

# HOROLOGICAL TIMES™

ADVANCING THE ART, SCIENCE & BUSINESS OF HOROLOGY

APRIL 2011



AMERICAN WATCHMAKERS-  
CLOCKMAKERS INSTITUTE

ISSUE highlights

**This Month's Focus: *Education and Certification***

**2011 Election: Meet the Candidates**

***Waterbury Desk Clock Repivoting***

**Organizing the Modern Clock Shop**

***Refinishing the Omega Constellation Bracelet***

**How to Make a Fly Cutter Holder**

# For the BEST high-quality watch polishing



## Menzerna Polishing Compound

Quality polishing compounds, 250 gram bars. German.

|         |        |                               |          |
|---------|--------|-------------------------------|----------|
| PSX400C | Gray   | Remove Scratches to Satin     | \$ 12.95 |
| PSX401F | White  | Bright Finish Stainless Steel | 12.95    |
| PSX402F | Yellow | Bright Final Finish Gold      | 12.95    |



## USA-made ARBE Variable Speed Polishing Motors for high end watch finishing

Sealed super flow hoods—100% of air is collected. 1/2 hp variable speed polishing motors, spindles. Filters to .3 micron particle size. FOB New York.

|               |            |          |            |
|---------------|------------|----------|------------|
| DC-CFSD920    | 2 Spindles | 1100 cfm | \$2,995.00 |
| DC-MMD948.005 | 2 Spindles | 400 cfm  | 1,995.00   |
| DC-MMD948.002 | 1 Spindle  | 400 cfm  | 1,795.00   |



|  |   |  |
|--|---|--|
| BF117.881<br>Bufflex Satin<br>4" Wheels<br>\$20.00 | BG6168E Medium<br>BG6168F Fine<br>Artifex<br>4" Wheels<br>\$49.00 | BG6085E2<br>Satin Finish<br>4" Wheels<br>\$30.00 |
|--|---|--|



## Combed Finex Muslin Buffs with Plastic Centers

Use unstitched muslin buffs with PSX401F and PSX402F for a high polish.

|       |    |        |         |
|-------|----|--------|---------|
| BF763 | 3" | 36 ply | \$ 3.10 |
| BF764 | 4" | 36 ply | 3.30    |
| BF765 | 5" | 54 ply | 4.90    |



## Felt Wheels

High-quality, medium firm wool felt buffs have pin holes for use with tapered spindles.

|        |          |         |
|--------|----------|---------|
| BF9225 | 3 x 1"   | \$ 9.95 |
| BF9253 | 4 x .75" | 9.50    |



## Arbe Variable Speed Motor

Powerful double-spindle 1/2 hp polishing motor enables full torque at any speed from 0 to 3450 RPM. Includes 2 pairs of spindles that screw on securely.

MO400  
\$515.00

## Ray Foster Variable Speed Polishing Motor

Rugged 1/3 HP polishing motor operates at 300 to 4,000 RPM. Industrial-grade, sealed ball bearings never need lubrication. Spindles included.



MO390  
\$519.00



## Jules Borel & Co.

1110 Grand Boulevard ■ Kansas City, Missouri 64106  
Phone 800-776-6858 ■ Fax 800-776-6862 ■ julesborel.com



Official Publication of the American Watchmakers-Clockmakers Institute

**EDITORIAL & EXECUTIVE OFFICES**

American Watchmakers-Clockmakers Institute (AWCI)  
701 Enterprise Drive  
Harrison, OH 45030  
866-FOR-AWCI (367-2924)  
or 513-367-9800  
Fax 513-367-1414  
awci@awci.com  
www.awci.com

**Amy S. Dunn**  
Managing Editor & Advertising Manager

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

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

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

**Daniela Ott**  
Education Coordinator

**Sally Landis**  
Membership Coordinator/  
Technical Support

**Sienna Condy**  
Publishing & Marketing Coordinator

**Jim Meyer**  
IT Director

**HOROLOGICAL TIMES ADVISORY COMMITTEE**  
Ron Iverson, CMC: Chairman  
Karel Ebenstreit, CMW, CC21  
David Fahrenholz  
Jordan Ficklin, CW21  
Chip Lim, CMW, CMC, CMEW  
Robert D. Porter, CMW  
Manuel Yazijian, CMW21  
Ron Landberg, CW21

Reprinting and reproduction is prohibited without written permission from the American Watchmakers-Clockmakers Institute. Copyright ©2011 by the American Watchmakers-Clockmakers Institute.

Horological Times (ISSN 0145-9546) is published monthly and copyrighted by the American Watchmakers-Clockmakers Institute, 701 Enterprise Drive, Harrison, OH 45030-1696. Subscription price for the public is \$137.00 per year (\$8.50 per copy). Members subscription is \$70.00 which is included with annual dues of \$137.00. Periodicals postage paid at Harrison, OH 45030 and additional entries. POSTMASTER: Send address changes to Horological Times, 701 Enterprise Drive, Harrison, OH 45030

# IN THIS **issue**

VOLUME 35, NUMBER 4, APRIL 2011

## features

### Education & Certification:

**Education and Certification at AWCI**  
pg. 11

**What is a SAWTA School?**  
pg. 13

**What is a WOSTEP School?**  
pg. 14

**REC Schools**  
pg. 10

**Important Change on CEU Credits**  
pg. 26

**Why Certify?**  
Michael Gainey  
pg. 27

**Education Development Program**  
Christopher Grygny  
pg. 28

**"I Almost Said...I Don't Need That Class."**  
Matt Hritz  
pg. 29

**From the Workshop**  
Jack Kurdizonak  
pg. 30

## technical discussions

**Clockmaking Elements: Machining Techniques**  
Laurie Penman  
pg. 36

**Waterbury Desk Clock Repivoting**  
Dale Ladue  
pg. 41

**Organizing the Modern Clock Shop**  
Master Clock Repair  
pg. 44

**Refinishing the Omega Constellation Bracelet**  
Jordan Ficklin  
pg. 49

**How to Make a Fly Cutter Holder**  
Robert D. Porter  
pg. 52

**Questions & Answers**  
David Christianson  
pg. 58

## industry news

**Swatch Group Using New Liquidmetal® Technology**  
pg. 61

**New Designer Offers Ultra-Feminine Watch Line**  
pg. 61

## awci news

**President's Message**  
Mark Butterworth  
pg. 2

**Executive Director's Message**  
James E. Lubic  
pg. 3

**Meet the Candidates 2011 - 2012 Board of Directors Election**  
pg. 4

**Classes & Certification Exam Schedules**  
pg. 9

## classifieds

**Buy Sell Trade**  
pg. 62

**Advertisers' Index**  
pg. 65

pg. 4 © Canstock Photos Inc/nmcandre  
pg. 7 © Canstock Photos Inc/badboo01

Editorial material and letters of opinion are invited, but reflect the opinions of the authors only and do not represent the views of the American Watchmakers-Clockmakers Institute (AWCI), its directors, officers or employees. AWCI reserves the right to edit all submitted materials and is under no obligation to accept any submitted materials for publication. The appearance, reference, or advertisement of any product or service in this publication shall not be deemed an endorsement of such products or services by AWCI, its directors, officers or employees.

# a message from the president

BY MARK BUTTERWORTH



**A**fter a brutal winter, there is hope for the coming spring with many exciting opportunities and activities at AWCI. First, your nominating committee has been in the process of securing an excellent slate of candidates for our election. These new board members will take office at the annual meeting in August.

Speaking of the annual meeting, it will take place August 3-7 in Vancouver, Washington, a “twin city” to Portland, Oregon. Our meeting planner has secured a wonderful location with lots of hotel perks for our attendees. We are planning more flexibility to allow more time for our vendors. This is the perfect place to meet folks face-to-face whom you may only know from placing phone or e-mail orders. This gives suppliers time to demonstrate equipment, such as timing machines, waterproof testers and more, that

you only see in catalogs. Of course, it's the perfect occasion for them to show off new tools and other offerings.

Plan to come and spend a few extra days to explore the area. There's a lot to offer, and the weather should be great for those wishing to escape the summer heat. Check into a trip by train starting on the East Coast or the Midwest. Also, it can be a jumping off place to catch an Alaskan cruise or to drive the Pacific coastline. I see a lot of possibilities, and it's not too early to start making your travel plans.

As for your Board of Directors, I don't know how well it's known, but they are all volunteers. When attending board meetings, the members travel to these meetings on their own time and at their own expense. There is no per diem or other reimbursement other than for the lodging itself, and sometimes breakfast and lunch meals. Just coming from the mid-year meeting, I can say that you have a Board of Directors and management who are really working hard together for the betterment of AWCI.

One of the major accomplishments of the first half of the year was the revamping of *Horological Times* magazine. Not only have I received many calls and e-mails on the new look and content, but we have also picked up new advertisers. Again, I ask you to thank those advertisers when you call to place an order and tell them you appreciate their support for AWCI. Also, if you are not doing business with those advertisers who carry a product you use, please consider throwing some support their way.

Without saying too much in advance, the board approved a proposal from our *HT* and marketing director, Ms. Amy Dunn, for revamping the AWCI website. I think this new effort is going to do for our website what was done for the *HT*. Of course, with my usual sense of excitement, I would like to have seen it done yesterday. We believe the prototype can be rolled out before the annual convention, if not the entire working product. The site will be more user friendly. It will also help improve business for our members by attracting consumers and connecting them with their local watchmaker and clockmaker.

I see many positive things in our future—a new website, an exciting convention and an improving business climate for our industry. Yes, it feels like spring has finally arrived!

An advertisement for Bergeon. The top half features a large, stylized letter 'B' composed of horizontal lines, set against a background of diagonal stripes. Below this, a close-up photograph shows a watch movement (caliber) mounted on a precision tool, likely a timing machine. The bottom section of the ad is a yellow banner containing the Bergeon logo (a 'B' in a circle), the text 'BERGEON Depuis 1791', and '220th ANNIVERSARY 1791 | 2011'. At the very bottom, it reads 'THE REFLECTION OF YOUR REQUIREMENT' and provides the address 'Av. du Technicum 11 CH-2400 Le Locle' and website 'www.bergeon.ch'.

# a message from the executive director



This month, Education and Certification are the focus of this magazine. These are primary functions of AWCI, and inside this issue you'll see details about these services, plus current information on REC schools in the U.S. which are vital to our industry. The more we grow in our knowledge and professionalism, the better positioned we are for the future. We continue to actively seek input from industry in developing more new courses to keep you up-to-speed on the latest processes, procedures, and tools, so you can offer the best possible service to your customers. Moreover, we also survey our students to continually improve our educational product.

Additionally, there has been an important change to CEU credits for maintaining certification which was made during the recent mid-year board meeting. The Board of Directors extended the dates for CEU courses applicable to the 21st Century certification. The new wording in the revised Education Development Program (EDP) is underlined below:

*Those with current 21st Century certificates who have completed their testing on or before December 31, 2011 will have 5 years from January 1, 2012 to complete their CEUs.*

*Courses that are applicable for CEUs taken after January 1, 2010 will count for CEU credit for the 5-year period beginning January 1, 2012.*

*Those who have taken courses prior to January 1, 2010 may apply for CEU credit with a petition to the Board of Examiners (BOE).*

*All future holders will have 5 years to complete their CEU requirement from the date on their certificates. (See page 43 of the watchmaker S & P for details.)*

For the upcoming annual convention, we are changing several things in response to your comments and requests. We are refocusing the daily agenda to allow everyone more time at the trade fair. We'll also schedule educational programs daily to give everyone a chance to attend. These programs include a variety of topics that not only help you at the bench, but also help with your business. For example, in addition to technical education, we will offer a marketing seminar showing you all the new materials and services we're providing to help your business grow.

If you know of fellow tradespeople who aren't members of AWCI, ask them to take another look at the organization. Temporarily, non-members can see the current issue of *HT* on our website at [www.awci.com](http://www.awci.com). Also refer potential members to our toll free number at 866-For-AWCI (866-367-2924), ext. 301. Our Membership Coordinator, Sally Landis, will be happy to explain the value of an AWCI membership.

Working together, our members, industry partners and staff are actively *advancing the art, science and business of horology* for the betterment of our industry.

## Alabama

\*Tom Dunn, Huntsville, AL

## California

Bruce Oren, San Gabriel, CA  
Richmond H. Wynn, Loma Linda, CA

## Connecticut

Michael Summit, Farmington, CT

## Illinois

Paul Nichols, Quincy, IL

## Indiana

\*Joshua W. Adams, CW21, Indianapolis, IN  
Philip A. Crooke, Bloomington, IN

## Louisiana

Jarren James Crotwell, French Settlement, LA

## Michigan

Dennis Engels, Grandville, MI

## Nevada

\*Nathan Smith, Las Vegas, NV

## New York

\*Kenneth E. Snowden, Nichols, NY

## Texas

\*Lisa Pham, Fort Worth, TX  
David Threlkeld, Arlington, TX

## Wisconsin

Daniel Cyril Taddy, Two Rivers, WI

## Wyoming

Adrian Wolverton, Jackson, WY

## International Members:

\*Fong Fu Sin, Malaysia  
\*John Shiha, Ontario, Canada  
Gary Fox, Ontario, Canada  
Stefan Breitmlechner, Cayman Islands

\*AWCI welcomes back these individuals who have chosen to reinstate their membership.

# meet the Candidates



Welcome to *Meet the Candidates, 2011*. This yearly feature gives each candidate for the AWCI Board of Directors the opportunity to introduce themselves to the membership prior to the annual mailing of the election brochure and ballot. This year there

are six (6) candidates vying for a seat on the Board of Directors. Candidates are listed in a randomly selected order. Three (3) directors will be elected, each for a three-year term. The three who receive the most votes will join the current AWCI board members during the annual AWCI Board of Directors meeting in August at our annual convention.

During April, ballots and a background sketch of each candidate will be mailed to all AWCI members eligible to vote. The election mailing will also contain each candidate's response to a question posed by the Nominating Committee.

A ballot return envelope will also be included in the mailing. The return envelope will be addressed to the Certified Public Accountant responsible for counting the votes and certifying the outcome of the election. All ballots returned must be in the ballot return envelope and postmarked before the deadline date published in the voting instructions. Only marked ballots should be sent to the Certified Public Accountant. Please do not include any notes, requests or other information in the envelope.

The election results will be e-mailed to members and also announced in the July issue of *Horological Times*.



**Justin Shiver,**  
**CW21**

### **Professional Experience**

**Primary Occupation:**  
Watchmaker, Ware Jewelers, Auburn, AL

### **Non - AWCI Education:**

- Certificate in Watch Repair, Jones County Junior College
- Rolex Factory Training
- Omega Factory Training

### **AWCI Bench Course: Swiss Autoquartz**

### **AWCI Continuing Education Courses:**

- Basic Watch Repair, Timing, and Adjusting
- Introduction to Basic Quartz Watch and Quartz Chronograph Repair
- Modern Mechanical Chronographs Servicing and Adjusting
- Precision Timing

- Introduction to the Watchmaker's Lathe
- Modern Automatic Watch Repair

### **AWCI Certification: CW21**

### **AWCI Service:**

- Education Committee
- Assessor for the CW21 Certification

### **AWCI Affiliate Chapter Membership**

- The Chronometer Club

### **Statement**

I am honored to be a candidate for the AWCI Board of Directors. As an AWCI Director, I will strive to accomplish the following:

- Expand the educational programs offered by AWCI.
- Educate the public about AWCI certifications and services.
- Encourage all members to be active in this great organization.

As Watchmakers and Clockmakers, we are fortunate. Not only are we able to challenge ourselves daily at the bench, but at times, we can bring a little happiness to someone by restoring a timepiece that belonged to a loved one. I find this part of our profession the most rewarding. Thank you for your support.



**Doug Thompson,  
CW21**

### **Professional Experience**

I grew up in Minneapolis, Minnesota. I am married to my wife, Karen, and together we have a teenage son, Frank.

My father was a watchmaker trained under the GI Bill after WWII. In my early twenties, I decided to follow in my father's footsteps and obtain formal watchmaker training at Saint Paul Technical Vocational Institute (the former name of Saint Paul College) in 1977. After graduation, I began my watchmaking apprenticeship in my father's jewelry store (3 employees: My sister, Dad and I). While there I also worked as a sales consultant, clockmaker and goldsmith. In 1981, I was licensed by the state of Minnesota in watchmaking. Upon my father's retirement in 1983, I took over the jewelry store and although I enjoyed operating the store, being a full-time watchmaker is what I really wanted to do. In 1987 (having closed the store), I started working as a full-time watchmaker at a large store in downtown Minneapolis, and all told, I worked in retail jewelry for 26 years.

In 2000, I started teaching (part-time) evening watchmaking classes at Saint Paul College. In 2004, Rolex Watch USA presented the program at SPC with a \$1,000,000 grant over 5 years, and at that time, an additional full-time instructor position was established. I have been the 2nd-year Watchmaking instructor at my alma mater ever since.

Locally, I've been the Vice-President and President of the Minnesota Watch and Clockmaker Association, currently known as the Midwest Watch and Clockmaker Association (MWCA).

Over the years I have received training from WOSTEP, Breitling, Rolex USA and AWCI. Currently I hold a CW21 (2005).

I have served as Director of the AWCI Research and Education Council and as REC Secretary. I am presently on the Board of Directors, serving as Secretary.

### **Statement**

There are hundreds, perhaps thousands, of watchmakers and clockmakers who are not members of AWCI. Many enthusiasts, as well, are potential members, but probably the greatest number of potential members are: retailer jewelers. I believe our goal should be to increase membership in those areas using our educational resources.



**Fred T. White,  
CW21**

### **Professional Experience**

Fred White became a Certified Watchmaker under the Horological Institute of America in 1957, and has success-

fully completed the AWCI 21st Century Certification for Watchmakers. Fred has had an active career in watchmaking and clock repair. Early in his career he was the C&O Railroad inspector responsible for watch repair in Clifton Forge, Virginia.

Fred has owned and operated Michelle Lee Jewelers for 26 years. He restored a watch that was owned by Napoleon Bonaparte. He has restored antique clocks for both the United States Navy and Department of

the Treasury. He has a worldwide clientele, including a customer in South Africa for whom he has repaired watches.

As president of the Horological Association of Virginia (HAV), he instituted a revision of the Constitution which upgraded and streamlined the organization's policies. Fred was also the Technical Director for the HAV with Marvin Whitney. He is a three-term Past Master of the Masonic Lodge.

### **Statement**

Fred states he is interested in the Board of the American Watchmakers-Clockmakers Institute to promote professionalism in the organization. His long-standing commitment to providing quality products to customers is based on his desire to provide professional service and to bring credit to the watchmaking profession.



## Arnold C. Van Tiem, CW21

### Professional Experience

**Career:** Currently self-employed doing watch and clock repair full time. Retired from the Career Preparation Center, Sterling Heights, MI in 2010. Taught the

only high school watch, clock, and micro-mechanics class in North America for 27 years. Many successful graduates went on to Lititz Watch Technicum. Also taught Industrial Arts for 7 years.

**Horological Education:** Apprenticed under a certified watchmaker and attended AWCI bench courses. Attended AWCI REC annual bench courses. Attended the SWATCH/Omega co-axial training program in 2010.

**Non-Horological Education:** Bachelor of Science in Education and Masters Degree in Vocational Education from Wayne State University.

**Horological Certifications:** AWCI CW21, Certified Watchmaker, State of Michigan, 1976.

**AWCI Committees:** Grader for CW21 certification, Past REC Director and Chairman.

**Horological Group Memberships:** AWCI member since 1985, Chronometer Club member, NAWCC Fellow and member since 1973, Director of NAWCC Chapter 6, past President of Michigan Watchmakers Guild, 1989.

### Statement

AWCI is a valuable and necessary organization for the advancement of watch and clock repair. Our education and certification programs are world class. I have benefited greatly from my training with the AWCI bench courses. In turn, I would like to give back to the organization by serving as Director.

If elected, my main focus and interests would be education, certification and industry partnerships. By educating our members, they can keep abreast with the new innovations in our field. I have 27 years of teaching experience in watch/clock repair and could use this experience as an educator to benefit the organization. Additionally, I am a CW21 exam grader, because I understand the importance of certification as it demonstrates competency of the individual meeting industry standards.

Please give me the opportunity to represent you as a Director. Your vote is greatly appreciated.



## Manuel Yazijian, CW21

### Professional Experience

#### Professional & Personal History

- Career watchmaker since 1983
- Fluent in seven lan-

guages

- Apprenticed with Constantinou Brothers, Larnaca, Cyprus
- Employed with Henry Birks and Sons as a bench watchmaker 1990 -1995, Montreal, Canada
- Owned and operated H. B. L'Acadie Watch repair service center, 1995-2005, Montreal,

Canada

- Currently owns and operates Swiss Watch Service, California
- Current place of residence, Southern California

#### AWCI History

- Life Member; first joined in 1998
- Member of the Board of Directors, 2002-2004
- Watchmaking Instructor & Certification Coordinator, 2005-2007
- Member of the Board of Directors, 2008 - present
- Past president and Charter Member of The Chronometer Club, AWCI's largest affiliate chapter.
- Current Vice President of AWCI.

#### Served on AWCI Committees

- *Horological Times* Committee, (member) 1999-2010

- Book Review Committee (member) 2000-2003
- Technology Committee (chairman) 2002-2004
- Committee (member) 2002-2005
- Spare Parts Survey Committee (member) 2002-2004
- Ethics Committee (chairman) as of 2011
- Education Committee (Watch Section Head) as of 2011
- Finance Committee (member) as of 2011

## Statement

As part of a team, I worked alongside highly esteemed individuals who truly believe in the genuine art of horology. However, this being only one aspect of our profession, there are still many milestones that need accomplished.

### Some of my goals for AWCI are:

- To persist in our efforts in making spare parts available to independent and qualified horologists.
- Educate the general public of the benefits of working with qualified horologists.
- Educate the retail jewelers of the benefits of

working with qualified horologists.

- Keep a sharp eye on our finances and, therefore, the financial viability of future projects.

AWCI has the potential to grow even further. With your vote, I hope to continue to accomplish all the fine work we have produced so far.



## AWCI 2011-2012 Election



### Henry M. Kessler

#### Professional Experience

I am not a horologist; however, I grew up in the watch and jewelry industry. My father, Sy Kessler, who passed away in 1980, was a sales representative for Portescap U.S., which

previously was the Watchmaster Products division of the Bulova Watch Company, distributing Greiner Vibrograf equipment. As a child, I can remember touring the Bulova factory during its Accutron glory days and listening to an old 16mm movie about the watch that went to the moon! Traveling together with Dad, I visited many watchmakers and tried to help (although I am sure I was in the way). Dad set up many exhibits at watchmaker's conventions in Texas and Oklahoma.

I have been responsible for marketing the Renata brand of watch batteries in the U.S. since my honey-

moon in 1983, when Renata's founder, Kurt Zehntner, offered me exclusive distribution rights. Although I began by supplying several watchmakers on a direct basis in 1980, over the years this changed to supplying watchmakers via local watch material and jewelry supply houses while we supplied virtually all of the major watch brands, as well as several national chains directly.

Friends working with some of the big brands asked me to join AWCI, endeavoring to grow awareness of AWCI while helping to raise the standard of education in our industry. I agreed to help, yet truly had no idea what I was getting myself into; I feel I have made tremendous progress!

#### Statement

My goal is to position AWCI as the American entity responsible for training and certification for all areas of horology, while positioning the American watchmaker and clockmaker as an integral professional expert, adding value to the process of buying, selling and servicing watches and clocks. I also believe AWCI must broaden its training programs to include all levels of watch and clockmaking.

