HOROLOGICAL TIMES™

August 2017

SETTING SERVICE STANDARDS AND EDUCATING THE HOROLOGICAL COMMUNITY

AMERICAN WATCHMAKERS-CLOCKMAKERS INSTITUTE

Guilloché

Shipping Credit up to $100 on Watch Cleaning Equipment!

8/1—9/30/17

Call for prices and more information

VIB-ACS900U Ultrasonic Automatic Watch Cleaning Machine

- Place watch parts in the appropriate-sized basket, start the Greiner Vibrograf, and walk away
- Automatic cleaning machine uses baskets in multiple jars and utilizes back and forth rotation plus ultrasonics to clean watch parts
- The first jar cleans ultrasonically, the other three jars rotate back and forth at variable speeds: one for cleaning and three for rinsing, then the final step of drying

ELMASOLVEX VA Single-Chamber Ultrasonic Vacuum Technology for more efficient cleaning

- Multi-frequency ultrasound is adjustable for delicate parts
- Place parts basket in the chamber: automatic pumping of solutions, ultrasonic cleaning, draining, drying; all under vacuum
- Vacuum technology removes gas bubbles during ultrasound, allowing cleaning and rinsing to reach all surfaces
- Includes the filtration system which captures solvent vapors for units that can't be exhausted outside

ELMASOLVEX SE Manual 4-Jar Cleaning Technology

- Four cleaning chambers and one drying chamber
- With 64mm stainless steel baskets

ELMASOLVEX RM Automatic Vibrasonic 4-Jar Cleaning Technology

- One cleaning, three rinsing and one drying chamber
- With 64mm stainless steel baskets

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

EXECUTIVE & EDITORIAL 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
www.facebook.com/MyAWCI

Jordan P. Ficklin, CW21
Executive Director
Ext. 310 jordan@awci.com

Donna Hardy
Managing Editor
Ext. 305 donna@awci.com

Kathy Ortt
Editor
kortt@awci.com

Janette Torres-Gomez
Graphic Designer &
Assistant Technical Support
Ext. 302 jgomez@awci.com

Tom Schomaker, CMW21
Watchmaking Instructor
Ext. 309 tschomaker@awci.com

Rob McLeod
Education & Certification Coordinator
Ext. 303 rob@awci.com

Maureen Seals
Membership Coordinator &
Technical Support
Ext. 301 mseals@awci.com

Horological Times (ISSN0 145-9546) is published monthly and copyrighted by the American Watchmakers-Clockmakers Institute, 701 Enterprise Drive, Harrison, OH 45030-1696. Subscription price for the public is $175.00 per year ($15.00 per copy). Members subscription is $99.00 which is included with annual dues of $175.00. 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 41, NUMBER 8, August 2017

Features

AWCI News

Technical Discussions

Shop Tip

Industry News

Education & Certification

Columns

Cover Image:

Andy Fallat, a student in Brittany Cox's intermediate engine-turning class at Memoria Technica, is making a guilloché disc on the rose engine. See page 35 for the second part of our article series about guilloché in conservation.

Photo courtesy of Brittany Cox

Classifieds

OUR VISION:

AWCI's vision is to have an educated and passionate horological community practicing the highest standards and with the resources to provide quality goods and services.

OUR MISSION:

Setting service standards and educating the horological community.

Like us on Facebook!
www.facebook.com/HorologicalTimes

Follow us on Twitter!
www.twitter.com/AWCInstitute

Follow us on Instagram!
www.instagram.com/americanwatchmakers

Like us on Facebook!
www.facebook.com/MyAWCI

Check out our educational videos!
www.youtube.com/awci/videos

a message from the president

FRED T. WHITE, CMW21

Fred T. White
fwhite@awci.com

That big, silver bird set down in Austin, Texas, at 4:05 p.m. on June 28, and Shirley and I were met by Dennis Warner. After an hour's drive, we were at his home, where his wife, Ruth, had dinner waiting. After dinner, Dennis and I set off on a three-hour drive to Arlington, Texas, for the NAWCC Convention. The next morning, we registered and got our AWCI display set up. Dennis brought a TV from home, and Jordan had provided us with a thumb drive with the many things that have gone on in our organization. I brought my computer with a large screen and played an endless loop of a watch that I had repaired. We had a good spread of HTs and other literature promoting AWCI. We talked with many people who were interested in what we, as an organization, are doing. Some people were members of both AWCI and NAWCC, and some were just NAWCC members.

Within the craft competition, some beautiful timepieces were on display, along with some novelty items using watch and clock parts. Pat Holloway exhibited some very interesting Christmas ornaments made with watch cases and watch parts. There were clocks and watches produced by some of the finest horologists; their skills are impeccable. Some very beautiful work was on display. One clock that caught my attention was made by John Thomsen. It was patterned after a tower clock, but stood only about five feet tall. It is the only clock I have ever seen with universal joints. The main drive for the hands came off at an angle from the dial, so the use of universals was necessary to drive the hands. The craft and design made this an absolutely gorgeous piece. Oh, by the way, it kept time to within approximately three minutes a month, which, to me, is pretty doggone good.

> "It is not how many facts you know; what's most important is how you put them together."

One of the most enjoyable parts of being there was the opportunity to visit with people who share my interest in repairing timepieces. One of many we met was a retired doctor, Leonard Steiner, who told us a story about a friend from medical school who had a photographic memory; he could remember everything in the books but was not a good doctor. Dr. Steiner made a statement that really rang true for me. "It is not how many facts you know; what's most important is how you put them together." If that is true in the medical profession, it certainly is true in our profession. You can read the books and study how a watch or clock works, but until you take a job in your hands and get the feel of it, you will never become a craftsperson. It is like riding a bicycle for the first time—it probably didn't go so well. As time goes by, though, you master it, and so it is with what we do. I will never forget how intimidating it was to work on my first chronograph. Keep trying—one day you will master it.

a message from the executive director

JORDAN P. FICKLIN, CW21

I want to thank all of you who took the time to research the candidates for the Board of Directors and cast your vote in our recent election. Despite decreases in membership, there were more ballots cast this year than in the past several years. The full election results are on page 6. I want to congratulate Aaron Recksiek and Justin Harrell in receiving the most votes. The membership has elected you, and now they trust you to carry out the mission you established in your messages to them. Serving on the board is hard work. It requires attending evening meetings, but more important is the time you must put in between meetings to help realize the vision created by the board for this organization and for our industry as a whole.

Aaron is already serving on the board and will now serve for three more years. Justin will join our board at the annual meeting in Tampa this fall. You should have received an invitation to our convention in the mail. Tampa is going to be lovely in October, and we have a great set of classes. The convention is a great way to earn some CEUs or just to come out and enjoy the company of fellow horologists. Our keynote speaker, John Reardon, will address the myriad of exciting opportunities within the horological industries, many of which you may never have thought about. We have planned a special tour of the Hadley-Roma watch-strap factory, where you can see how they are making watch straps right here in the United States. We are signing up our vendors, and it is shaping up to be a fantastic vendor fair this year. We have an excellent hotel rate this year of just $139/night, which includes free parking, Internet, breakfast, and a hotel shuttle. However, the rates go up on August 10, so be sure to register *now*. If you want to make a vacation out of it, come a little early. There are lots of fun things to do in and around the Tampa Bay Area. Bring your spouse and/or your kids. We have activities planned for them as well, or they can venture out on their own and see the sights. Tampa is an easy city to navigate.

Our keynote speaker will address the myriad of exciting opportunities within the horological industries.

Your voice was heard in our election. Now come out and get involved at our convention. It will be the best thing you have done for your business this year!

And for some of the most exciting news to come out of AWCI in quite some time, we want to announce the hiring of our new Clock Director. We are pleased to have Mike Carpenter, CC, on board to direct our 21st Century Certified Clockmaker Exam and to help us implement more clockmaking classes. Clockmakers, please tell your fellow horologists about this exciting news and help us welcome Mr. Carpenter. You can reach Mr. Carpenter at clocks@awci.com or by sending mail to Clock Director c/o AWCI, 701 Enterprise Dr., Harrison, OH 45030. Please let him know if you are interested in becoming certified or if you are willing to help teach classes. If you want to take classes, you could provide suggestions and make requests. Your ideas are critical to the success of the clock program at AWCI!

2017 Election Results

BOARD OF DIRECTORS

Board of Directors — Vote for TWO (2) — Ballots Cast: 462

***	**Aaron Recksiek**	**209**	**45.24%**
***	**Justin Harrell**	**207**	**44.80%**
	Joshua Kroman	185	40.04%
	Christopher Wiles	166	35.93%
	Nicholas Butt	125	27.06%

ELECTION STATISTICS

	Ballots Returned	Eligible Members	Percent Returned
ALL eligible voters	**462**	**1,413**	**32.70%**

Valid Ballots - Online	177	38.31%
Valid Ballots - Paper	285	61.69%
Total Ballots Received	462	100.00%

"This was my second course at AWCI, and I was impressed with the great sense of progression that we experienced while reviewing most aspects of watchmaking at a deeper level. I think it's very beneficial that, even though the courses have a particular focus—such as automatic system, balance and timing, servicing the escapement system—there's always an overview of all aspects, each time at a deeper level. I had to take vacation time off work to be there and it was well worth it!"

~Julian Guitron

TIME IS MONEY

Increase the quality and quantity of your work and become more profitable with classes from the American Watchmakers-Clockmakers Institute. We offer refresher and advanced courses designed to help you sharpen your skill set and stay current with the latest service techniques.

ARE YOU CERTIFIED?

Invest in yourself by taking your skills to the next level, and becoming a Certified Watchmaker of the 21st Century (CW21). Becoming certified demonstrates your high level of expertise to your customers, elevates your store above the competition, and enhances the brands you carry. Start the process today by registering for our 21st Century Standards Course.

Not sure which course to sign up for? Log onto our website and fill out our experience questionnaire or contact us so we can help you find the best course suited to your skill level, expertise, and interests.

Call or email our Education & Certification Coordinator today for more information at education@awci.com or call 1-866-367-2924, ext 303

educational calendar

Prices reflect member's discount! Contact us so we can help you find the best course suited to your skill level, expertise, and interests.

Class Schedule for 2017

Reserve your spot today. Contact Rob McLeod at 866-FOR-AWCI (367-2924), ext. 303.

August 14-18

WATCH 210: **$1,095**

Quartz & Quartz Chronograph Service Procedures & Diagnostics

Instructor: Tom Schomaker, CMW21
AWCI Headquarters, Harrison, Ohio

Expand what you know to increase your profit! Quartz watches can be one of the most profitable sectors of your business. This course reviews quartz watch repair and quartz chronographs, including the various important electronic tests, giving you the skills you need to be faster and more consistent at servicing quartz watches.

September 11-15

WATCH 230: **$1,095**

Balance Staffing & Timing

Instructor: Tom Schomaker, CMW21
AWCI Headquarters, Harrison, Ohio

Build on what you know in this course by investigating the verification and analysis of the escapement function, poising (static and dynamic), truing, and timing adjustment in a mechanical watch, cutting out a balance staff on a lathe, adjusting the balance staff, and removing the balance staff from Glucydur balances with the Horia tool.

September 18-22

WATCH 220: **$1,095**

Modern Mechanical Chronograph—ETA 7750

Instructor: Tom Schomaker, CMW21
AWCI Headquarters, Harrison, Ohio

Brush up on your chronograph skills before taking the CW21 Exam with this class on the modern mechanical chronograph. It focuses on the service and adjustment of modern mechanical chronographs, such as the ETA 7750.

September 23-24

$1,500

Modular CW21 Exam "Chronograph & Theory Components"

AWCI Headquarters, Harrison, Ohio

The Modular CW21 is an opportunity to start the process of taking the CW21 Exam by first taking the Chronograph course listed above, and then taking the corresponding Chronograph and Theory Components of the exam.

October 2-4

$350

Atmos Clock Repair Workshop

Instructor: Jeff Hamilton, CMW21
To register, contact Abby Krouse at **education@nawcc.org**.

For advanced students wanting to learn to repair the Atmos clock. Hands-on practice in component definition, part handling, disassembly, cleaning, assembly, troubleshooting, and testing.
For more information visit: **www.nawcc.org/atmos**

October 4-8

AWCI Annual Convention & Educational Symposium

Tampa, Florida

Registration available at
www.awci.com/symposium.

Be energized by your colleagues and inspired by the education!

- Learn new methods and techniques
- See the latest tools and technology
- Meet industry leaders
- Create relationships that will last a lifetime

The schedule for 2017 includes classes on American Style Time & Strike Movemment, Servicing the Accutron, Appraising for Clockmakers and Watchmakers, Selecting & Maintaining a Lathe, and much more!

Follow us on Social Media...

October 9-13

WATCH 175: **5 CEUs** **$1,350**

Case & Bracelet Refinishing

(includes polishing kit)

Instructor: Tom Schomaker, CMW21
AWCI Headquarters, Harrison, Ohio

Today's luxury watch consumer demands perfection. This course is perfect for the watchmaker or dedicated refinisher. It will help you achieve the different finishes on modern watch cases. Also covered is disassembly and assembly of common watch cases.

Plan Ahead! 2018 Classes Now Available!

February 5-9	**21st Century Watchmaking Standards** Instructor: Tom Schomaker, CMW21 AWCI Headquarters, Harrison, Ohio	**$1,095**	Understanding the fundamental expectations of manufacturers, consumers, and industry in modern watch repair. Evaluate your skillset in this course by exploring the fundamentals of modern mechanical watch repair including cleanliness, lubrication, endshake adjustment, and may include the verification and analysis of escapement function.
February 19-23	**Quartz & Quartz Chronograph Service Procedures & Diagnostics** Instructor: Tom Schomaker, CMW21 AWCI Headquarters, Harrison, Ohio	**$1,095**	Expand what you know to increase your profit! Quartz watches can be one of the most profitable sectors of your business. This course reviews quartz watch repair and quartz chronographs, including the various important electronic tests, giving you the skills you need to be faster and more consistent at servicing quartz watches.
March 5-9	**Modern Mechanical Chronograph-ETA 7750** Instructor: Tom Schomaker, CMW21 AWCI Headquarters, Harrison, Ohio	**$1,095**	Brush up on your chronograph skills before taking the CW21 Exam with this class on the modern mechanical chronograph. It focuses on the service and adjustment of modern mechanical chronographs, such as the ETA 7750.
March 19-23	**Balance Staffing & Timing** Instructor: Tom Schomaker, CMW21 AWCI Headquarters, Harrison, Ohio	**$1,095**	Build on what you know in this course by investigating the verification and analysis of the escapement function, poising (static and dynamic), truing, and timing adjustment in a mechanical watch, cutting out a balance staff on a lathe, adjusting the balance staff, and removing the balance staff from Glucydur balances with the Horia tool.
April 2-6	**Servicing the Lever Escapement** Instructor: Tom Schomaker, CMW21 AWCI Headquarters, Harrison, Ohio	**$1,095**	This intense 5-day course will help you refine your escapement adjusting skills. The course covers all of the adjustments for the Swiss lever escapement, hairspring, and balance. Also covered is the ETAchron system.
April 23-25	**CW21 Exam** AWCI Headquarters, Harrison, Ohio	**$2,495**	Get certified today, the CW21 Exam is a 3-day examination covering topics in the AWCI Standards & Practices. If you are interested in becoming a Certified Watchmaker for the 21st Century please contact Rob McLeod, AWCI's Education Coordinator for possible availability 866-367-2924, ext. 303. An exam application, and a notarized affidavit is required at time of registration.
April 26-27	**CW21 Retakes** AWCI Headquarters, Harrison, Ohio	**Prices Varies**	Only available to past examinees needing to retake just a portion of the CW21 Exam. For additional information, contact Rob McLeod, AWCI's Education Coordinator, 866-367-2924, ext. 303.

For additional details about specific courses in comprehensive syllabi form, including complete tool lists, visit: **http://www.awci.com/classes** or contact **Rob McLeod**, Education & Certification Coordinator, at 866-FOR-AWCI (367-2924), x303. For additional calendar events visit: **http://www.awci.com/calendar**.

Now Is the Time to Get Certified!

Register today for AWCI's first **Modular CW21 Exam**, and take the Chronograph component of the exam on **September 23-24**. You can even prepare for the exam by taking the Modern Mechanical Chronograph Course, September 18-22. Don't miss your opportunity to take the first step in becoming certified.

The new modular format offers you the ability to:

- Get certified at your own pace
- Complete components of the exam on the weekend, avoiding time away from work
- Take classes to sharpen your skills prior to taking components of the exam

To register, contact Education Coordinator, Rob McLeod, at certification@awci.com or 866-367-2924, ext. 303.

2017 Annual CONVENTION

Register now!
www.awci.com/symposium

The Treasures of AWCI Await You at

Tampa Bay

October 4-7

Tampa, Florida

"I strongly recommend you head to this year's national convention in Florida—you never know who you might meet."
~Oliver Broos Revitt

Follow us on Social Media.

There's Plenty to Do in Warm and Sunny Tampa!

