HOROLOGICAL TIMES™

ADVANCING THE ART, SCIENCE & BUSINESS OF HOROLOGY
February 2014

AMERICAN WATCHMAKERS-CLOCKMAKERS INSTITUTE

The Case Issue

Repairing a Silver Hunting Case

The Best Products and Techniques for Refurbishing Wooden Clock Cases

Certification Update

How to Use the Lathe's Back Gear as a Spring Winder

A Look Back at the Development of the **Gruen Watch Company**

Innovative Watch Cleaning from Elma

Elmasolvex Series

ELMASOLVEX VA - $17,900

- Vacuum technology removes gas bubbles during ultrasound
- Multi-frequency ultrasound is adjustable for delicate parts
- New vacuum drying system uses warm, filtered, clean air
- TÜV-certified to be explosion protected
- Price shown has 64mm baskets
- 23.6" W x 24" H

ELMASOLVEX RM AUTO - $5,599

- Four jars: one cleaning, three rinsing and one drying chamber
- Use the standard cleaning program or select options to vary time in the jar, basket speed, spin off speed and time, select rotation or vibration cleaning
- Optional exhaust port available
- 20.3" W x 21.4" D x 25.6" H

ELMASOLVEX SE - $2,899

- Four jars: one cleaning, three rinsing and one drying chamber
- Manual operation, improved method for moving baskets jar to jar
- Optional exhaust port available
- 19.8" W x 20.3" D x 25.6" H

Elmasonic S Series

- Greater ultrasonic power than the E Series
- Degas new solution to speed up the cleaning time
- Choice of sweep or regular ultrasonic action
- LED lights show temperature of cleaning solution
- LED lights show cleaning period remaining
- Drain available on the S30 model

VIB-S120H - $1,464

VIB-E120H - $895

- 12 Quarts
- 11.8" x 9.4" x 8"

VIB-S60H - $999

VIB-E60H - $695

- 6 Quarts
- 11.8" x 5.9" x 5.9"

CL720.10
Nylon Basket
$7.00

CL609.08
Hook for 16 rings
$7.80

VIB-S30H - $560

VIB-E30H - $360 (No Drain)

- 3 Quarts
- 9.4" x 5.4" x 3.9"

All units shown are warranteed in the USA

Borel

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IN THIS issue

VOLUME 38, NUMBER 2, February 2014

features

technical discussions

awci news

industry news

education & certification

columns

COVER IMAGE:

When Bob Little received this clock, it was in pieces and badly mildewed. Find out how Bob refurbished this clock and what products and techniques he recommends for repairing wooden clock cases on page 32.

Photo by Robert Little

classifieds

Horological Times Advertising Policy & Editorial Policy

Dear AWCI Members,

The Board of Directors of AWCI, by the request of our advertisers, recently passed a motion defining an advertising policy and standards for *Horological Times*. The objective of this policy is to promote the use of genuine parts, to encourage higher quality workmanship, and support certification. This policy helps to ensure that AWCI consistently presents a professional image through its magazine. We recognize that restrictions on the sale of genuine parts have created an increased demand for non-genuine parts. Nevertheless, allowing the advertisement of non-genuine parts endorses their use and reflects poorly upon our industry and our members. We will continue to regulate the advertisement of non-genuine parts in an effort to promote the use of genuine parts whenever they are available and to encourage their fair distribution.

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 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 but shall not indicate that the parts are generic, aftermarket, or non-genuine. Phrases like "to fit [brand name]", "[brand name] style", and "generic" are not allowed. 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 & 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

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a message from the president

MANUEL YAZIJIAN, CMW21

Manuel Yazijian
myazijian@gmail.com

I talked last month about how important it is for us to adhere to high standards, and I offered solutions to the labor shortage of some watch companies and methods of having a win-win situation for independent horologists as well as the manufacturers. This month, I will discuss the role of the sales division in our arena.

For those of us working at the bench, our professional world is usually relegated to about one-quarter of the circle of what is immediately in front of us, that is, the service aspect. The other three-quarters is made up of research and development, design, production, marketing, and distribution and sales of the new product. We choose to support what is at the very end, *after-sales* service, therefore *supporting* the sales. Therefore, our role in the larger equation is as important as those who are in the other three-quarters of the circle.

We help maintain the manufacturer's product that was intended to last a predetermined period of time. Each brand and manufacturer has different philosophies and approaches that may not always be the same. However, each brand has calculated a certain "cradle to grave" period for the said product.

Experienced companies with long-term goals understand the importance of after-sales service, also known as "service après-vente" in French, or SAV for short. Therefore, they continue to incorporate details that make it simpler and easier to perform the SAV function either by their own facilities or independent agents. These details include efficient parts stocking and distribution, intelligent design of cases and bracelets that are relatively easy and expedient to refinish and maintain as new, and solid and properly designed movements that function well and are relatively easy to service. All these details add up to a solid product that is desirable, functions well, and is easy to service.