## Minnesota Clockmakers Guild

The Minnesota Clockmakers Guild (MCG) has had a busy couple of months. In February they viewed and practiced techniques from a video called *The Woodwright's Shop: File Philosophy*. Susan Wood showed elements of a forged clock she had been working on, and Doug Bester talked about a movement with interesting weights (nuts) to improve stop action.

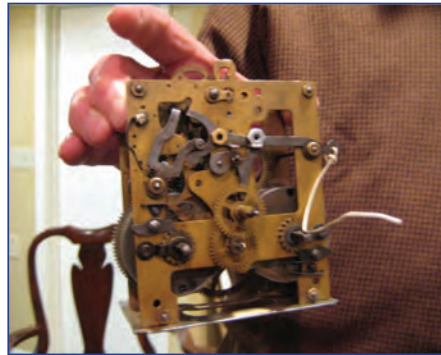


Paul Engebretson using skills learned in the video on punching holes with a chisel and plate.



Susan Wood showed a photo of the forged clock she is building.

Elroy Anderson also demonstrated his work on an E. Howard tower clock with missing numbers, while Richard Zie-like showed two large and



Doug Bester showed a movement with interesting weights (nuts) glued to the lever to improve stop action.



Small and large case shelf clocks being restored which used the same movement.

small clock cases he is restoring which use the same movement.

The March program featured a demonstration of a shop-made pivot polishing machine for use on a jeweler's or Sherline lathe. Pivot polishing techniques were presented by Ron Saboe.

## Upcoming Events:

### Symposium, April 2, 2011

Speakers: Dewey Clark - Historic Timekeepers, Gary Anderson - Q & A on Pocket Watches, Robert Mattheys - Pressure Compensating Pendulums

### Hands-On lathe Class, April 3

Turning with the Graver (following the symposium)

## PLEASE REMEMBER OUR FRIENDS IN JAPAN

Interest May be Waning,  
But the Need is Not.



Many watch companies, battery companies, suppliers and fellow watchmakers live in Japan. The earthquake and ensuing tsunami represent the biggest humanitarian tragedy for that country since WWII. Even those living outside the stricken area are suffering from water and energy shortages. Additionally, the extent of the radiation hazard is still unknown.

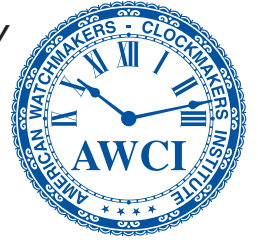
Even if you've already given, please consider another small donation because worldwide donations are falling far below donation levels for the Haitian and Katrina disasters.

And be careful where you donate—the American Red Cross is one safe way to assure your donation gets to those in need.



## Alessandro Betti

AWCI is proud to offer Alessandro Betti's only U.S.-based course this year! Learn the latest on ETA products and techniques from this renowned instructor who teaches at the ETA Training Center in Grenchen, Switzerland. Sign up now for Mr. Betti's class entitled *New ETA Products*.



## AWCI Academy of Watchmaking Class Schedule

AWCI is offering a series of 5-day watchmaking classes. Each 5-day block will cost \$725; 3-day block is \$435.00. All classes are held in Harrison, OH. For additional information call toll-free: 1-866-FOR-AWCI (367-2924), ext. 303 or e-mail [education@awci.com](mailto:education@awci.com). Class information is also available online at [www.awci.com](http://www.awci.com).

|                        |  |
|------------------------|--|
| April 4-8, 2011        | Basic Quartz Watch Repair  |
| April 11 - 15, 2011    | NEW Class! Modern Watch Lubrication  |
| May 9 - 13, 2011       | Basic Watch Repair   |
| May 16 - 20, 2011      | New ETA Products - Alessandro Betti of the ETA Training Center, Switzerland  |
| June 13 - 17, 2011     | Servicing & Adjusting the Modern Automatic Chronograph   |
| June 27 - July 1, 2011 | Special High-Grade Automatic Class with Kari Halme - Title still to be announced. <i>This will be a VERY advanced class with strict prerequisites.</i> |
| 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<br>(Featuring the Vertical Clutch System)   |
| Oct. 17 - 21, 2011     | NEW Class! Polishing & Waterproof Testing  |

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

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

May 23-26, 2011 AWCI Training Facility, Harrison, OH  
 June 20-23, 2011 AWCI Training Facility, Harrison, OH  
 July 11-14, 2011 AWCI Training Facility, Harrison, OH  
 August 8-11, 2011 Lititz Training Facility, Lititz, PA  
 August 15-18, 2011 N. Seattle Community College, Seattle, WA  
 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

Please Call AWCI for Available Dates.



The AWCI Watch Certification schedule is subject to change. Seats may become available for the exams; please contact AWCI to be added to the waiting list.



This issue of *Horological Times* gives an overview of Education and Certification in the horology industry. The overall health of the watchmaking and clockmaking business depends on these programs to train and certify up-and-coming professionals. These ten U.S. schools, along with AWCI, all strive to provide a quality educational product. Our mutual goal is to help develop the highest degree of knowledge, technical expertise and professionalism in the horologists who represent the future of our industry.

## RESEARCH & EDUCATION COUNCIL (REC) SCHOOLS - U.S.

### **Bishop State Community College**

Southwest Campus  
925 Dauphin Island Pkwy.  
Mobile, AL 36605  
Contact: Stephen Lange  
Phone: 251-665-4084  
Fax: 251-479-1448  
E-mail: slange@bishop.edu  
Website: www.bishop.edu

### **Gem City College**

School of Horology  
7th and State Street  
Quincy, IL 62301  
Contact: Russell H. Hagenah  
Phone: 217-222-0391  
Fax: 217-222-1557  
E-mail: gemcity@adams.net  
Website: www.gemcitycollege.com

### **Lititz Watch Technicum**

1 Wynfield Drive  
Lititz, PA 17543  
Contact: Karen J. Harnish  
Phone: 717-625-3787  
Fax: 717-625-3624  
E-mail: info@lititzwatchtechnicum.org  
Website: www.lititzwatchtechnicum.org  
SAWTA Curriculum

### **NAWCC School of Horology**

454 Poplar St.  
Columbia, PA 17512  
Contact: Jim Michaels  
Phone: 717-684-8261  
Toll Free: 717-684-0197  
E-mail: jmichaels@nawcc.org  
Website: www.horology.edu

### **N.G. Hayek Watchmaking School**

5301 Blue Lagoon Drive, Suite 610  
Miami, FL 33126  
Contact: Paul F. Madden  
Phone: 201-271-1400  
Fax: 305-264-1405  
E-mail: nghayekschool@swatchgroup.com  
Website: www.nghayekwatchmakingschool.org  
WOSTEP Curriculum

### **North American Institute of Swiss Watchmaking**

15100 Trinity Blvd. #300  
Fort Worth, TX 76155  
Contact: Stanley McMahan  
Phone: 817-785-2420  
Fax: 817-785-2389  
E-mail: info.na@iosw.com  
Website: www.iosw.com  
WOSTEP Curriculum

### **North Seattle Community College**

Horology Department  
9600 College Way North  
Seattle, WA 98103  
Contact: Elaine Rolf  
Phone: 206-526-0169  
Fax: 206-527-3659  
E-mail: wti@sccd.ctc.edu  
Website: www.northseattle.edu/programs/  
watch-techno  
SAWTA Curriculum

### **OSU Institute of Technology**

Watchmaking & Microtechnology  
1801 E. 4th Street DWRTC #235  
Okmulgee, OK 74447  
Contact: Rozina Snelson  
Phone: 918-293-5178  
Fax : 918-293-4633  
E-mail: rozina.snelson@okstate.edu  
Website: www.osuit.edu  
SAWTA Curriculum

### **Saint Paul College**

Micro Mechanical Technology/Watchmaking  
235 Marshall Ave.  
St. Paul, MN 55102  
Contact: Douglas Thompson  
Phone: 651-846-1600  
Fax : 651-846-1722  
E-mail: doug.thompson@saintpaul.edu  
Website: www.saintpaul.edu

### **Texas Institute of Jewelry Technology**

Horology Department  
2400 Clarksville Street  
Paris, TX 75460  
Contact: Frank Poye  
Phone: 903-782-0361  
Fax: 903-782-0452  
E-mail: fpoye@parisjc.edu  
Website: www.watchmaking.net

BY TOM SCHOMAKER, CMW21, AWCI WATCHMAKING INSTRUCTOR AND CERTIFICATION COORDINATOR



Tom Schomaker, CMW21

### Our Profession Is Evolving

The watchmaking world has changed dramatically and continues to evolve. In the past, our emphasis was primarily on the running performance of the watch. Today, updated training is teaching us aesthetics, water resistance, overall finish, quality control, precision oiling, modern timing techniques, screw torque and much more. When performing a competent repair there are many systematic checks to be done along the way. But as we incorporate new techniques into our repairs, we will become more efficient and the results will be self-evident.

Feeling the pressure from a heavy workload, your boss, or the desire to make money quickly sometimes leads to a weakening in our skill sets. Between phone calls, batteries and interruptions, you may find yourself no longer checking the escapement. Or maybe you don't bother to open up the ETACHRON regulating pins to check for centering. Or maybe there's no quality controlling the watch over a four-day period after completion. When we

find ourselves lapsing into these habits, it's time to make a choice in the direction we intend to go: Do we want to continue taking these risks? Or are we willing to take control of our situation? If your goal is to maintain your skills and stay current on new products and techniques, education is the key.

### What Has Changed?

There are many new concepts covering topics such as co-axial escapements or the touch sensor crystals in the Tissot. There are also changes in lubrications and their applications. AWCI and industry have developed new ways to deal with common problems in the daily watch repairing routine. By re-thinking the way some procedures were done in the past, and the sometimes less than desirable results, we can show you proven methods that give consistent, predictable results.

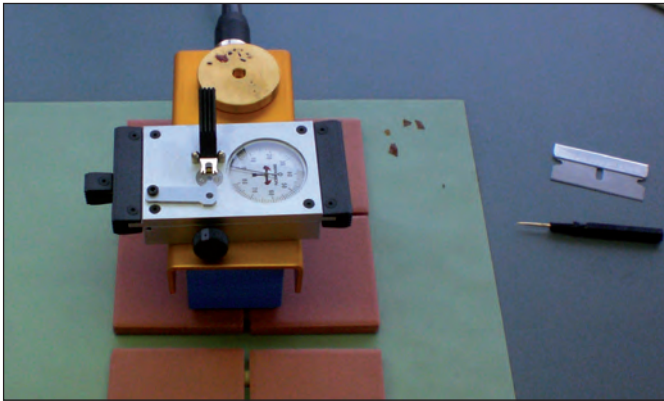
An example is the technique of opening the barrel lid with compressed air versus using the force exerted by pushing down on the barrel and allowing the barrel arbor to push against the lid (the common older method). Steven Schechter, a structural engineer for a major aerospace company, performed an analysis for us on these two methods. He showed that the new method of removing the barrel lid by air reduced stress by 75% and cover deflection by a third. Our profession can benefit greatly from new information like this and from studying different business models. By attending continuing education classes, you learn alternative methods to hone existing skills.

### How Do You Know *What You Don't Know*?

There's no need to be embarrassed if you don't know something. *Learning* is what continuing education is all about. Participating in a professional organization like AWCI is a strong first step towards



BY TOM SCHOMAKER, CMW21, AWCI WATCHMAKING INSTRUCTOR AND CERTIFICATION COORDINATOR



improving your skills, establishing standards, networking with other watchmakers and improving your ability to learn and communicate. Classes offer you a forum in which questions are encouraged and problems may be solved. We cover topics such as, *How does the Horia tool work? How do you make the escapement checks? What is delta and what does it tell me?* When we gain a deeper understanding of how a watch actually works, it's much easier to troubleshoot and repair.

### Everybody Wins!

As a benefit to members we have established a group of classes to aid in the understanding of specific calibers and topics. Everybody wins if you take a class and, upon returning to work, you implement the successful procedures you learned. The customer wins because the repair was made using a high standard,



### Education Means Everybody Wins

thus doing no harm. The brand wins because the customer espouses the greatness of the watch to others. And the boss wins with a very satisfied customer. Most importantly, you win by successfully meeting the expectations of everyone above—plus yourself. You will be compensated, and you will feel a sense of

accomplishment and pride. As a watchmaker, you'll be in control of your destiny and you'll come to view your profession as labor of love. It's contagious.

### Taking The Next Step

This is the easy part. There are numerous ways to begin the process of updating. You can start by attending guild meetings or state conventions. You can attend the annual AWCI convention which includes educational seminars on relevant, timely topics. You can attend brand-specific training or take a traveling course. And of course, you can attend a class here at the American Watchmakers-Clockmakers Institute where our purpose is to help support and educate watchmakers and clockmakers.

### If Your Goal Is Certification

The different types of training we've mentioned are a great way to prepare for the certification exam. AWCI can also supply helpful study guides. The Standards and Practices, which can be found at [www.awci.com](http://www.awci.com), also describes everything to be covered. Additionally, if you have questions, we're only a phone call or e-mail away!

Once you're certified, you'll see a return on your investment though improved productivity and profitability. Certification also distinguishes you from the competition and instills confidence in your customers. What's more, it expands your business and/or employment opportunities.

### Let Us Help

At AWCI we're happy to provide assistance and offer ideas for your education or certification. Every clockmaker and watchmaker is important to us, and we all share a common interest in horology. The fact is, no one is born with all knowledge already implanted in their head—virtually everything has to be learned. Take the first step and the rest will follow. Before long, you'll find you're ready to run a marathon to the finish line of Quality.

### SAWTA

#### Swiss American Watchmakers Training Alliance

The Swiss American Watchmakers Training Alliance (SAWTA) currently collaborates with the three largest watchmaking schools in the United States having a combined capacity of 42 students per year. These schools are the Lititz Watch Technicum, the Watchmaking Department at OSU - Okmulgee, OK, and the Watchmaking Department of the North Seattle Community College. The American Watchmakers-Clockmakers Institute (AWCI) is instrumental in supporting SAWTA with their exam assessment expertise.

Students of the SAWTA curriculum receive an intense and comprehensive training in all relevant aspects of high grade after-sales service. Its contents consist of movement service, case and bracelet repair and refinishing, estimating, parts logistics, quality control and customer consultation. The SAWTA certificate, which is granted upon successful completion of a two-year curriculum, includes various examinations. It testifies to the skills and knowledge required for a wide array of career opportunities in the field of watchmaking. This profile ranges from an independent watchmaker in a retail environment, where a wide variety of tasks are performed, to a service center setting with a high degree of specialization.

A project-oriented pedagogical approach, using exclusively high quality training materials, tools and equipment, provides a balanced development of technical skills and theoretical background knowledge. This is essential to impart the strong problem-solving skills needed to succeed in demanding positions, and to build solid careers in the high-grade watch service.



Project-oriented approach: First Year Students build a table clock as an introductory project.



First Intermediate SAWTA Examination 2011: Students hand craft a click spring for a 1910 Lange pocket watch.



Comprehensive exams to complement the wide ranging scope of the training: during the third intermediate exam, students finish a bracelet and a raw watch case to factory standards to house their exam movement.

## ButterBearing

Never file, polish, or pivot a clock wheel using this ball bearing system.  
Fits 0.5 mm - 9.0 mm pivots. Warranted for life.  
Fast, easy, no special tooling required.  
**Less cost overall at only \$3.00 each**  
Contact us for details.

## Butterworth Clocks, Inc.

5300 59th Ave. West      Muscatine, IA 52761  
Phone: 563-263-6759      Fax: 563-263-0428  
E-mail: [butterworth@machlink.com](mailto:butterworth@machlink.com)  
Web: [www.butterworthclocks.com](http://www.butterworthclocks.com)



Since 1966, WOSTEP has provided services for the Swiss watch industry and its representatives around the world, as well as for independent watchmakers in Switzerland and abroad. These services are constantly adapted to fit the needs of quality after-sales service.

**The WOSTEP Program:**

- Courses are given by a WOSTEP-approved technical team
- Candidates must be over 23 years of age
- Certificates and diplomas are recognized by the Swiss watch industry and its representatives around the world

**WOSTEP Schools in the US:**

- North American Institute of Swiss Watchmaking, Fort Worth, TX
- N.G. Hayek Watchmaking School, Miami, FL

With over 40 years experience in training watch repairers, WOSTEP has achieved international status as a leader in watchmaker education and certification. The support of multiple brands across all segments of the watchmaking industry allows WOSTEP to provide an education of the highest technical standards. The graduate of a WOSTEP Partnership school has the assurance their certification will be recognized by employers worldwide.



# CHRONOS

IF YOU LOVE WATCHES,  
YOU'LL LOVE CHRONOS

- \$22.50 – One year
- \$42.00 – Two years
- \$60.00 – Three years

Foreign subscribers add \$32.00 per year. (U. S. Funds drawn from U.S. bank only)

- Check or money order enclosed
- Charge my Visa or Mastercard

Card No. \_\_\_\_\_  
 Exp. Date \_\_\_\_\_ V Code \_\_\_\_\_  
 Signature \_\_\_\_\_  
 Phone \_\_\_\_\_  
 Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_  
 Zip \_\_\_\_\_ Country \_\_\_\_\_  
 Company Name \_\_\_\_\_  
 Type of Business \_\_\_\_\_

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

**Chronos Magazine**

is published 6 times per year for the connoisseur of luxury timepieces. Each issue presents the finest watches and clocks of today as well as exploring premier vintage collections.



# WATCH & JEWELRY

Watch & Jewelry Review  
 THE INDUSTRY'S MOST-USED PUBLICATION

- \$19.50 – One year
- \$35.00 – Two years
- \$50.00 – Three years

Foreign subscribers add \$40.00 per year. (U. S. Funds drawn from U.S. bank only)

- Check or money order enclosed
- Charge my Visa or Mastercard

Card No. \_\_\_\_\_  
 Exp. Date \_\_\_\_\_ V Code \_\_\_\_\_  
 Signature \_\_\_\_\_  
 Phone \_\_\_\_\_  
 Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_  
 Zip \_\_\_\_\_ Country \_\_\_\_\_  
 Company Name \_\_\_\_\_  
 Type of Business \_\_\_\_\_

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

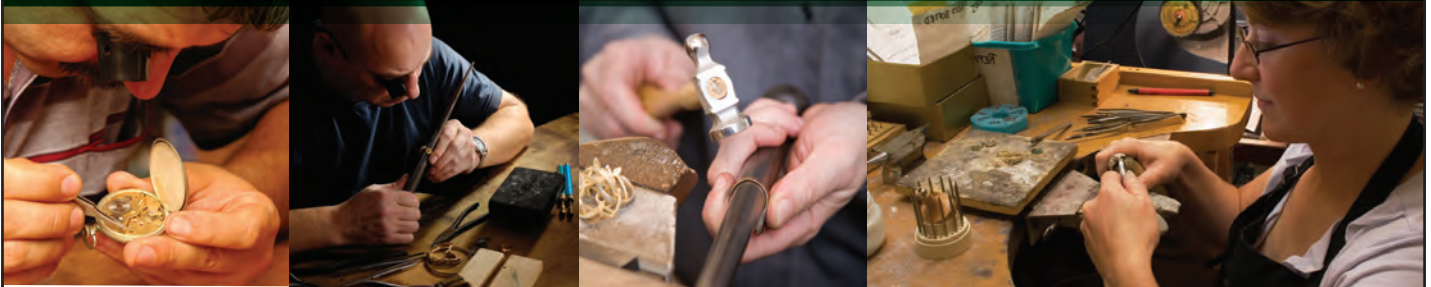
**Watch & Jewelry Review**

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.



## WATCH REPAIR & JEWELRY DESIGN

Success  
*Starts*  
Here



Designing jewelry and repairing watches are timeless art forms. Becoming a first-class jewelry designer, jewelry restorer, or watch repairman, however, is not timeless. In fact, Bishop State Community College's Jewelry Design and Watch Repair programs can teach you this timeless trade and have you ready for employment in a jewelry store or trade shop in less than a year.

At Bishop State, we expect our graduates to be fully prepared for the world after college.

**Bishop State** 

*For more information about our Jewelry Design Program and Watch Repair Program, call 251-665-4084.*

**e-mail:** [slange@bishop.edu](mailto:slange@bishop.edu)   **click:** [www.bishop.edu](http://www.bishop.edu)   **visit:** Southwest Campus, Mobile, Alabama

Gem City Business College, located in Quincy, Illinois, was founded in 1870. In 1961, the school's name was changed to Gem City College, and the school of horology was added to the school's curriculum.

Situated at Seventh and State streets, the building is completely handicapped accessible. The school's experienced instructors offer students specialized training leading directly to careers in business, industry, government or self-employment.

### Requirements

Students must have a high school diploma or equivalent. They must also be a U.S. citizen. Candidates must be able to work with their hands, and good eyesight (with or without glasses) is extremely important. Even more important, they must have the desire to produce the best work possible and to stick with a project until it is completed.

### The Program

The Watchmaking and Repairing Course is a self-paced program. Students will finish in 12 to 15 months, depending on their aptitude and diligence. Classes are held Monday through Friday from 8:30 a.m. to 3:30 p.m. with an hour and fifteen-minute lunch break. The beginning student will make tools and learn to disassemble, clean and assemble watches. They will also work on developing their hand and eye coordination, become acquainted with the terms and concepts of horology, and learn how to order parts.

Intermediate students are introduced to the lathe, learn how to make parts from scratch, fabricate more complex tools and perform repairs and service on wristwatches, both mechanical and quartz. Advanced students are introduced to complicated watches, including chronographs. They also study the theory of hairsprings, escapements and other watchmaking intricacies.

Gem City College also offers a Clock Repair Course. Following the same hours and self-paced program of the Watchmaking and Repairing Course, a student can usually finish in six months. Students learn to disassemble, clean, lubricate and assemble a variety of clocks—chime, cuckoo, striking, alarm and electric. They will become acquainted with a wide range of skills, including the art of replacing mainsprings,

repairing or replacing missing or broken gear teeth and re-tooling wheels and bushings.

For those students interested in the jewelry business, the school offers courses in hand engraving, jewelry repair, jewelry design and diamond setting.

### An Excellent Opportunity

Anybody involved in the Watchmaking industry is well aware of the shortage of trained watchmakers, not only in the United States, but all over the world. As the numbers continue to decline, watchmakers are not able to meet the needs of suppliers, manufacturers, repair facilities and retail stores. The training provided by Gem City College is recognized throughout the industry. The school's atmosphere is designed to be professional. Required student conduct, attitude and dress are consistent with what they can expect in the work place.

**For more information about Gem City College contact us at:**

Phone: 217-222-0391  
gemcity@adams.net  
www.gemcitycollege.com  
Stay connected to us  
through Facebook at Gem  
City College.



### Professional Watchmaking Begins Here

The broad based curriculum of SAWTA (Swiss American Watchmakers Training Alliance) is the foundation of the Lititz Watch Technicum watchmaker training program.



In two years of intensive instruction carried out by a faculty of four experienced instructors, students acquire an in-depth knowledge that is necessary for a successful career in the high-end watch service profession. The skills offered include: movement service, case and bracelet repair and refinishing, estimating, spare parts logistics and customer consultation.



With a placement rate of over 98%, our graduates establish themselves in leadership roles as independent watchmakers with luxury retailers or in service centers where several of them have achieved management positions.

Upon completion of the program, graduates will be awarded the Lititz Watch Technicum (LWT) diploma, the SAWTA and the American Watchmaking-Clockmaking Institute CW21 certificates.

For more information contact:  
717-625-3787 - [info@lititzwatchtechnicum.org](mailto:info@lititzwatchtechnicum.org)  
*Teaching the Art of Swiss Watchmaking*



# Make Time Your Career

New Semester  
Starts in June!

