	0	29.9	765	14.7	1.03	101
500	152	29.4	751	14.4	1.01	99.5
1000	305	28.9	738	14.2	0.997	97.7
1500	457	28.3	724	13.9	0.979	96.0
2000	610	27.8	711	13.7	0.961	94.2
2500	762	27.3	698	13.4	0.943	92.5
3000	914	26.8	686	13.2	0.926	90.8
3500	1067	26.3	673	12.9	0.909	89.1
4000	1219	25.8	661	12.7	0.893	87.5
4500	1372	25.4	649	12.5	0.876	85.9
5000	1524	24.9	637	12.2	0.860	84.3
6000	1829	24.0	613	11.8	0.828	81.2
7000	2134	23.1	590	11.3	0.797	78.2
8000	2438	22.2	568	10.9	0.768	75.3
9000	2743	21.4	547	10.5	0.739	72.4
10000	3048	20.6	526	10.1	0.711	69.7
15000	4572	16.9	432	8.29	0.583	57.2
20000	6096	13.8	352	6.75	0.475	46.6

Source: [http://www.engineeringtoolbox.com/air-altitude-pressure-d\\_462.html](http://www.engineeringtoolbox.com/air-altitude-pressure-d_462.html)

BY HENRY KESSLER

## Watch battery laws are changing. Again.

**0%  
MERCURY**

**renata 0% MERCURY**  
silver oxide batteries are now readily available everywhere throughout the U.S.



### Watch Battery Laws

Most of us have heard that button-cell battery laws are changing, but despite all of the news, some folks remain unclear about the current status of the laws—for good reason. The subject is confusing.

Many people are laboring under the understanding that battery producers quit using mercury back around 1995, but this is not true! They stopped producing mercuric oxide 1.35V watch batteries, but continued production of 1.55V silver oxide watch batteries, 1.5V alkaline novelty batteries (often used in give-a-way, ultra low-end watches), and 1.4V zinc-air hearing aid batteries, while adding a few milligrams of mercury to every cell. You might think 2 to 7 milligrams is not much. But when considering the estimated 100 million silver oxide batteries consumed in the U.S. each year, along with the 300-million zinc-air batteries—even before factoring in those millions of novelty batteries—this U.S. consumption of mercury could add up to 4,400 pounds or 2 metric tons a year. And that's year after year.

Until a few weeks ago, it was going to become illegal in Maine, Rhode Island, and Connecticut to sell these mercury-containing batteries, or to use them to power devices that are sold after July 1, 2011. But these laws have changed.

In response to a request of the American Watch Association, these states decided to continue allowing silver oxide watch batteries containing mercury to be sold, for a while, anyway. Maine pushed their transition date out six months to January 1, 2012 for all types of button-cells, and Connecticut and Rhode Island pushed the date out a full year to July 1, 2012 for silver oxide. Louisiana has a ban on mercury containing button-cells going into effect in 2012. A ban is being proposed on all button-cells for the state of Wisconsin, and similar activity is

taking place in Canada, proposed to go into effect January 1, 2012. In addition, it has been reported that more than 30 other states have laws pending about the use of mercury, and there is talk of national legislation.

These new generation 0% Mercury batteries are now readily available everywhere. But, if you do business in Maine, Connecticut or Rhode Island, you have a few extra months to use up your old, non-complying watch battery inventory.

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## NEW EVIDENCE OF RESURGANCE IN RETAIL WATCH MARKET

A recent article in *The New York Times* documents a trend that many in the industry have been sensing: Yes, the retail watch market is making a strong comeback. And this isn't just for low-priced brands. See this excerpt below:

"The men's-wear set has recently rediscovered the joy of proper mechanical timepieces," Mr. Williams said. "Right now there is no clearer indication of cool than wearing a watch. If it was your grandfather's bubbleback Rolex, even better."

As recently as a half-decade ago, time seemed to be running out for the wristwatch. With cellphones, iPods and other clock-equipped devices becoming ubiquitous, armchair sociologists were writing off the wristwatch as an antique, joining VHS tapes, Walkman players and pocket calculators on the slag heap of outmoded gadgets.