If we, as highly skilled technicians, perform our tasks to within industry standards, and all the aforementioned entities do so as well, then you might surmise that the entire machine performs smoothly. However, it gets a bit complicated.

In this message, my focus is on the *sales* divisions of brands and the perceived power they wield. The sales divisions of some brands hold a certain "importance" or hierarchy within their companies. Often, sales reps are the "go-to" persons for the retailer/dealer to get a certain task accomplished or to receive certain privileges. After all, if sales of new products are threatened or perceived to be threatened, it becomes easier to bend rules or bypass standards. Unfortunately, bypassing quality standards and bending rules and guidelines does only one thing—erode the quality of the service. As mentioned in several of my previous messages, if service and sales are inextricably linked, this will affect the overall image of the product and therefore reverse the efforts the marketing department has painstakingly worked to create. Only when service and sales are together and on equal standing will the product have a chance to succeed and flourish.

Bypassing quality standards and bending rules and guidelines does only one thing—erode the quality of the service.

For example, a somewhat similar industry, the automotive industry, faces similar challenges, but some car brands have instituted strict guidelines—specifically, the sales division is in fact a stalwart supporter of the service division. Should a retailer be caught bypassing industry standards during after-sales service, or if a car they serviced that will be sold as "factory certified" pre-owned is found not to meet approved standards, they are ultimately warned by the sales division of the brand. The sales division looks at this violation as cause for deep concern, knowing it will eventually affect their overall brand image and, therefore, total sales. Corrective measures are then taken.

Just as in the auto industry where various brands are found side by side on "auto alley," so are various watch brands found side by side in many retailers and dealers. Competition can be fierce, and the survival of the brand is always at stake.

Understanding and respecting those who work to high standards will help grow sales, and a byproduct of this is the creation of a healthy and vibrant independent SAV network. The promotion of double standards by the brands, which favor some retailers over those who have embraced the highest of standards of workmanship, will inevitably hurt everyone in the industry.

In the meantime, keep your skills honed, your standards very high, your attitude professional, your tools and equipment in great condition, and your workshops clean and organized—this is the only way we will excel.

a message from the executive director

JORDAN FICKLIN, CW21

Jordan Ficklin
jordan@awci.com

A Financial Update

I know our membership is eager to know what has been accomplished at AWCI since I started as Executive Director. At the time of this writing, we just finished closing out the first half of our fiscal year, and I just want to give a quick financial update to let you know of the progress that has been made.

As of December 31, 2013, net profit for AWCI was $62,000 despite having budgeted a loss of $116,000. Some of the factors that have allowed us to perform so much better than we had budgeted are less-than-expected expenses related to staff changes at headquarters, many little changes that have allowed us to save in areas such as utilities, taxes, and heating/cooling, as well as more-than-budgeted revenue for classes and advertising. This is in great part thanks to generous in-kind contributions from Industry to help us continue offering classes as we look for a full-time instructor. You will see an ad in this magazine for the position of watchmaking instructor. If you or anyone you know may be interested, spread the word. AWCI has a beautiful educational facility and provides an excellent opportunity for someone who is passionate about this profession to share their knowledge with other clockmakers and watchmakers.

As of December 31, we owe $518,000 on our mortgage and have an outstanding line of credit of $279,000. One year ago the outstanding balance on the mortgage was $547,000, and the line of credit was at $348,000. Just four short months ago, the line of credit was at $475,000.

The Midyear Meeting

As you are reading this, your Board of Directors is preparing to travel to Florida for the midyear meeting of the Board of Directors on February 12. Last year's midyear meeting and this year's annual meeting focused on the immediate future of AWCI. In addition to the necessary motions to prepare for the publication of a budget and preparing for an election and the annual meeting, the focus of this meeting will be on the long-term future of AWCI. An emphasis will be on which programs to expand and develop vs. which ones should be changed or eliminated. Also on the table will be the topic of the membership structure of AWCI—whether it can or should be changed to better benefit our members as well as attract more individuals into our organization. As members, your feedback on this topic is greatly needed. Please email or call your board members so that they know what are your concerns going into this meeting. Their individual emails are located at the front of this magazine, or you can reach the entire board at awciboard@awci.com.

A Survey

The future of AWCI is in your hands. This organization belongs to each of you. The building, the classrooms, the employees are all here because of each of you, our members. We want to know how we can best serve you and how we can best attract more members to participate in our organization. We have developed a short, seven-minute survey that can be taken online. It asks you to rate the value you place on our current programs as well as some possible future programs that have been considered for implementation. Please take the time to fill out this survey and let us know what you value about AWCI. Note: This survey is not just for members. Please share the link to this survey with your friends and colleagues who are involved in the horological professions. Their feedback will help us better understand why they are not members of AWCI and what we can do differently to attract them into our organization. Share the survey on facebook, in discussion forums, and via email with anyone involved in our profession.