The NAWCC School of Horology Clockmaker and Watchmaker programs begin anew on **Monday, June 20, 2011.**

Graduates of the programs will have learned skills in the art of **clock repair/watch repair**. Job possibilities include working in a clock/watch repair shop or jewelry shop or starting your own business.

Businesses turn to the NAWCC School of Horology when they need well-trained **watch and clock specialists**.

Currently, the demand for technicians is greater than the number of graduates; so many opportunities are available for **gainful employment!**

Visit [www.horology.edu](http://www.horology.edu) to learn more.

**Watch Program:** Micro Mechanics, Introduction to Watch Repair, Horological Lathes, Staffing and Jeweling, Swiss Lever Escapement, Hairsprings, Wristwatches, Watch Technician, Making Parts & Restoration, Chronographs, Business & Repair Issues.

**Clock Program:** Introduction to Clock Repairs, Clock Repair Skills, Basic Clock Repairs, Introduction to Clock Escapement, Cuckoo & Torsion Pendulum Clocks, Chiming Movement Clocks, Tall Clocks, Platform & Lever Escapement Clocks, Wooden Movement Clocks, Machine Tools and Construction, Miscellaneous Clock Movements, Advanced Clock Repair.

Each program takes approximately one year to complete. The combined watch and clock program takes two years to complete.



School of  
**HOROLOGY**

Contact Jennifer Adams at **717-684-8261 ext. 219** or email [jadams@nawcc.org](mailto:jadams@nawcc.org).

The NAWCC School of Horology is licensed by the Pennsylvania State Board of Private Licensed Schools and is accredited by the Accrediting Commission of Career Schools and Colleges—ACCSC.

454 Poplar St., Columbia PA 17512 - Ph: 717-684-8261 • Fax: 717-684-0197—[www.horology.edu](http://www.horology.edu)



### NICOLAS G. HAYEK WATCHMAKING SCHOOL

The Nicolas G. Hayek Watchmaking School is dedicated to developing professional watchmakers and future after-sales service leaders for the Swiss watch industry by providing a WOSTEP education that will lead to a rewarding career. Our staff and faculty are committed to instilling the time-honored spirit of watch making, where tradition is balanced in harmony with cutting-edge technology, truly preparing graduates for the demands of modern after-sales services.

#### The School

WOSTEP was founded in 1966 by Ebauches SA and the Federation of Swiss Watch Manufacturers (FH) and is an institute for further education in watchmaking. The Swiss watch industry set up this school under the name of Watchmakers of Switzerland Training and Educational Program (WOSTEP) in order to train foreign watchmakers in after-sales service methods for Swiss watches. WOSTEP launched an ambitious program to foster and encourage the training of watch repairers and retailers worldwide.



The WOSTEP program is widely recognized as the industry's best training and certification program. As one of only two WOSTEP Partnership training facilities in America, the Nicolas G. Hayek's Watchmaking School's mission is to develop and nurture the future generation of watchmakers. In doing so, we provide not only a resource for servicing fine qual-

ity Swiss watches, but also a lucrative career for our graduates. The WOSTEP certificate is internationally recognized.

#### Course Description

The Nicolas G. Hayek Watchmaking School provides the WOSTEP two-year program designed to train and certify students to work in the field of after-sales service. The program entails 3,000 hours of theoretical and hands-on instruction, including the manufacturing of tools and watch parts, as well as service and maintenance procedures for all types of watches.

Upon completion of the curriculum, students must prove their skills in a final exam to qualify for WOSTEP certification. The exam includes theoretical and practical tests that cover all aspects of horology.

#### Tuition, Fees and Schedule

The Nicolas G. Hayek Watchmaking is a tuition-free program. Students will be required to pay for their tools (estimated cost is approximately \$3,500.00). The program is divided into four sessions:

- Semester 1: January - June (Spring Break - 1 week)
- Semester 2: July - November
- Break: December -No classes
- Semester 3: January - June
- Semester 4: July through November

#### For more information contact:

Phone: 201-271-1400

E-mail: [nghayekschool@swatchgroup.com](mailto:nghayekschool@swatchgroup.com)

[www.nghayekwatchmakingschool.org](http://www.nghayekwatchmakingschool.org)





### INTRODUCTION

The North American Institute of Swiss Watchmaking (NAIOSW) in Fort Worth, Texas enrolled its first class of students for their Certified Watchmaking Course in May 2009. Graduation of this first class at the end of March 2011 is a culmination of 23 months of rigorous classroom activity that has prepared students for a lifetime career of opportunity in the art and science of horology. These students have not only developed exceptional hand skills in the manipulation of fine and delicate mechanisms, but also have acquired, and expanded, their analytical thinking skills to apply the correct repair techniques to each timepiece.

### WOSTEP PARTNERSHIP SCHOOL

As a WOSTEP Partnership school, the NAIOSW maintains those same high standards for the educational process, the learning environment, and the performance of administration and faculty.

### NAIOSW COURSE OFFERINGS

The NAIOSW offers two different but complementary WOSTEP certified courses called the Certified Watchmaking Course and Encasing Techni-



cian Course. The Certified Watchmaking Course is based on the WOSTEP Full Training Course, sometimes known as the three 3,000-hour program. This 23-month course provides full watchmaker training in the repair of watches from case and bracelet work through complete movement intervention on modern mechanical and quartz watches, including mechanical and quartz chronographs.

The Encasing Technician Course is the newest WOSTEP certified training program. The focus of this 800-hour (16 week) course is to prepare the graduate for a successful career in the repair, maintenance, and refinishing of the external components of a watch which includes the case and bracelet, crystal replacement, fitting of a stem and crown, and movement exchange which includes setting the dial and hands. Movement intervention is limited to functional and electrical testing of quartz watches and the regulation of mechanical watches.

Both course offerings begin with micromechanics, which is the first phase of education at NAIOSW and is the foundation for an entire career. The knowledge and experience gained in this phase of each program include: understanding the properties of the materials used in watchmaking, how to service and maintain the important tools used by the watchmaker, and in the case of the Certified Watchmaking Course, how to fabricate certain watch parts in the event the graduate performs restoration work on historically significant timepieces.



The next phase of the Certified Watchmaking Course and the Encasing Technician Course begins with fully-cased watches. The student learns the importance of the watchcase, the variety of styles in the marketplace and the proper repair and maintenance

techniques for the large diversity of products manufactured. This segment of both programs culminates with the precision setting of dials and hands where the student quickly develops an understanding of the level of precision and skill the watchmaker or technician must possess to accurately and carefully perform this delicate operation. It is at this point the Encasing Technician Course student demonstrates their competencies with a final exam administered to the high level of integrity for which WOSTEP is well known.

The Certified Watchmaking Course continues with the next phase of learning, which is complete movement intervention. The student is introduced to a combination of theory and practical work that follows the logical progression of analysis and the typical repair process of the respective products being repaired. Diagnosis of the fault and the correction methods are fully supported by the educational process producing a logical and systematic approach to each repair operation.

For both programs, the combination of these educational elements provides our graduates with an understanding of “why” an operation is performed, in addition to “how” the operation is performed. For the faculty and staff at the NAIOSW, it is not enough for the student to “know” how. Understanding “why” is the focus of every lesson.

### INDUSTRY SUPPORT

The NAIOSW enjoys the support of multiple luxury watch brands, which ensures our students have an ample and diverse product range upon which to hone their skills. Three fully-equipped technologicaly advanced classrooms, an advanced micromechanics lab, and other support infrastructure ensure the students of our institute a thorough education in this modern profession.

### HOW TO ENROLL

Enrollment for the Certified Watchmaking Course and the Encasing Technician occurs annually in May, and applications for both courses are accepted year-round.

For more details about our school, faculty, enrollment, and most importantly, our students, visit: [www.iosw.com](http://www.iosw.com)

### IT'S OFFICIAL! Alessandro Betti Teaching ETA Class at AWCI this May

This is Alessandro Betti's only U.S. course this year! Learn the latest on ETA products and techniques from this renowned instructor who teaches at the ETA Training Center in Grenchen, Switzerland.

#### Sign Up Now:

**NEW ETA PRODUCTS CLASS, May 16-20, AWCI Academy, Harrison, OH**

#### ETA Calibers to be covered:

- 7751 Chronograph w/ Triple Calendar & Moon Phase
- 7770 Chronograph w/ Fly Back
- 2894 Modular Chronograph
- 2895 Small Seconds
- 2896 Big Date
- 2857 Power Reserve

**Reserve your space now: Daniela Ott, AWCI Educational Coordinator, 866-367-2924 x 303 [dott@awci.com](mailto:dott@awci.com)**

**\*\*IMPORTANT NOTE:\*\*** 5-years of professional experience required, CW21 preferred. We reserve the right to cancel a class if there are less than (6) participants registered prior to the deadline. Please contact Daniela Ott, AWCI Education Coordinator, before making specific travel reservations.





# The Watch Technology Institute at North Seattle Community College

*Exceptional training from a respected program*



North Seattle Community College's **Watch Technology Institute (WTI)** is the only Swiss American Watchmaker's Training Alliance (SAWTA) partnership-training program on the West Coast.



WTI has offered excellent preparation for future watchmakers for over 40 years, collaborating with Rolex Watch USA, Inc., since 2000 to create a state-of-the-art facility. The program has newly designed, spacious labs, the latest equipment and a nationally recognized curriculum.



Faculty members are experienced in the industry and are WOSTEP and CW21 certified. The small student cohort guarantees close personal attention from instructors, with strong results: over the past ten years, graduates have an 88 percent job placement rate within months of program completion.



Graduates of the WTI SAWTA program who pass the final certification exam receive both SAWTA and CW21 certifications.

To explore WTI's program in depth, visit [northseattle.edu/programs/watch-technology-institute](http://northseattle.edu/programs/watch-technology-institute).

**The Watch Technology Institute**  
North Seattle Community College  
Seattle, Washington  
(206) 526-0169





## Oklahoma State University INSTITUTE OF TECHNOLOGY

# THE *Fine Art* OF WATCHMAKING

### OUR SCHOOL HISTORY

Since 1946, OSUIT has had a deep-rooted commitment in advancing watchmaking education in the United States. This tradition continues today with start-of-the-art facilities, equipment and curriculum. Emphasis is placed on diagnostics and estimating to ensure that repairs are completed accurately and efficiently as well as soft skill proficiencies to professionally communicate with customers. Workshop management is taught utilizing parts management, quality control standards and profit/loss principles. Through continuous advancing technology and industry feedback, OSUIT continues to prepare students for leading watchmaking in the 21<sup>st</sup> century.

### PROFESSIONAL CERTIFICATION

- SAWTA
- AWCI CW21
- A.A.S.

OSUIT is a SAWTA (Swiss American Watchmaker Training Alliance) certified school, which works in conjunction with AWCI (American Watch and Clock Institute) and the CW21 examination. Through our partnerships we offer students the opportunity to obtain certification through both SAWTA and AWCI. OSUIT graduates also receive an Associate in Applied Science degree in Watchmaking and Microtechnology.

### CURRICULUM

OSUIT delivers the high intensity watchmaking education necessary to break into and succeed in today's modern market. Certified, self-reliant watchmakers are in high demand from all corners of the industry.

Our curriculum is comprehensive in scope, designed specifically to effectively address the needs of today's watch market. Many of these different competencies include:

- Micro mechanics including making parts and tools
- Complete service of modern and vintage timepieces including complications and chronographs
- Case and bracelet service, refinishing, water resistance testing
- Quality control
- Customer service
- Communication skills: written, verbal, non-verbal
- Estimating
- Job tracking and Documentation
- Parts ordering and Inventory control



**S**aint Paul College recently celebrated its 100th anniversary. Located in the heart of Saint Paul's Cathedral Hill, it has been educating watchmakers since 1919. It is the oldest of the Saint Paul Metro Area's public two-year colleges, and recently, it was recognized as one of the top 50 fastest-growing public two-year colleges in the nation. *Washington Monthly* magazine named Saint Paul College the # 1 U.S. community college in August 2010. Offering a breadth of liberal arts and sciences and trade and technical programs, Saint Paul College continues its long-standing commitment to the people in the community it serves.

Thanks to a generous grant from Rolex, the Watchmaking program has been able to establish a modern training facility that prides itself on continually updating its equipment and pedagogy.

The Watchmaking Certificate Program at Saint Paul College is an advanced certificate and a continuation of the skills and knowledge taught in the Micro Mechanical Technology Diploma Program. The entire curriculum also serves as preparation for the certification examination given by the Watchmakers of Switzerland Training and Education Program (WOSTEP), the long-established, globally-recognized horological organization.

Students in our program have hailed from England, the Bahamas, Arizona, Illinois, Connecticut, New Jersey, Vermont, Wisconsin, Florida, Missouri, Canada, Arkansas, Nebraska, Vermont, Michigan, Wyoming and yes, Minnesota. All of the students currently enrolled are AWCI members and the significance of being a Certified Watchmaker is not lost on them, as previous students have remarked on the importance of this certificate in our country. Seven of the December, 2010 Saint Paul College graduates currently hold a CW21.

Well-qualified watchmakers are in great demand to repair the complex, high-end watches sold today, and we plan on training many more of these professionals.

**Check out our program video on the web, or for more information contact:**  
**Doug Thompson, Saint Paul College**  
**651-846-1719 • [doug.thompson@saintpaul.edu](mailto:doug.thompson@saintpaul.edu)**  
**[www.saintpaul.edu/watchmaking](http://www.saintpaul.edu/watchmaking)**



Current class (left to right): Stephen Tobusch, Katie Nelson, Jeremy Grace, Matt Hameister, Jacob Deaver, Erin Laxton, Peter Wengjen



### Paris Junior College • Paris, Texas

**H**istory- Paris Junior College (PJC) was founded on June 16, 1924. Located in Paris, Texas, the school, initially housed in the city's high school building, opened its doors with seven faculty members and ninety-one students. A year later, the college moved into an unused two-story post office. Horology became the college's first technical program in 1942. Through the leadership and vision of seven presidents, a supportive board of regents, industry experts and a dedicated faculty, the Texas Institute of Jewelry Technology (TIJT) grew from its meager beginnings in the basement of PJC's administration building to become a world-renowned training facility.

**Philosophy-** The nature of the program has remained very true to a philosophy that people have come to associate with TIJT. Over the years, TIJT has been fortunate to be able to stick with the things that have worked to make it a successful independent operation in a world that is often becoming more of a franchise. TIJT has 5 program areas. They are Horology, Jewelry, Gemology, Cad/Cam and Lapidary. While these courses are obviously not taught in the same room, they all are located in the same facility. The instructors, as well as the students, are quite interconnected. The feeling has always been that exposure to all the different "facets" (if you will) of the business makes a well-rounded person who stands a better chance of achieving independence and success than one with a myopic view. While many graduates work in after-sales service centers of major brands, most work with independents and small companies. Increasing numbers are finding self-employment a more profitable option. Hundreds of watchmakers from around the globe have started careers and developed lifelong friendships at the college.

**Program-** Mechanical wristwatches are the primary focus of study. The courses cover the basic models, as well as automatics, calendars, timers and chronographs. The experience is hands-on with lectures, discussions and demonstrations that are designed to prepare the apprentice for a career as a professional watchmaker. Subjects include nomenclature, material systems, cleaning, lubrication, lots of hairspring work, jewellery, escapements, regulation and dynamics of timekeeping. In addition to turning staffs and stems, students are instructed in pivot burnishing, staff removal, jewel setting, repivoting and other fabrication processes. Electronic and Quartz watches from vintage to modern are explored. There are also elective options. As an example, TIJT is the

only school still offering training in 6 different models of tuning fork movements. Students may choose to earn a Certificate in Horology or elect to earn an Associate of Applied Science in Horology by taking additional academic classes. Both can be completed in 16 months. Students take 12 credit hours per semester for four semesters. All horology students are also required to complete the business course, Applied Jewelry Practices. For students interested in jewelry, TIJT offers certificate programs in jewelry technology, casting and computer-aided jewelry design. Students may also earn an Associate of Applied Science degree in Jewelry Technology.



**Requirements** - Applicants must provide an official high school transcript showing date of graduation and signature of certifying official. Those who have completed their GED must provide a copy of their scores or GED certificate. Tuition for twelve credit hours is \$582 for in-district students, \$954 for in-state students, and \$1,446 for out-of-state and international students. There is also a lab and instructional fee of \$96. The tool kit required for the horology technology program costs \$1,350, attached to the first semester tuition. The tool kit for the jewelry technology program costs \$2,000. Payment plans are available and many financial aid programs are offered for students who qualify. Student housing is available on the campus. New student enrollment is 3 times yearly in January, May or August.

**For additional information:**

**On the Web :** [www.parisjc.edu/tijt](http://www.parisjc.edu/tijt) (or) [www.watchmaking.net](http://www.watchmaking.net)

**Phone:** 1-800-232-5804 (or) 1-903-782-0361

**Email:** [fpoye@parisjc.edu](mailto:fpoye@parisjc.edu)

## Note: Certification CEU Change

The Board of Directors has extended the dates for CEU courses applicable to the 21st Century certificate. Please refer to the new wording which has been underlined below:

### NEW Education Development Program (EDP) Wording:

Those with current 21st Century certificates who have completed their testing on or before December 31, 2011 will have 5 years from January 1, 2012 to complete their CEUs. Courses that are applicable for CEUs taken after January 1, 2010 will count for CEU credit for the 5-year period beginning January 1, 2012.

Those who have taken courses prior to January 1, 2010 may apply for CEU credit with a petition to the Board of Examiners (BOE). All future holders will have 5 years to complete their CEU requirement from the date on their certificates.

### Prior EDP Wording:

Those with current 21st Century certificates who have completed their testing on or before December 31, 2011 will have 5 years from January 1, 2012 to complete their CEUs. (CEUs earned prior to January 1, 2012 will not be counted for the 5-year crediting period that begins January 1, 2012.) All future holders will have 5 years from the date on their certificates.

## AWCI and ClockClass.com Partner for Training Program

Welcome to ClockClass.com,  
where clockmaking meets  
the Internet.

Watch David J. LaBounty, Certified Master Clockmaker and Fellow of the British Horological Institute, restore everyday clocks in his everyday routine. Study the restoration of every timepiece that passes through David's door — from the cherished cuckoo to the atmos — for free.

Look for the link on AWCI's Home Page [www.awci.com](http://www.awci.com)  
One Hour Classes - \$35.00 per  
Visit [www.clockclass.com](http://www.clockclass.com) for more details



BY MICHAEL GAINEY, CC21



**These are excerpts from an article previously appearing in *Horological Times* magazine.**

You own your own repair shop or perhaps run one for someone else. You consider yourself successful and respected in your community. You have plenty of business. You make a decent income. You don't seem to struggle much with the repairs that you do. You are comfortable with your skill level. If some or all of these things are true, you might ask yourself, "Why should I become certified? What's in it for me?"

### Benefits of being Certified

Once I achieved certification, what did I do with it? I began to charge more for the work that I did. In my state, there are only five certified clockmakers. What an amazing revelation that was! I came to the realization that what I do and what I have accomplished is unusual and rare. The entire process showed me the value of the unique talents of a well-trained and certified clockmaker. When quoting a price for your repairs, it is important to have the assurance that you are worth what you are charging. Going through the certification experience gave me the rationale for higher prices and gave me increased confidence in my work.

Still another reason to be certified is to make you stand out from others in the trade. I am located in a large metropolitan area. In the local yellow pages, there are 11 different clock repair listings. When a customer looks in the book to find a repairman, what are they going to look for? Admittedly, some will only look for who is the closest to them. The discriminating customer is going to look for who might be the best! Obviously, this is difficult to tell with certainty only from an ad. Stating your certification, however, is a great way to get people's attention. They may not know they are looking for it, but, when they see it mentioned in some ads and not in others, it may be enough to get them to give you a call. I have had many customers say that is why they called me or went to my website. Once they view the site or talk to me on the phone, I am able to give

more details if they ask. Almost anyone can provide a few good references to show a potential customer (because you only have to make a few people very happy) and anyone can boast of their skill or experience, but only a few can say that their skill has been judged by others in their trade and that they have a certification to prove it!

You also may find yourself beginning to receive higher quality clocks or watches for repair. The person who is a collector or owns a rare or valuable timepiece is more likely to be one of those discriminating customers who are looking for a highly-skilled professional repairperson.

### Try It, You'll Like It

When I was much younger I would avoid eating many foods because I was convinced (without having previously tried them) I would not like them. My parents would say, "Try it, you'll like it". Of course, being a child I would refuse. As I grew up, I eventually tried some of these foods, liked them, and now eat them all the time... In spite of all that I have said, you may still decide not to seek certification. However, please do not say that certification has no value until you have experienced the process for yourself. I would be willing to bet that you will not regret it. You may find out that you like it, too!



**BY CHRISTOPHER GRYGNY, CMW21, GAINESVILLE, GA**

**“My work is unquestionably better after becoming aware of the quality standards that are currently expected.”**

My experience with AWCI Certification has been overwhelmingly positive. I certainly feel that it gives me much better job security, as Rolex repair is a very large part of my shop’s work. If I ever had a need to leave my present position, certification would certainly expand my employment options.

From a personal viewpoint, certification gives a great sense of satisfaction because I know that my skills meet the highest standards of quality. My work is unquestionably better after becoming aware of the quality standards that are currently expected.

The exam prep work that I needed was fairly minimal (but quite essential). I attended Manuel Yazijian’s “Secrets of Escapement Oiling,” and Tom Shomaker’s “Modern Mechanical Chronograph” classes, both

of which were sponsored by the Florida Watchmakers and Clockmakers Association.

I plan to continue taking classes in order to keep my skills up-to-date and fully support the new Educational Development Program.



### THE 2011 ANNUAL

## CONVENTION & EDUCATIONAL SYMPOSIUM

**AUGUST 3 - 7, 2011 • VANCOUVER, WA**

PORTLAND, OREGON  
METROPOLITAN AREA



### WHERE IT IS:

- ✓ VANCOUVER (*Not B.C.*)
- ✓ WASHINGTON (*Not D.C.*)
- ✓ NEAR PORTLAND (*Not Maine*)
- ✓ CLARK COUNTY (*Not Nevada*)



### WHAT IT IS:

- ✓ GREAT TRAVEL DESTINATION
- ✓ EDUCATIONAL
- ✓ LOTS OF FUN
- ✓ TAX DEDUCTIBLE
- ✓ FULL OF NETWORKING OPPORTUNITIES
- ✓ IMPORTANT FOR AWCI GOVERNANCE

*Don't Miss this  
Important Event in August!*

BY MATT HRITZ, CW21, FWCA EDUCATION CHAIRMAN, SARASOTA, FL

Much of the training being offered at the AWCI headquarters is geared toward preparing watchmakers for the CW21 exam. This has been a big help to the members, but in looking over the schedule, it might lead some to say, “I don't need that class.” The reasons? Some have already passed the exam, some don't plan on taking it at all, the classes seem expensive, or it covers material they are already familiar with, etc.

I had several “good” reasons for not attending the quartz training last October in Tampa, but I decided to go, hoping when it was over, I would feel it was time and money well spent. Without a doubt it was! The instructor, Tom Schomaker, did an outstanding job, as usual. Some things I expected to learn, but it was the many things I hadn't expected that really surprised me.