The wristwatch "may be going the way of the abacus," declared a news article in *The Sacramento Bee* in 2006. *The Times* of London had it "going the same way as the sundial." *The Boston Globe*, in a 2005 lifestyle feature, was more definitive: "Anyone who needs to know the time these days would be wise to ask someone over the age of 30. To most young people, the wristwatch is an obsolete artifact." Or, maybe not...

After plunging 35 percent in 2008, and another 13 percent in 2009, sales of moderately priced watches (between \$150 and \$1,000) have rebounded and are up 15 percent for the last three months, compared with the same period last year, according to Fred Levin, the president of LGI Network, a market research company that tracks the industry.

Luxury watches are faring even better. Sales of timepieces priced between \$10,000 and \$25,000—Ferraris of the forearm — are up 33 percent.

The Swatch Group, the largest watchmaker in the world, is scrambling to add factory capacity after

net profits rose 42 percent last year (the company, which owns Omega, Longines and more than a dozen other brands besides Swatch, is also a dominant supplier of movements for other brands). Fossil Inc., which manufactures a jaunty mall-friendly line of watches under the Fossil brand, as well as licensed watches for design labels like Burberry and DKNY, saw its global watch sales shoot up 44.4 percent in the first quarter, after sliding 1.8 percent as recently as 2009...

"The coolest electronic gadgets they buy now are owned by everyone else they know, too," said Mitch Greenblatt of Watchismo. But "a really unusual watch is very likely to be one-of-a-kind in their circle of friends."



A few years ago, Casio reached out to younger buyers by introducing bigger and more colorful models and marketing them with surfers like Gabe Kling and skateboarders like Stevie Williams. Since then, sales of its hefty rainbow-colored G-Shock and Baby-G watches have doubled year over year, according to Shigenori Itoh, the chairman of Casio America, in a statement issued through a spokeswoman.

But perhaps the most robust sector is the youth-friendly "fashion watch" category: watches licensed by labels like Tommy Hilfiger, Hugo Boss and Lacoste. Fossil reports that sales of its Michael Kors watches were up 142 percent in the first quarter this year; for its Armani Exchange line, 129 percent.

"The increases are phenomenal, significant strong double-digit retail growth," said Jon Step, president of licensed brands at Movado Group Inc., which has several such designer licenses. Manufacturers have courted younger buyers in part, he said, with exuberantly styled watches using extravagant or offbeat materials: brightly colored plastic, rubber or ceramic. But for some newly minted watch geeks, the appeal of a timepiece that has endured for decades is more emotional.

"James Bond wore a Rolex," Michael Williams said. "Who really needs more convincing than that?"

Williams, Alex. "Watches Are Rediscovered By The Cellphone Generation" *The New York Times*, [www.nytimes.com](http://www.nytimes.com). 6 July 2011 [www.nytimes.com/2011/07/07/fashion/watches-are-rediscovered-by-the-cellphone-generation](http://www.nytimes.com/2011/07/07/fashion/watches-are-rediscovered-by-the-cellphone-generation).

BY HERMAN MAYER,  
AWCI EDUCATION COMMITTEE CHAIRMAN



## New Goals for AWCI's Education Committee

I would like to thank the president and the AWCI Board of Directors for my appointment as Education Committee Chairman. My current goals in this position are:

1. Finalize the implementation of a Master Level Certification to complement the CW21 certification.
2. Assess the feasibility of, and the demand for, a Master Level Certification as the next higher proficiency level to the CC21 certification.
3. Promote industry recognition for the new Master Watchmaker Certification.
4. Assess the feasibility of, and the demand for, Watch Technician and Clock Technician Certification. Assess the possible risks for the profession and the Institute that come with involvement in semi-skilled activities.

5. Assess the feasibility, benefits and risks of a regulated apprenticeship system as an alternative to full-time schools to become a certified watchmaking professional.
6. Review and make recommendations for the training offerings currently provided by AWCI, under the criteria of demand and efficiency.

I am looking forward to working on these and other tasks with Mike Gainey, Manuel Yazijian, and their content experts.