By Terry Kurdzionak

I used to hear people say that as you get older, time seems to go by faster. Well, now I seem to be living the experience because it seems to me that many of us were together just a few months ago at the 2016 convention in Illinois. Now it is August of 2017 and we will be in Tampa in early October for our next convention!

If you truly want to make it more than a convention, why not come earlier in the week or stay later when the convention is over? If you rent a car, you can park it for no additional charge at the hotel, and then head to any of the beautiful Gulf beaches. Not a beach goer? Well, there are plenty of museums to suit each one's fancy—if you fancy being in a museum in the "Sunshine State." While we are in Tampa, there will be a Victorian dining display at the famous Henry B. Plant Museum on the University of Tampa campus, right downtown. Adult admission is only seven dollars. If you take a look at their website, www.plantmuseum.com, I am sure you will be enticed to visit.

Another thing you may want to do is take the Pirate Water Taxi, which takes you all over downtown and is an all-day hop on/hop off boat ride throughout the city of Tampa. Their website is www.piratewatertaxi.com.

If you are a land lover and not a water lover, you may want to try riding a Segway on a tour of the city. You get your own Segway and have a guided tour along the Riverwalk. They are safe, and you can practice riding one prior to the tour. Check out the details at their website, www.magiccarpetglide.com.

The Chronometer Club members will have their own class and meeting on Wednesday, October 3, prior to the official opening of the convention. Thursday morning, we will have the keynote address by John Reardon of Christie's to get us started. There will be two meetings after the keynote, one for the Affiliate Chapters and the other for the Industry Advisory Board. That afternoon, there will be two separate tours of Hadley-Roma, the watch-strap manufacturer in Largo, Florida, a short ride from our hotel. To learn more about Hadley-Roma before you visit, go to www.hadleyroma.com. The tour is part of your convention registration, if you choose to go. The Board of Directors will hold their annual meeting on Thursday evening to allow for their members to also join the tour to Hadley-Roma in the afternoon.

The Vendor Fair this year will be held on Friday afternoon and Saturday morning, which gives everyone the opportunity to see the vendors. Each vendor will also have the opportunity to spend time in a classroom-type environment to demonstrate a piece of equipment or talk about a product in a more personal setting.

Finally, next month's article will be the last one prior to the convention. It will include any final information you need. Please check out the registration information in *Horological Times* or in the mailer you receive. If you have any questions for me, do not hesitate to email me at terrykurdz@gmail.com. In the meantime, don't forget to pack the sunscreen!

Terry Kurdzionak is a graduate of Northeastern University College of Nursing. She has been involved in the family watch/clock/material business for 28 years and has served as an officer and board member of AWCI as well as the membership and convention committees.

Looking at Options: Business and Workshop Practices Survey

What Are You Working On?

By Hannah Mancill

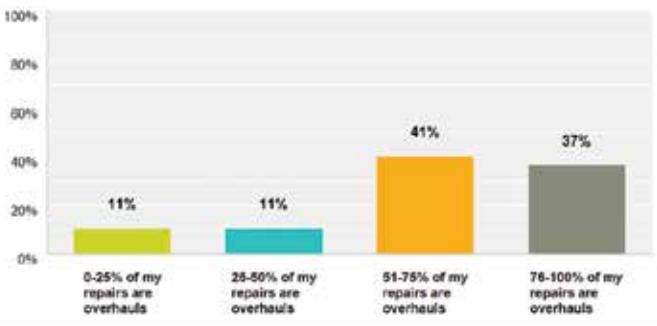
In the June issue of *Horological Times*, the topic for the survey was, "What Are You Working On?" I want to thank the 27 independent watchmakers and clockmakers who participated. Here are the results of that last survey.

Most of the work taken in by survey participants is mechanical:

- 81% of respondents indicated the majority of repairs that come across their benches are mechanical.
- 19% answered the majority of their repairs are quartz.

Overhauls/COAs (clean, oil, adjust)/full services make up the lion's share of survey takers' repairs:

- 37% of respondents indicated 76-100% of repairs were overhauls.
- 41% of respondents indicated 51-75% of repairs were overhauls.
- 11% of respondents indicated 26-50% of repairs were overhauls.
- 11% of respondents indicated 0-25% of repairs were overhauls.



93% of participants accept work from the public.

In his book All in Good Time, George Daniels describes a trade watch repairer as one who "attends to watches for shopkeepers, who then add their margin before charging their customers for the repair." A bit more than half of respondents accept trade work:

- 59% accept trade work.
- 41% do not accept trade work.

89% of those surveyed describe themselves as having an influence on the type of work their shop takes in.

70% of respondents perform restoration work on vintage pieces.

Twenty-four of those surveyed supplied a favorite brand to work on; however, some participants wrote in more than one brand for a total of thirty-one responses.

- 13 preferred working on Rolex.
- 3 answered Jaeger-LeCoultre.
- 2 wrote in Omega.
- 2 responded "English tall case clocks."
- 2 replied Hamilton.
- There were several other brands mentioned, each by only one survey taker. These brands are as follows: French, variety, wall clocks, ETA, Waltham, Elgin, Chelsea, Gruen, Seth Thomas.

Nineteen participants entered a favorite caliber to service; however, a few participants recorded more than one caliber for a total of twenty-one responses.

- 10 survey takers favor Rolex 3135. Given that this question was fill-in-the-blank and not multiple

choice, the number of respondents who provided this same answer is truly astonishing.

- 2 answered Valjoux 72.
- There were several other calibers mentioned, each by only one survey. These calibers are as follows: French, Rolex 3035, ETA 7750, ETA 955, 2800s (I assumed ETA 2892 and 2824), Rolex 9001, Rolex 1500 family, Omega 560, Rolex 3155, Hamilton 992.

The survey asked participants if they were working on anything interesting. Below are some of the responses received:

- Street clock overhaul.
- Corum Admirals Cup with DD module (DD is assumed to be the Dubois-Depraz chronograph module).
- Tower clocks.
- My own watch brand.
- Vintage Longines 19a with an interesting winding system.
- New horological curriculum.
- Tall case clock by John Sleightholme, Heaford.
- A badly damaged Omega 3313-C with a co-axial escapement.

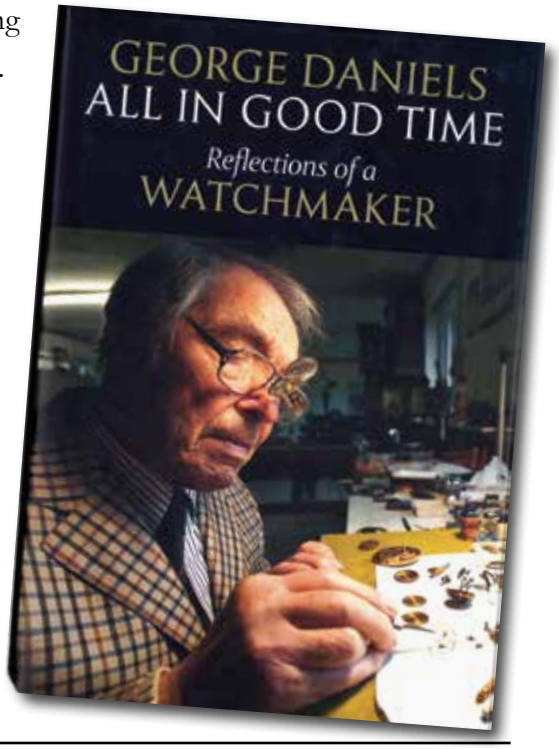
I encourage these watchmakers and clockmakers to contribute articles to the *Horological Times* describing the interesting features of these projects as well as what he or she learned through the repair process and/or troubleshooting or repair tips.

Catch George Daniels's Enthusiasm

In the ideal workshop, watchmakers and clockmakers would be 100% enthusiastic about their work 100% of the time; however, reality is not so rosy. The level of contentment a repairperson feels about his or her work, known as job satisfaction, can ebb and flow annually, weekly, or even hourly. Increased feelings of dissatisfaction over any length of time can turn once-stimulating repairs into "just work"—unexciting and basically a means to an end (financial gain). Below are recommendations to re-energize the watchmakers and clockmakers who find themselves in this kind of slump.

I recently read George Daniels's book *All in Good Time: Reflections of a Watchmaker* (reviewed by Daniel Benson in the January 2017 edition of the *Horological Times*). Many are likely familiar with Daniels's contributions to horology as inventor of the co-axial escapement, catalyst for the renaissance of artist-craftsman fabrication of complete watches from movement to case, as well as contributor to the body of knowledge on the works of Abraham-Louis Breguet. With his lengthy resume of accomplishments, George Daniels is certainly worthy of respect and emulation.

Most who have heard his name would agree Daniels was marked by hard work and drive. He worked long hours and had very high standards. Producing watches into his 80s (with no plans to stop there), he is a prime example of a satisfied, fervently motivated horologist. Literally taking a page from his book, let's look at possible options for re-engaging with horology.



(Note: all of the quotes on pages 14 and 15 are from George Daniels's book *All in Good Time*.)

1. Remember what initially excited you.

Daniels describes his first encounter with a watch: "The fascination of the movement was the orderliness of its function. No luck or judgment was needed, as with most other things in life. Every component had a function which it passed on to each succeeding component in a train of actions. It was preordained, certain and precise. It started with the mainspring and terminated at the balance wheel, oscillating in gently ticking majesty as the hairspring dilated and contracted in tranquil harmony. Part of its fascination for me was its complete independence from outside assistance. It needed no batteries or plugging in, it was self-contained and made no demands. I couldn't have expressed it at the time but it exactly echoed my own philosophy and made a great impression on me." (p. 13)

Think back to your first weeks as a watchmaker or clockmaker. Remind yourself why you chose this profession. Consider the ground covered between then and now, and let your accomplishments and successes motivate you.

2. Set goals and actively try to reach them.

Assess your goals for each repair and consider how to surpass your own standards. Objectives focus attention on certain aspects of your work, giving you something to strive toward. Achieving goals can boost confidence and propel you into the next repair.

As a new watchmaker, my goal is to increase speed. I try to perform each service just a little quicker than the previous one. Other goals might include striving for better customer service, consistency, or quality.

Early in his career, Daniels concentrated on "better-quality work." (p. 55) When he switched to predominantly manufacturing watches, he set goals for improving the functionality of his watches. "I was concerned to make further improvements to the mechanical watch, if only because it was my belief that every professional should endeavor to make a progressive contribution to his art." (p. 96)

3. Learn something new.

Learning something new will break up the routine in addition to augmenting professional growth.

Consider working on an unfamiliar brand or manufacturing a part outside of your expertise. Endeavor to fabricate a movement or case. Study restoration.

When introduced to antique watches, Daniels describes opening and examining the watches "with enthusiasm and some excitement, for [he] was now looking at the wonderful inventions that [he] had read about…." Later in the book, he explains that his "interest in antique watches became a passion, and [he] sought every opportunity to increase [his] experience." (pp. 61, 66)

4. Read a book or write.

This method works for the same reason as method 3. A book can teach you new techniques or offer a fresh perspective on what you already know. Authors may provoke thought which can generate interest in topics related to the book's content.

"My thirst for horological knowledge became an obsession. I purchased every available book and studied every word in my mind's eye in order to follow the processes described." (p. 47)

If you're looking for a suggestion, the "Sit on Your Hands" column in the March 2017 issue of Horological Times, reveals the horological "must reads" of some of your fellow horologists.

Writing can also inspire as it gives you a project to focus your energy. Especially if writing about processes from your past, putting pen to paper could remind you of a time when you were more excited about your work.

In addition to *All in Good Time*, Daniels has authored several books, including *Watchmaking, The Art of Breguet*, and *The Practical Watch Escapement*.

5. Get certified.

Preparing for a certification is a great way to improve skills and push limits. As an added benefit, holding a certification can foster confidence in your work.

Daniels writes "I was proud of my new certificate" (in reference to graduating from Northampton Polytechnic), "but the real benefit was the confidence I got from knowing that I had been examined on every known aspect of the science of watches. I had no doubt about my ability to master the subject." (p. 51)

Information about AWCI's certifications may be found at: www.awci.com/education-certification/certification/

6. Remember, even the "greats" feel uninspired sometimes.

Daniels remarks, "I was 30 years old and somewhat bored with watch-repairing." (962) In regard to trade repairs, he writes "the work is uninspiring and certainly not creative…" and "was made more difficult because I had become fascinated by the mechanics of my Bentley, and was finding it more interesting to repair than watches." (p. 56)

Despite these feelings, Daniels ultimately found his work "worthwhile" and resolved to "continue for as long as [he was] physically able to do so" After all, having a few bad days is common and doesn't make you ill-fit for this profession.

7. Befriend the motivated and encouraging.

Passion is contagious. Daniels describes many of his "stimulating" horological acquaintances. Of Andrew Fell and Sam Clutton, he writes "such men were among the outstanding individuals of horology, men with whom one could discuss ideas and projects in a constructive way." (p. 108)

8. Do something you love outside of work.

Man is not machine. Rest is required to maintain energy. Spend time doing what you love to positively affect your attitude at work. Daniels documented his love for restoring cars, which filled much of his time outside of watchmaking. He was also active in car clubs and participated in competitive speed events.

Unfortunately, there isn't really a one-size-fits-all approach to restoring lost excitement. Even so, I hope George Daniels's example inspires a change in your outlook.

Sources

Daniels, George. *All in Good Time: Reflections of a Watchmaker*. London: Philip Wilson Publishers, 2013.

www.danielslondon.com/media/books/

www.boundless.com/management/textbooks/boundless-management-textbook/organizational-behavior-5/drivers-of-behavior-44/defining-job-satisfaction-231-7247/

www.google.com/amp/s/www.forbes.com/sites/kevinharrington/2014/01/08/7-ways-to-reignite-your-passion-for-success/amp/

http://m.huffpost.com/us/entry/2936551

www.inc.com/mandy-gilbert/youre-going-to-lose-passion-for-your-job-heres-how-to-get-it-back.html/

www.personalexcellence.co/blog/why-set-goals/

Hannah Mancill is a graduate of the North American Institute of Swiss Watchmaking and a watchmaker at a service center in Texas.

Survey on next page...

To take the next survey, "Customer Service Survey" go to:
https://www.surveymonkey.com/r/3XHHHGB

Customer Service Survey

If you don't want to take the survey online, answer the questions below and email to watchclockstory@awci.com or mail to Editor/AWCI/701 Enterprise Dr./Harrison, OH 45030.

1. Do you provide comments or written summaries of repairs to customers?
- A. Yes
- B. No

2. Why or Why Not?
(open ended)

3. Do you include timing analyses or pressure test printouts (if you're a watchmaker) in paperwork delivered to customers?
- A. Yes
- B. No

4. If a customer brings in a repair for which you don't have spare parts, how do you proceed?
- A. Offer to send the repair to the brand's service center on the customer's behalf
- B. Suggest the customer send the repair to the brand's service center
- C. Turn the customer away without advice
- D. Recommend the name of another repairperson
- E. Accept the repair and attempt to resource brand-specific or generic parts or make the parts in-house

5. Though customer satisfaction requires a balance of all the factors listed below, which factor do you feel contributes most to customer satisfaction?
- A. Speed (High turnaround time for repair)
- B. Quality (High quality of repair/how long the repair lasts before needing another service)
- C. Cost (Low cost of repair)
- D. Customer-Staff Interaction (how friendly or knowledgeable the customer believes you or your staff are)

6. Do you charge for an estimate?
- A. Yes
- B. No
- C. Sometimes

7. If you charge for an estimate, do you take this cost off of the repair cost if the customer decides to go through with the repair?
- A. Yes
- B. No
- C. I don't charge for an estimate.

8. How do you ensure your customers have a great repair experience?
(open ended)

DISASSEMBLY AND REASSEMBLY OF THE A200 MOVEMENT

By Paul Corn

Clockmakers have complained about reassembling Seth Thomas A200 mechanical movements after completing repairs, Figure 1. This article serves as a technical guide for using the necessary tools to repair this movement.

This article is more about the disassembly and reassembly of the A200 movement than about the actual repair itself; though repair techniques are included for overhauling this movement. When reassembling the A200 movement, the mainsprings are on one side of the plate and the gears are on the other side. This is what makes it hard to reassemble. In Steven Conover's Clockmakers Newsletter Workshop Series, covering Seth Thomas clocks, the movement was assembled by placing the gears in the front plate and the mainsprings in the black plate, leaving out the second wheels during partial assembly, then placing the second wheels and finishing the final assembly.[1] However, there is an easier and faster way to do the assembly.