I wanted a refresher course on quartz movements and my quartz equipment, and I got it. We got general information on quartz technology and brand-specific information on Ronda and ETA, as well. I learned a few new things about my Elma Watch-Master even though I've had it for several years. We were reminded to update our technical guides periodically—companies do change oiling recommendations and make parts modifications from time to time. Tom walked us through Ronda's website, and if you haven't seen it, have a look. The website ([www.Ronda.ch](http://www.Ronda.ch)) is set up very nicely. ETA looks good as well ([www.eta.ch](http://www.eta.ch)), and both make it simple to download and update technical information. I was in the training room a little early one morning and had a nice discussion with Tom as he and I were setting up. As a result, I changed the way I estimate certain jobs. The following week I estimated and got customer approval on two of these types of jobs. This simple change almost covered the cost of the class!

I didn't know there was going to be a section on quality control. This covered many topics, including workshop design, bench practices, and cleanliness. We discussed time-saving (and lawsuit-avoiding) take-in and estimating procedures. The binder that came with the course included useful information on

Rolex and ETA mechanical movements, timing analysis worksheets, timing procedures, troubleshooting information, and instruction for different types of water-resistance testing machines.

Lunch and dinner provided time with the other watchmakers, and we compared notes on tools and techniques we use. In sharing our experiences with others, we all got the benefit of some dos and don'ts on certain watches. I also found out Terry Curkan, our new Vice President, has an authorized Ebel service center not far from me. This is helpful to me, since I can't get parts for Ebel and would like to have someone I can recommend to my customers.

**I am a watchmaker with over 20 years experience, graduated top of the class from the WOSTEP refresher course in Neuchatel, and passed the CW21 exam. I'd like to say I knew all this stuff, but I didn't. The list of things I learned that I hadn't expected is too long to put in this letter. I almost said, “I don't need this class.” I'm glad I didn't. I heard a wise man say, “I can calculate the cost of getting an education, but I cannot calculate the cost of not getting an education.” He was right.**



BY JACK KURDZIONAK, CW21



## What Is Certification?

The encyclopedia states, "Professional certification, trade certification, or professional designation, often called simply *certification* or *qualification*, is a designation earned by a person to assure qualification to perform a job or task."

For many professions, the professional society issues the certifications to individuals who have earned it by demonstrating their occupational competencies. In general, persons holding certifications must renew them periodically, or they may be only valid for a specific period. As a part of a complete renewal or reissue of an individual's certification, it is common for the individual to show evidence of continued learning by earning continuing educational units (CEUs). Professional associations and trade organizations create and sponsor most of the certification programs. Product vendors may also create a certification program. The common thread in all certification programs is a genuine interest in raising the standards of the profession.



There has been a significant growth in the number and quality of certification programs during the past decade or so. This reflects the rapidly changing employment environment of most professions. The so-called, "lifetime job," no longer exists. No longer can a person expect to retire after working for one employer for 30 to 40 years. Numerous firms will

employ the average person over that time. Certifications are portable. They do not depend upon a single company's definition of a profession.

Certification is impartial, as it speaks for the person's qualifications. It becomes part of one's resume as a third-party endorsement of proficiency and knowledge. A true professional certification travels with the certified person from job to job. No employer will permit you to take a company's tools and equipment to your next job, but you always take your certification. It never stays with your previous employer. Certification speaks for you and tells potential employers that you are qualified for the position. In addition, certified professions permit the use of post-nominal letters such as CPA, CFE, and CW21. These letters indicate the user has earned a privilege from an overseeing, independent, professional organization.

## Why Certify?

For the past several years, many AWCI members have been questioning the need for a new watchmaker's certification exam. Comments include:

1. I have been a watchmaker for over thirty-five years. Why are you telling me I need to retrain?
2. Why do I need to take an exam to become certified, especially since I was certified in 1975?
3. I heard the exam takes several days, and I have to pay for it. I remember when I took the Bulova Accutron class; it was free and included a free lunch every day, compliments of the Bulova Watch Company.

These are certainly legitimate questions and concerns for many AWCI members who have been practicing watchmakers for years. A decade or more of experience is valuable in that it demonstrates longevity in the profession and dependability. Unfortunately, longevity does not necessarily translate into professional competence. Employers look far beyond tenure when hiring a new employee. A potential employer will always look favorably upon a candidate who has continued his professional education on a regular basis. An Accutron certification (CAT) from Bulova is not a professional certification, but rather a product certification that certified the holder was able to repair an Accutron to Bulova's satisfaction. Few, if any, Accutrons will cross the average watchmaker's bench in 2011. Watchmaking in 2011 is definitely not practiced the same way it was in 1975. If you do not believe this statement, just ask anyone

BY JACK KURDZIONAK, CW21

who has taken a continuing education class at AWCI in Harrison, ETA in Switzerland, or at Swatch Group here in the U.S.A. These watchmakers all agree that the effort in terms of time and expense to attend these classes was a valuable investment in their own professional development.

The predecessor organizations of AWCI began to develop the old certifications over a half century ago. Those certifications met the watchmaker's needs for that era. Several states required a watchmaker's license to practice watchmaking, and AWI provided a certification that met the license requirement for some states. Today, no state licenses watchmakers, and no state recognizes the old AWI exam. Because AWI administered the old exams through the mail with minimal local supervision, their validity sometimes was viewed with suspicion. In reality, the old exams and certifications gradually became obsolete, and no longer had meaningful recognition by the watch manufacturers or the majority of watch owners.

## There's No Such Thing As A Free Lunch



Tradition has it that in the nineteenth century many saloons here in the U.S.A. served a free lunch to patrons who bought a drink. The free lunch was not free. The patron bought

an expensive drink that covered the true cost of the lunch and the drink. The old saying, "There is no such thing as a free lunch," exemplifies that you cannot get something free or get any more than you pay for. Yes, Bulova did provide free Accutron classes for watchmakers. The classes were free, but that did not mean Bulova lost money on these classes. At that time, the Accutron was a revolutionary timepiece. Bulova sold millions of them and garnered a significant share of the market. They needed hundreds of watchmakers to service these timepieces, and they needed them quickly. Rather than set up

an enormous in-house service center and train many new employees, they decided to train independent watchmakers all over the country to service the Accutron. In addition, Bulova was the sole supplier of Accutron spare parts and the test equipment needed to service these watches. It was not an altruistic decision on Bulova's part to provide the training, but rather a sound business decision based upon the market circumstances of the era.

Over a decade ago, AWCI recognized the need for a new watchmaking certification. Our industry partners encouraged the Institute to develop a new examination that would be a valid tool for certifying watchmaker competency. The new exam had to be reliable and relevant so that AWCI could confidently certify a watchmaker capable of producing quality repairs to modern watches. AWCI developed a new watchmaker's certification (CW21) over a period of several years. The cost of developing the exam was borne by the Institute. Our industry partners contributed the services of their training staff, equipment, and facilities to the effort. Generous volunteer members of the Institute contributed untold hours of their time and often traveled at their personal expense to make this certification a success. The examination has a development cost, a material cost, and an administrative cost. That is why AWCI needs to charge its members for the exam.

## An Asset For You And Potential Employers

A member who holds the CW21 has now gained an asset. It belongs to the member, not to any watch company or employer. The holder of a CW21 can bring this asset to a new employer who will be willing to compensate the employee who can develop new opportunities for the shop. Certification is not to be viewed as an expense, but rather as an investment in one's career potential. ♦



# new recycling program

## Help The Environment. Help The ELM Trust.

Watch Battery Buyers has offered to donate the funds from your recycled batteries to the Education, Library & Museum (ELM) Trust. This trust is our 501(c) 3 not-for-profit organization that supports the advancement of horology. For every donation of batteries to [AWCI's ELM Trust Battery Program](#), you'll receive a letter of acknowledgement from AWCI which can be used for tax purposes.

The company has created this program specifically for AWCI and its members. Their services have no fees attached, and the shipping of your spent silver oxide batteries is free. This makes it exceptionally easy to recycle your spent batteries. Even the non-value batteries you send will be efficiently sorted and properly recycled.

Did you know there are literally hundreds of millions of batteries produced each year? This consumes natural resources and adds toxicity and waste to the environment. Through this helpful program Watch Battery Buyers gives you an easy, effective way to Reduce, Reuse, and Recycle. According to Ari Kesler, Vice President of Watch Battery Buyers, "We are dedicated to providing a free, convenient way for businesses to 'do the right thing.' Our corporate leadership and knowledgeable staff take great pride in developing long-lasting business partnerships with groups like AWCI, and we focus on building integrity, trust and professionalism in these relationships."

He adds that, in the past, people would just toss batteries away. But today, silver oxide batteries are worth being reclaimed and provide a high payout. So when customers bring watches to you for battery replacement, gather them up and send them in when you've accumulated a couple of pounds. Don't sell them to "traveling salesmen" paying half the price of what you could receive through Watch Battery Buyers.

*Think about it:* Your old batteries could mean hundreds of dollars for the ELM Trust, and you'll also be helping the environment. It's a win-win situation for everyone!

### HOW TO DONATE YOUR BATTERIES TO AWCI'S ELM TRUST BATTERY PROGRAM:



- 1. Gather old batteries**
- 2. Contact Watch Battery Buyers for FREE secured shipping and pick up**
- 3. You'll receive a letter confirming the weight and value, and you'll be asked the amount you'd like to donate to the ELM Trust.**

*AWCI will then send a letter acknowledging this donation for your tax purposes.*

*You can choose to donate all or a portion of your payout to the ELM trust.*

**Be sure to contact Watch Battery Buyers and mention the AWCI Battery Program:**

watch battery  
BUYERS 

**877-670-7799 or [info@watchbatterybuyers.com](mailto:info@watchbatterybuyers.com)  
[watchbatterybuyers.com](http://watchbatterybuyers.com)**

**HOW DOES YOUR DONATION HELP THE ELM TRUST?**



**E L M means...**

**Educational Assistance to REC Schools and Students**

The Harold J. and Marie Borneman Greenwood Memorial Fund of the New Hampshire Charitable Foundation is distributed annually. This past year scholarships were given to seven deserving students. REC schools also receive other excess donations and items from AWCI.

**Educational Assistance for AWCI Programs**

AWCI provides watch repair instruction on an ongoing basis. This includes continuing education courses, traveling bench courses and certification exams.

**E L M means...**

**The Library Funding for The Henry B. Fried Resource Library**

Lends vintage horological texts and publishes horological books, videos and DVD's. Books are free for members to borrow (two per request) and videos are a \$5 rental (two per request).

**E L M means...**

**The Museum Funding for The Orville R. Hagans History of Time Museum**

Preserves unique timepieces and tools for study, research and public viewing. The museum provides both the public and the professional with a better understanding about the history of watchmaking and clockmaking through the years. This year we are hosting groups including NAWCC, local seniors, and community groups such as Boy Scouts and Girl Scouts.



**What Certification Means To Me**

**“These classes are about much more than just servicing the watch.”**

**Jeff Forslund, CW21  
Lake Country Jewelers Ltd.  
Pewaukee, WI**

CW21 has been a very important part of my business from many perspectives. Attaining this was part of the Rolex requirement, and Rolex service plays an important role in my business. Secondly, I decided a few years ago when I received the notice I needed to be certified that I should have a commitment to obtain as much current training as I could get. I wanted to pass the test which I had heard was pretty tough (It was!). It was a financial burden, but after completing it, I'm glad I did it. I can also see the return on the investment.

Current training has made me a much better watchmaker. Additionally, Tom Schomaker and Manuel Yazijian are some of the finest instructors I have had in any training situation. (Bob Porter and Ron DeCorte were great, as well, but that was pre-CW21.) The AWCI training facility is first rate and very current. It's almost too current! It cost me a lot of money to upgrade my shop after attending classes and seeing what technology and techniques I had been missing which were critical to excellent work.

I think EVERY watchmaker should take the automatic or the chronograph course as each of these gave me the highest amount of useable, day-to-day information. Even if a watchmaker thinks they can service the 2824/7750 in a dark room, they would get something worthwhile that would more than pay for the class. These classes are about much more than just servicing the watch. In fact, the watch is somewhat secondary to the skills that are improved on during the week. I found the skills I learned could be applied to any watch that came across my bench.

Lake Country Jewelers is a small shop, and each of us has our individual skill sets. Everyone, including myself, has to produce to a high level of productivity in order for the store to function and survive. Rolex, Omega, Cartier, etc. are the watches that pay a big chunk of my bills, so this test was critical as I am the entire watch repair department. My not passing would have meant I would probably have to close my store. When I got around to reading the letter that came from AWCI, I noticed that the label contained something vital, both personally and professionally. It was addressed to: **Jeff Forslund, CW21.**

# Time is money.

Knowing how to properly repair watches and clocks saves time - while also generating additional traffic and profits. It also helps to protect and enhance the brands you promote as well as your reputation and integrity. Expertise through formal training is available through AWCI, and demand is growing! We invite you to learn more about the CW21 and CC21 certification programs now available and hope that you will be as excited as we are about our other certifications currently under development.

American Watchmakers Clockmakers Institute  
701 Enterprise Drive Harrison, OH 45030-1696  
Fax: 513 367 1414 Phone: 513 367 9800 Toll-Free: 866 367 2924



# WATCH PARTS

let us deliver

Intelligent Distribution  
Since 1969

Cousins Global  
www.cousinsglobal.com

incorp. [www.COUSINSUK.COM](http://www.COUSINSUK.COM)



# FREE watch batteries

## Eckcells AWCI Membership Reward Program

Buy tools or materials & receive  
**FREE BATTERIES**  
of your **CHOICE**  
equal to 10% of your purchase

*Sale items and prior sales excluded.  
Offer subject to change without notice.*



379 Main St • Stoneham, MA 02180  
1-800-514-1270 • [eckcells@gmail.com](mailto:eckcells@gmail.com)  
[www.eckcells.com](http://www.eckcells.com)

We accept all major credit cards

# Get \$50/lb. & Up FOR USED SILVER OXIDE BATTERIES



## HELP ELM TRUST & THE ENVIRONMENT

Recycle your batteries with Watch Battery Buyers and be compensated with industry-high payouts. If you choose, we will donate your earnings to AWCI's Education, Library & Museum Trust (ELM), helping to fund the advancement of horology.

1. GATHER OLD BATTERIES
2. FREE SECURED SHIPPING & PICK UP
3. PAYMENT ISSUED IMMEDIATELY



CONTACT US FOR COMPLETE DETAILS:

watch **battery** BUYERS

877-670-7799 or [info@watchbatterybuyers.com](mailto:info@watchbatterybuyers.com)  
[watchbatterybuyers.com](http://watchbatterybuyers.com)

# Clockmaking Elements: Machining Techniques

BY LAURIE PENMAN

Clockmaking requires a great deal of machining, of course, and there are several techniques that can make the various processes simpler to carry out and easier to duplicate precisely. These often need special equipment to be made or bought; the latter option is not often available for small lathes like mine (a 7" x 12"). For that reason, and an inborn dislike of spending money unnecessarily, I prefer to make most of what I need.

Consider the turning of pivot shoulders on arbors. All except the pallet arbor usually need to be the same dimension over the shoulders, and unless there is to be more shake than necessary between the plates, it should be fairly tightly controlled. The same is true for pillars. Tolerances of + 0.00 mm - 0.05 mm for the arbors and + 0.05 mm - 0.00 mm for the shoulders of the pillars would be quite normal for a movement 100 mm wide and 120 mm high. This is not the actual shake, of course, but the amount that it is allowed to vary from one part to another.

To turn one shoulder, no special arrangements have to be made. The raw material is held in a chuck or collet, and the machining of the pivot, extension or mounting is carried out and finished to whatever level is convenient. However, when the other end of the arbor is machined, the first shoulder disappears inside the chuck or collet and the distance over the shoulders cannot be measured without taking it out. (I am ignoring the possibility of drawing the full length of the arbor out, supporting it in a steady and using a left hand tool for the second pivot.)

If a means of positioning the already-machined end inside the chuck or collet is provided so that the arbor is always inserted to the same extent, then the lathe tool can be set so that it always produces the same over-the-shoulders dimension. Figure 1 shows the idea, which takes advantage of the fact that most small lathes (and larger ones) have a morse taper inside the nose of the headstock mandrel. The drawing shows the pillar for one of my clock designs being held in a split bush and set up for just skimming the face of the right-hand shoulder. If all the pillars are set up in this way and the cutting tool is not moved from a set position on the longitudinal axis of the lathe, all the pillars will have the same measurement over the shoulder faces.

The first thing to be made is a morse taper plug that will fit in the nose of the lathe. My lathe has a top

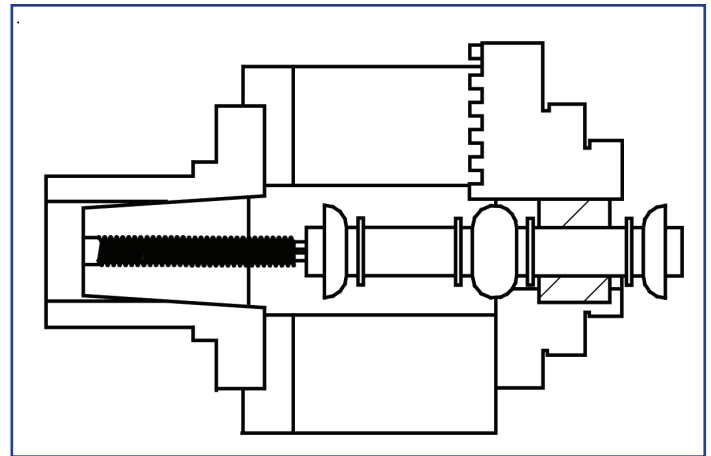


Figure 1

slide which can be swung over to cut tapers. Other small lathes, such as the Sherline, have a swiveling headstock to achieve the same result. The means of setting the headstock over to the correct angle is essentially the same as the following description of setting over the topslide.

I needed to find an existing morse taper that could be copied and the most obvious example was the drill chuck from the milling machine which has a hole at the end for a drawbar. In Figure 2, I have closed the chuck onto a convenient brass bar, which is then held in the lathe chuck. The other end of the drill chuck taper shank is supported on a dead center in the tail stock. I now had a means of adjusting the top slide until it matched the tapered surface of the chuck shank.

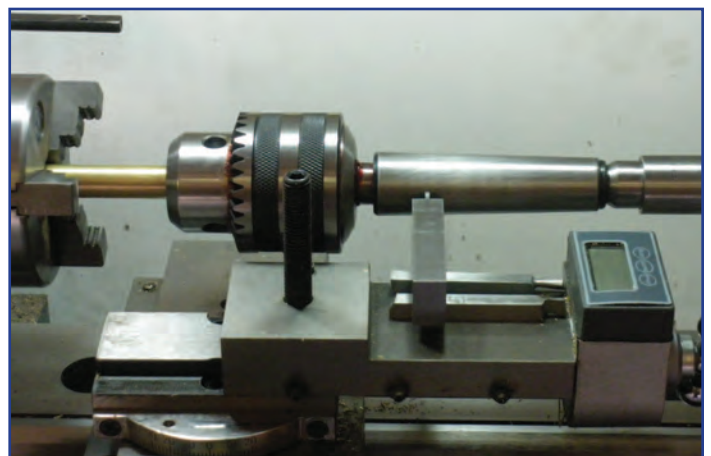


Figure 2

# Clockmaking Elements: Machining Techniques

BY LAURIE PENMAN

The screws that lock the top slide in position were slacked off allowing me to swivel it to match the taper. When it seemed a close match, I laid an engineer's square on two tool bits to lift the stock of the square above the center line of the shank and pressed the inside of the blade against the slide. Fine adjustments can be made now, advancing the cross slide until the square touches the taper shank and then moving the square to the right and checking whether it just touches in the new position, or leaves a gap, or jams. A few gentle taps with a rubber hammer will change the position of the top slide until the square can be moved from side-to-side and just touch the shank at all positions. The slide is locked firmly in place, and the drill chuck is removed from the set up.

A short piece of brass bar, large enough to turn a number 2 taper, is put in the lathe chuck and drilled to accept a 10 mm coarse metric thread (Figure 3). The tap was started by holding it in the drill chuck and rotating the lathe chuck by hand. However, this drill chuck is not beefy enough to prevent the tap rotating with the work after it has cut two or three threads, so I took the bar out of the chuck and put it in a vise for tapping by hand (Figure 4). In order to hold the bar for turning the taper, I used a ready-made bolt, simply cutting off the hexagonal head.

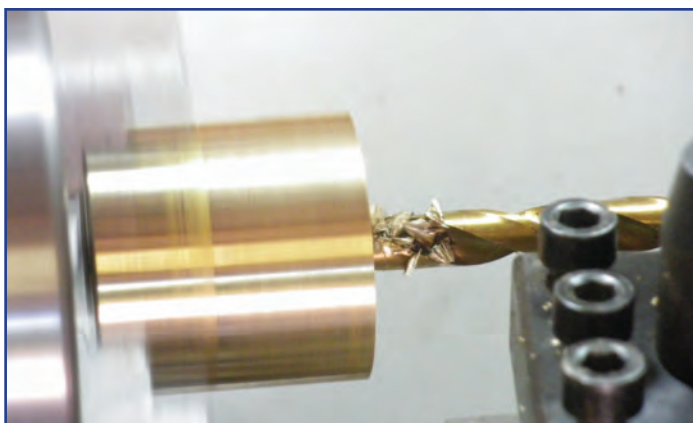


Figure 3

What is now a length of screwed thread is put into the lathe. The chuck was removed and a collet fitted in the lathe mandrel (Figure 5). This will enable me to test the taper I am turning, because it is far too big to pass through the hole in the chuck body. Before screwing the brass plug onto the threaded rod, a spacer washer is made to fit over the screw and lie

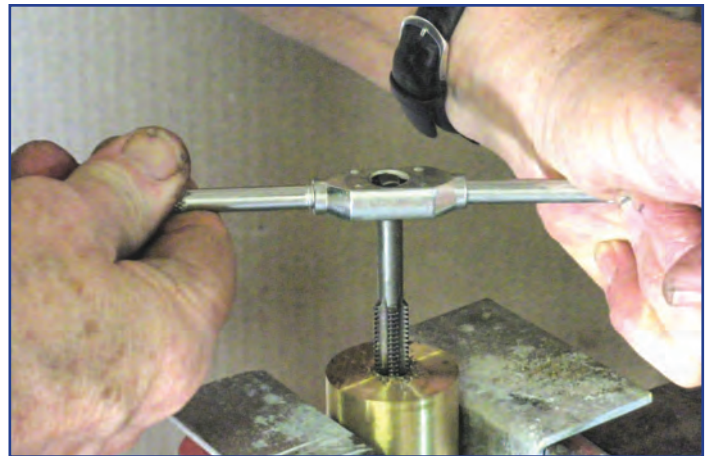


Figure 4

against the face of the collet. When the bar of brass is screwed onto the bar, ready for turning the taper, the washer provides space between the end of the bar and the hard face of the collet. The turning tool can now run off the bar with no danger of breaking its tip on the face of the collet or damaging it.