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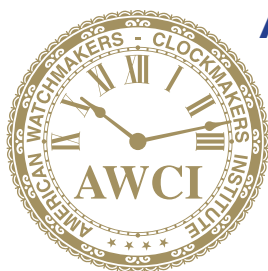
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## AWCI Academy of Watchmaking Class Schedule

*"To say that Tom Schomaker knows the subject would be an understatement. His use of visual aids was impressive and the material was presented in a logical, clear manner. I learned a lot and I will be back."* Student in the Basic Quartz Watch & Quartz Chronograph Repair class, April 2011.

Sign up now for one of our new classes on the Modular Chronograph or Polish and Waterproof Testing in October!

## AWCI Academy of Watchmaking Schedule

AWCI is offering a series of 5-day watchmaking classes for the continuing education of watchmaking professionals:

Each 5-day block will cost \$725.00

Each 3-day block is \$435.00

Sept. 12 – 16, 2011	Servicing & Adjusting the Swiss Lever Escapement
Sept. 26 – 30, 2011	Balance Staffing & Timing
Oct. 10 – 14, 2011	NEW Class! Modular Chronograph (Featuring the Vertical Clutch System)
Oct. 17 – 21, 2011	NEW Class! Polishing & Waterproof Testing

All classes are held in Harrison, OH. For additional information call toll-free 1-866-FOR-AWCI (367-2924), ext. 303 or e-mail [dott@awci.com](mailto:dott@awci.com). Class information is also available online at [www.awci.com](http://www.awci.com).

AWCI Watch Repair Course schedule is subject to change. Seats may become available for the classes; please contact AWCI to be added to the waiting list.

## AWCI 21st Century Certification Exam Schedule

*Please visit AWCI's website for complete information on the 21st Century Certified Watchmakers Exam.*

September 19 – 22, 2011 AWCI Training Facility, Harrison, OH

October 3 – 6, 2011 AWCI Training Facility, Harrison, OH

November 7 – 10, 2011 AWCI Training Facility, Harrison, OH

December 12 – 15, 2011 St. Paul College, St. Paul, MN

*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](mailto:education@awci.com).*

## Please Call AWCI for Available Dates

All classes are held in Harrison, OH. We reserve the right to cancel a class if there are less than six participants signed up 30 days prior to the first day of class, so we encourage you to wait before making travel or hotel arrangements until this deadline has passed. For additional information call Daniela Ott toll-free at 1-866-FOR-AWCI (367-2924), ext. 303 or e-mail [dott@awci.com](mailto:dott@awci.com). Class information is also available online at [www.awci.com](http://www.awci.com).

Should a class be cancelled due to lack of participation, the class fee will be returned to you the same way you paid (i.e., credit on your credit card or check). Or if the class is offered again later during the year, you will have the option to transfer to that class. You will also have the choice of transferring the fee to another class of your choice, provided space is available.

AWCI Watch Repair Course schedule is subject to change. Seats may become available for the classes; please contact AWCI to be added to the waiting list.

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## BULLETIN BOARD

### MEMBER REQUESTS YOUR HELP FOR A BOOK

Gary Fox is researching the Canadian Horological Institute, a school for watchmakers that operated in Toronto, Ontario from 1890 to 1913. To graduate from the school, a student had to make a watch. Gary will be publishing a book in the fall about the school and would like to receive pictures of "student masterpiece" watches or escapement models, and/or scans of class pictures, and school circulars. Gary will cover any out-of-pocket costs and will credit you in the book. Check his website at [www.cdnwatchmaker.com](http://www.cdnwatchmaker.com). He may also be reached at: [chi\\_information@yahoo.ca](mailto:chi_information@yahoo.ca)



Example of photos needed:

### Needing a Parts List for the Bulova Accutron 2186

The Bulova Accutron 2186 is different on the dial side from its predecessors, including the 2185. The 2186 was the last 218 series produced by Bulova. It had a "direct read" dial arrangement in an attempt to compete with the new digital wrist watches coming out at the time.

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

Please send any Bulova Accutron 2186 information you may have to [techserv@awci.com](mailto:techserv@awci.com) or mail to AWCI, Bulletin Board Reply, 701 Enterprise Drive, Harrison, OH 45030.

### Member needs: Motion works for a SOHM (keyless) self-winding clock.

Contact the HT Editor if you can help: [adunn@awci.com](mailto:adunn@awci.com) 866-367-2921, ext. 307.

A member is looking for a complete balance wheel for a Longines 9-L caliber.