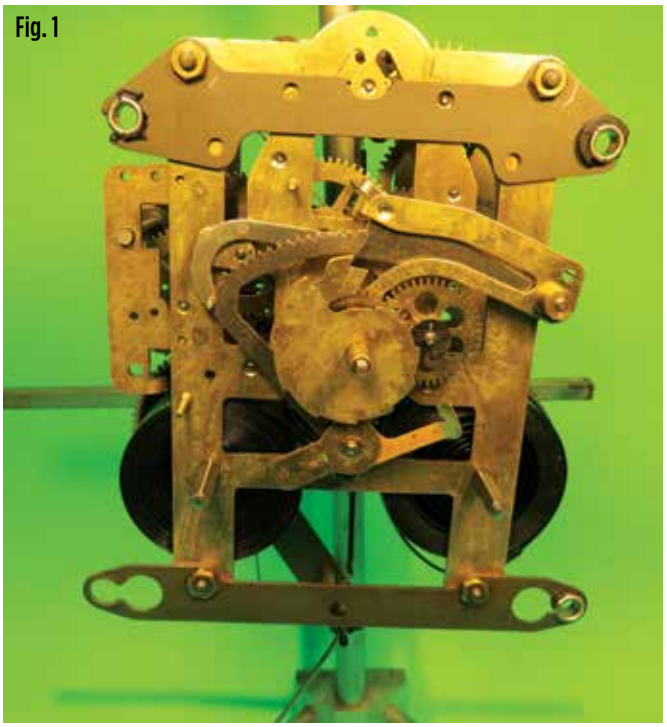


Fig. 1

Most repairers don't remove the center shaft cam when doing repairs on this movement, which is why the movement is so difficult to assemble after repairs. When an A200 movement comes in for repair, the center shaft lifter cam and the center shaft are removed to polish the center shaft pivot, or bush the center shaft pivot hole if needed.

After the repairs are done, the mainsprings, center shaft, and all the gears are placed in the back plate. Then the front plate is set over the center shaft and down on all the gear pivots to complete the assembly. To accomplish this task, I made some tools.

Disassembling the Movement

The mainsprings are open but compact. There doesn't seem to be enough room to use the clamps that are typically used when clamping open mainsprings. Therefore, the mainsprings are wound up and retained by using simple wire clamps. The wire clamps were made specifically for the A200 movement from spring steel .040" (1.03mm) thick and 6.750" (170mm) long with a short hook on each end. One hook is horizontal, and the other hook is vertical. After the clamps are made, they must be formed in a circle to match the mainsprings. The wire clamps may look weak, but they are made of spring steel wire, Figure 2.

1. Conover, Steven G. *Seth Thomas, Book 6*, p. 98, Clockmaker Newsletter Workshop Series.


Fig. 2

Before the movement is disassembled you want to note the relation of the minute hand and the cam on the center shaft. The lifter cam is two sided—high side for the hour strike and low side for the half-hour strike. Place the minute hand on the center shaft, and rotate the center shaft until the lifter cam's high side, hour strike just releases the warning lift lever. The minute hand should be at the 12:00 position. Note the lifter cam angle in relationship to the drop-off point of the lifting lever and the minute hand. This is important during reassembly. The lifting lever was held up for clarity, Figure 3. In most cases with other clocks, the repairer can adjust the minute hand collet to have the drop off at the 12:00 position. This isn't correct with the A200 movement. The minute hand collet is staked onto the point in such a way that in most cases it is difficult to move it without damaging the hand.

After the movement is disassembled, the front plate is left with the center shaft and the lifter cam still on. To remove the lifter cam, a slotted piece of brass is used. It is 2.500" (63.56mm) long, .312" (7.93mm) wide, and .050" (1.28mm) thick. The slot is 0.133" (3.90mm) wide and 0.285" (7.24mm) deep. The brass is placed under the cam for cam removal, Figure 4. This tool is needed because the lifter cam is made with formed edges on each end. The formed

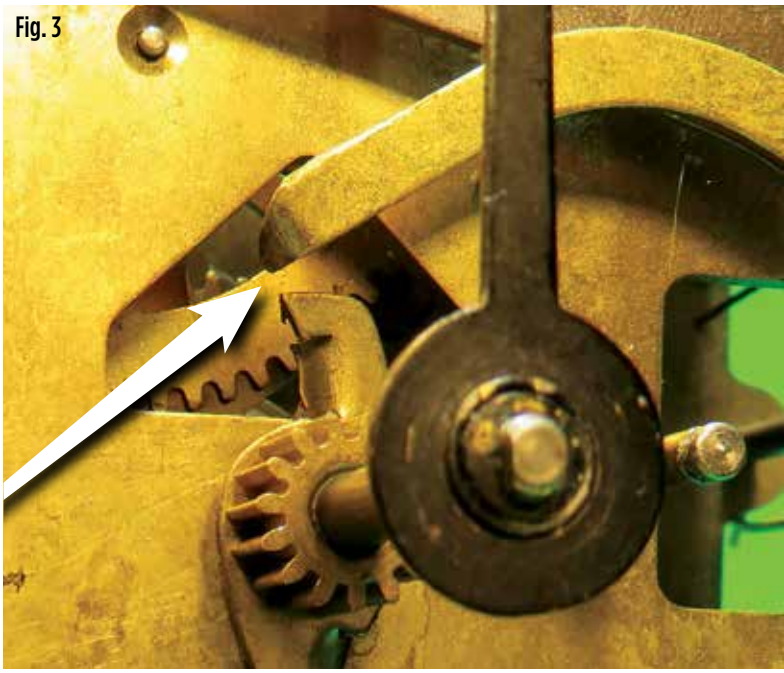


Fig. 3


Fig. 4

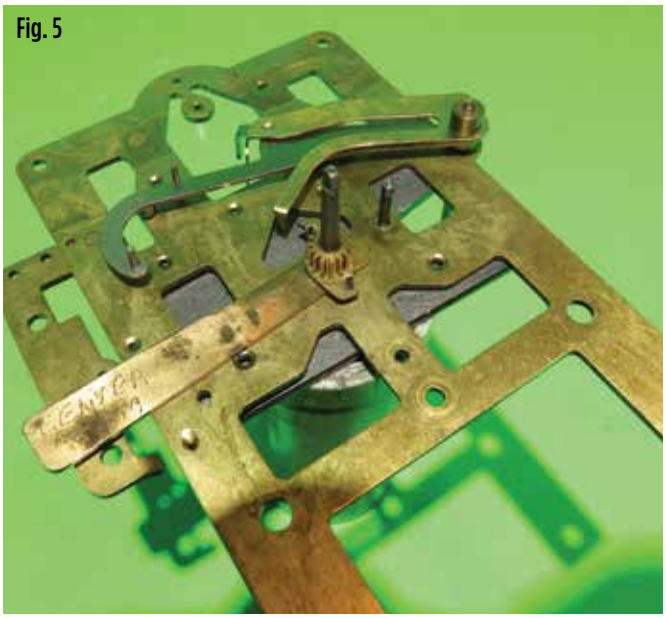


Fig. 5

parts of the lifter are for the turn-back assembly when the hands are turned backwards. If the center shaft is pressed down without something between the lifter cam and front plate, it will bend the formed edges, Figure 5. The center shaft and a gear are the only gear

and shaft on the front plate. Place the slotted tool between the lifter cam and front plate. Put a crow's foot tool between the center shaft under the back side of the front plate. Place the crow's foot over a plastic PVC tube, and use a drill press to remove the center shaft lifter cam. Place the hand nut on the center shaft backwards, so the threads are not damaged, Figure 6.

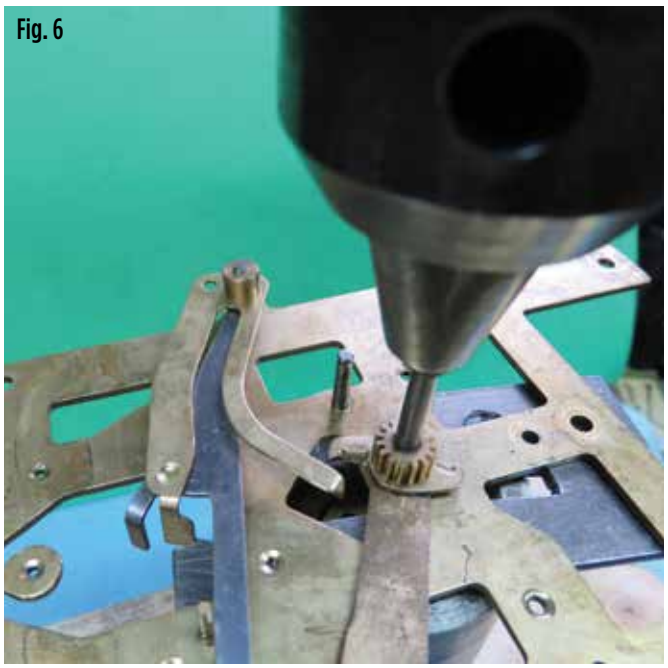


Fig. 6

The cam should come off with little difficulty. After all repairs are done, the movement is ready to be reassembled.

Assembly

When assembling the gears and mainsprings in the back plate, the strike gears don't have to be put "in time." That can be done later. Complete the assembly by placing all the gears and mainsprings. Note that the strike mainspring loop end is placed on the center pillar post and not the bottom left pillar post. Place the time mainspring loop end on the bottom right pillar post, Figure 7. Then place the front plate over the center shaft and the pivots, and tighten the four nuts. Now, the pallet should not be in the movement. With a finger on the second wheel, rotate the time gears to see if they are free to rotate. While holding the rack hook up, rotate the strike gears to see that they are also free to rotate. If they are free to rotate then continue to the next step.

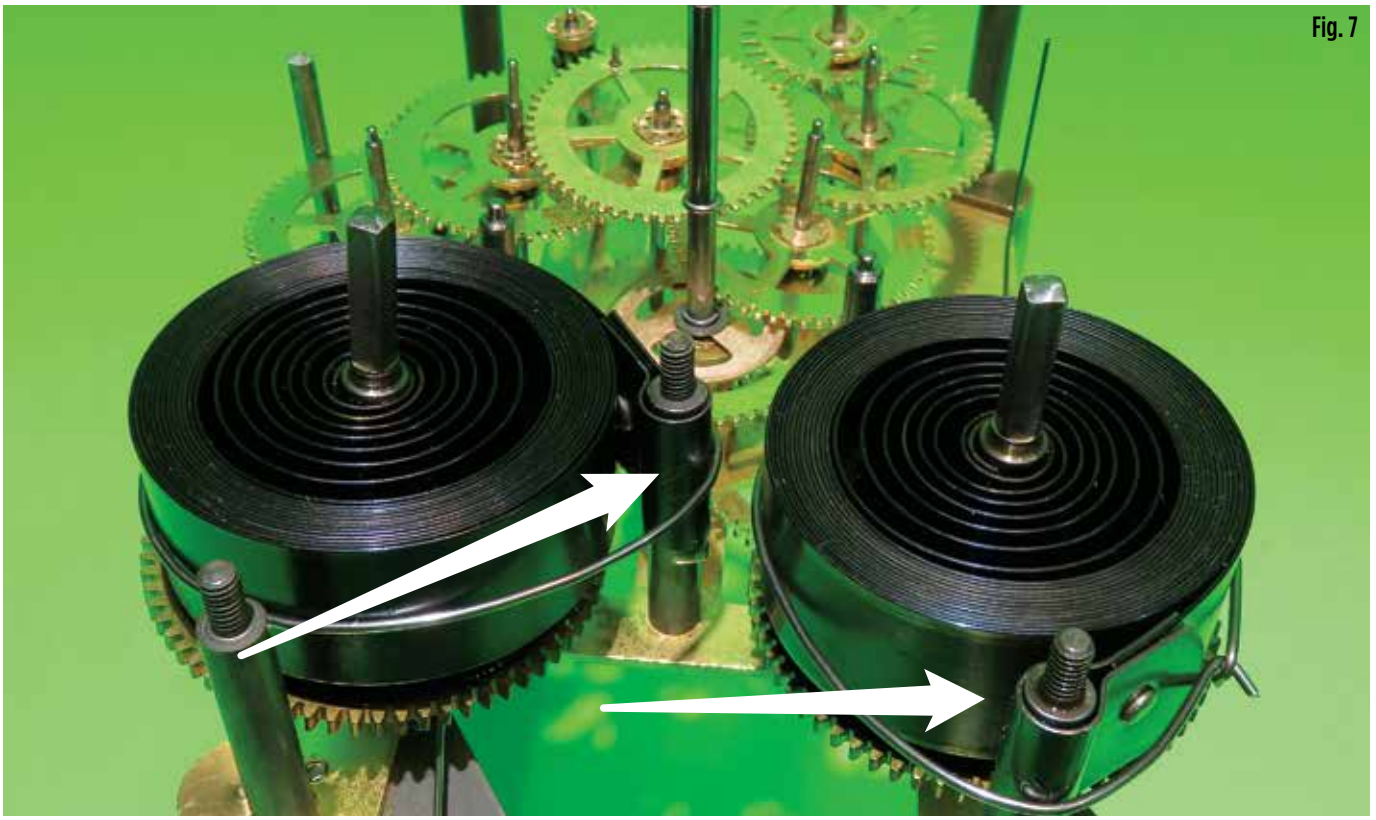


Fig. 7

Strike Train Timing

After assembling the movement, timing is completed in three steps. The first step is to rotate the strike train by hand and watch the striker lifter and the lifter wheel. When the striker lifter piece drops, stop the train by holding the fly. The lifter piece should be between two points of the lifter wheel, Figure 8.

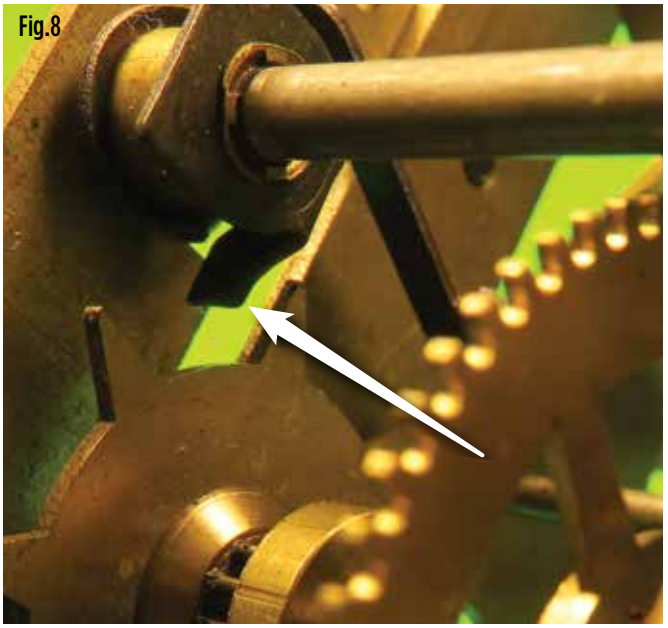


Fig.8

In the second step, look for the location of the pin on the warning wheel. Release the fly and rotate the warning wheel until the pin contacts the rack hook tab. Contact is made when the rack hook is in the zero position. Zero position is when the rack hook has dropped below the end of the rack, Figure 9, arrow A.

Fig. 9

The third step requires holding the fly. Hold the fly with a small alligator clip with tape wrapped around its teeth, Figure 10. Place the gathering pallet on its shaft in a loose position. Rotate the gathering pallet, while the fly is being held, until the pin in the gathering pallet is just free of the rack teeth, Figure 9, arrow B. Then tighten


Fig. 10

the gathering pallet and check the strike train for proper operation. Note the little washer on the strike lifter wire, Figure 11. This washer must be there for proper operation. Sometimes it will get lost during the cleaning process.

If the washer is lost, make a replacement washer, Figure 12. First, drill a #65 hole in a piece of brass. Then using the power punch[2] with its smallest punch and die, punch out the piece that has the hole drilled in it. The punches have points on their ends; align the point with the hole drilled in the piece of brass.

Placing the Lifter Cam Back on the Center Shaft

Placing the lifter cam back on the center shaft requires multiple steps. First, place the minute hand on the center shaft and position the hand at 12:00. Remove the minute hand without turning the center shaft.

Second, just set the lifter cam on the center shaft. The lifter cam will be above the warning lifter lever. Eyeball the angle of the lifter cam with the warning lifter lever drop-off point. The lifter cam will be vertical. You can also align the lifter cam with the two slots at the end of the center shaft, where the thread is.

Move the lifter cam high side left or right for best drop-off adjustment. Then place the movement on a staking block to support the rear center shaft. The center shaft is extended beyond the plate. In the shop, a dimple is drilled into the crow's foot tool, and the rear extended pivot sits in this dimple. This keeps the rear pivot from sliding around. Place the slotted tool around the center shaft. Using a drill press, carefully press the lifter cam on the center shaft until it just touches the slotted tool, Figure 13.