**Jones & Horan**  
**AUCTION TEAM**

*Superb Auction* FEATURING A  
**Watchmaker's Collection & Shop**

**Saturday, May 7, 2011 at Noon**

**Auction Location: Radisson Hotel Manchester  
700 Elm St. Manchester, NH 03101**

*Most of the 500+ auction lots come from a Texan Watchmaker's Personal Collection and his Material and Tool shop. There are several outstanding Clocks, 100's of European and American Pocketwatches, Vintage Wristwatches, Lathes and other Watchmaker's Tools, Parts and Material.*

*Please contact us for a free catalog.*

VIEW PHOTOS AND CONDITION OF ALL ITEMS:

**[www.jones-horan.com](http://www.jones-horan.com)**

453 Mast Road, Goffstown, NH 03045

**800 622-8120 or 603 623-5314**

**NO BUYER'S PREMIUM • NO SALES TAX**

# Clockmaking Elements: Machining Techniques

BY LAURIE PENMAN

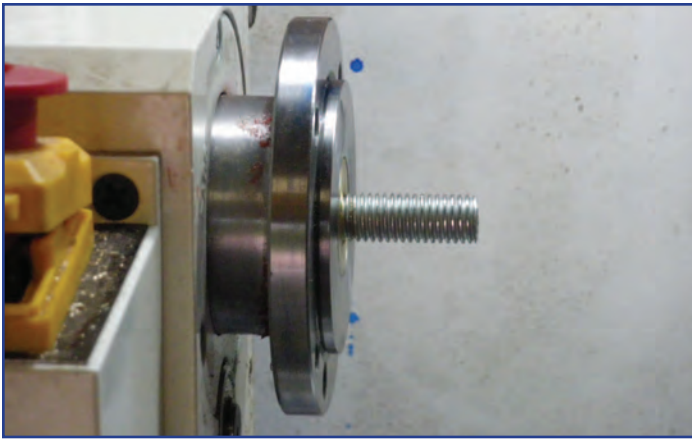


Figure 5

In Figure 6, the plug is seen fitted on the screw thread and successive cuts taken along it until it can be tested in the mandrel. Admittedly, this means the collet has to be removed each time to make way for the tapered plug, but removing the collet and then replacing it for further machining is a lot simpler than unscrewing the three nuts that hold the chuck in place (and there is very little space to fit the nuts; it becomes a prodigy of digital juggling).

The actual turning of the taper must be taken gently because the plug has a much larger diameter than the screw thread supporting it, and it is very easy



Figure 6

to create a vibration (which will produce a poor surface), or a “dig in” that might bend or break the screw thread. In fact, I took cuts of no more than 0.25 mm at each pass.

To reduce the amount of testing, I had previously pushed a number 2 morse taper that had been

coated with blue marking—and a scribe around it—against the end of the mandrel (Figure 7). The diameter at this point can now be measured accurately with a vernier caliper and used to check the progress of the turning of the new taper. Figure 8 shows the last trial with the tapered plug seated well in the mandrel with its face slightly below that of the nose of the mandrel, ensuring that it does not interfere with the rear face of the chuck.

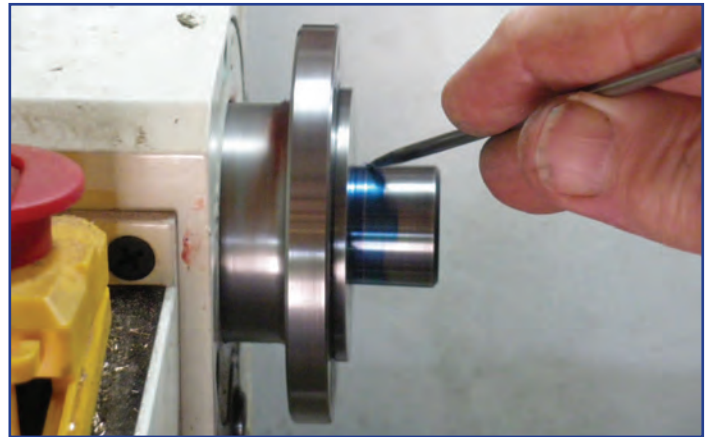


Figure 7



Figure 8

The actual stop is made from the screwed rod that had supported the plug for machining. It must stay in place, of course, when being used. It is of no use if it moves when parts are being set up in the chuck for facing to length. A saw slot was cut along the axis of the screw for just over half its length. A piece of half hard sheet was slid into the slot and a scribe used to mark the width necessary (Figure 9). I used tin snips to cut the strip from the sheet in Figure 10, and a little extra hammering gave the strip a curve and fully

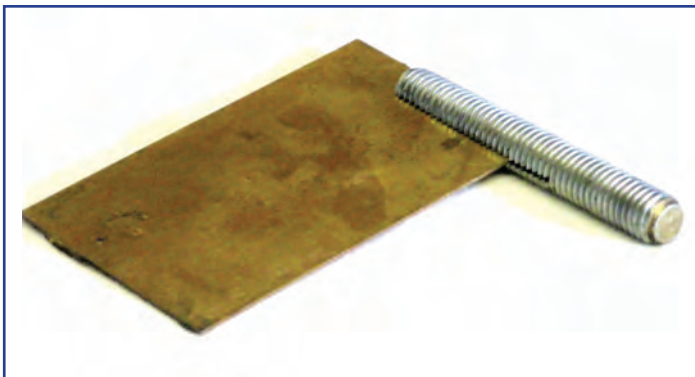


Figure 9



Figure 10

hardened it. The strip should be rectangular and just a little wider than the screw thread, which is why I filed the sides. The fraze (or burr) is left in place because the next operation is intended to throw up even more fraze and increase the friction when the screw is fitted back into the tapered plug. First though, the threaded rod was screwed into the back of a 10 mm die with the unslotted end leading. Enough was screwed into the die to allow the vise (with thick aluminum jaw protectors) to grip it securely (Figure 11). Now, when the die is rotated counter-clockwise, it



Figure 11

# Livesay's

Your Horological Source  
Since 1969



**Deluxe  
Stand-Up  
Polishing  
Unit With  
Variable  
Speed  
Motor**

This deluxe unit offers a dust-free polishing environment with the addition of two plexiglas enclosures surrounding the polishing area. The hands and work piece are placed inside the enclosures while the 960 CFM, 1/4 HP suction motor collects compound and polishing debris. Unit includes two flexible arm lamps, heavy-gauge metal cabinet and variable speed motor with quick change chucks as well as spindles.

**Dimensions:**

- Overall Height: 53" (Excluding Lamps)
- Floor to bench top height: 40"
- Width of unit: 44"
- Depth of unit: 18"

**Motor specs:**

- 300 - 4,000 RPM speed range
- Constant torque 1/3 HP through the entire speed range
- Quick-change chuck is easily mounted on right side
- Industrial grade, sealed ball bearings never need lubrication
- UL recognized and CSA certified for electrical safety

Shipping weight 200lbs and must be shipped motor freight.

**Stock No. 47.088**

**\$2,995.15**

Phone Orders : (800) 476-2715

Fax Orders: (800) 476-8016

Email: info@LivesaysInc.com

Online Catalog: www.LivesaysInc.com



# Clockmaking Elements: Machining Techniques

BY LAURIE PENMAN

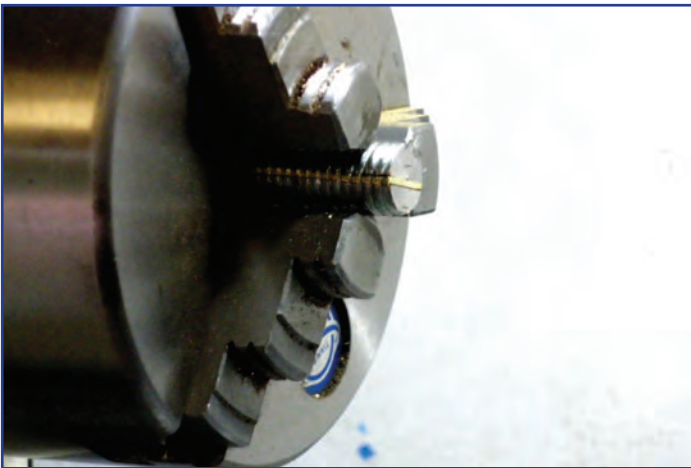


Figure 12

will cut a thread in the brass strip; winding carried on until the die came off the screw.

Left like this, the thread produces only a small amount of friction and not enough to keep the screw in position when it is being used. This is something that will change in a moment; meanwhile, the end needs facing to present a clean surface to any work that is held in the chuck (Figure 12).



Figure 13

To increase the friction (it will remain slight and only just sufficient to perform its function), I removed the strip and placed its edge on the anvil of the vise (Figure 13). I then very gently tapped the tops of the threads (which cannot be seen in the Figure) so that they were thickened by a small amount and deformed. Finally, I tapped the strip down the slot about 10 mm. This had the effect of widening the slot and applying friction by reason of the increased di-

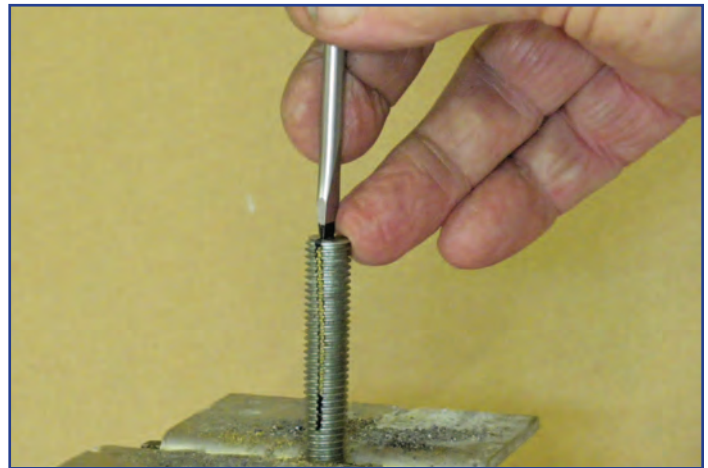


Figure 14

ameter (Figure 14), but it also put the thread on the strip, out of phase with those on the screw. It was just a small amount, but enough.

The device is now ready to use and Figure 15 shows a movement pillar positioned by the stop and ready to have its shoulder distance skimmed to correspond very closely with the other pillars in the set. The pillar has been form turned, of course, and there is really nowhere for chuck jaws to close on a cylindrical portion or for a dog to be fitted for turning between centers. Consequently, I used a bush that was split in two longitudinally and short enough to fit between the fins of the pillar. Since it is only longitudinal accuracy that I am aiming for in this operation, absolute concentricity is not important. ♦

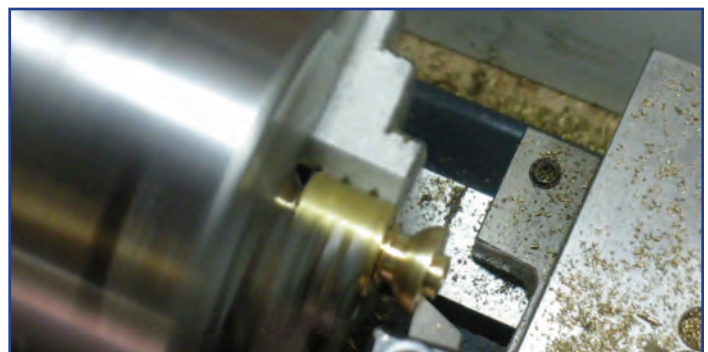


Figure 15

Laurie Penman has contributed his expertise to many different facets of AWCI. He has been a clock instructor and has taught correspondence courses for the Institute. In addition, he has contributed many articles to *Horological Times*. Currently, he teaches and writes from his home in Kidderminster, England.

# Waterbury Desk Clock Repivoting

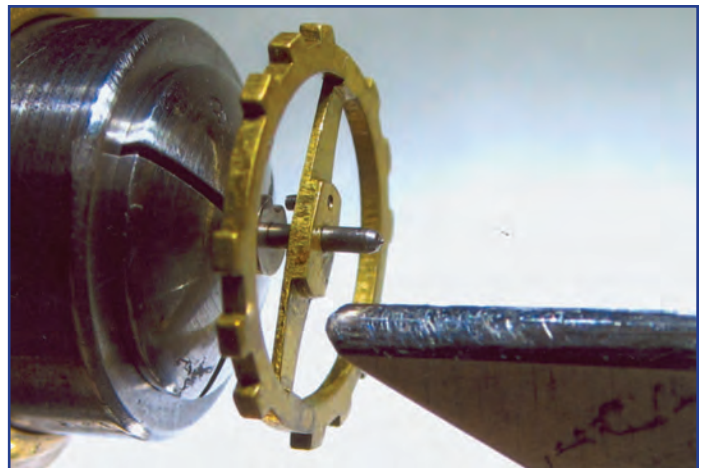
BY DALE LADUE, CMW21

A customer sent in a balance wheel that needed to be repivoted. He stated in his note to me, "Enclosed please find a balance wheel with a broken pivot that fits on the rear plate of a Waterbury desk clock set. Also enclosed are the jewels for that pivot. Three pieces total. The threaded jewel goes into the rear plate of the movement and is the end that the pivot is broken. Please install a new pivot the same size as the unbroken end."

Having the balance jewel at hand, I was able to determine the pivot diameter. Since the balance cap jewel unit was threaded, the end shake was adjustable. The balance was mounted in the lathe as shown in Figure 1. A closer view of the staff indicates that it may have been previously repivoted (Figure 2). A diamond file was used to flatten the staff end as shown in Figure 3. Using a sharp graver, a perfect center was cut as shown in Figure 4. A carbide spade drill was presented to the perfect center and with its opposite end supported in the tailstock. The staff was drilled in Figure 5. In Figure 6, the finished hole provides plenty of surrounding metal to support a substantial plug to form a new pivot.

A piece of blued steel rod was placed in a properly sized collet and a hand-held rotary tool was brought to bear on the rod. The lathe head and bed were protected from the grinding debris by a paper towel in Figure 7. As the rod was spun in the opposite direction of the cut-off disk, a slight taper was ground on the rod as shown in Figure 8. I used a small broach to determine the depth of the hole. The broach was then grasped by tweezers. Figure 9 shows the broach bottomed in the hole and the tweezers slid down to the entrance. I removed the broach. Figure 10 shows the depth measurement of approximately .5 mm. Regardless of the actual measurement, the broach was held up to the new pivot plug to determine the overall length, as shown in Figure 11. I usually leave pivots longer and adjust for endshake as the final procedure.

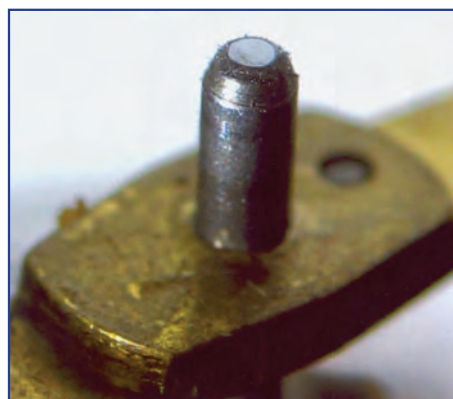
The plug diameter was determined by the taper as it was inserted in the hole, and then it was finished with the hand graver. A back taper was cut as shown in Figure 12. The fit of the plug in the hole is easy to determine but somewhat difficult to explain. A slight friction fit, a firm friction fit, a tight fit, a loose fit—which would apply in this situation? I decided to try to attain a slight-to-firm friction fit with a permanent (red) thread locker to bind the plug in place.



1. The balance wheel held in a proper size collet and running true to the lathe.



2. A closer view shows that this pivot may have been repivoted previously.



3. A view of the filed staff end.

A Correction: Please note a correction in the Challenging Situations, Part 5, Bezel-Set Jewels article by Dale LaDue, the photo captions for Figure 6 and Figure 7 are reversed on page 23 of the March, 2011 issue.

# Waterbury Desk Clock Repivoting

BY DALE LADUE, CMW21

The arbor can split upon insertion of the plug if it is too tight, or if the thread locker is placed in the hole prior to seating the plug. This situation can produce excessive pressure as the plug is driven in place. Figure 13 shows the thread locker placed on the plug. The lathe start switch was briefly turned on as the plug was inserted, which then snapped the plug from the rod. The plug was immediately gently tapped in place until completely seated in the hole (Figure 14).

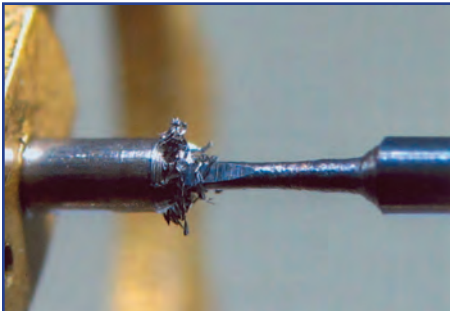
Once the plug was seated and fixed in place, an oblong graver was used to turn the cone pivot as shown in Figure 15. After the pivot was turned to the proper shape and near the correct diameter, it was ground down to fit the jewel. A ceramic slip was used in Figure 16, then a Jasper slip was used to burnish the cone (Figure 17). Finally, a polished Jasper slip was used to further burnish the pivot in Figure 18. I noticed the opposite pivot was slightly bent. The staff was reversed in the collet, and a pair of flat-nose tweezers were heated and wrapped in a section of Scotch-Brite™ abrasive pad to protect my hand (Figure 19). As I approached the pivot with the warm tweezers (Figure 20), I gently pinched on the slowly turning pivot (Figure 21). This was repeated a few times, and as luck would have it, the pivot did not break or crack.

Initially, I was not familiar with this clock. I only had the lower pivot jewel, balance and upper bridge. Considering how the hairspring would fit on the staff was perplexing. Looking at the upper pivot in the balance bridge, there was a lack of clearance between the balance rim, the stud and the regulator pins. I asked the customer if the balance was moved on the staff or if something had been altered. He said nothing had been changed, and I shipped him the three pieces.

Two weeks later I received a letter stating, "Just a quick note to let you know the pivot repair for my Waterbury clock was very good and it enabled me to bring an old clock to life. I have enclosed a picture of the balance in the clock. As you can see the hair-spring was on the opposite end of the pivot repair." Figure 22 shows the photo provided by my customer. ♦



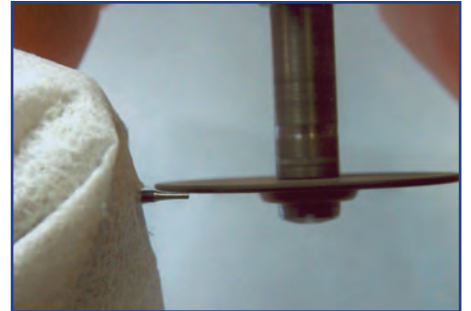
4. The perfect center.



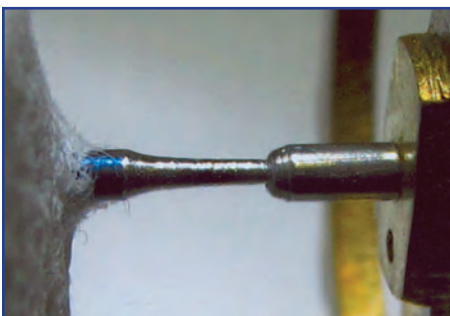
5. The other end of the drill is supported in the tailstock to aid in alignment while drilling.



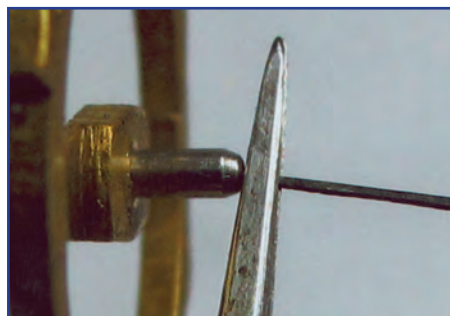
6. The finished hole.



7. The lathe is covered as the rod is ground. The disk turns in the opposite direction of the rod.



8. Testing the fit of the plug in the hole.



9. The tweezers grasped the broach.



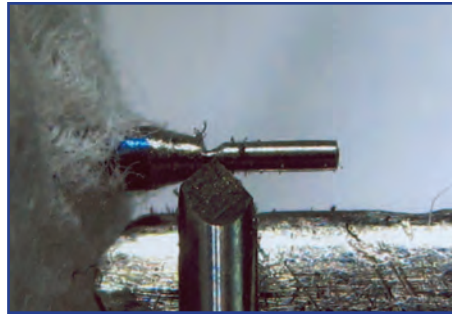
10. The depth of the hole was approximately .5 mm.

# Waterbury Desk Clock Repivoting

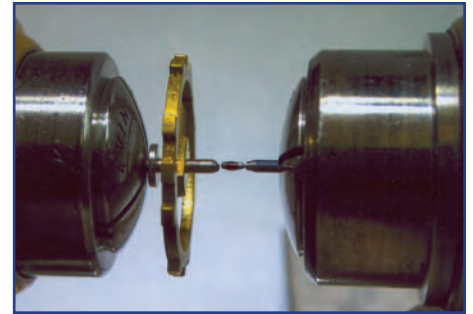
BY DALE LADUE, CMW21



11. The plug diameter was finished with a hand graver to fit the hole. The total length was also determined.



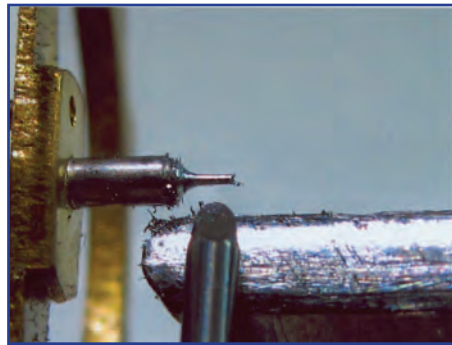
12. A back taper was cut with a sharp graver.



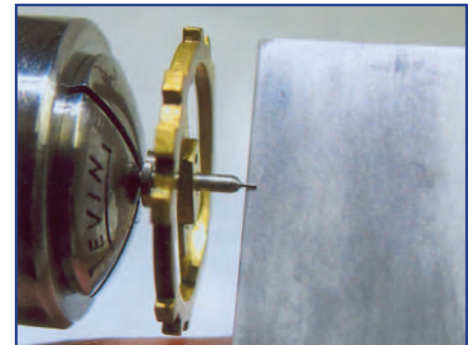
13. Red permanent thread locker was applied to the plug.



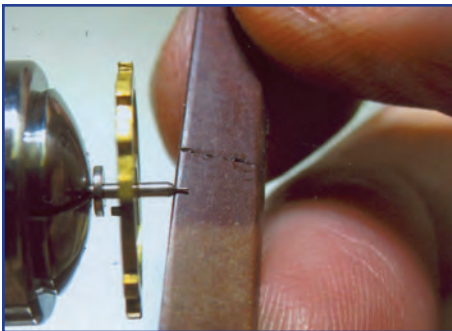
14. The plug was gently tapped fully in place.



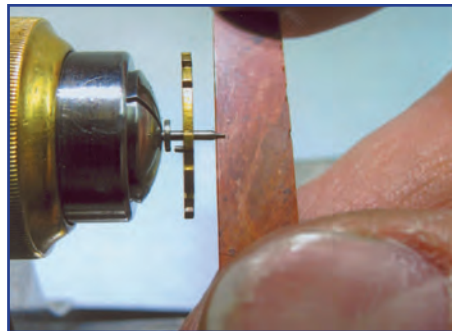
15. Radius graver forming conical pivot.



16. A ceramic slip was used to remove the graver marks.



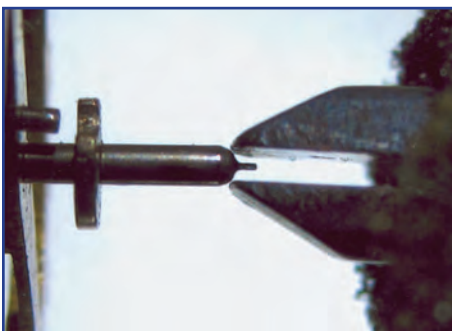
17. A round edged Jasper slip was used to burnish the pivot and cone.



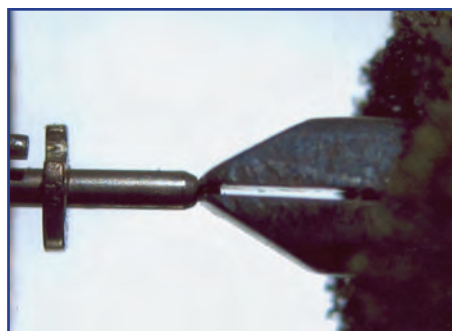
18. A polished Jasper slip was used to further burnish the pivot.