Contact the HT Editor if you can help: [adunn@awci.com](mailto:adunn@awci.com) 866-367-2921, ext. 307.

BY RON LANDBERG, CW21

## Watchmaking

By George Daniels,  
 Publisher: Philip Wilson  
 Publishers Ltd.

*Watchmaking*, first published in 1981, is widely considered an indispensable source, not only for watchmakers and experienced horologists, but for clockmakers and hobbyists, as well. The first edition sold out and was reprinted with additions in 1985. Additional revisions were made in 1999 and reprinted in 2002. Until recently, it was difficult to locate a copy of the book. It was hard to find for less than \$250 in any addition. That is a strong indication of the value of this book. If you do not have a copy of this book, I strongly recommend it.

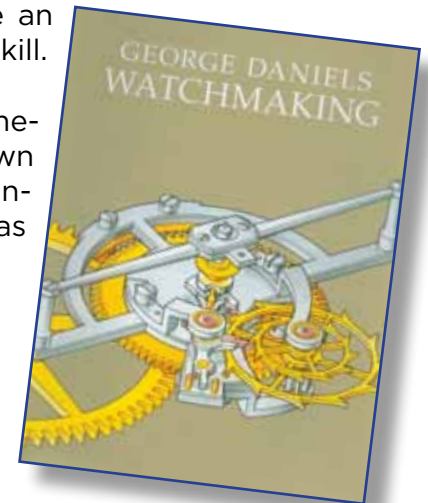
There are a few changes to the latest revised reprint released this year. There are two additional pictures of Dr. Daniels and eight additional workshop pictures from 2010. The photographs in the first part of the book show many of the watches and parts made by Dr. Daniels, along with pictures from his workshop filled with incredible tools. Throughout the book there are numerous drawings by David Penney used to help explain the processes being described in detail in each chapter.

This book begins with chapters on workshop layout, tools and their uses, and the materials used by the watchmaker. There are valuable chapters on the processes of hardening and finishing different steels and brass, and “turning,” (which is the use of the lathe.) This is followed by chapters focusing on specific watch components: Wheels and pinions, small components, including making square holes, ratchet wheels, stop works, chronometer detents and more. This is followed by a chapter in jewellery.

The chapter on escapements has been revised from the original and is very extensive, including a section on Dr. Daniels’ Co-Axial escape-

ment now used by the Omega watch company. There are chapters on mainsprings and accessories including the fusee, winding indicators, constant-force escapements and movement design (people can follow this chapter and the book’s appendices to make a watch). Next, he covers the balance and spring, and case making; which is also helpful for case repair. The final chapter on engine turning is extremely valuable if you have an interest in this rare skill.

If you dream of someday making your own watch, this book is inspirational as well as instructional.



### Insights: The Industry Advisory Board

#### Butterworth Clocks, Inc.

*“Why do I support the IAB? There are 3 good reasons. First, belonging to the IAB goes beyond the cliché called “networking.” When we get together twice a year, I’m meeting with other industry suppliers who share their ideas and unique perspectives—it’s a learning situation that’s invaluable. Secondly, I believe that if you’ve been fortunate enough to make a living at something, there’s a time to give back to the industry that’s served you. Thirdly, I think that when IAB people invest their time, money and talents by volunteering, we should support them and their business efforts. I’m a strong believer in the IAB, and in fact, in AWCI as a whole.”*

Mark Butterworth, President  
 Butterworth Clocks

Butterworth Clocks is the U.S. importer and distributor of a wide array of German clock movements. These include: Hermle’s Urgos and Hermle brands, Regula and Hubert Herr clock movements, Kieninger clock movements and parts. They are also the US master distributors for Quad chiming quartz clock movements and Nano-Oil by StClaire. Additionally, Butterworth Clocks is the manufacturer of Butter Bearings, a patent pending ball bearing system that combines both the bushing and bearing into one. This unique product can adapt to any pivot from 0.5 to 9 mm in size for exceptional low friction and has a lifetime warranty.

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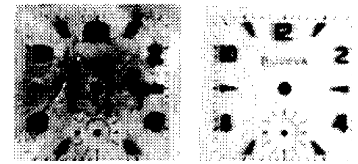
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