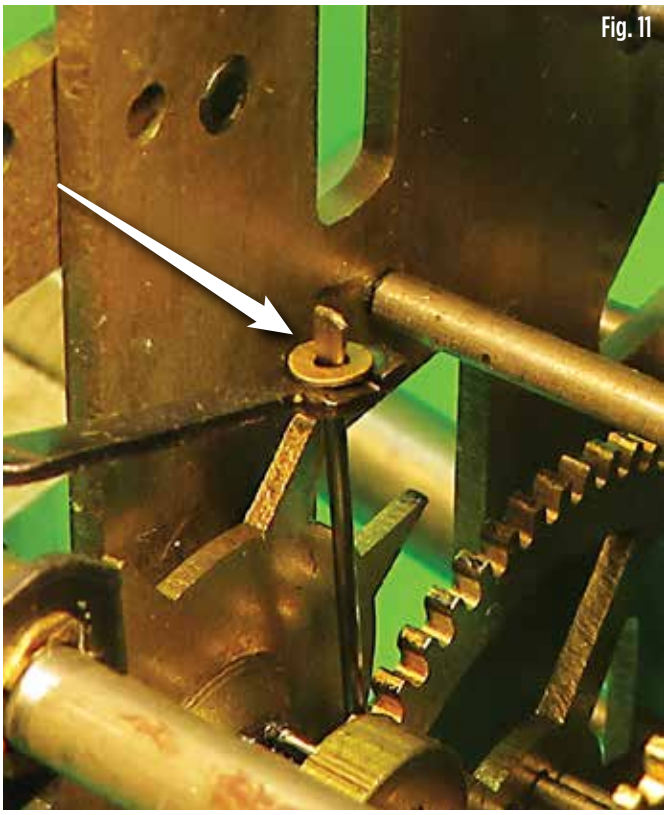


Fig. 11


Fig. 12

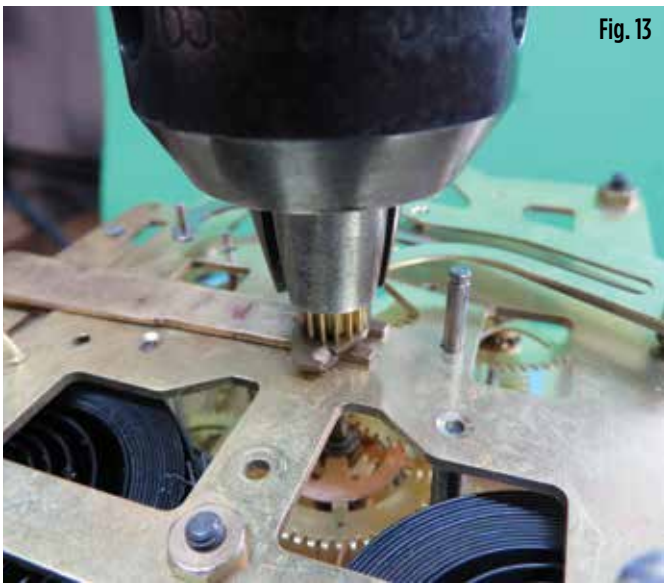


Fig. 13

2. Power punches are sold at most clock material houses.

Replacing the Rubber Grommets

When overhauling these movements, in most cases the rubber grommets have dry rot, or are missing, Figure 14. The correct replacement size is hard to find. The replacement grommet that is used has a 1/4" hole. However, these sizes are easy to find in hardware stores as electrical box entrance grommets. After the old grommets and their spacers are removed, cut a piece out of the new grommet so that it will fit in the small hole of the mounting strap, Figure 15.

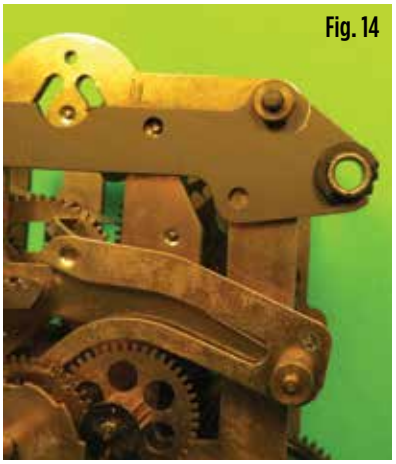


Fig. 14


Fig. 15


Fig. 16

Place the cut grommet in the larger hole. Take a small pin punch and place it in the hole of the grommet. Finally, pull the grommet through to the smaller hole, Figure 16. Rotate the grommet so the cut side is facing towards the closed end of the mounting strap. Four pieces of brass or aluminum tubing 0.187" (4.74mm) diameter, 0.216" (5.50mm) long, and 0.157" (4.05mm) hole diameter are made up and placed inside of each grommet, Figure 17.

Figure 18 shows the movement completed, lubricated, adjusted, and running. I hope this article was informative enough to be used by clockmakers of all proficiencies.


Fig. 17

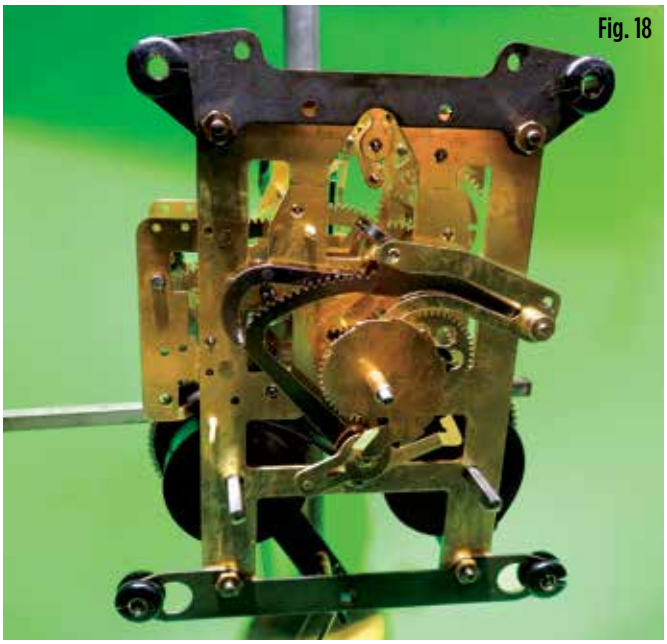


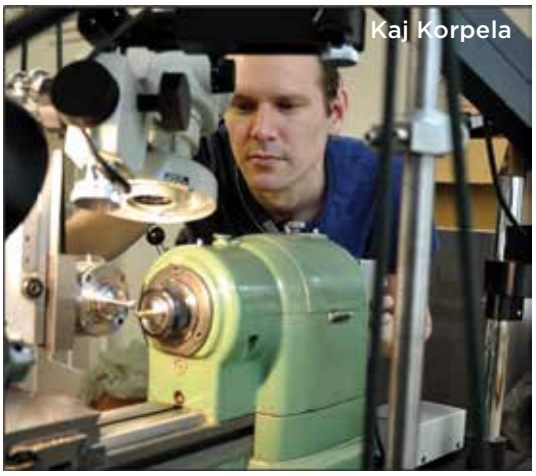
Fig. 18

Paul Corn is an independent clockmaker and owner of Fine Clock Repairing in Waldorf, Maryland.

Making a Watch from Conception to Finished Product with Kaj Korpela

Watchmaking, Prototyping, and Restoration of Watches

PART EIGHT



By Henrik Korpela

We are slowly reaching the end of this project. In order to have one completed tourbillon wristwatch, we still need a mechanism to wind the mainspring and set the hands (winding and setting mechanism) with its motion work (dial train), balance and hairspring, and finally external parts (case) to protect the movement while wearing it, including the time display (dial and hands).

This article covers the winding and setting mechanism, including the motion work. The next article will cover the balance and hairspring. The final article in this series will cover the case, dial, and hands making.

Although Kaj did not make the rest of his watch exactly in this order, it makes sense, however, to explain it in this order. Kaj actually first made the balance staff, balance, and hairspring to ensure the movement was working without problems before investing time in the winding and setting mechanism. The way we initially imagine being the most logical order of doing something, might not always be the most efficient or suitable. Everyone has a different idea about when and even how to make something.

Because we are on the subject of winding and setting, I would also like to include a practical restoration tip on how to make a missing or broken winding and setting part of an old watch, starting from sheet metal. The example being: how to design and make a missing yoke.

Because the barrel, gear train, and size of the mainplate has already been established on Kaj's movement, some of the remaining available free space will be utilized for the winding and setting mechanism, which, in this case, is the middle of the movement (vertically) on the right-hand side seen from the dial side (position between barrel and tourbillon). Considering the height of the crown compared to the case, it makes most sense to have it in the middle. Therefore, the winding stem will be in the middle of the movement, since the movement is placed in the middle of the case. Because he wanted the hands to be in the center of the movement (horizontally) but above the center (vertically), and with the position of the tourbillon being at 6 o'clock, the motion work will end up above the barrel.

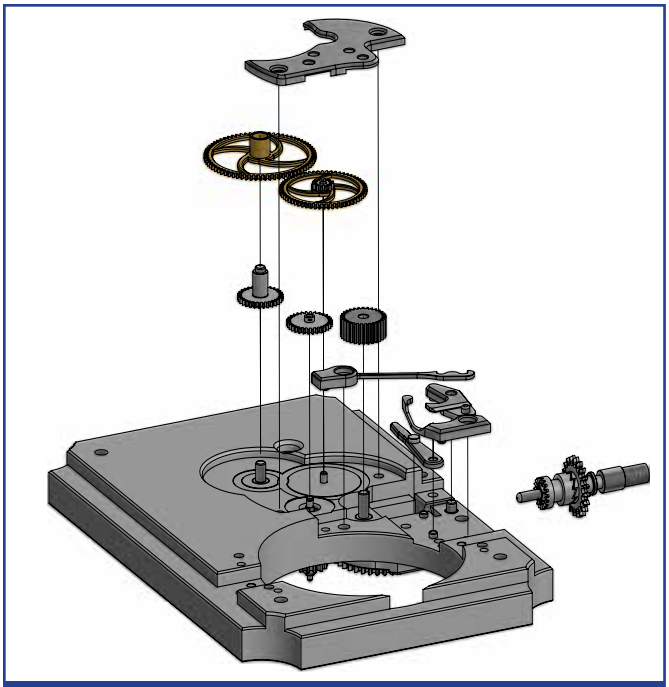


Figure 1. Winding and setting mechanism with motion work, dial side.

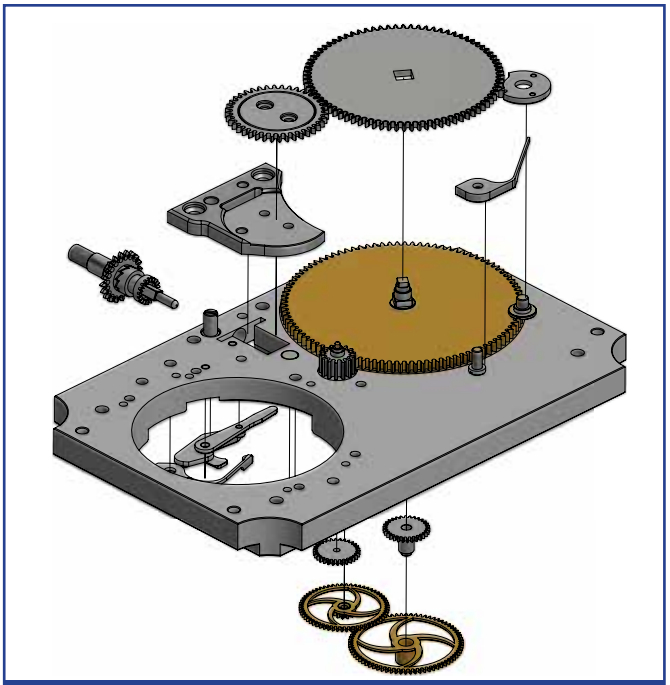


Figure 2. Winding and setting mechanism, movement side.

Because of the constraints in terms of space and position, Kaj needed to design the parts to fit in the available space and positions. He used the same module and size for the intermediate setting pinions and cannon pinion, since he could then use the same cutter to mill all of them. One of the hard parts to deal with was the depth of penetration and the diameters for the crown wheel and winding pinion. Kaj followed the recommendations in *Gears for Small Mechanisms* for the depthing.[1] Kaj also had to decide how much movement of the crown from winding to setting position he wanted (therefore, also determining the length of the sliding pinion) so he could design the rest of the winding and setting parts on the dial side.[2] He also needed to keep in mind the relative height of parts so he did not design them to be too large and conflict with the movement-side parts, as well as steady pins and screws.

Kaj decided to make the winding and sliding pinions. First, he prepared a square broach to create the square hole in the sliding pinion, turning first a bar of tool steel to final full diameter. It had to be slightly larger than the square hole that needs to be produced, since some of the steel will flex back after the broaching operation. The square was then milled in the lathe with the milling attachment, Figure 3.

Figure 3. Square broach for sliding pinion milled in the lathe.

1. Wilfred Owen Davis, *Gears for Small Mechanisms* (1993), 32-35.
2. Michel Vermont, Philippe Bovay, Damien Prongué, and Sébastien Dordor, *traité de construction horlogère* (2011), 676-679.

The broach also needed to have a slight undercut to clear the steel when broaching, as well as incremental tapered steps to help ease it in in the beginning of the broaching operation,[3] Figure 4. The broach was also hardened and tempered to straw. The cylindrical pilot at the end of the broach serves as a guide during the broaching operation and has nearly the same diameter (pilot being 0.005-0.01mm smaller in diameter to avoid binding) as the previously drilled hole in the sliding pinion. The sliding pinion was first turned oversized and then drilled in the lathe. Then it was broached in the staking set by lightly tapping the broach through the round hole.

Figure 4. Square broach for sliding pinion after turning incremental steps and a cylindrical pilot.

Another square of the same size was made to support the sliding pinion to mill the leaves. Figure 5 shows the boring of the recess to clear the cutter during the milling procedure. The sliding pinion is held by the square in the lathe collet.

Figure 5. Sliding pinion being bored out in the lathe.

3. Archie B. Perkins, *The Modern Watchmakers Lathe and How to Use It* (2003), 320-321.

Kaj designed his sliding pinion by taking inspiration from *traité de construction horlogère*[4] and NIHS,[5] with Breguet teeth interacting with the winding pinion and cycloidal-shaped leaves interacting with the intermediate setting wheel. Kaj milled the cycloidal leaves with a HSS cutter from www.ppthornton.com. The number of leaves should be equal so the cutter can fully form the leaves and pass through the center and form the leaves below the center as well. Having an unequal number of leaves will not allow the full formation of the leaves, because the cutter cannot reach down deep enough without hitting and damaging the leaves below. Kaj fixed the sliding pinion in the Aciera F1 milling machine on a square shaft (secured with glue) of the same size as the square hole of the pinion during the milling operation, Figure 7.

Figure 6. Sliding pinion with its square hole and bored recess for leaves.

Figure 7. Milled sliding pinion leaves.

4. Michel Vermont, Philippe Bovay, Damien Prongué, and Sébastien Dordor, *traité de construction horlogère* (2011), 674-676.

5. Fédération de l'Industrie Horlogère Suisse FH, *NIHS Extrait des Normes de l'Industrie Horlogère Suisse* (2005), 373.

Milling the Breguet teeth is equally easy. The sliding pinion just needs to be flipped in the holder to expose the other side. With a special attachment for the F1 explained in part 7 of this article series, the Breguet teeth were broached using a single tooth broach, Figures 8-9. The slot for the yoke was turned in the lathe. Not every watchmaker has a milling machine with a special attachment. That's not a problem, because you can do the same in the lathe with a milling attachment and a small, round degussit stone shaped with the correct angle. Or you can use a small, triangular-shaped burr with the correct angle. As with the cycloid leaves, it is not possible to cut right through the center because of the shape of the Breguet teeth. That's why it's important that the cutting tool is not too big in diameter, Figures 10-11. The winding pinion was made in a similar fashion except for the cycloid leaves, which were milled

Figure 8. Setting up the broach on the center of the sliding pinion in the F1.

Figure 9. After the Breguet teeth broaching.

Figure 10. Degussit stone after shaping it with various diamond files in the lathe.

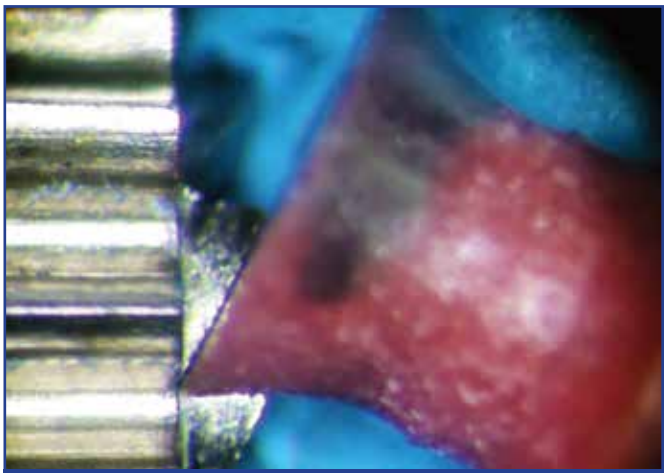


Figure 11. Breguet teeth being shaped by grinding with the degussit stone using the milling or grinding attachment of the lathe on a brass prototype winding pinion (works equally well on steel).

the same way as milling regular pinion leaves. Both pieces were then heat treated and were now ready to be tried in the movement, Figure 12.

Figure 12. Prototype winding and sliding pinion ready for testing in the movement.

Next, he made the yoke, yoke spring, setting lever, setting lever spring, winding stem, and prepared the area on the mainplate for the motion work with various recesses and posts. All this was done with the combination of the lathe, milling machine, and the jig-boring machine, Figures 13-14.

Figure 13. Yoke, yoke spring, and setting lever, drilled and scribed to shape.

Figure 14. Winding and setting parts after milling and filing the final shapes, with the motion work mainplate area prepared with posts, maintaining bridge, and recesses.