19. Heated flat nose tweezers with insulation were used to gently restore the opposite bent pivot to center.



20. Straightening pivot.



21. Use of heated tweezers.



22. Completed pivot repair.

# Organizing the Modern Clock Shop



## Featured Business: Master Clock Repair, Columbus, Ohio

Developing a modern clock repair business absolutely requires proper organization and good equipment. Michael Gainey, owner of Master Clock Repair, believes that business success not only demands good organization and the right tools, but also goes hand-in-hand with obtaining certification. “Anyone serious about watch or clock repair will benefit greatly by becoming certified,” he says. “Even when you believe you’re successful, you may wonder how your ability compares with others. Do you have gaps in the knowledge of your craft? Are you weak in a particular skill set? Can you perform better repair work?” Gainey felt he owed it to his customers—and to himself—to have these questions answered by taking the certification exam.

Additionally, certification has had a positive impact on his business. “The entire process showed me the value of the unique talents of a well-trained and certified clockmaker,” he says. Since obtaining certification, he’s felt more comfortable in charging more for his services. “Going through the certification experience gave me the rationale for charging higher prices and gave me increased confidence in my work,” he adds. “In fact, it changed my perception of what I do. The person who trained me made a very wise and practical statement when she said: *“If you do not place a value on what you do, no one else will do it for you.”*”

Certification also helps you stand out from others in the trade and enhances your value in the eyes of the customer. “I wrote about it on my website,” says Gainey. “I put it on my receipts, letterhead, business cards and in all my advertising and promotional letters.

Creating and maintaining a professional image is also a way to successfully market your business. The appearance of your shop is a reflection of the pride you take in your craft. More often than not, it is the first impression your customer gets—and you can only have one first impression. “If they see that I take great pride in the appearance of my shop, they’re

more likely to think I also take great pride and care in my work.” He conjured up a familiar image of sitting in a restaurant with a dirty dining area, thinking the kitchen is just as bad. Likewise, a sloppy and disorganized shop may lead customers to believe the work is of similarly poor quality.



### CUSTOMER ENTRANCE

- Effective product display.
- Clean and organized area.
- Serves as the intake, testing and office portions of the business.
- Certification and exam scores posted for maximum visibility.

When it comes to shop organization, Gainey believes most watch and clockmakers know the value of a neatly ordered and clean shop. Yet, some struggle with how to organize, while others simply don’t find the time to do it. Every day, new things jump to the top of your to-do list, leaving the bottom of your list unfinished. He’s been fortunate to work in, and help design, four different shops, and he’s used that experience to incorporate ideas that help. He’s also learned to discard methods that don’t work. Additionally, he also uses trips down the hardware store aisle to inspire better ways to organize.

To begin with, knowing exactly where your tools and parts are located is convenient and saves time. While sifting through a drawer, or box of unorganized parts, every one of us has experienced the frustration of lost time—and time equals money. A drawer dedicated to a specific part makes it easy to find and easy to track inventory.

Safety is another critical reason to keep your shop neat and organized. Not just for your own personal safety, but for the safety of client merchandise.

# Organizing the Modern Clock Shop

Tripping over a misplaced item in your shop could be a disaster in both cases. Gainey cites an example where just setting an item in the wrong place temporarily led to trouble. The mishap cost him \$150. He was working on a crystal regulator when he accidentally dropped a tool on top of the porcelain dial he'd set in the middle of his bench. "Now I place all dials, even paper ones, upside down and out of the way," Gainey adds. "This way, it's unlikely anything will fall on them. If it does, little or no damage occurs."

Gainey admits, "It's a chore to keep a shop tidy and well organized." He makes an attempt at the end of each day to put things back in their place and wipe down all countertops. "Doing a little every day keeps the job from becoming too intimidating," he says. He also often uses Saturdays to clean and reorganize. At least once a year, Gainey does a "spring cleaning" and implements any new organizational ideas he may have learned.

Frequently a particularly large or difficult job will cause him to "restore his shop" to keep from misplacing something. He'll make all possible counter-top space available to provide a clean and efficient work environment. "Personally, I am able to maintain my focus better when I am not surrounded by chaos," Gainey explains.

Most customers never get to see the work areas of the shop, so he posts photos on his website as a "virtual tour" for potential customers. "I believe my work and my shop are each a reflection of the other. My pride in both is the same."



## MAIN WORK SPACE

- Repair bench with view of customer lobby, office and testing area.
- Plenty of well-organized and labeled storage media.
- Long, uncluttered counter work space.
- Visibly clean environment.

The size and variety of clocks found in an average shop requires lots of counter space. Gainey also has six blue storage cabinets with small plastic drawers. It helps to see the contents through the drawers. He has grouped similar or related parts in the same cabinets. (He still has a goal to label all drawers and arrange them alphabetically.)



## ADDITIONAL WORKSPACE WITH CABINETS AND BINS TO ORGANIZE PARTS:

- Quartz movement parts including hands and mounting hardware.
- Cuckoo parts: chains, hands, cuckoo birds, etc.
- Mechanical clock hands, both modern and antique.
- Screws, nails of various sizes, bolts, nuts and washers.
- Variety of clock parts, cranks, taper pins, pulleys, ratchets, rivets and more.

His clock keys are conveniently hung on evenly-spaced nails above the cabinets and below the blue-lidded clear plastic containers for easy access. As we all know, there are many different key sizes from size 0 to 14, plus the double-ended varieties.

In this workspace, which is opposite the main work area, Gainey uses the counter to the left for two lathes and a drill press. A library card catalog is useful for storage of heavier items, like infrequently-used hand tools, cuckoo weights, cuckoo case parts, boxes of nails and screws, large clock hands, soldering supplies and buffing materials.

Under his counter top is a shelf about 12" from the floor which keeps items off the floor to avoid tripping hazards while providing extra storage space. "To organize what I store there, I use cardboard file-type boxes you get from the office supply stores," says Gainey. (If you need this type of storage remember, Office Depot offers significant discounts to AWCI members.) He uses the same type of containers in specific areas to keep a more orderly appearance. The containers are filled with various electric

# Organizing the Modern Clock Shop

hand tools like drills, jig saws and staple guns. Others are filled with cleaning rags, extra cleaning supplies, various bottles of wood stain, as well as paper dials and dial-cutting equipment.

The tri-level cleaning setup wastes no space and keeps supplies nearby. The black shelf to the right is one of two shelves he uses to store customer's clocks while they await estimates.



## CLEANING AREA

- Tri-level cleaning area efficiently utilizes shop space.
- Bottom shelf used for storage of cleaning fluids, cleaning tools and funnels.
- Middle section is home to ultrasonic cleaning machines.
- Top level serves as additional counter space.
- Shelf-lined walls keep supplies handy.

The less frequently used items are contained on the top shelf of the back wall. "On the left, you'll see I'm reusing Hermle shipping boxes," he points out. "The smaller boxes have a hinged lid convenient for storage of larger clock parts." He keeps about 30 of these boxes in a separate area of his shop which are labeled and filled with a variety of antique clock parts and movements.

The middle shelf has a box with various sizes of convex and flat glass arranged by size. Plastic bins, stacked two-high across the middle shelf, are filled with parts and supplies used frequently. Computer-printed labels identify the contents. A variety of chemicals used for case cleaning and restoration are stored on the lowest shelf and underneath are paper towels. "If you're like me, you go through a lot of rolls in the course of a month," adds Gainey.



## LATHE AREA

- Lathe with view of shelf under counter tops.
- Shelf holds shallow-drawer metal storage cabinets commonly found in military surplus stores.
- Drawers store sandpaper, adhesives, drill bits taps, dies, mainsprings and more.
- Items are grouped by type: Parts, materials and tools are all separate.



## LATHE AREA CLOSE UP

- Close-up view of the lathe area showing drawer mounted under counter top.
- Custom-cut pinewood pieces divides drawer into segments fit to sizes of smaller, frequently-used tools.

The sturdy bench frame for the workbench is constructed of 2"x 4" wood and supported by 4"x 4" legs to absorb a solid beating without shifting. It's also perfectly level for beat setting purposes. The plywood top is covered by thin particle board material Gainey believes is called white, melamine-laminated sheet board. It is easy to wipe clean and commonly found at larger hardware/building supply stores.

For his workbench, the 2'x 4' Masonite in the center serves as a main work area. Masonite is found in the

same stores—usually in 4'x 8' sheets, but also pre-cut 2'x 4' sheets. The hardness makes it a great work surface. "I have a groove cut in it as an aid when filing various clock parts," Gainey points out. "A hole can be drilled to accept the pin on the bottom block of an anniversary clock suspension assembly when fitting a new suspension spring." The Masonite requires replacement every few years due to degradation from stains, scratches, drill marks and occasional torch burns.



#### THE WORK BENCH

- Close-up view of workbench with  $\frac{3}{4}$ " rough plywood top.
- Center of bench shows 2'x 4' sheet of Masonite.
- \* Hand tools shown mounted above and left of the bench with "bench" keys.
- Custom drawer below bench top makes easy access storage for small parts and tools.

Since Gainey is left-handed, you see his tools mounted to the left along with one of each key size. You'll recognize the most commonly used tools, such as broaches, bench blocks, bushing containers and oil. Another custom-made drawer helps keep often-used small parts and tools close by. Numerous items like a torch lighter, small files, various knives and the delicate broaches are kept handy in the drawer. He fills the small plastic containers with taper pins, hand washers and nuts for various clock types, plus stores small nails, clicks, click springs and rivets.

According to Gainey, the drawer under his bench requires no special skills to make. The frame is made of  $1\frac{1}{2}$ "x  $\frac{3}{4}$ " pine boards, while the bottom is made from  $\frac{3}{16}$ " plywood. The dividers are individually-cut pine pieces, while the drawer slides are made from the same  $1\frac{1}{2}$ " x  $\frac{3}{4}$ " pine. "I used two pieces nailed together to form an 'L,' he explains. "Then I screwed the two slides to the frame work under my workbench at a distance slightly wider than the drawer. The bottom of the 'L' holds the bottom of the drawer. The drawer, front-to-back, is much longer than I actually use.

# trusted



The world's most prestigious watch technicians trust Renata Swiss quality batteries. Featuring dedicated high and low drain batteries for optimal performance. Freshness dated and absolutely perfect leakproofness.

New 0% mercury batteries, as required in several states, are now available.



Please contact us for a great deal on the world's finest batteries.



**STAR TIME**  
Supply Co., Inc.

2215 Gessner Rd. Houston, TX 77080  
[www.startimesupply.com](http://www.startimesupply.com)  
**800.927.7664**

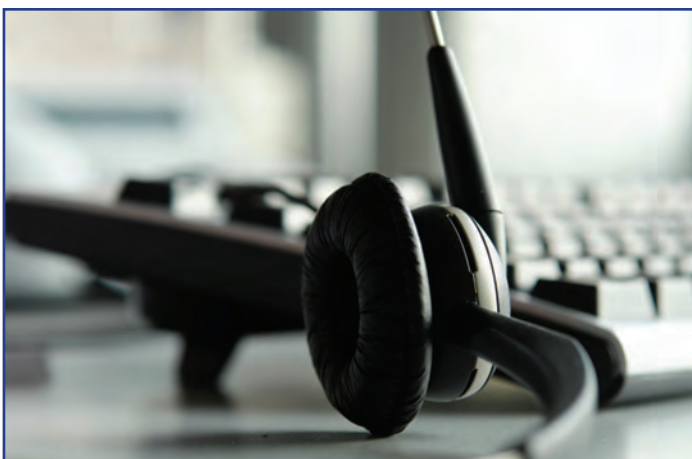
Your Authorized Full-Line Renata Distributor

# Organizing the Modern Clock Shop

The extra length keeps the drawer from tipping out of the slides when I pull it out far enough to expose all my plastic containers.”

Other surface work spaces are made from laminated kitchen counter tops available from any hardware store. They are inexpensive, make a better work surface than plywood, and are easy to clean.

For all of you who work alone, Gainey has another “tool” he says “buys me more extra time than everything else I do.” What is his miracle “tool?” It’s a cordless phone with a headset. Like many of you, he must answer every phone call to his shop which is at least 20 calls a day. Most calls take only a few minutes, but phone time adds up in a hurry. Gainey uses the smallest cordless phone available, wears it on a belt clip and carries it everywhere in the shop. Even though he’s not fond of wearing the headset, it keeps his hands free and allows him to work productively while speaking with a customer. “The amount of time I save by working while I am speaking to a customer is phenomenal.” He suggests running the headset cord under your clothing to avoid catching it on something, or to use a Bluetooth.



Another time-saving tool is, of course, the computer. Master Clock Repair has a computerized accounting system. They also use it to keep in touch with other clockmakers and on top of the latest information.

Being asked to share how he keeps a neatly organized, contemporary repair shop made Michael Gainey realize the enormous volume of parts and supplies in a typical shop. Keeping those items organized is a task he believes is vital to work efficiently. To squeeze every dollar we can out of the work day, we must make the most of every hour. A wasted min-

ute here or there quickly translates into the loss of real dollars. “Why not spend some of your free time working to organize your shop?” Gainey asks. “Then, the hours you spend earning money will, ultimately, be more profitable.” ♦

## Recommended Tools List For Clockmakers

### From the AWCI Standards & Practices Manual

1. WW style lathe and collet set, tooling (gravers) and burnishers
2. Measuring devices (with both inch and metric)—calipers are essential, micrometer is optional
3. Number drill set
4. Assorted files, buff sticks and abrasives
5. Torch/alcohol lamp with solders and fluxes
6. Jewelers saw and blades
7. Bench pin
8. Letdown keys
9. Mainspring clamps
10. Bushing system tools and bushings (KWM, American or Bergeon)
11. Cutting and smoothing broach sets and handles
12. Assorted hand tools—pliers, screwdrivers, nut drivers, hammers, etc.
13. Staking tool set or punch set and bench blocks
14. Lubricants, oils and applicators
15. Cleaning and drying system—that is safe!
16. Bench vise
17. Assorted tweezers
18. Pegwood, etc., for cleaning pivot holes, etc.
19. Safety goggles or glasses
20. Leather gloves and work protection gloves
21. Brass and steel stock
22. Loupes or optics
23. A variety of movement test stands

### Optional Tooling Recommendations

1. Drill press
2. Bench mill
3. Dental burrs or jewelers burrs
4. Mainspring winder
5. Electronic movement timer
6. Ultrasonic cleaner(s)
7. Bushing tool
8. Larger lathe (6” and up with necessary tooling)
9. Step chucks, bezel chucks and drill chucks (even for the WW lathe)

# Refinishing: Omega Constellation Bracelet

BY JORDAN FICKLIN, CW21

**R**efinishing the Omega Constellation bracelet can be a difficult task. The bracelet consists of alternating horizontal bands of brushed and polished surfaces (Figure 1). Taping off



Figure 1: Omega Constellation Bracelet.

these different sections would be a monumental task. To aid in this endeavor, Omega makes two useful masking tools, 5130039 and 5130040, with replaceable metal plates (5150039-gents and 5150040-ladies). Pictured in Figure 2 are the current gents masking tool (5130039) and a discontinued ladies



Figure 2: A gents masking tool and a discontinued ladies masking tool.

masking tool (5000042). The new metal version is a large improvement over the plastic model because the plastic model would wear out too quickly. To use the tool, you first apply the high polish to the round tubes using a cotton-buffing wheel and your

favorite buffing compounds. A mask should always be worn during any polishing operation.

Once the final polish is applied to those sections, you return with the bracelet, exposing the satin portions through the hole in the mask to a Bufflex or other similar wheel (Figure 3). I use Bufflex Wheel FB6-F. It is the fine 25 mm wide by 100 mm diameter wheel. Unfortunately, I have found that the Bufflex wheel isn't aggressive enough to remove the large scratches my customers seem to put in their watches. In order to work through the deep scratches, I have developed the following method.



Figure 3: Exposing the satin portions of the bracelet through the hole in the mask to a Bufflex wheel.

I first prepare a soft Artifex wheel to have a surface just narrower than the satin portions of the bracelet. The Artifex Wheel (SC46WP) is a soft wheel 100 mm diameter by 20 mm wide (Bergeon 6168D). They come in hard, soft and many other coarseness levels. According to the manufacturer, "The Artifex P series combines a polyurethane foam bond with a

**CLOCKS**  
m a g a z i n e

**A Beginner's Guide to Clock Repair**  
£6.99  
USD \$11.95  
£2.95

Based on our acclaimed series of articles for the horological newcomer, the **BEGINNER'S GUIDE TO CLOCK REPAIR** has now been published as a 64-page, A5, full-colour book.

In clear and simple terms, it gives the reader a comprehensive understanding of how a striking clock works and how to repair one when it stops.

A **MUST** for anyone learning to repair clocks for the first time, and a valuable addition to the library of even the veteran.

**by Ian Beilby**

**ONLY \$11.95**  
plus \$3 postage and handling.  
Purchase at our website:  
[www.clocksmagazine.com](http://www.clocksmagazine.com)

# Refinishing: Omega Constellation Bracelet

BY JORDAN FICKLIN, CW21

homogenous silicon carbide or standard aluminum oxide grain. The resulting tools are not only highly adaptable and cooler in operation, they are also extremely resistant to loading in even the most challenging conditions.”

To cut the Artifex wheel down to size, I put it on my



Figure 4: Cutting with a loose hacksaw blade to carve away excess material and leave a raised portion in the wheel.

polishing lathe spinning at a medium speed (about 1000 rpm). First, I cut with a loose hacksaw blade straight into the spinning wheel to mark the width of the wheel I want remaining (Figure 4). Next, I use the hacksaw blade to carve away the excess material, leaving a raised portion in the wheel just narrower than the width of the satin section of the links (Figure 5). The reason I make the working portion narrower than the section I want to polish is because the soft Artifex wheel will deform some when the



Figure 5: The raised portion is just narrower than the width of the satin sections of the bracelet links.

bracelet is pressed against it and will expand to polish the whole width. If you make the working surface the exact width, the wheel can expand outwards and mark the polished portions of the bracelet. Using a chisel to carve out the middle section of the wheel, you could also prepare this wheel so that it had the correct width for ladies bracelets on one side and gents watches on the other side.

With the prepared Artifex wheel, I fold over the links of the bracelet, exposing the satin portion, and introduce it to the wheel, moving it up and back evenly refinishing the surface of the link (Figure 6). I do this free hand. You do need to be careful not to let the wheel slip off to the polished portions, but it is not a difficult task. Once all of the deep scratches are removed, I use the Omega masking tool with the Bufflex wheel to finish off the links (Figure 7). ♦

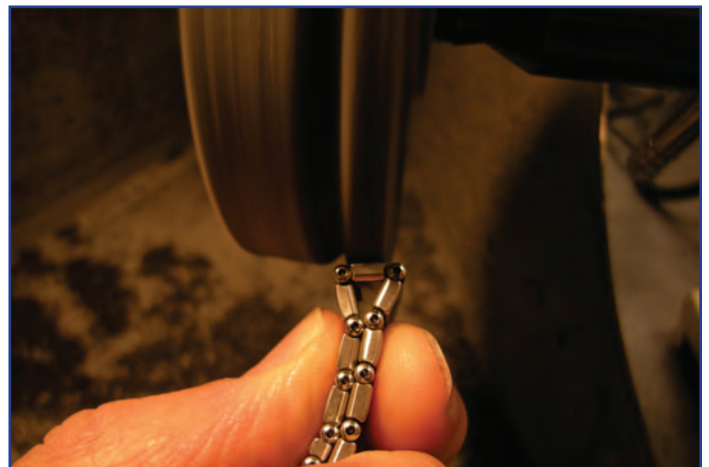


Figure 6: Refinishing the surface of the bracelet links.



Figure 7: Omega masking tool and Bufflex wheel.

## BULLETIN BOARD

Do you need a special part? Have a meeting announcement? Want to respond to a request? Send your information to the *HT* Bulletin Board.

### NEW REQUESTS:

A member is looking for parts for an Audemars Piguet Caliber K2072 (base caliber K2070 & K2071).

The member needs the following:

- Top automatic device in good condition (automatic bridge)
- Oscillating weight pinion # 1478



FOR THE *HT* BULLETIN BOARD CONTACT:  
Amy Dunn, Editor, 866-367-2924, ext. 307  
e-mail: [adunn@awci.com](mailto:adunn@awci.com)

# Standing the Test of Time

## *Energizer* Watch Batteries

 A USA CORPORATION

*Cas-Ker is your complete source for Energizer Silver Oxide & Lithium Watch Batteries.*

- Fresh supplies of all popular numbers in stock.
- Quantity pricing for both retailers and wholesalers.
- Convenient cabinet starter kits and sales aids.
- The fastest and best customer service in the business.

*Try us for your next battery order - we're just a phone call away.*



**Cas-Ker Co.**  
2550 CIVIC CENTER DR PO BOX 31167  
CINCINNATI OH 45231-0167

**CALL 1.800.487.0408**  
**FAX 1.800.487.5848**  
Shop our web site: [www.casker.com](http://www.casker.com)

# Fly Cutters

BY ROBERT D. PORTER, CMW

## HOW TO MAKE :

- A FLY CUTTER HOLDER
- A CONSTANT-PROFILE FLY CUTTER
- DEPTH-OF-CUT ATTACHMENT

First, a word of caution: Always wear safety glasses and take proper precautions when doing any type of machining or torch work. Also, use adequate ventilation.



Figure 1

Fly Cutter Holder and Constant-Profile Fly Cutter  
Figure 1 pictures an easy-to-make fly cutter holder we have used to make a 0.5 module, 96-tooth, clock gear. This holder is reversible, so we can use one form tool to form both sides of the 1/8" diameter fly cutter, thereby assuring perfect symmetry on both sides of the cutter profile.

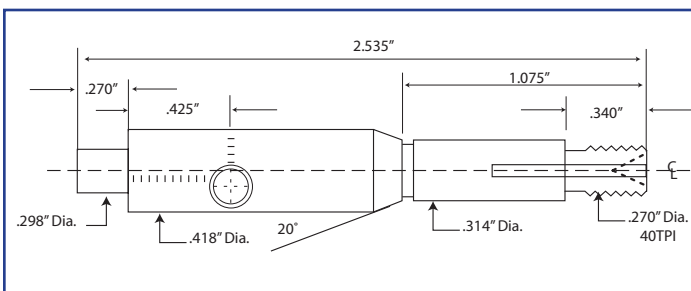


Figure 2

Figure 2 is a sketch of the holder which was made to fit an 8 mm, WW-style lathe or milling attachment. These dimensions can be changed to match your particular lathe collet. The fly cutter is held in place with two 4-40 set screws.

A note on measurements in the article: If you are more comfortable working with millimeters, multiply decimal-inch values by 25.4 to find the equivalent millimeter value. Also, millimeters divided by 25.4 equal the decimal-inch value.

Why did I choose a module of 0.5? All the gears for this clock are to be made on a small watchmaker's lathe, so a module of 0.5 (which is the pitch diameter of the wheel, 48 mm, divided by the number of teeth, 96, = 0.5) was chosen to be well within the machining capacity of the lathe and milling attachment. A main wheel of 96 teeth will drive an 8-pin lantern pinion to achieve a ratio of 12 pinion revolutions to 1 revolution of the wheel, and for a smoother gearing action. All the rest of the train and motion work gears in the clock will also use a 0.5 module with fewer teeth. The clock is designed to beat 7200 beats per hour, or 2 beats per second, with a theoretical pendulum length of 9.8". Now, back to our fly cutter holder...