The ratchet wheel was made like a gear train wheel except it has a square hole, which was made in the same way as the square hole for the sliding pinion. The click was designed as a gear interacting with the ratchet wheel using the same module. The click, however, only needed one tooth since the side without the formation of teeth will act as a stop. The click spring was made in a similar fashion as the yoke spring except it has only a very small step to clear the brass on the underside of the bridge where it is screwed down. This step is so small that it can be hand filed. The crown wheel was made the same way as the ratchet wheel with the same module. The motion work parts were made like conventional wheels and pinions, Figures 15-17.

Figure 15. Testing the ratchet wheel, click, and its spring.

Figure 16. Testing crown wheel/winding pinion engagement. spring.

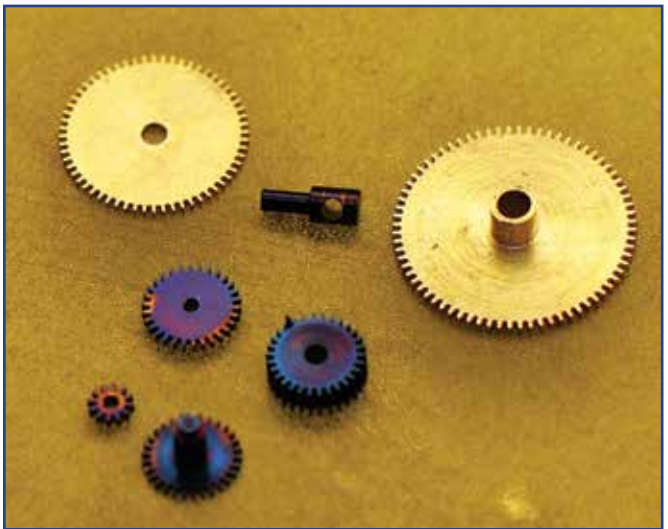


Figure 17. Motion work and intermediate setting gears ready for testing and finishing.

Figure 18. Motion work, winding and setting parts assembled together for testing.

Making a Missing Yoke

1. Before you start, you could read *Twenty-First Century Watchmaking, Book One*[6] to understand the concept of making these types of parts.

2. Start by drawing the area of the mainplate with the neighbouring parts in all its different operating positions: crown pushed in and crown pushed out. Do this in the profile projector using the episcope function, Figure 19. Alternatively, you can make photographs and print them out.

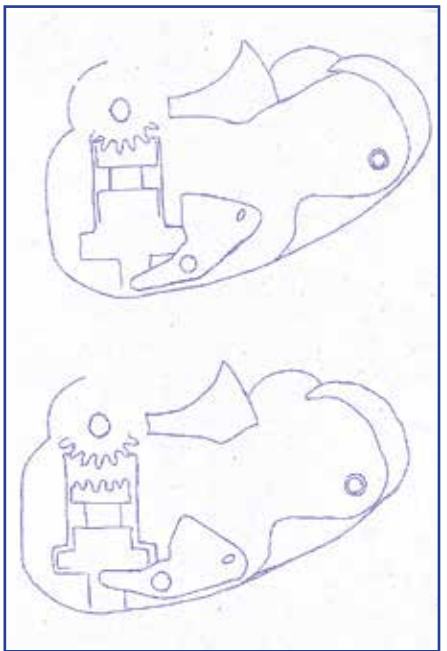


Figure 19. Upper: hand setting position; lower: winding position, drawn in the profile projector.

6. William O. Smith, Jr., *Twenty-First Century Watchmaking, Book One* (1996), 119-170.

3. Study the function of the part that needs to be made as well as the interacting parts.

4. Have both drawings—winding position and setting position—on the same paper, if possible. On the drawing of the winding position, draw a circle around the post of the yoke twice the size of the post. This represents the material of the yoke around the post.

5. From the lower part of this circle, draw a line (straight) to the acting beak of the setting lever (the point that interacts with the yoke).

6. Continue to draw a line down following the acting surface left side of beak. How far down the line goes must be determined by how much the yoke needs to be lifted to give correct sliding pinion/intermediate setting wheel penetration. Therefore, draw this line excessively long for now, and at the end of this line draw a line straight out to the left. This line represents the resting position of the setting lever beak in the hand-setting position. From this line, draw a curved nose fitting inside the sliding pinion slot. The curved nose will prevent the yoke from binding when moving the sliding pinion back and forth.

7. Draw the rest of the body of the yoke to follow a similar design as the other winding and setting components.

8. Make a copy of this drawing and cut out the yoke shape.

9. On the upper drawing (setting time engaged), pin the cut-out yoke to the post and place yoke in correct position to the sliding pinion.

10. Now it will be obvious how much needs to be cut from the resting position of the yoke. Cut it so that it looks to rest on the setting lever beak.

11. On a piece of rectangular paper, put the paper model at the corner of the paper. The rectangular paper represents the steel plate that the yoke will be cut from.

12. Draw important changes in the shape, such as the end of the beak, the beginning of the resting position, the hole for the post, etc., Figures 20-21.

Figure 20. Transferring important points onto another piece of paper.

Figure 21. Transferred important points on paper.

13. With a ruler, measure all these positions and transfer them onto the steel plate with scriber, ruler, calliper, etc. Make sure you know the scale of the drawing so you can transfer the right dimensions onto the steel. Choose sufficiently thick stock, 0.10mm thicker than the final thickness or approximately the same

thickness as the setting lever plus 0.10mm so that you have enough material for the final finishing, Figure 22.

Figure 22. Points transferred onto a steel sheet (silver steel).

14. Drill the hole for the post either by hand or in the drill press.

15. In the 8mm lathe, grind out the roughly outlined shape. Or you can saw it out with a piercing saw, Figure 23.

Figure 23. Prepared piece of steel for grinding and filing the yoke.

16. The piece can now be ground to shape in the 8mm lathe. When grinding, use your fingers or two pieces of pegwood with rubber ends or something that grips when moving the piece around during grinding. Alternatively, some material from the sheet metal can be left at one end of the yoke to enable you to handle the piece easier when grinding. The handle is ground off in the end.

17. Grind the top part of yoke to fit the slot of the sliding pinion. Grind it to a curved shape to prevent binding when the yoke is being operated.

18. Test to see that the yoke can move up and down with the sliding pinion. If not, grind more.

19. Grind the rest of the yoke to shape according to the paper model. You can do this either by comparing shape by eye or comparing in the profile projector. Leave a bit of extra material at the straight resting position for the setting lever beak. You can also file the yoke (using diamond files) when it is clamped in a small vise. Or you can use a combination of the two techniques.

20. With a smoother grinding disc, or fine diamond files, grind down the rest of the yoke to shape and function. Test it frequently in the movement. You can test the correct penetration between sliding pinion/intermediate setting wheel by applying pressure with pegwood on the intermediate wheel while turning the crown. It should feel smooth with a slight resistance coming only from the pressure applied with the pegwood. It should not, however, feel jerky. Try different positions until the smoothest position is found, Figures 24-25.

Figure 24. Testing the yoke in hand-setting position.

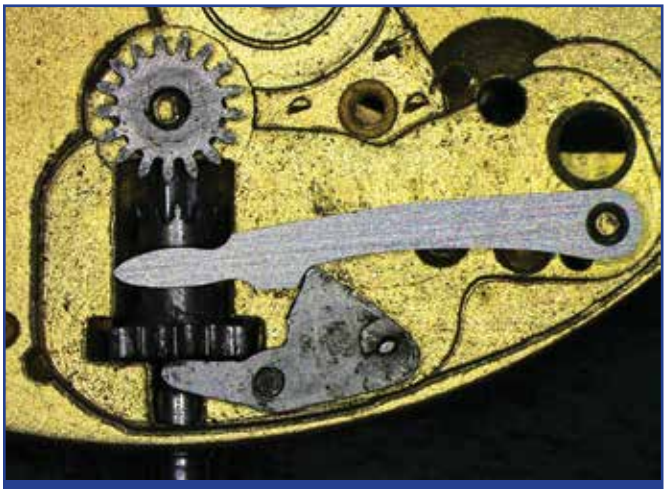


Figure 25. Testing the yoke in the winding position.

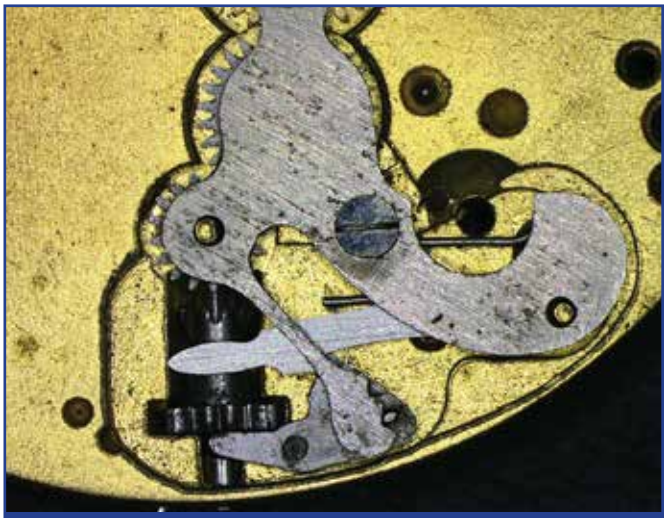


Figure 26. Testing the mechanism in its entirety.

21. On abrasive paper, grind down the thickness to about 0.02-0.03mm thicker than the final thickness. If the yoke needs bevels, they can also be filed now.

22. Harden and temper to dark blue.

23. Final testing with all the winding and setting parts, Figure 26.

24. Clean off scale, and polish bevels with abrasive paper or diamond paste.

25. Do final straight graining on top surface with shellac stone or 3M abrasive paper.

Figure 27. Final shape of yoke.

References:

Korpela, Kaj: interviews on how to make parts of his watch. Figures: 1-9, 12-18
Korpela, Henrik: Figures 10-11, 19-27

Bibliography:

Davis, Wilfred Owen. *Gears for Small Mechanisms* (1993), 24-35.
Fédération de l'Industrie Horlogère Suisse FH. *NIHS Extrait des Normes de l'Industrie Horlogère Suisse* (2005), 373.
Perkins, Archie B. *The Modern Watchmakers Lathe and How to Use It* (2003), 320-343.
Smith, William O., Jr. *Twenty-First Century Watchmaking, Book One* (1996), 18-170.
Vermont, Michel, Philippe Bovay, Damien Prongué, and Sébastien Dordor, *traité de construction horlogère* (2011), 665-683.

Henrik Korpela is a watchmaker living in Switzerland and the principal of Korpela and Hofs Watchmaking Competence Centre.

Cousins UK Material House Makes Progress in Swiss Court

By Aaron Recksiek, CW21

A Swiss court in Berne has ruled that a Negative Declaratory Action (NDA) suit filed against Cousins Material House Ltd by the Swatch Group is inadmissible under Swiss Law and the case has been dismissed. The suit was brought against Cousins UK after the parts supplier had sent a legally required "Letter Before Action" to the Swatch Group warning them of a pending anti-competition lawsuit in the English High Court, unless they restored supply of spare parts within three weeks to independent distributors. The legal grounds for the lawsuit against the Swatch Group were stated as a "breach of a range of laws and trade agreements." The NDA was an attempt by the Swatch Group to receive an early ruling from a Swiss court that their parts restrictions were not violating any British or European laws, ideally keeping the issue out of the English courts.

The conflict originated back in 2015 when the Swatch Group announced that it would cease the supply of spare parts for all subsidiary brands to independent distributors on January 1, 2016. The impact this would have on the independent repair trade prompted Cousins UK to work with the British Watch and Clock Makers Guild to set up an Industry Action Fund to help pay the legal fees of court proceedings against the Swatch Group.

This ruling does not mean that the Swatch Group must reopen the supply of spare parts to independent distributors, only that Cousins has the legal right to file their lawsuit against the Swatch Group in the High Court. The Swatch Group has until the end of August to decide whether they will file an appeal of the court's decision. If an appeal is not filed or it is denied, Cousins will inevitably file the originally intended lawsuit. Managing Director Anthony Cousins has assured through public statements that they are "staying in this fight until it is won."

Sources:

www.cousinsuk.com/page/news

www.watchpro.com/breaking-news-swiss-court-rules-swatch-favour-cousins

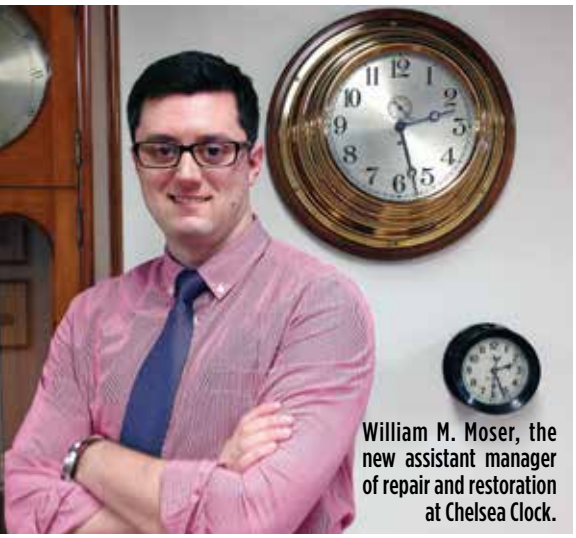
www.watchpro.com/cousins-versus-swatch-group-dispute-gets-first-hearing-in-swiss-court

In Summary

Chelsea Clock Hires New Assistant Manager, Repair & Restoration

American clock brand Chelsea Clock has appointed William M. Moser as assistant manager of repair and restoration. William Moser is the great-grandson of Erhard Jauch, the master clockmaker and co-founder of manufacture Moser-Jauch Black Forest Clocks and Watches. Moser first started out as an apprentice watchmaker for his family business. He later worked as chief horologist with Mont D'or of America, a business involved in "the wholesale distribution of jewelry, precious stones and metals, costume jewelry, watches, clocks, and silverware," according to bloomberg.com.

Patrick Capozzi, Director of Marketing for Chelsea Clock
www.bloomberg.com/profiles/companies/1004111D:US-mont-d'or-of-america-llc
www.chelseaclock.com/p/master-clockmakers/



William M. Moser, the new assistant manager of repair and restoration at Chelsea Clock.

Management Changes at Seiko USA

Seiko has brought in two watch-industry veterans to help in their push to make Grand Seiko a more widespread independent global brand. Brice Le Troadec was hired as executive vice president, Seiko Corporation of America, and as brand president, Grand Seiko America. Le Troadec came to Seiko from Omega USA, and he will lead the continued push of Grand Seiko into the American market. John Pistner, the other recent hire, left his post as executive vice president of Bulova Watch Company, and was hired as Seiko Corporation of America's vice president of sales. Pistner will mainly be focused on sales of the Seiko "core" lines, as well as the Pulsar brand and Seiko clocks.

www.jckonline.com/editorial-article/seiko-appoints-bulova-omega-veterans/

Witschi Wins EPHJ Grand Prix Award

Salon International EPHJ (Environnement Professionnel Horlogerie-Joaillerie) is an annual trade show held in Geneva, Switzerland, focusing on the manufacturing and production side of the Swiss watch industry. Each year during the show, organizers allow exhibitors' names to be submitted for consideration of winning the show's Grand Prix of Exhibitors trophy meant to "reward the most innovative project of the year." The award is decided by a ballot submitted by all fellow exhibitors.

The 2017 edition of EPHJ saw six companies nominated for the award, Witschi Electronic AG, Techniwatch, Rifft, Precitec, Enovasense, and Coat-X. On June 20, the award was given to Witschi Electronic for the innovative WisioScope S, the new timing machine capable of measuring rate, amplitude, beat, and lift angle of a mechanical watch with the assistance of an optical laser mounted on a traditional microphone. The technology was developed with collaboration of the Swiss Center for Electronics and Microtechnology (CSEM) Neuchâtel.

www.ephj.ch/en/witschi-electronic-ag-remporte-le-grand-prix-des-exposants-2017/

The WisioScope S sales team. In the middle is Martin Schürch, Chief Sales Officer, holding the award. Schürch was with AWCI at JCK and will be at the convention this October in Tampa.

Aaron Recksiek is an independent watchmaker in Salt Lake City, Utah. He is a graduate of the 2008 WOSTEP class at the Lititz Watch Technicum.

Looking at Guilloché in Conservation *Part II*

By Brittany Nicole Cox and David Lindow

Originally written for the American Institute for Conservation of Historic and Artistic Works, published in the post prints for the Annual Meeting 2016.

3.1. ROSE ENGINE

Rose engines, including those made specifically for guilloché work, have not significantly evolved since the 18th century. The machine pictured in Figure 12 is a 20th-century machine made in La Chaux-e-Fonds, Switzerland, by Lienhard, a popular maker of rose and straight-line engines. This was used in the Bulova Watch Co. factory on Long Island, New York, before its closure.