The half-inch diameter, cold-rolled steel bar is being turned with a Craftsman screw cutting bench lathe, while the end is supported by a live center in the tailstock. The lathe compound has been rotated to the



Figure 3

70° setting to turn the 20° half angle in Figure 3 to achieve a 40° included angle. Figure 4 is a closer view of the compound setting.

The threaded end on the right was turned to a .270" diameter, and 40 threads per inch were then cut with a lathe tool bit ground to a 60° included angle. The thread depth is .016". Dies to cut this thread are occasionally available on an internet auction site. The live center was moved to the right and the threads checked for fit with the milling attach-

# Fly Cutters

BY ROBERT D. PORTER, CMW

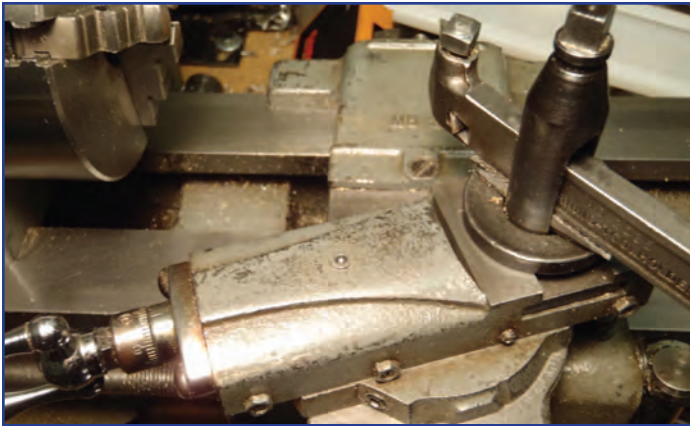


Figure 4

ment draw bar. The stock was then removed from the lathe chuck and clamped in a bench-top milling machine vise, so a 1/16" wide key slot could be cut as pictured in Figure 5. If you don't have a mill, you can file a flat across the .314" diameter to the top of the .270" thread - not as good as a slot, but it will work.

The holder was cut to the 2.535" overall length and mounted in my Levin lathe to turn the .298" diam-

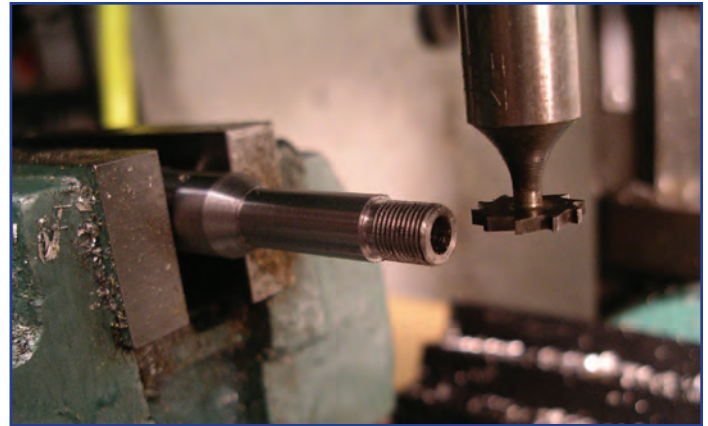


Figure 5

eter by .270" length. This end was then center drilled with a #2 (.1875") center drill to produce an accurate cone in the end of the holder. The center drill was followed up with a #42 (.0935") drill to a depth of .696". Carefully thread the hole with a 4-40 tap. An approximate 57% of thread depth will be achieved with this tap drill size.

Probably the most difficult dimension to machine ac-



LEADING SWISS PRODUCTS



## New Tech Handy II

The multifunctional, largely automated "easy to use" instrument for quick service

### Quartz Watches / Movements

- Rate measurement
- Current consumption
- Coil resistance
- Battery check

Distributed by:



CALL 1.800.487.0408  
FAX 1.800.487.5848  
Shop our web site: [www.casker.com](http://www.casker.com)



Jules Borel & Co.  
1110 Grand Boulevard  
Kansas City, MO 64106-2348

Order Desk 800-776-6862  
Order Fax 800-776-6862  
Local 816-421-6110



# Fly Cutters

BY ROBERT D. PORTER, CMW

curately is the  $\frac{3}{16}$ " (.1875") diameter hole exactly square to the axis of the holder. A close-fitting  $\frac{3}{16}$ " diameter brass bushing with a  $\frac{1}{8}$ " reamed hole through it was made to fit the  $\frac{3}{16}$ " hole in the holder. The top of the  $\frac{1}{8}$ " hole should be on the horizontal center line of the holder, as shown, to achieve symmetry on both sides of the cutter. The  $\frac{1}{8}$ " fly cutter size can be used for most watch and small clock gears.

The holder was securely clamped horizontally in a drill press vise. The vise was also clamped, so it would not move, while a sharp #2 center drill was used to carefully start the  $\frac{3}{16}$ " hole. Then, a #15 (.180") drill was used to drill through. A  $\frac{3}{16}$ " (.1875") reamer completed the hole. The holder was rotated 90°, drilled (.0935") and tapped 4-40 as shown at the .425" location.

The perpendicularity of the fly cutter hole was tested with a straight rod and dial indicator in Figure 6. The indicator must indicate exactly the same value when the holder is rotated. Use a round escapement file on the side of the  $\frac{1}{8}$ " hole closest to the lathe headstock to achieve a zero-zero condition, if needed. The set screw in the end of the holder pushes the fly cutter against the straightened side of the hole.

Figure 7 shows a  $\frac{3}{16}$ " lathe tool bit being used to set the sine bar square to the lathe spindle nose. The tool bit has been replaced with the form tool in Figure 8. Feeler gages totaling .049" are being used to set the .938° radial flank angle on the 3" sine bar. The sine of .938° is .01637, times the 3" length of the sine bar = .049".

Figures 9 and 10 show that a light reference cut has been turned on the end of the oil hardening drill rod fly cutter blank. The form tool was then advanced to the cutter profile length of .0676". The finished width of the fly cutter at the minor diameter is to be .030". Subtracting .030" from the .125" width of the fly cutter equals .095". We divide .095" by two to get .0475", which is the amount the form tool has been carefully advanced to the left in Figure 11 to cut the first side of the fly cutter.

The holder is then reversed in the lathe, and the .298" diameter end is driven with a collet, while the threaded end of the holder is supported with the lathe tailstock center. The second side of the fly cutter was then cut as pictured in Figures 12 and 13. A stiff brass brush was used to remove flash.

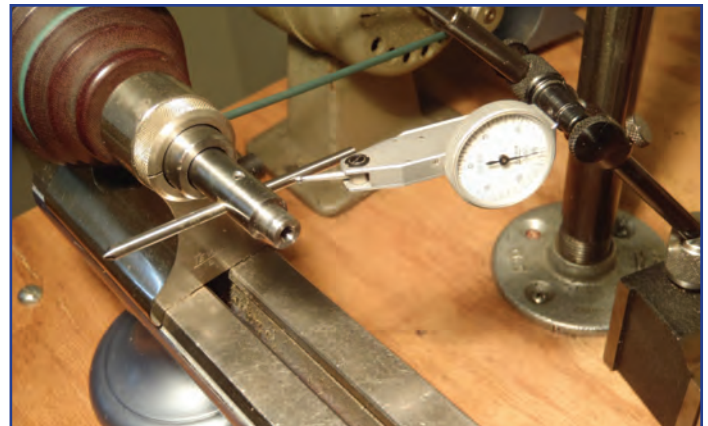


Figure 6

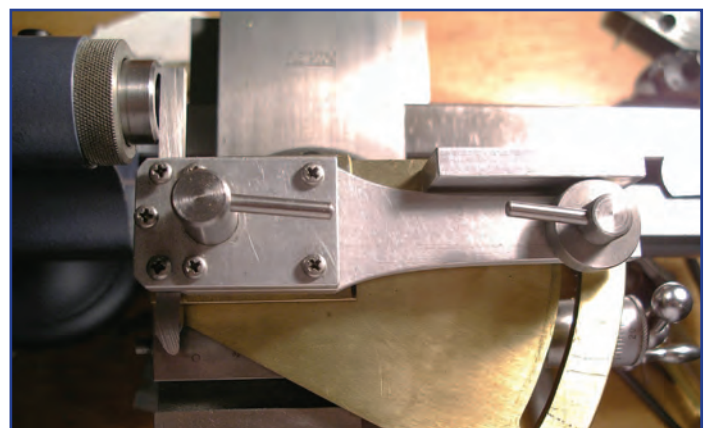


Figure 7



Figure 8

The fly cutter was removed from the holder and wrapped with steel wire, leaving about a 6" handle to hold with insulated pliers. The basket holding the cutter was heated to a carrot-orange color with a torch and held at that temperature for about 30 seconds before quickly quenching in oil to harden. A cutting edge that is radial to the center of the holder

# Fly Cutters

BY ROBERT D. PORTER, CMW

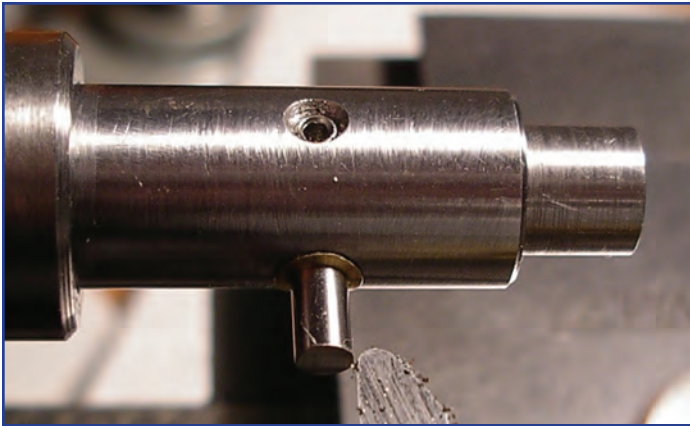


Figure 9



Figure 10

was then carefully ground on the fly cutter, as pictured in Figure 13. Notice that the fly cutter has been rotated 180° axially from the original forming position to achieve a relief behind the cutting edge.

## DEPTH-OF-CUT ATTACHMENT

We are now ready to cut the gear. But first, we will make a depth-of-cut attachment (Figure 15) for the lathe milling attachment. This makes it easier to hold the .057" cutter working depth from "touch off" of the fly cutter with the top of the gear blank.

A piece of 3/8" square key stock from a hardware store was cut to a length of 1-5/8" long. A .850" long slot was milled to a depth of about 3/16". A 1/2" diameter, by 45° dovetail cutter was then used to mill the angles on each end of the slot to match the dovetail on the lathe milling attachment. A 4-40 brass screw secures the attachment as pictured in Figure 16. Feeler gages are being used to set the .057" cutter working-depth dimension with the attachment.

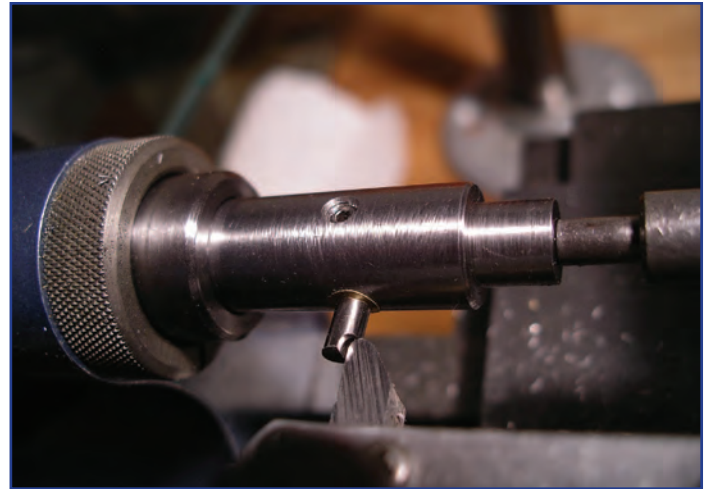


Figure 11

The gages were removed and 96 teeth are being cut in the gear blank in Figure 17. Figure 18 shows a "quickie" setup to check the action between the gear we have just made and the 8-pin center pinion it is to drive. This gear set action is very smooth. Now, I just have to find time to finish this little clock...

Articles showing you how to make a lathe attachment to grind the cutter forming tool and the sine bar attachment can be found in the April and June 1998 issues of *Horological Times*.

I encourage you to make your own watch or clock—it is a lot of fun. The AWCI library carries several books on horological gear cutting which you can borrow. ♦



Figure 12

# Fly Cutters

BY ROBERT D. PORTER, CMW



Figure 13



Figure 14

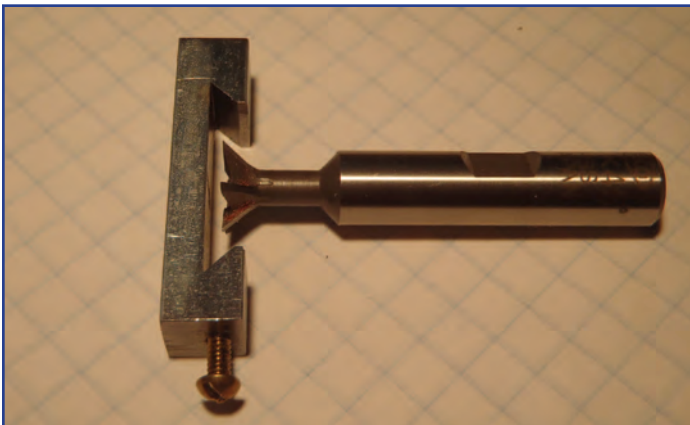


Figure 15



Figure 16

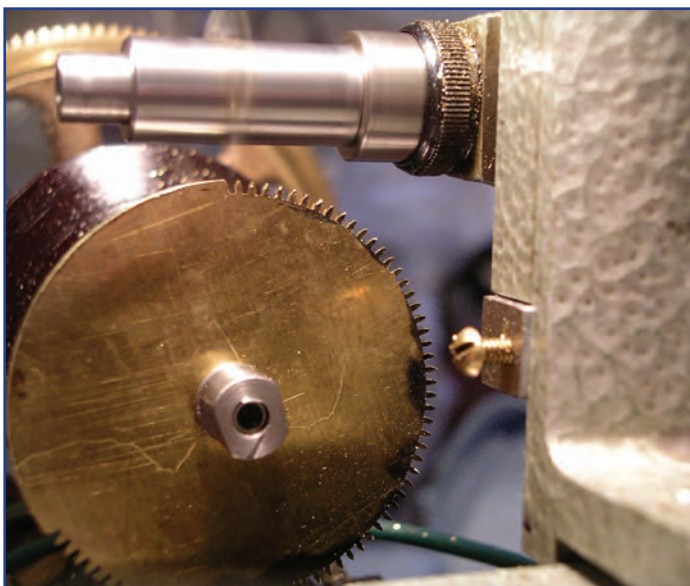


Figure 17

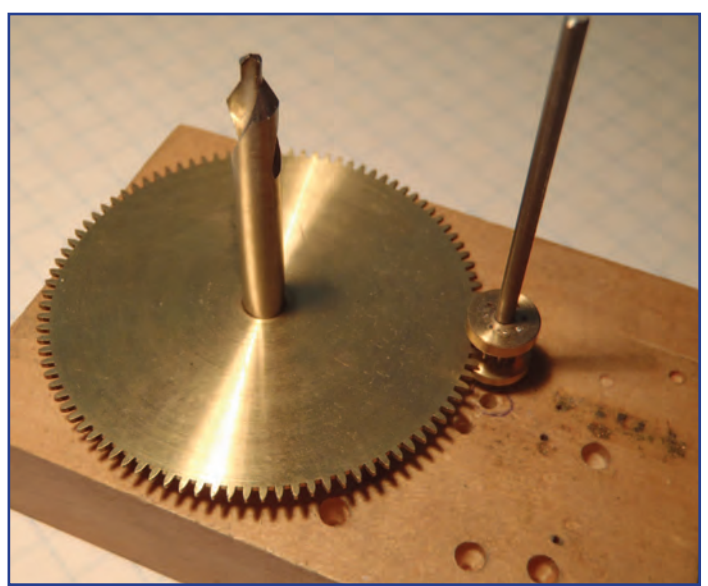


Figure 18

# Fly Cutters

BY ROBERT D. PORTER, CMW

Information needed to make the 0.5 module, 96-tooth gear, and fly cutter:

- Gear blank size = 49.67 mm (1.956")
- Pitch diameter = 48 mm (1.890")
- Minor diameter = 46.8 mm (1.843")
- Width of fly cutter at minor diameter = .765 mm (.030")
- Radial flank angle to set the form tool = .938 degrees
- Cutter profile length = 1.717 mm (.0676")
- Cutter forming tool radius = 1.22 mm (.048")
- Cutter working depth = 1.435 mm (.0565")

Sources for material, drills, taps, etc.

Always patronize your local suppliers whenever possible.

The Enco Company [www.Use-Enco.com](http://www.Use-Enco.com) 1-800-use-enco  
A source for taps, drills, etc.

On-Line Metals [www.OnlineMetals.com](http://www.OnlineMetals.com)

A good source for small quantities of brass and steel, etc.  
Most hobby shops also carry sheets of brass.

Small Parts Co. 1-800-220-4242

A source for small quantities of all kinds of stuff.

Micro Fasteners 1-800-892-6917

A good source for set screws, Allen wrenches, etc.

The author is not endorsed by, or affiliated with, any of the brand names mentioned in this article which are trademarks of their respective companies. All rights reserved.



**Is your shop a stellar example of organization and modern technology?**

Are you growing and expanding? Just contact us and we could be doing a profile on your business

while providing you with some promotional assistance for your business. If you can supply quality digital photos we will assist with content, design and artwork. You'll not only be featured in *Horological Times* for the all the industry to see, but to thank you for your assistance, we'll provide a copy of the artwork for your future promotional use in both web and print formats.

**If interested contact:**

**Amy Dunn, Editor, *Horological Times*,  
866-367-2924, Ext. 307 or e-mail:  
[adunn@awci.com](mailto:adunn@awci.com).**

**AWCI MEMBER BENEFIT**

# watch around

*a unique timepiece magazine*

**3 yrs/only \$30**  
(6 issues)

**AWCI Members Save \$10!**  
Regular Subscription Rate \$40.  
US Delivery Only.

[www.watch-around.com](http://www.watch-around.com)

pay via **PayPal**  
account: [us@watch-around.com](mailto:us@watch-around.com)  
or **send check** (payable to TWI, LLC)  
To: Jennifer Sarkissian, Watch Around TWI, LLC  
1760 2nd Ave., Ste 7C., New York, NY 10128-5355

BY DAVID CHRISTIANSON, CMW21, FAWI

## QUESTION:

On the movement it is marked Ontario Watch Co., Montreal, and, what I assume is the production no. 69178. We have never heard of this watch company and would like to know if you have any information at all on this Montreal-based watch company. Any help you can offer will be much appreciated.

Dan Hooper  
Bowmanville, ON, Canada

## ANSWER:

I cannot find any written record that the Ontario Watch Company of Montreal ever existed. But I did find a few documented expert opinions about your watch.

In the “The Answer Box” column of the December 1997 issue of the *NAWCC Bulletin* (page 711), a member inquired about a watch movement that appears to be exactly like yours. Kathleen Pritchard responded by saying that “the watch appears to be Swiss, made in the ‘English’ style. The Swiss made many movements like this, intended for the English and American markets, and also, no doubt, for the Canadian market.”

In the April 1998 issue of the *Bulletin* (page 187) two individuals responded to Mrs. Pritchard’s opinion by contending that the watch in question was an early Elgin 1st model, circa 1871. A fourth person weighed in supporting its Swiss (non-Elgin) origin. And finally, a fifth individual who is a well-known Elgin collector actually had an opportunity to examine the watch in person. He, too, concluded that the watch was of Swiss origin for a number specific reason. His detailed assessment was published in the *The Answer Box* column of the *Bulletin* in February 1999 on page 65. He concluded his report by saying: “In summary, this watch is not Elgin and not American. My guess is that it is Swiss. It is factory-made rather than hand-made. The appearance of the barrel bridge and hair-spring stud suggests that it was intended to imitate an Elgin 18-size movement. Therefore, I would classify it as a Swiss-imitation American. As frequently happens, we have answered some of our question but others remain.”

Send your Questions to *Horological Times*  
701 Enterprise Drive • Harrison, OH 45030  
magazine@awci.com • 866-367-2924 ext.307



BY DAVID CHRISTIANSON, CMW21, FAWI

## QUESTION:

Enclosed are pictures of an English watch with dial marked J.W. Benson [with additional markings on case, movement and chain]. The watch is stem wind and pin set, so the chain is not original to the watch. Any information would be appreciated.

John D. Ingram  
Oklahoma City, OK

## ANSWER:

S.S. Benson and J.W. Benson are listed between 1847 and 1855 as working at Cornhill and Ludgate Hill as watchmakers, goldsmiths and silversmiths. Later, they named their firm J.W. Benson with premises at 33 Ludgate Hill between 1855 and 1897. When the area streets were renumbered in the mid-1860s, their address changed to 58-60 Ludgate Hill. The watch factory was in the rear of the premises on Horse-shoe Court. In 1892, they built a new steam-powered workshop in nearby Belle Sauvage Yard. Their watches were well-finished and well-known and, in

1879, they obtained Royal patronage, a fact that they clearly stated on their movements after this date. They also retailed watches purchased from other manufacturers in England and Switzerland.

Pin-setting was commonly used and preferred in England and on the Continent between 1870 and 1900. With all of this information, I would date your fine English-manufactured watch around 1886.

PS: Much of this information comes from Alan Shenton's book, *Pocket Watches: 19th & 20th Century* and Max Cutmore's book, *Watches: 1850 - 1980*.



## Come to Sunny Florida for Memorial Day Class!

AWCI Presents: Precision Timing and Adjusting Course

May 27 th – 29 th 2011

Tampa, Florida

This course teaches the fundamentals of obtaining good timing results which includes: 1. How to identify errors using modern equipment, 2. Making appropriate checks as you repair the watch, 3. How to lower your "Delta" score, 4. How to dynamic poise the oscillator, 5. Correction of common hairspring errors, and 6. Adjustment of the ETACHRON system. (Also a support course for the AWCI CW21 exam.)

Course covers general repair procedures plus:

1. Proper servicing of the balance (removal and attaching)
2. Dynamic poising (the procedure explained with great detail)
3. Adjusting and truing the hairspring and balance wheel
4. Removal of the new Nivatronic collet
5. Proper adjustments of regulator pins
6. Escapement checks
7. Endshakes and adjustment
8. Using modern timers to assist in problem solving
9. Timing adjustments and analysis
10. Discussing the timing specifications for various calibers

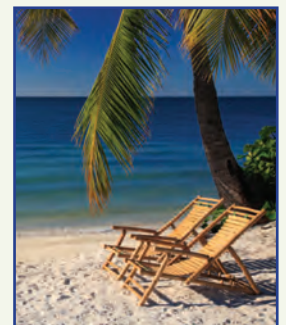
Call for the list of tools/materials needed.

Course Cost: \$495

TO REGISTER CONTACT: Matt Hritz, 941-993-0514

Taught By: Tom Schomaker, CMW21,  
AWCI Watchmaking Instructor

\*Must be an FWCA member, or join for a \$40 donation.



**Want To Reach Over 2,500 Watchmakers And Clockmakers Every Month?**

Place your advertising in *Horological Times* magazine. We're the only publication dedicated to the professional watchmaker-clockmaker industry. Plus, the *HT* has an exceptional pass-along rate and added distribution at industry trade shows. Let us show you how to reach your prospects affordably!