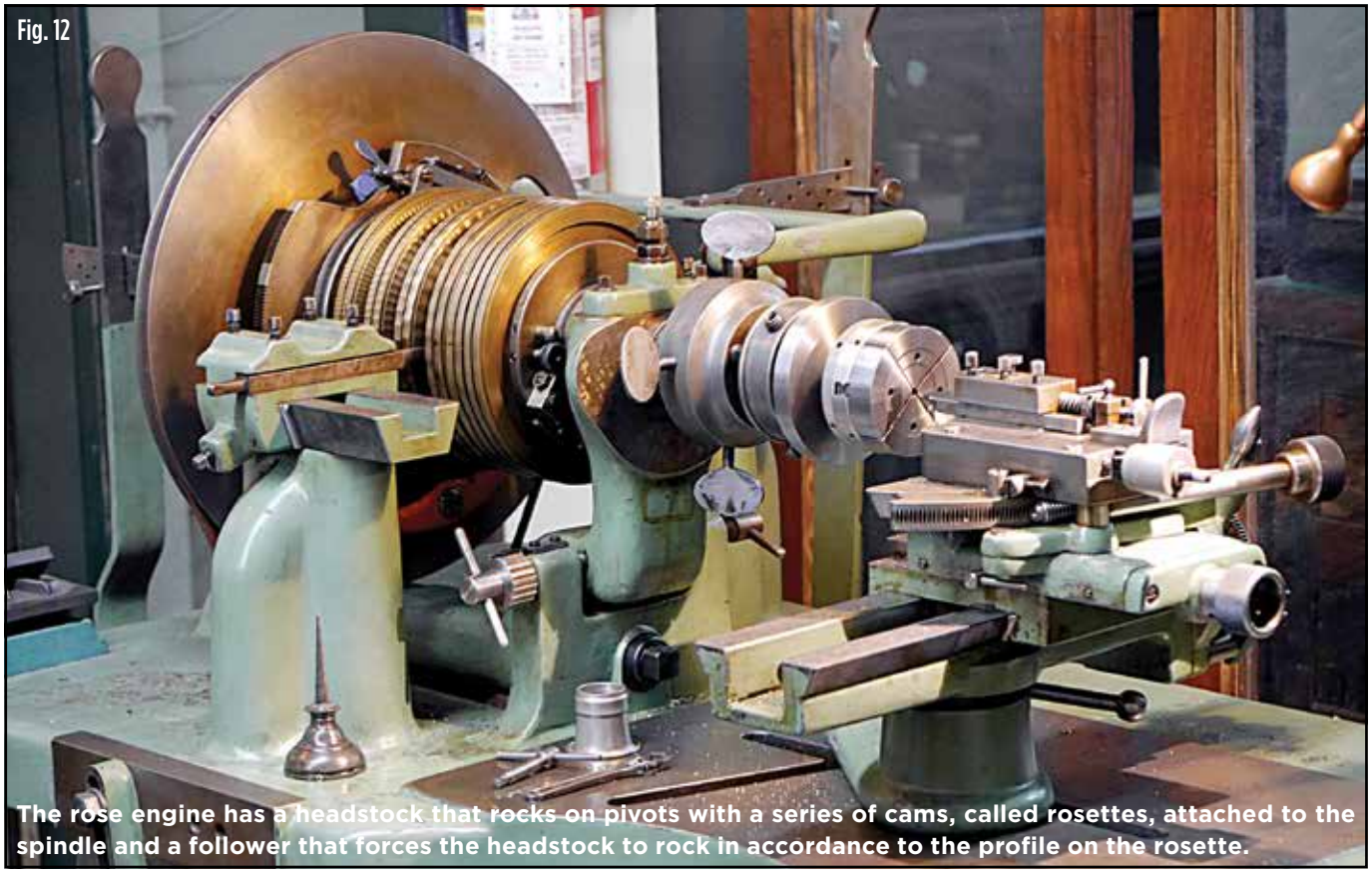


Fig. 12

The rose engine has a headstock that rocks on pivots with a series of cams, called rosettes, attached to the spindle and a follower that forces the headstock to rock in accordance to the profile on the rosette.

The cutting tool and geed.

The slide.

Cutting tool and geed engaged with the work.

Rosette engaged with the rubber.

As the spindle rotates, carrying the work in the chuck, a "fixed" or non-rotating tool cuts the metal. The depth of cut is set by the "guide" or "geed," which can be seen on the right side of the cutting tool. It is dressed with an obtuse angle of 160°, as shown in Figure 13a.

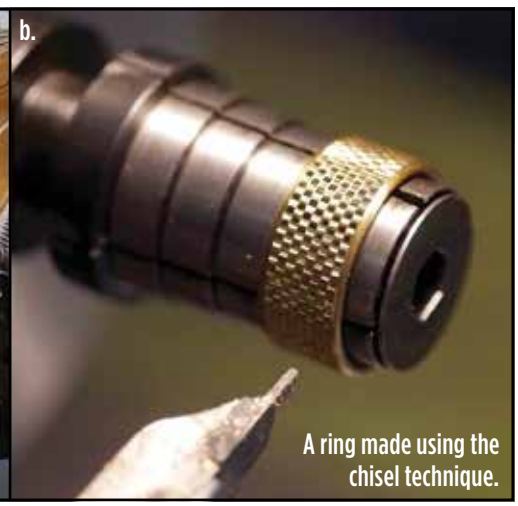
The depth of the geed can be adjusted to give deeper or shallower cuts. The cutting tool slides forward or back by the hand of the operator and is pushed in until the geed rubs against the work, as shown in Figure 13b. An adjustable dead stop can also be used in place of the geed, as seen on the right side of the slide in Figure 13b.

Figure 13c shows both the cutter and geed engaged with the work. The obtuse angle of the cutter ensures that the cut is quite shallow and the shallow angle, coupled with a slight negative relief on the top of the tool, gives the bright, reflective shine typical of guilloché.

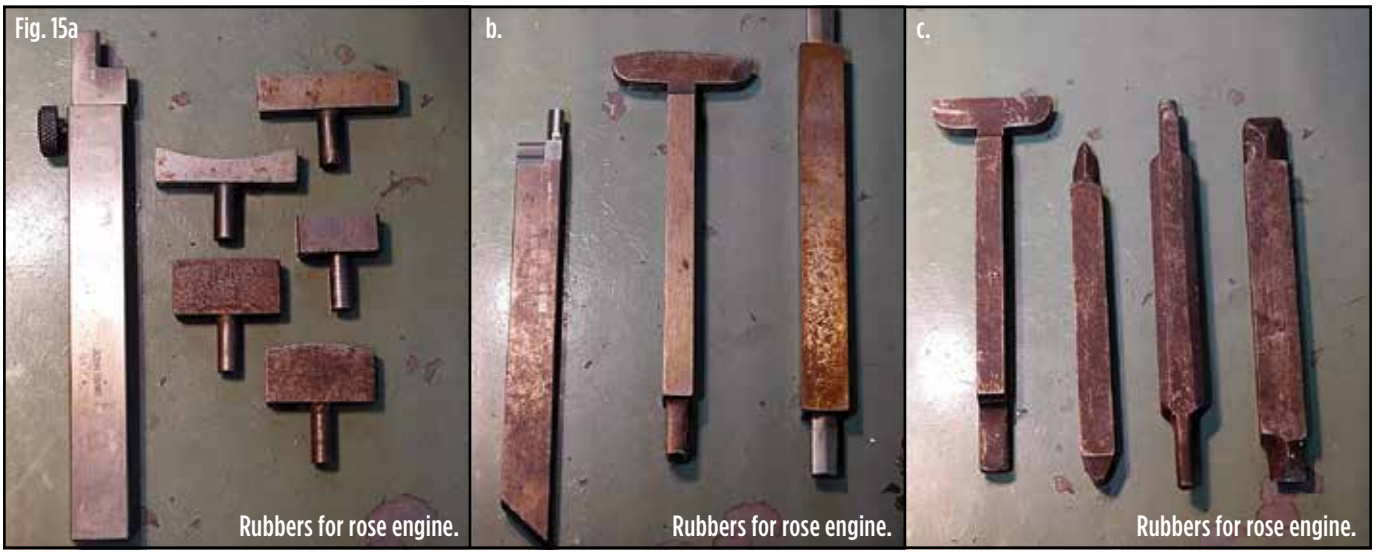
The "rocking" action, produced by the engagement of the rubber with the rosette is shown in Figure 13d. The headstock moves forward and back through spring tension produced by the rubber being driven by the outside diameter of the rosette.

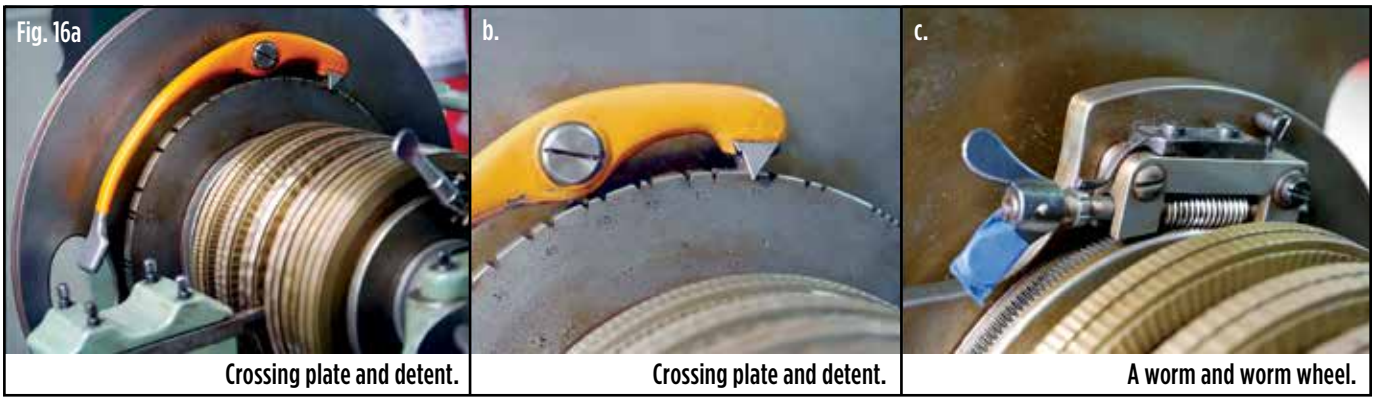
A rubber can be seen engaged with the face of the rosette in Figure 14a, which causes the spindle to traverse, or slide left and right in the spindle bearings. This action is used for work on the outside of cylinders, such as the ring in Figure 14b. It is also used to give what is called the "chisel" effect on watch dials, often to highlight the seconds and chapter rings.

Rubber engaged with the rosette.



A ring made using the chisel technique.





Followers, called "rubbers" or "touches," some for pumping and some for rocking, can be seen in Figures 15a-c. Just as any change of rosette renders a different cut pattern, so does any change to the rubber. A wide variety of rubbers are required for diversified work.

The crossing plate and detent are shown in Figures 16 a-b. This is used to "phase" the pattern on the work. This entails shifting the pattern so that the cuts "cross" over each other, creating optical illusions that are often associated with guilloché. Figure 16c shows a worm and worm wheel, which offer alternative means of phasing. The worm is used for patterns such as the "moiré" and "drape." The worm offers more minute adjustments as well as greater variability in phasing.

Many distinct patterns can be cut using a single rosette with the same rubber; four such patterns are illustrated in Figure 17. These pattern changes were created through alterations in phasing and by moving the tool toward center in varying amounts between subsequent cuts.


Fig. 18a
Lienhard straight-line machine.


b.
Vertical and horizontal slides.

3.2 STRAIGHT-LINE MACHINE

A 20th-century Lienhard straight-line machine from the Memoria Technica workshop is shown in Figure 18a. The leather belts that connect to the spindle go over the top and come down to the left-hand side, carrying weight to counter balance the weight of the main slides. The headstock is driven by means of a lead screw, which is protected by the large vertical casting on the left-hand side of the machine. The lead screw is moved by means of a belt, which is turned by the crank on the left. The slide rest sits to the right.

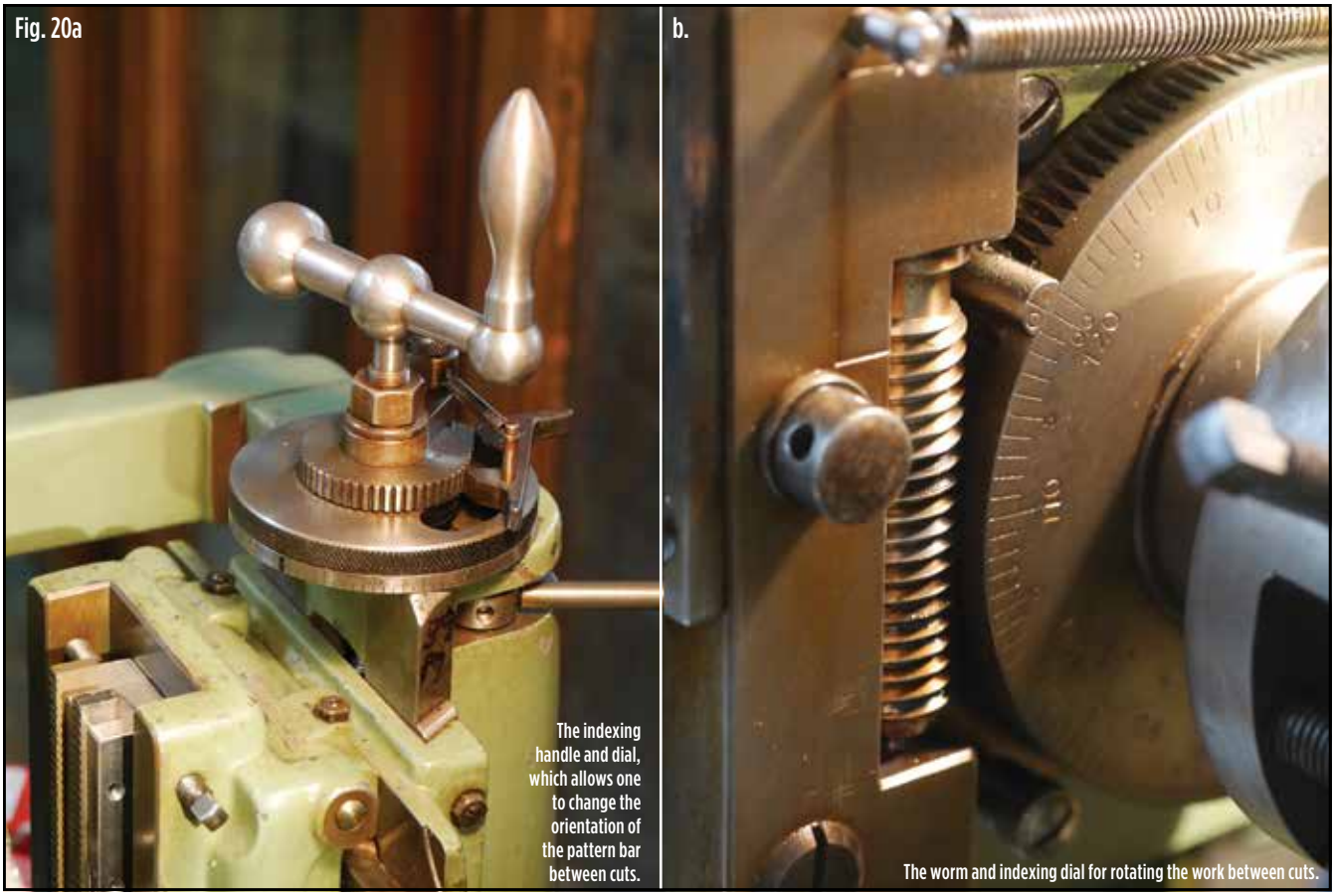
There are two main slides, vertical and horizontal, in Figure 18b. As the lead screw drives the headstock vertically, the horizontal slide is forced to move forth and back according to the pattern bar being followed by the rubber or touch.

A rubber can be seen engaged with a pattern bar in Figure 19a. Figure 19b shows a variety of rubbers and, as with the rose engine, any change to the rubber—even on the same pattern bar—will result in a different cut. Figure 19c shows a variety of pattern bars ranging from low amplitudes to high, allowing a wide variety of work from the same machine.


Fig. 19a
Rubber engaged in a pattern bar.


b.
A variety of rubbers.


c.
A variety of pattern bars.



The pattern bar can be moved with a lead screw, as illustrated in Figure 20a. The function of this relates to the "crossing wheel" on the rose engine and is used for "phasing." It allows the pattern bar to be shifted up and down, changing its relationship to the work. This is what creates the various patterns in straight-line work.

The headstock has an "indexer" which allows the work to be rotated a specific amount, Figure 20b. This mechanism allows for patterns such as a sunburst. The indexing on this machine is done by means of a worm, which rotates the work 3° per revolution. It also serves to augment alignment, especially with work-holding devices such as the pen chuck, which attaches to the headstock spindle. The pen chuck allows cylindrical devices to be held vertically and indexed after each subsequent cut.

All photos courtesy of Brittany Cox.

For references, acknowledgements, a list for further reading, and full author biographies, see page 25 of July 2017 *Horological Times*.

Brittany Nicole Cox is a horological conservator with an MA in Conservation Studies from the University of Sussex, specializing in clocks and related dynamic objects in partnership with West Dean College. She is a certified watchmaker/clockmaker, and operates Memoria Technica, an independent workshop in Seattle.