Contact: Amy Dunn, [adunn@awci.com](mailto:adunn@awci.com), 866-367-2924, ext. 307



**Congratulations To CW21 and CMW21 Members**

**AWCI would like to announce these members have achieved CW21 or CMW21 status:**

**CW21**

John Annibali  
Casey Clayton  
David Grochowski  
Adam Kantz

Palmyra, PA  
Shreveport, LA  
Monclova, OH  
Rancho Cucamonga, CA

Bobby McGee  
Leonid Pishnik  
Michael Scriniera  
Daniel Warner

Shreveport, LA  
Wellesley, MA  
Souderton, PA  
Norwalk, OH

**CMW21**

Jack Fulwiler  
Antonio Mastromattei  
Steven Spinner

Abilene, TX  
Revere, MA  
Chicago, IL

**Are You On Facebook?**



**CONNECT WITH AWCI ON OUR FACEBOOK PAGE**



There's no better place to find immediate information on recent events than the American Watchmakers-Clockmakers Institute Facebook page. You'll find everything from events to PowerPoint presentations to links to articles. Right now, for example, you can find the entire PowerPoint from Witschi on *Quartz Know-How for the Professional* which many people have asked to view. We'll also have ongoing updates on the upcoming convention. *Like Us* so we can continue to double our weekly visitors! It's a great way to stay updated on events in the watchmaking-clockmaking world. (Yes, we're definitely including info for our clockmaking friends, too!)



## The Swatch Group Using New Liquidmetal® Technology

The Swiss manufacturer of 19 watch brands will now employ Liquidmetal alloy technology in their manufacturing. The announcement between Liquidmetal® Technologies Inc. and The Swatch Group Ltd. will allow the Swatch Group to use the technology exclusively in their entire line of timepieces. Liquidmetal alloys have many beneficial characteristics that include resistance to corrosion, high tensile strength, a high coefficient of restitution and a longer product life. This metal is also able to be easily heat-formed in a method that is similar to thermoplastics. The company states that the alloys belonging to this class of materials with amorphous atomic structure (by contrast to the crystalline structure) are particularly well-adapted for utilization in the watch industry.

The Swatch Group Ltd. is the world's foremost manufacturer of finished watches. Its watch brands include: Breguet, Blancpain, Glashütte Original, Jaquet Droz, Léon Hatot, Omega, Tiffany & Co., Longines, Rado, Union Glashütte, Tissot, cK watch & Jewelry, Balmain, Hamilton, Certina, Mido, Swatch, Flik Flak, and Endura. The Swatch Group, headquartered in Biel/Bienne, Switzerland, has a presence in all segments of the watch market and employs some 25,000 people in 50 countries.

## New Designer Offers Ultra-Feminine Watch Line

At Baselworld last month Manufacture Rodolphe Cattin introduced a cushion-shaped Ultra-Feminine timepiece dedicated to women. This model bears the stamp of its designer, Rodolphe Cattin. Featuring a dual time-zone quartz movement, this watch is available in several versions with a 40-mm case made of polished steel or polished 18-carat pink gold.

In harmony with the design, the crown has an alligator-skin strap with a folding clasp in the place of horns. This model is an ode to femininity with its shapely lines, unique curves and perfect ergonomics. New designer, Rodolphe Cattin, incorporates both mother-of-pearl and diamonds in this example of fine watchmaking.



## Technical Discussion & Parts Forum



The American Watchmakers-Clockmakers Institute *Technical Discussion & Parts Forum* is available online at [www.awci.com](http://www.awci.com). Just click on *Technical Discussion and Parts Forum* in the blue box. Guests are free to browse our topics and posts but only validated AWCI members will be able to actively post messages and communicate with one another via private messaging. The purpose of this forum is to aid our members in finding watch parts, clock parts, and tools, and to enable members to discuss technical issues. This forum is not open to generic advertising posts; therefore, web addresses and e-mail addresses should not be included in public messages.

## classified advertising regulations & rates

Ads are payable in advance \$1.00 per word, \$1.10 per word in bold type. Classified display ads are \$45.00 per column inch, 2 1/4" wide. Classified ads are not commissionable or discountable. Payment can be made by check, VISA, MasterCard, Discover, Diner's or American Express. The publisher may, at the publisher's sole discretion and for any reason and without notice, decline to publish or republish any ad, in which case any fees submitted or paid for such ads shall be returned or rebated to the advertiser. The publisher reserves the right to edit all copy. Price lists of services will not be accepted. Confidential ads are \$15.00 additional for postage and handling. The first of the month is issue date. Copy must be received 30 days in advance (November issue closes for copy on October 1st).

**Horological Times:** 701 Enterprise Drive Harrison, OH 45030

Toll Free 866-367-2924, ext. 307 Phone (513) 367-9800

Fax (513) 367-1414 E-mail: [adunn@awci.com](mailto:adunn@awci.com) [www.awci.com](http://www.awci.com)

## for sale

### PARTS - CIRCUITS - MOVEMENTS

Including but not limited to calibers 201.001, 210.001, 950.001, 959.001. We also have parts for ETA, ESA, AS, FEF, FHF, UNITAS, FELSA and other calibers.

[bhswatch@gmail.com](mailto:bhswatch@gmail.com) (208) 676-8430

### Clockmaking & Modelmaking Books, Videos & DVDs

by W. R. Smith, 8049 Camberley Drive, Powell, TN 37849.

Phone 865-947-9671; [www.wrsmithclocks.com](http://www.wrsmithclocks.com)

### HAMILTON ORIGINAL MILITARY MATERIAL

Supplying original factory material for the Hamilton Model 21 Chronometer, Model 22 Deck Watch & Military 16 Size Watch Models 23, 3992B, 4992B and 2974B As well as much material for the 950B & 992B Railroad Watches.

LARRY CRUTSINGER

P.O. Box 8514 Norfolk, VA 23503

757-650-9470 E-mail: [detent21@aol.com](mailto:detent21@aol.com)

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

### STUCK FOR A MOVEMENT

Or a watch part? Call Don Kroker's Watch Movements, 559-229-8423 or write: 4325 No. 5th St., Fresno, CA 93726.

## Order On Line 24/7



We stock thousands of products for repairing and manufacturing clocks. We inventory many products not available elsewhere. Most orders are shipped within 24 hours. We ship worldwide daily!

## Timesavers

Box 12700 • Scottsdale, AZ 85267 • USA

Phone: 480-483-3711 • Fax: 480-483-6116

[info@timesavers.com](mailto:info@timesavers.com) • [www.timesavers.com](http://www.timesavers.com)

Our 180 page illustrated catalog #36 is free online or only \$4 for a printed copy mailed in the USA.

**Our new 2010-2011 Catalog of Parts and Repair Supplies is now available... Free with any order!**

**or call/write for your copy today... \$5.00 postpaid**

- Watch Repair Tools & Supplies
- Clock Repair Tools & Supplies... for American and European clocks
- Horological Repair/Reference Books

**Browse through our inventory and order on-line 24-hours a day! [www.merritts.com](http://www.merritts.com)**

**Merritt's Clock & Watch Repair Supply**

1860 Weaverturn Rd, Douglassville, PA 19518

610-689-9541 FAX: 610-689-0567

### Dashto Inc

Established in 1974

Tom Mister  
Virginia Beach, Va

Huge and ever-changing selection. Used and new horological items. Sold by internet only

Check out our site:

[www.dashto.com](http://www.dashto.com) or [www.dashto.org](http://www.dashto.org)

TOOLS/EQUIPMENT/MATERIAL ASSTS/PARTS  
POCKET/WRISTWATCHES/WATCH MOVEMENTS  
WATCH CASES & DIALS/WATCH BRACELETS/BUCKLES & MUCH MORE

**WE BUY AND TRADE ALSO: [Dashto@cox.net](mailto:Dashto@cox.net)**

### The Original Troop-Balas Labs

Silcon-7® Sealant \$6.60, One-Dip Solution® \$6.60

Crystal-Kleer® Rouge \$7.25, KT-22 Microlubricant® \$3.90

[www.troop-balas.com](http://www.troop-balas.com)

800-423-3294

### PARSA - Mainsprings & Crystals

MAINSPRINGS: Pocket watch Elgin 817(16S)-\$8, To fit: RLX 2130/2135-\$5, ETA 2892/A2-\$4, Crystal to fit RLX 135-\$4.

Specializing in mainsprings/crystals to fit RLX. Also supply watch movements, batteries, etc. Parsa Co, Inc. 1-866-

655-3155, [watchsupply@hotmail.com](mailto:watchsupply@hotmail.com)

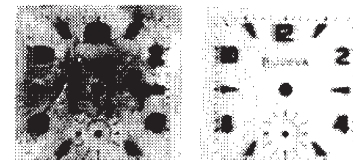
### ESTABLISHED AZ CLOCK SHOP FOR SALE

Complete turn-key operation—great reputation—large inventory, all tools, parts, contact list, everything! Only clock repair shop within 100+ miles. Establ1974; 8 years in same location. Sweet deal on property rental. In beautiful high-desert northwest AZ, historic downtown, 1-block off famous route 66. Want to retire—will train right person. Call for particulars: 928-715-6581 Check my website: [www.theclockman-az.com](http://www.theclockman-az.com) Willis L. Lynes.

## tradesmen

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

## DIAL REFINISHING



BEFORE AFTER

Quartz Conversions  
Diamond Dial Conversions  
Emblem & Name Personalization

Write for Brochures

**INTERNATIONAL DIAL CO., INC.**

58 W. SUGARTREE

P.O. BOX 970

WILMINGTON, OH 45177

(937) 382-4535

### MORGAN PIVOT POLISHER

POLISH PIVOTS IN AS LITTLE AS 5-7 SEC.

FITS SHERLINE, MOST WATCHMAKERS & ENGINE LATHES.

**MORGAN CLOCK CO.**

800-805-2220 9-5 CST

[MORGANPIVOTPOLISHER.COM](http://MORGANPIVOTPOLISHER.COM)



### DENNIS KAYE

108 Corgy Drive • Cary, NC 27513

888-363-9510 • 540-SERVICE

Porcelain Dial Restoration  
Watch • Pocket Watch • Clock

Platform Escapement Repair

Atmos Parts & Service

400-Day Clock Repair

Kundo Coil/Electric Clock Service

Prompt Reliable Service . . . Guaranteed™

Large Supply of Watch Movements & Parts for LeCoultre, Wittnauer & Longines

Call Us or Visit [dialrepair.com](http://dialrepair.com)

**CHELSEA CLOCK**  
Repair | Restoration



All Brands · Warranted Work · Free Estimates  
Mention Code HT2011 and Enjoy 15% Off  
chelseaclock.com | 800 284 1778

**ATMOS Service/Repair**  
Warranty 2 Years Parts & Labor  
**877-437-1774/314-968-1010**  
**Clockmaster, Inc. – Robert Good**  
2537 So. Brentwood Blvd. St. Louis, Missouri 63144

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

**Larry Blanchard, CMW21**  
**At Palmer's Jewelry**  
101 East Sycamore St., Kokomo, IN 46901  
Phone (800) 207-1251  
Fax (765) 457-8517  
E-mail: service@palmersjewelry.com  
Continuing with service of tuning fork Accutron, vintage American and fine Swiss watches.

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

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

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

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

**ELECTRONIC INSTRUMENT SERVICE**  
We are Factory Authorized Service for:  
• **VIBROGRAF & PORTESCAP**  
• **TICK-O-PRINT & L&R**  
We service all makes of ultrasonics, all makes of watch rate recorders, and related equipment. 25 years experience.

190 Deepstone Drive San Rafael, CA 94903  
**Used Equipment Bought & Sold**

**For Information**  
**(415) 479-8960**




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

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

**WILL INSTALL BUTTERBEARINGS**  
We will install our patent pending ButterBearings™ in your chain wound movement. These bearings reduce friction by over 90% and come with a lifetime warranty.  
For details contact: Butterworth Clocks, Inc.  
5300 59th Ave. W., Muscatine IA 52761 tel 563.263.6759  
fax 563.263.0428 email butterworth@machlink.com

## business opportunity

**WATCH BATTERY EXPRESS LLC.**  
**FRANCHISES AVAILABLE**  
JOIN A FAMILY OF SKILLED  
WATCH & JEWELRY REPAIR TECHNICIANS.  
**CLEVELAND & PITTSBURGH**  
MARKETS ARE FILLED WITH OPPORTUNITY.  
**1-800-929-0808**  
FOR MORE INFORMATION  
**www.watchbatteryexpressllc.com**

## situations wanted

**WATCHMAKER**  
CMW21/MBHI  
30 years experience  
yourtimedoc@gmail.com

**WATCHMAKER/TECHNICIAN**  
30 years experience  
Horology School Graduate  
Please contact John  
jburger25@yahoo.com

## clock classes

**Clock Repair, Making & Designing**  
by **Laurie Penman**

Laurie Penman's Correspondence Course has run since 1990. One-to-one tuition, 24/7 distance instruction and help by Internet and Skype.

No time limit on individual courses. £550.

**Classes in the gorgeous English countryside.**

One student £800, Two £450 ea. Three £330 ea.

Mid-day meal included.

Details: laurie\_penman@hotmail.com

## help wanted

**Live & Work in Sunny Florida**

Old established Jewelry store in St. Petersburg, FL seeks exp. Watchmaker with CW21 certification. Good work ethic mandatory. Sense of Humor a Plus!

Benefits available after 90 days.

Drug free work place. F/T, P/T or Seasonal  
Jeffreyphess@aol.com (727) 896-0622

**Expert Watchmaker Wanted**

A legendary watch repair business located in the heart of New York City is seeking an expert watchmaker to work on all major brands. Must be proficient in all phases of vintage mechanical and chronograph movements. Experience with Eta mechanical and chronograph movements a must. Great opportunity to join a long established, fast-growing business. Grand Central Station location, state-of-the-art equipment, very competitive compensation.

Please contact Steve Kivel at  
stevekivel@yahoo.com or 646-789-2900.

**Central NJ Shop Seeks Experienced Watchmaker**

Family owned and operated estate jewelry store-- Central Jersey's largest estate jewelry retailer. Looking for an experienced watchmaker to help build retail repair department. Qualified candidates will have at least 5-10 years experience, the ability to communicate face-to-face or over the phone with retail customers, be a team player and a self starter able to work without direct supervision. You will have a private office with all necessary equipment provided. Salary includes a base + percentage of all completed repairs. Benefits include paid time off, health insurance, and simple IRA. Please email resume & at least 2 references to: NJRetail71@gmail.com

**Expert Watchmaker Needed**

Must be able to handle repairing and replacing watch components as needed Must be familiar with equipment required for evaluating water resistance and movement performance For immediate and confidential consideration, forward your resume (complete with salary requirements) to: Fax: 954-927-0834 or e-mail: morningstars.jewelers@gmail.com

## help wanted

### EXPERIENCED WATCHMAKER

Immediate opening, full or part time, for an experienced Watchmaker in a busy Rhode Island Service Center. Must be proficient in all phases of Quartz, Mechanical, Chronographs. Please call or email your resume to Fred at (401) 946-5158, Delmanwatch@aol.com

### WATCHMAKER FOR CARTIER PRODUCTS

Cartier, a Richemont brand, is one of the leading names in the world of jewelry and luxury watch-making. We are seeking a Watchmaker who will be responsible for Quality repair of Cartier watches and other Cartier products as needed.

**Responsibilities:** Maintain quality workflow while meeting productivity standards.

**Qualifications:** WOSTEP or equivalent training or, previous watch-making experience of at least 2 years is required.

We offer competitive compensation and benefits.

For consideration, please submit resume with salary history via email to [employment.na@richemont.com](mailto:employment.na@richemont.com).

EOE M/F/D/V

### WATCHMAKER WANTED!

#### OPPORTUNITY AWAITS AT EXPANDING BOSTON FIRM!

We service everything from Bulova to Patek, specializing in restoration of Repeaters, Chronographs, Moonphases, and High-End Timepieces. Work on variety of exciting pieces, not just plain old cleanings! This is a job for the watchmaker who wants variety, a challenge, and to expand his/her knowledge!

Call 978.494.3368 to inquire.

Competitive pay, immediate employment. Work From Home opportunity available too. Must be US based.

## CHELSEA CLOCK

Since 1897

### Lead Clock Repair Technician Immediate Opening

Chelsea Clock, one of America's oldest and most revered names in luxury timepieces, seeks an experienced lead clock technician to join its team of expert clockmakers. Headquartered in Chelsea, Mass., we are the country's largest branded repair and restoration facility servicing all brands of mechanical clocks. **Qualifications:** Candidates must have demonstrated experience with mechanical clock or advanced watch repair; 5 - 10 years experience preferred. Escapement experience a plus. We offer competitive compensation and benefits. For consideration, please submit resume with salary history to: [Restoration@chelseaclock.com](mailto:Restoration@chelseaclock.com) EOE M/F/D/V



### WATCHMAKERS

Breitling USA Inc. is seeking Experienced Watchmakers for its state-of-the-art Service Facility located in Wilton, CT. Experienced candidates must have knowledge of mechanical and/or quartz watches. Breitling offers a competitive salary and full benefits.

Please send your resume to:  
Human Resources Manager  
Breitling USA Inc., Hangar 7,  
206 Danbury Rd., Wilton, CT 06897  
Fax: (203) 762-1178  
Email: [careers@breitlingusa.com](mailto:careers@breitlingusa.com)

INSTRUMENTS FOR PROFESSIONALS™

## wanted to buy

### \$\$WANTED ANYTHING\$\$

Rolex - Cartier - Patek - Breitling

Panerai - Le Coultre

Vacheron - AP - Etc.

Watches, Boxes, Dials, Links, Parts, Bands, Movements, Crystals, Bezels, Crowns, Clocks, Signs, Posters, Catalogs, Instruction Books, Polish Cloths, Wallets, Hats, Shirts, Promo Items, ANYTHING! **Doug Giard, 586-774-3684**

### Top prices paid

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

### WE BUY WATCHES

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

### WANTED WATCH BOXES

Buy - Sell - Trade

We want most major brands. Also buying high-end jewelry brand boxes. **Doug Giard, 586-774-3684**

### WANTED: USED SILVER OXIDE BATTERIES

Payout: \$60/lb. and up for used silver oxide batteries. Free secured shipping & pickup. Payment issued immediately. You can DONATE all or portion of EARNINGS TO AWCI'S ELM TRUST as tax write off. For details contact: [info@watchbatterybuyers.com](mailto:info@watchbatterybuyers.com) 877-670-7799. [www.WatchBatteryBuyers.com](http://www.WatchBatteryBuyers.com)

## WANTED!

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

Call Toll Free 1-800-208-2608

Visit our website for more information  
[www.specialtymetalsrefiners.com](http://www.specialtymetalsrefiners.com)

## Specialty Metals

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

## ROLEX PARTS WANTED

Buying Rolex crowns, crystals and material, new stock only. Also buying Rolex watches, bracelets and movements any age.

Call Paul at 978-256-5966

or e-mail [Paul@pduggan.com](mailto:Paul@pduggan.com)



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

## G F Specialties

1-800-351-6926

P.O. Box 170216

Milwaukee, WI 53217

## ATTENTION RETIRED WATCHMAKERS

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

## BOARD OF DIRECTORS

### Officers

Mark Butterworth: President  
mbutterworth@awci.com

Manuel Yazijian, CMW21:  
Vice President  
myazijian@awci.com

Douglas Thompson, CW21:  
Secretary  
dthompson@awci.com

Henry Kessler: Treasurer  
hkessler@awci.com

### Immediate Past President

Joseph Juaire, CW21  
jjuaire@awci.com

### Directors

Gene Bertram, CC  
gbertram@awci.com

David Douglas, CW21  
ddouglas@awci.com

Roland (Ron) Iverson, CMC  
riverson@awci.com

Joseph Juaire, CW21  
jjuaire@awci.com

Ron Landberg, CW21  
rlandberg@awci.com

Joseph Schrader, CMW21  
jschrader@awci.com

Glenn Gardner, CMW:  
Affiliate Chapter Director  
ggardner@awci.com

Jason Ziegenbein, CW21:  
REC Director  
jziegenbein@awci.com

Henry Kessler: IAB Director  
hkessler@awci.com

### Fellow

#### American Watchmakers-Clockmakers Institute

\*Robert F. Bishop  
\*James H. Broughton  
Fred S. Burckhardt  
Alice B. Carpenter  
David A. Christianson  
George Daniels  
Wes Door  
\*Henry B. Fried  
\*Josephine F. Hagans  
\*Orville R. Hagans  
Ewell D. Hartman  
\*Harold J. Herman  
J.M. Huckabee  
Gerald G. Jaeger  
\*Benjamin Matz  
Robert A. Nelson  
\*Hamilton E. Pease

Archie B. Perkins  
Antoine Simonin  
William O. Smith, Jr.  
Milton C. Stevens  
\*Marvin E. Whitney  
\*Deceased

## STAFF DIRECTORY

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

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

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

**Amy Dunn**  
Managing Editor/Advertising  
Manager  
1-866-367-2924 ext. 307  
adunn@awci.com

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

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

**Sienna Condy**  
Publishing & Marketing Coordinator  
1-866-367-2924 ext. 302  
scondy@awci.com

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

#### American Watchmakers-Clockmakers Institute

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

## ADVERTISER'S INDEX

|                                   |            |
|-----------------------------------|------------|
| Bergeon                           |            |
| +41 32 933 60 46 .....            | 2          |
| Borel & Co., Jules                |            |
| (816) 421-6110 inside front cover |            |
| Butterworth Clocks, Inc.          |            |
| (563) 263-6759 .....              | 13         |
| Cas-Ker Co.                       |            |
| (513) 674-7700 .....              | 51         |
| Chronos/WJR                       |            |
| (303) 296-1600 .....              | 14         |
| Clocks                            |            |
| 011 44 131 331 3200 .....         | 49         |
| Clock Class                       |            |
| www.clockclass.com .....          | 26         |
| Cousins Global                    |            |
| +44(0) 1708 757800 .....          | 35         |
| Eckcells                          |            |
| (800) 514-1270 .....              | 35         |
| Jones-Horan Auctions              |            |
| (800) 622-8120 .....              | 37         |
| Livesay's, Inc.                   |            |
| (813) 229-2715 .....              | 39         |
| Maxell Corp                       |            |
| (201) 794-5900 .....              | back cover |
| Renata                            |            |
| (800) 527-0719 .....              | 47         |
| Watch Around                      |            |
| (724) 989-5191 .....              | 57         |
| Watch Battery Buyers              |            |
| (877) 670-7799 .....              | 35         |
| Witschi Electronic Ltd.           |            |
| 011 32 352 05 00 .....            | 53         |

### Horological Times Advertising Policy

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

# Maxell Guarantees Authenticity.

## The Proof is in the Package.

Maintains Maxell's Unique Color Coding System

Individual UPCs on Back of Package

Easy-to-Open Pill Package (vs. Blister)

One-of-a-Kind Authentication Hologram

Clear, Bold Model #'s

30% Lighter than Previous Packaging

Smaller Card Size Fits Popular Watch Battery Storage Systems

Batteries that are counterfeit or otherwise not factory authorized for distribution have become an epidemic. Their performance does not meet exacting factory standards. They lack reliability. And they ruin the trust between buyers and sellers. That's why Maxell has developed holographic battery packaging that guarantees authenticity. Extremely difficult to copy, this packaging ensures peak performance and reliability you can expect from genuine, factory-authorized Maxell batteries. Accept no substitute.

CONTACT CATHY RUFFIN AT [CRUFFIN@MAXELL.COM](mailto:CRUFFIN@MAXELL.COM) FOR MORE INFORMATION.