David Lindow is an independent clockmaker and owner of Lindow Machine Works in Pennsylvania. He specializes in restoring period Americana clock movements and other instruments, as well as building handmade movements.

From Australia to America

Observations of an Australian Watchmaker

By Oliver Broos Revitt

Part I. AWCI's Annual Convention

My name is Oliver and I'm an Aussie. I finished my four-year apprenticeship in December 2014 in my hometown of Coffs Harbour, New South Wales. I work for an independent watchmaker in Adelaide, South Australia. We take in work from the general public, trade (jewelry stores), and provide warranty work for small, independent German and Swiss watchmakers. Last year I had the pleasure of taking six weeks off work to visit the United States from September to October. My article will be broken into two parts, as I wish to talk about attending AWCI's national convention last year in Chicago, and taking the CW21 Exam.

In April 2016, I began planning the trip. I knew I wanted to take the CW21 Exam, but that was about all. I knew AWCI's national convention was coming up, so I thought, "Hey, why not attend?" I also wanted to do some sightseeing after all the watchmaking. A bit of background for anyone who doesn't know Australia—it's really far away and we have a population of about 24.5 million. That's it! In terms of landmass, we are just smaller than the US. People often ask me if our animals are dangerous. The answer is simple yes! Most things will kill you—spiders, snakes, sharks, octopuses, jelly fish, and the list goes on. Traveling from Australia to Chicago would take me approximately 30 hours. So, if I was going to come over, it wasn't going to be for a short period.

I arrived in Chicago five days prior to the convention, which gave me time to adjust to the time difference and do some sightseeing. When booking the convention, I saw that Henrik Korpela would be attending and running a short course. I knew straight away that I would sign up for this. If you are considering attending one of his courses, I cannot recommend it enough. Over the course of two days, we covered black polishing, graining, frosting, bluing, matte finish, and we got to talk shop and politics of the industry. This two-day course gave me an introduction to high-end finishing. With numerous hours of practice on my own, I have been able to incorporate his techniques into restoration jobs that walk through the door, providing better service to my customers and making me of further use to my employer.

The social events provided a relaxed environment for everyone to come together and talk.

For example, where appropriate, I now offer black polishing on screws that have burrs, scratches, or rust stains. Having Henrik show me how he does it and with some practice, I have been able to turn this simple process into an added option, creating

profit for the business and a more complete job for the customer. This is just one example, but I often try to add these extra services onto the jobs, offering before-and-after photos so customers can appreciate what has been done. Of course, some people just want it going and don't want any of the bells and whistles and that's fine.

These finishing skills allow me to differentiate myself from the competition and give me a competitive advantage. Some of you might be thinking, "But that's added time, and I have a huge backlog, so I don't need to do this." Or, "How do I charge for this?" Easy! Figure out how long it takes you to polish a screw, and multiply this by the number of screws, and then charge according to your hourly rate as a business owner. Also, take into consideration the skill involved; the time and effort to learn; and the cost to learn these skills. Then, you should be able to come up with a price. The last point I would like to make about Henrik's course is that should I ever cause the damage to some part of the watch myself, I can now rectify it by leaving the watch in the same condition as it was when it was brand new.

After the two days with Henrik, the convention officially started. Coming from Australia, I had never been to one in the US before, so I didn't know what to expect. I quickly signed up and got my name tag, grabbed some food, and started chatting. The following days were jam-packed with talks, education, lots of food, laughter, and just fun times. The educational talks that the AWCI organized were awesome. So many subjects were covered, giving me a greater understanding of repair processes, the industry, innovation in our industry, challenges, tools, and calibers, allowing me to grow as a watchmaker. The social events provided a relaxed environment for everyone to come together and talk.

I feel we often forget the importance of networking opportunities and potential friendships that can be made at these events, and I would like to give two examples. Firstly, Henrik was kind enough to allow me to visit him and his brother Kaj (you may have seen the articles Henrik is writing about his watch in HT) in Le Locle this year. In May I spent one day with Henrik. He showed me his school and all the equipment, and I got to ask many questions and talk to his students. I also had the pleasure of spending two days with his brother Kaj in his workshop, where we talked about the construction, design, and problems he had. He was also kind enough to let me stay with him and his lovely wife. Thanks! This was a once-in-a-lifetime experience and something I will never forget.

I made lots of friends at the convention. Here I am with fellow watchmaker Francis Zape.

Secondly, after the convention I had some free time and needed to sit at a bench and get some practice in for the CW21, so I began asking around to see whose workshop I could come back to and practice. More than a handful of people where kind enough to extend an offer. To everyone who did, thank you very much. I eventually chose to stay with Craig Stone after he checked with his wife, of course, to tell her a complete stranger was coming back with him. (I will cover the rest of this story in Part II on the CW21 Exam.)

If you are an employee and are thinking about changing jobs, it is the perfect place to put the feelers out and see what jobs could be opening up in the near future. Having brand representation at these convention is critical. I appreciated all those brands that attended in 2016, and I took advantage to have some chats. For me, the talk by Michael Mooney from Omega about workshop compliance and accreditation was insightful and answered a lot of questions. If you own a business, you can talk about issues you are having and how to overcome them with fellow watchmakers. Finally, the food and the venue were amazing—so much room and so much food. I have no doubt that the 2017 national convention will be as good as the last. These events, however, need to be supported by members, and all you have to do is show up.

Some of you may be thinking these conventions are expensive. Or you might say, "I don't have time to take off work; I'm snowed under" or "I already know everything I need to know" or "I went last year." Trust me: you never really appreciate something, or someone for that matter, until it's gone or not available. Our national convention in Australia does not compare to yours, which is a shame. You are currently seeing a surge in watchmaking in the US due to both the demand for American-made watches and the entrepreneurial spirit of watchmakers across the States looking to create their own watches and brands. What better place to come together and share your knowledge, work through problems together, network, and relax? If you are going to the convention this year, call all your friends and colleagues and encourage them to go—the more the merrier! So, as you can see, you have many reasons to go. If you have the time or can make the time, I strongly recommend you head to this year's national convention in Florida—you never know who you might meet or what you might learn.

Kangaroo Photo: By Standards Australia (Standards Australia) [CC BY 3.0 au (http://creativecommons.org/licenses/by/3.0/au/deed.en)], via Wikimedia Commons https://commons.wikimedia.org/wiki/File%3AAustralia_road_sign_W5-29.svg
Photos of Oliver courtesy of Ken Nichols.

Oliver Broos Revitt works for an independent watchmaker in Australia but frequently travels abroad to meet other watchmakers.

I had a few quiet moments during the convention to study for the CW21 Exam, which I was preparing to take in just a few weeks.

From the Workshop

By Jack Kurdzionak, CW21, FAWCI

ETA Will Restore Good "Customer Service"

During my recent visit to Switzerland, I was able to have some candid, private conversations with industry insiders who were willing to speak about current business conditions in the watch industry as well as some future planning going on in their respective companies. They did not reveal any confidential industry information to me. Rather, they confirmed and validated observations I and other writers have made for the past few years.

Sales of new watches and watch movements have had a serious decline. Related to that sales decline is a commensurate reduction in the sales of machinery, equipment, and supplies to the watch manufacturers. These companies recognize the need to diversify their products and their customer base so that they are not entirely dependent upon watch manufacturing to stay in business. When the sales of watches and movements are strong, the supportive companies do well, but during a downturn, especially one as deep as the current one, these companies experience serious financial stress. Often these companies are far smaller in size than the major watch manufacturers and do not have the resources to withstand a long business recession. Hence, they are now actively trying to diversify their customer base away from watch manufacturing so that they will not be so heavily dependent upon the watch business.

Even Swatch Group, with its immense pool of resources, is feeling the downturn and modifying some of its sales policies. The management of their movement manufacturing group, ETA, now recognizes that it ignored customer service in the recent past. They have decided to correct that deficiency by emphasizing quality customer service. They want to increase the sales of watch movements and spare parts to their customers. Before my readers get too excited and read too much into that news, you need to understand what ETA means when they use terms such as "customer" and "customer service." It was clearly stated to me that material distributors and individual watchmakers, who previously held accounts with ETA, are not their customers and will not be their customers. Their definition of customers only includes other companies producing watches. Because ETA has so much excess capacity for movement production, they want to not only continue supplying movements to other companies, they want to increase the sales of those movements to fully utilize their production capability. Those customers will be eligible to obtain the necessary spare parts to repair and maintain the movements they have purchased. ETA will be selling movements and spare parts for those movements only to those "customers." It was reiterated to me that spare parts distribution will be only available to those customers and not to the trade as was the practice in the past. In addition, ETA will be tracking the sales of their movements so that the only spare parts available to a "customer" will be those for the movements purchased by that "customer." As an example, if a watch company buys 1,000 ETA 976001 quartz movements, that company will qualify to buy parts only for those ETA 976001 movements and only in the quantities necessary to repair the movements previously purchased. Hence, watch manufacturers will not have the entire spectrum of ETA spare parts available to them but only the ones for the movements they have purchased.

Jack Kurdzionak, watchmaker and watch material specialist, owned a Boston-area watch sales and service shop for 40 years. He has a BS (Northeastern University, 1967) and has studied at ETA, WOSTEP, BHI, SGUS, and AWCI, and works for Eckcells Watch Materials.

Cleaning Up Your Drawers

By Bruce Ross Forman

Fig. 1

A clean and tidy workshop.

Every clock shop needs a thorough cleaning once in awhile. Even when this is done on a regular basis, we often forget about the junk that can accumulate inside the drawers in our workbench and tool cabinets. Although the workbench in Figure 1 might give the impression of a tidy shop, nothing could be farther from the truth. Lurking inside the workbench drawers are many lathe accessories, specialized collets, chucks, grinding wheels—and God only knows what else—that I have collected over the past 20 years and had yet to organize.

Things had gotten so out of control, Figure 2, that it took me several minutes to find what I was looking for if it was in this drawer.

Fig. 2

A drawer in need of organizing.

Ideally, this drawer should have been well organized like my lathe collets, with a unique location for each object, but this was not the case. For many years, I had put a lot of thought into how these objects could be organized but had taken no action. Finally, like a volcanic eruption, I inventoried the contents to figure out if I really needed all of this stuff.

The most important objects in this drawer turned out to be my collection of lathe chucks. I measured each chuck and determined its diameter so that I could make a drawer organizer. I had some leftover white shelving material and began by cutting it to fit inside the drawer. I drilled holes into the board the size of each chuck. A drill press and hole saw are ideal for this work, Figure 3.

Because my four-jaw chuck could not be stood on end and fit into the drawer, I had to mill a pocket in the board to hold it in the horizontal position, Figure 4. This can be done with a router or a milling machine. When the project was completed, I could actually find the chuck I was looking for, and the chucks actually took up less storage space, Figure 5.

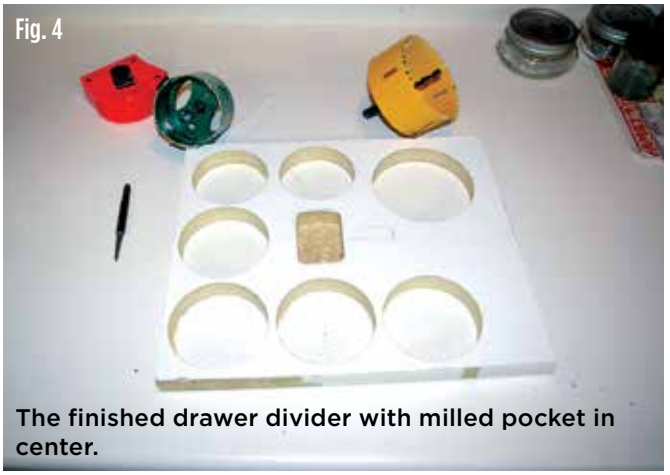
I plan to make more dividers for the other tools I own, but I thought our members would like to see the difference just one divider can make in cleaning up your drawers.

Bruce Ross Forman is a clockmaker with over 40 years of practical bench experience, specializing in making clock hairsprings and restoring tall case clocks made before 1840. Twice he has won first place in NAWCC's Craft Competition for making horological tools.

Fig. 3

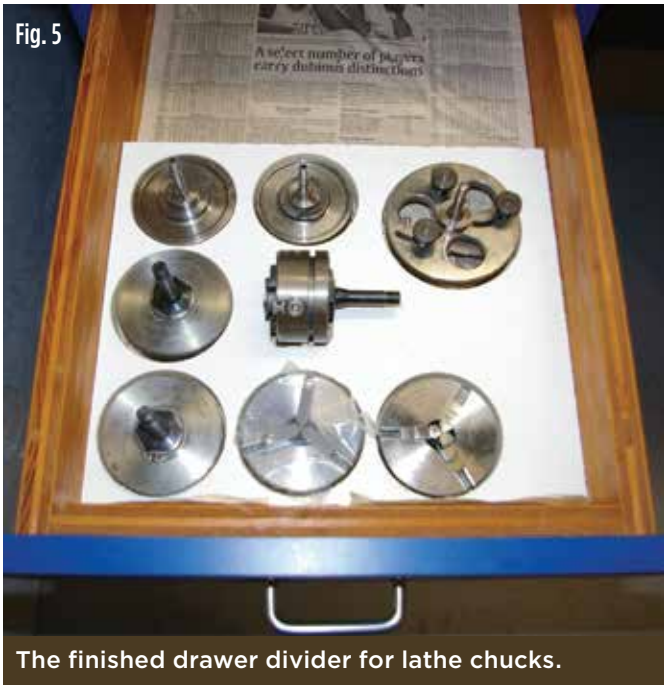
Drilling holes using a drill press and hole saw.

Fig. 4



The finished drawer divider with milled pocket in center.

Fig. 5



The finished drawer divider for lathe chucks.

Lititz Precision Products

By Aaron Recksiek, CW21

In the after-sales service industry of watchmaking and clockmaking, there is a constant need for quality tools and equipment. A high-quality machine can drastically increase your efficiency, which directly impacts your profitability. In modern workshops, much of the Swiss-made equipment has become increasingly more expensive year after year, many times becoming financially out of reach to the independent technician. Also, many brands require equipment with specific capabilities, such as water testing watches to a specific vacuum or depth, or using ultrasonic in small-parts cleaning machines. An American company has been trying to solve these issues for the last eight years, Lititz Precision Products.

John Baer is the owner, engineer, and watchmaker behind Lititz Precision Products (LPP), located in Lititz, in Lancaster County, Pennsylvania. Baer is a Pennsylvania native who, having grown up in a region of the country with a rich horological heritage (the original Hamilton Watch Company is eight miles from Lititz), was always interested in timepieces and how they worked. When it came time to choose a career, Baer wanted to attend a watchmaking school, but his parents encouraged him to pursue the more versatile vocation of engineering. He graduated with a degree in mechanical engineering from Pennsylvania State University in 1981. After college, Baer worked in several industries for different companies in their production departments, helping to refine and improve products. He also worked in tooling and fixturing of machines, including agricultural equipment for New Holland, ball bearings for The Bearing Corporation of America, and hand tools for KD Tools.

While working for large corporations, Baer was becoming increasingly frustrated with expending too much energy navigating the political climates of those companies. Eventually he decided to leave engineering behind and go back to his original interest of watchmaking. The thought of being in business for himself was appealing. Baer began taking courses from Jim Michaels at the National Association of Watch & Clock Collectors School of Horology in Colombia, Pennsylvania. The curriculum consisted of short courses to teach skills with longer breaks designed to allow the students to refine those skills in a real-world environment.

iCan Spirit

pieces Again

Baer decided to open his own shop, The Lititz Watch Company, in the fall of 2001. The Lititz Watch Company consists of a showroom, located on the corner of N. Broad Street and Lincoln Avenue, filled with jewelry, clocks, watches, and many gift items. Located in the back is a workshop where all manner of watch, clock, and jewelry repair is offered. Coincidentally, around the same time, The Lititz Watch Technicum watchmaking school and Rolex USA Service Center opened their doors a half-mile up the road.

For any watchmaker or clockmaker who spends several years at the bench, the pros and cons of common tools and equipment of the trade can become increasingly apparent. For a watchmaker who is also a mechanical engineer, you can only imagine the frustrations realized with design, cost, maintenance, and repair of what seem to be the only products available on the market. Out of this frustration, Lititz Precision Products was born. Initially, Baer sold and marketed his company's first piece of equipment, the Diver 125, under the Lititz Watch Company name. After a few years, as the demand for more products grew, Lititz Precision Products split off from the Lititz Watch Company. A business partner took the reins of the Lititz Watch Company and eventually changed the name to the Lititz Watch & Jewelry Company.

John Baer in front of the Lyon astronomical clock in France.

The Diver 125 was a simple 125-bar wet pressure tester for deep-dive watches, Figure 1. It was made up of a pressure chamber, pressure gauge, pressure wheel, cover, sight glass, and knurled knobs all together in a sleek anodized aluminum housing (refer to May 2008, *Horological Times*, pages 40-41, for more detailed information). The capability to test to those depths is required by some watch brands for spare parts account access. The first major brand to recognize the Diver 125 was Omega, which still approves the tester today for access to dive watch components. John even designed and manufactured a special version of the Diver 125, capable of testing 20 watches at a time, which is currently in use at several Omega Service Centers around the world.


Fig. 1
Diver 125 housings rough machined.

As time went on, the industry's need for an alternative to the equipment currently available encouraged Lititz Precision Products to design and produce more and more tools each year, easily identifiable by their signature "Lititz red" color. With each new piece of equipment, Baer implemented his brand's philosophy: Designing an elegantly simple, reliable, easy-to-produce, and economical machine, while also using as many stock components as possible. As Baer states, "Designing a special part frequently requires tooling charges and large initial orders, driving up costs. Sometimes we will buy a component and modify it a bit. I spend a huge amount of time in design and testing. Simple, elegant mechanical design drives down price and drives up reliability." Baer does all the design work himself, even the printed circuit boards, Figure 2. The only major engineering that he doesn't do personally is the machine code which consists of "C" programming of the microprocessor. In terms of value, about 95% of all the components he uses are manufactured in the United States. All final assembly and testing is done personally by Baer in Lititz.

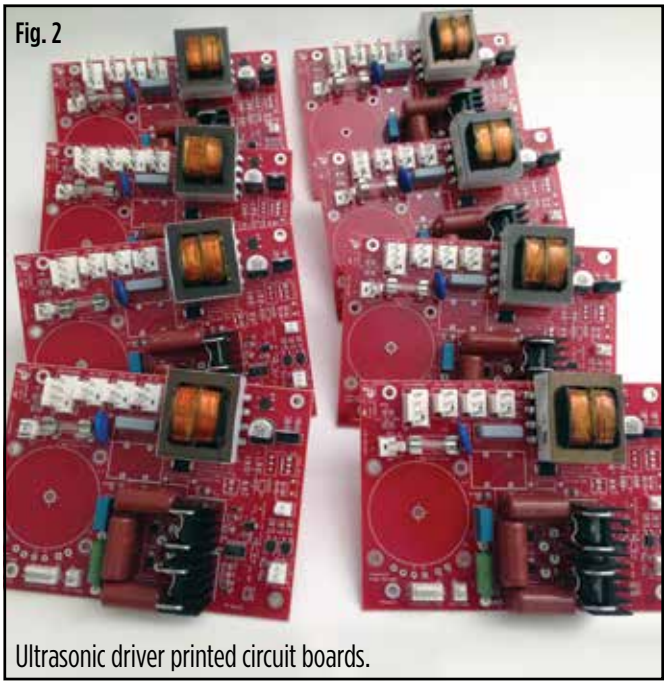


Fig. 2
Ultrasonic driver printed circuit boards.

Following the Diver 125, LPP produced the Preciso 47, a hotplate designed to accompany the wet tester which heats watch cases to a constant 47° C. In 2011, they produced both a wet vacuum leak tester and a hand setting press which can be used with several brands' pushers. The year 2012 saw the introduction of the Revolution, a more sophisticated condensation tester, which consisted of a hotplate and cold element combo. Three years ago, it was the Matador, a manual ultrasonic watch parts cleaning machine.

Fig. 3
Finished Freedoms ready to box.

The most recent venture of Baer and LPP is the Freedom automatic cleaning machine, Figure 3. This new machine is the brand's most ambitious project yet. The Freedom consists of five stations for cleaning or rinsing, all with ultrasonic, and one drying station. There are 10 user-customizable programs with agitation strength and station time programmable at each station. Surprisingly, this was the most difficult part of producing the machine. The jars used in the Freedom are an example of a stock part Baer designs into his machines and are available at any container store for about three dollars. Baer has tested the prototype machines with over 10,000 cycles, which simulates over 12 years of use in a busy workshop. The Freedom retails for $7,495, which is several thousand dollars less than similarly capable Swiss- or German-made machines. The machine also uses LPP's proprietary non-scratch baskets made of laser-sintered nylon, also made in the US. The new baskets come in about a dozen different configurations in 64mm and 80mm diameters. They can be used in various other cleaning machines such as the L&R Tempo 400, Elma RM-90, Vibrograf ACS 900, and L&R Varimatic.

Lititz Precision Products' machines are primarily sold through a network of distributors, but can also be purchased directly. They also have an extensive presence internationally and can be obtained through five distributors in Europe. Technical information on each product can be downloaded directly from www.lititzpp.com. Baer has also posted several "how to" videos on YouTube for a better understanding of how some of the machines are operated. You can contact John Baer through email at jbaer@lititzpp.com.

Sources:
www.lititzpp.com
www.youtube.com/user/LititzPrecision

Aaron Recksiek is an independent watchmaker in Salt Lake City, Utah. He is a graduate of the 2008 WOSTEP class at the Lititz Watch Technicum.

Classified Ads

help wanted

GRAY & SONS Since 1980
INSPIRED JEWELERS WATCH SPECIALISTS
www.grayandsons.com

Master Watchmaker
Gray & Sons Jewelers
Miami Beach, FL
Master watchmaker wanted for the largest seller of fine pre-owned watches in the world.
See **www.grayandsons.com** for watches we buy, sell, and repair. Minimum 10 years experience repairing Patek Philippe, Rolex, Audemars Piguet, Piaget. Experience in chronographs, perpetual calendars, auto movements & lathe work. $70,000 / year plus benefits.
Please fax or e-mail your resume.
305-865-9666 • Email keith@grayandsons.com

ClockMaker Wanted
Located in Salt Lake City, Utah
Minimal experience or experienced.
Wage negotiable. Send resume to:
Itsallabouttime09@gmail.com or 801-631-0829

Check out other
Help Wanted ads at
www.awci.com

click on *Career Center.*

http://awci-jobs.careerwebsite.com

help wanted

Watchmaker Wanted
The Real Real
Brisbane, California
We have an award-winning leadership team with a proven track record of success and we are experiencing hyper-growth. This is a unique opportunity to be part of a VC funded start-up that is changing the marketplace. TheRealReal offers competitive salary, stock options, 401K with company match and a full menu of benefits.
Join our team and make some history!
View job description and apply at:
www.awci-jobs.careerwebsite.com
Job ID: 35451697

for sale

Attention Watchmakers !
Having trouble finding parts to repair that watch?
Try us! Thousands of new parts in stock.
S & S Service
816-273-7402

Our new 2016-2017 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
Merritt's
1860 Weavertown Rd,
Douglassville, PA 19518
610-689-9541 FAX: 610-689-0567

for sale

BUSINESS FOR SALE
Master Watchmaker Retiring
Upscale Watch Repair and Retail Sales Business
Established over 30 years ago on Hilton Head Island; one of the best tourist areas and wealthiest development areas in South Carolina.
Our business is well established with the majority of our business in Rolex and other high-end watch brands repair and sales.
Numerous opportunities daily for Rolex, Patek, Cartier and other fine watch repairs.
Our store is located in a prime shopping center in a high traffic area. A beautiful, professionally designed showroom; separate spacious rear workbenches for repairs with showroom visibility. A large inventory valued at approximately $450,000 in watches, clocks, tools and equipment, including approximately $100,000 in Rolex and Patek spare parts.
Additionally for Sale A 2-bedroom apartment in a prime location for $250,000
Peter D. Baier, CMW - Owner
Phone/Fax - **(843) 842-9500**
Email: **peter@swisstimezone.com**
Website: **www.swisstimezone.com**

wanted to buy

ATTENTION RETIRED WATCHMAKERS
Call us before you sell your parts, tools, and watches. We have helped over 200 watchmakers in the last 15 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

Wanted: Chronograph Movements and Parts
Paying for Valjoux 69, 72, 88 up to $800.00, Venus 178 $300, Longines 13 ZN, 30 CH $500.00, Movado 90, 95 $300.00. Also buying high-grade movements and parts.
Dean Sarnelle
25 W. Beverley St., Staunton, VA 24401
540-885-6064
onceuptime@aol.com

Classified Ads

wanted to buy

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

Rolex Dial Wanted
Buying Rolex dials and parts.
Top premium prices for vintage!
Daytona: up to $20,000
Submariner: up to $5,000
GMT: up to $4,000
Explorer: up to $2,000
Modern dials Gent's: $100 - $1,000
Call: **617-742-0221**
Email: paul@pduggan.com

WANTED!
Entire Watch Collections
Scrap Watchbands
Gold-Filled Cases & Scrap
Gold, Silver & Platinum Scrap
Call Toll Free 1-800-426-2344
Visit our website for more information
www.specialtymetals.com
Specialty Metals
2490 Black Rock Tpke.
Fairfield, CT 06825
203-366-2500 - Local
800-884-7966 - Fax
sales@specialtymetals.com
Member: Jewelers Board of Trade

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

wanted to buy

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

tradespeople

Dashto Inc
4716 Larkspur Ct
Virginia Beach, VA 23462
757-752-1806 Tom Mister
Email: dashto@cox.net
Watchmakers and hobbyists come and check our extensive inventory list out.
We have small items like balance staffs to large items like Bergeon 5537 Grooved Watch Case Back Opening Wrench for oyster watches.
Check our websites:
www.dashto.org & www.dashto.com
(both are mirror images if you have a problem with one try the other website)
We accept PayPal, Visa, MasterCard, American Express, and Discover for payment.

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

MAINSPRINGS
Clock and music box - All sizes.
Custom made. Brass gear blanks.
Timewise (formerly TANI Engineering)
Ph: 330-947-0047, E-mail: twclock08@att.net

Follow us on Twitter!
www.twitter.com/AWCInstitute

Like us on Facebook!
www.facebook.com/HorologicalTimes

Follow us on Instagram!
www.instagram.com/americanwatchmakers

Check out our educational videos!
www.youtube.com/awci/videos

tradespeople

DENNIS KAYE
Advanced Clock Repair Services
108 Corgy Drive • Cary, NC 27513
Call 540-SERVICE (737-8423)
Now Restoring Painted & Silvered Dials!
Porcelain Dial Restoration
Watch • Pocket Watch • Clock
Platform Escapement Repair
Atmos Parts & Service
Kundo / ATO Coil Repair
Large Stock of Electric Motors
All Types Clocks Serviced
Prompt Reliable Service . . . Guaranteed™
Large Supply of Watch Movements & Parts for LeCoultre, Wittnauer & Longines
Call or Visit at dialrepair.com

YOUR SHERLINE SOURCE
LATHES MILLS TOOLING
5% to 15% OFF LIST
PETE CRONOS
PETESTOOLS.COM • PETE@USA.COM
870-974-2583

Watch Parts Fabrication:
I make all types of movement parts: Vintage to modern. MATT HENNING CW, 413-549-1950
www.henningwatches.com

situations wanted

CLOCKMAKER/TECHNICIAN
CC21 Clockmaker is seeking employment in the greater Denver CO or Front Range area.
Please email: **atmosclock@gmail.com**
for resume and experience info.

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

Classified Ads

services

SERVICE/SALES OF TIMING AND CLEANING MACHINES
Vibrograf, L&R, and Watchmaster
Over 19 years experience
Quick repairs & reasonable prices
www.timemachinerepair.com
Dale Sutton 609-374-5880 or
service@timemachinerepair.com

ELECTRONIC INSTRUMENT SERVICE
We are Factory Authorized Service for:
• Greiner VIBROGRAF
• 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
www.electronicinstrumentservice.com

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

2017 CLASSIFIED POLICY

AWCI HT classified advertising fees/rates and minimum schedule remain the same as last year. **We request that you put all classified advertising on a credit card.** We accept MasterCard, Visa, American Express and Discover. If you require a physical invoice and 30-day terms, your rates will be higher due to the additional costs incurred in labor, supplies and carrying charges.

HT Classified Rates for 2017:

For Credit Card Payments...
- $1.10 per word
- Classified "Display" ads with art borders: $47.50 per col. inch (2.25" wide)
- Blind ads – add'l $15.00 per ad

For Paper Invoicing...
- $1.20 per word and
- Classified "Display"ads with art/borders: $52.25 per col inch (2.25"wide)
- Blind ads – add'l $16.50 per ad

Minimum Schedule: 3-Month Minimum
Advertising studies show it takes over 3 viewings for readers to recognize specifics in your ad.

Deadline: 30 days before the first of the month in which you plan to run your ad.

Note: If you place a recruitment ad on the www.awci.com Career Center as a combo online/HT ad, there's no need to resend the ad to us. The website system is automatic.

To Place Your Ad:
Email: classad@awci.com **Fax:** 513-367-1414 **or**
Call: 866-FOR-AWCI (367-2924) • 513-367-9800

Horological Times Advertising Policy & Editorial Policy

Advertising Policy for the *Horological Times*
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. The advertiser will also accept responsibility for any claims or suits arising therefrom brought against the publisher. Printed articles may also be used by the publisher without permission expressly sought, or payment made, on www.awci.com, the American Watchmakers-Clockmakers Facebook page, or via other media.

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 approval procedures are available from AWCI and at www.awci.com. The appearance, reference, or advertisement of any product or service in this publication shall not be deemed an endorsement of such products, methods or services by AWCI, its directors, officers, or employees.

Publisher's Standards
AWCI makes a concerted effort not to publish any advertisement which promotes or depicts practices not in harmony with our professional Standards & Practices for Watchmakers & Clockmakers. The advertisement of generic parts, tools, and materials is allowed when such advertisement does not possess any trademarked image, brand, or name. Advertisers can refer to the items by name, function, quality, size, and description. Genuine parts can be advertised as such in accordance with the advertiser's relationship and agreement with the manufacturer.

We encourage advertisers to reach out to our members and market goods and services which will help them to professionally service their clients and represent themselves in a way which will "reflect positively on him or her, on the AWCI, and the entire watch and clock repair industry, including all of its participants." – *AWCI Code of Ethics*

awci directory

ADVERTISERS' INDEX

BOARD OF DIRECTORS

American Watchmakers-Clockmakers Institute
701 Enterprise Dr.
Harrison, OH 45030
Ph: 866-FOR-AWCI
513-367-9800
Fax: 513-367-1414
awci@awci.com • www.awci.com

WE THANK THE IAB

AWCI would like to thank our Industry Advisory Board members for their ongoing support of the institute and the industry.

BREITLING 1884
C.R. Time Company "WHERE WE HAVE THE TIME FOR YOU" 431 ISOM ROAD, # 109 SAN ANTONIO, TEXAS 78216
Mercury Refining America's #1 Recycler of Silver Oxide Batteries www.MercuryRefining.com
STAR TIME Supply Co., Inc.
Cas-KerCo.
eckcells watch materials and tools
Parsec Enterprises, Inc.
SWATCH GROUP
SY KESSLER SALES, INC. renata batteries GemOro SUPERIOR INSTRUMENTS
CHELSEA CLOCK
G-S SUPPLIES, INC
Richemont North America
TIFFANY & Co.
CHRISTIE'S
Borel
ROLEX
SEIKO DEDICATED TO PERFECTION
watchonista
CHRONOS American Watch Guild
LÖWEN WATCH GROUP
Selco The Watch Source
WLXT Fine Diamond Jewelry

RICHEMONT NORTH AMERICA, INC.

Richemont owns several of the world's leading luxury companies in the field of luxury goods, with particular strengths in jewelry, luxury watches and other luxury accessories.

We are seeking talented and qualified Watchmakers to work for our brands located throughout the United States and Canada in our Boutiques and Service Centers.

Responsibilities

- *Must be qualified to perform services which include Complete Maintenance and Quick Services on calibers that include*
  - *Quartz*
  - *Mechanical*
  - *Automatic*
  - *Chronograph*
  - *Complications*
- *Diagnosis*
- *Case Preparation*
- *Achieve and maintain Production and Quality Objectives*

Qualifications

- *Accredited Certification*
- *Experience working with luxury brands preferred*
- *Strong attention to detail, with the ability to handle multiple tasks*
- *Ability to work in a fast-paced environment*
- *Strong diagnostic skills*
- *Good customer service and communication skills*
- *Knowledge of SAP System would be a strong advantage*

We offer competitive compensation, on-boarding program, benefits and relocation assistance. To be considered, please submit your resume and profile on www.Richemont.com or by fax to 817-283-2304.

Renata's born on date...

is marked on the side of each battery.

Renata silver oxide batteries have a "born on" date openly printed on the side of each battery. The first digit marked on the side of the cell indicates the year of production, while the second digit represents the month. For October, November and December 0, Y and Z are utilized. This cell, marked 78, would indicate a Mercury Free battery produced in August of 2017.

All Renata silver oxide battery packaging indicates "0% Mercury" and is also marked with a "Best Before" / use by date that falls 3-years from the date of production.

Before the 2010 transition to 0% Mercury, three-digits were used. The first digit indicated the year the battery was produced, and the next two, the month. A (colon) ":" preceding the numbers was used to indicate batteries which were produced over the decade just prior, whereas the decade before that had no ":" (colon). Baby Watts's born on date was :801 = January 2008
(He is now 9 years old!)

SY KESSLER SALES, INC.

renata batteries

Renata Batteries - North American Headquarters
800.527.0719 sales@sykessler.com
www.sykessler.com **www.renatausa.com**