AWCI is poised to grow and develop.

AWCI is in an excellent position right now and is poised to grow and develop. Please be a part of your future by taking seven minutes to take a quick survey.

www.awci.com/about-us/survey

AMERICAN WATCHMAKERS -

AWCI continuing education courses are designed to help professional watchmakers continually improve their skills and stay current on changes in recommended service techniques. We are offering a combination of refresher courses, advanced level courses, and courses designed to prepare individuals for the CW21 (Certified Watchmaker) Exam. Previous work on watches in a watch repair environment is recommended—for example, self employed, factory service center, independent service center, or store manager.
Not sure which course to sign up for? Please log on to our website and fill out the Professional Experience Questionnaire. Contact us so we can help you find the best course suited to your skill level, expertise, and interests.
Don't see the course you want here? We are always trying to expand and improve our course offerings and we welcome suggestions. We may also have a course already developed which isn't scheduled, and we can try to accommodate you.
Looking for someone to come to your business, chapter, or guild to teach a course? We do that too. Please contact our education coordinator for more information.

Polishing, Case Refinishing, and Water Resistance Testing
(MARCH 10-13)

Polishing a watch today requires many skills. Complex case and bracelet designs are common in the marketplace. Today's consumer has high expectations concerning the quality of the watch repair which includes the refinishing of the case and bracelet. Knowledge is the key.

This course will be taught by instructors from the Lititz Watch Technicum and includes concepts and hands-on training in the following areas:

- Casing information
- Case and bracelet refinishing
- Metallurgy
- Lathe finishes
- Use of modern variable speed polishers
- Modern polishing techniques ensuring case shape integrity
- Water resistant testing

This course is designed to help you realize:

- A higher quality of service
- Reduced comebacks due to moisture issues
- Faster turnaround time
- Higher customer satisfaction

Introduction to Watchmaking I
(MARCH 24-28)

Everyone you talk to is interested in what you do. They see your passion and your dedication. This course is an opportunity for each of us to share this passion with those we work with.

Introduction to Watchmaking I is a class which gives a basic knowledge of what we do with an emphasis on professionalism. This class is a little different from the one-day (or weekend) course where you take a pocket watch movement apart and hopefully get it back together again. This class covers not only disassembly and assembly but the importance of cleanliness and oiling.

This class is perfect for anyone considering a profession in watchmaking, for sales people who want to be able to speak more professionally with their customers about what is involved in watch servicing, and for industry professionals hoping to become better acquainted with the work of a professional watchmaker.

We don't make watchmakers in a week but we can help individuals become passionate about watchmaking, and help them understand the importance of the standards and practices being implemented by the Industry today.

The Introductory course is designed for individuals with very little or no watchmaking experience. If you know somebody who is interested in the profession this is the course for them.

Basic II is for individuals who have experience with disassembly and assembly and/or have been working on watches, but not professionally.

Basic III is for individuals who have been working on watches but do not have formal training and would like to start the continuing education process to raise their proficiencies to meet those required by the Standards & Practices of AWCI and the Industry as a whole.

Basic Watchmaking I, II, and III are hands-on courses that provide the essential feedback from an instructor that you can't get learning watchmaking from a book or on the Internet.

We hope to see you, your friends, and your associates in our classroom soon!

CLOCKMAKERS INSTITUTE

FEBRUARY 11-12

Midyear Meeting of Board of Directors

FEBRUARY 24-27

Refresher Course

MARCH 3-5

CW21 Exam
AWCI
Harrison, Ohio

MARCH 10-13

Polishing, Case Refinishing, and Water Resistance Testing

MARCH 24-28

Introduction to Watchmaking I

APRIL 7-10

Basic Tool & Spare Parts Making – Level II

The second course in this series designed for both clockmakers and watchmakers is a more customized program to further your micromechanical skills. You will be designing and making a dead beat escapement for the Hermle 77 movement.

APRIL 14-17

Modern Mechanical Chronograph – ETA 7750

This course focuses on the service and adjustment of modern mechanical chronographs like the ETA 7750 and is the perfect course for anyone preparing for the CW21 Exam. Students should have a solid understanding of basic service procedures as this course will focus on the chronograph mechanism itself.

MAY 5-8

The Art of Watch Adjusting: Escapement, Timing, and Oscillator Work

This intense 4-day course will help you refine your adjusting skills. The course covers all of the adjustments for the Swiss lever escapement, hairspring, and balance. Also covered is balance staff replacement, poising, and adjustments for classic oscillator systems with flat or overcoil hairsprings, as well as the ETAChron system.

MAY 12-14

CW21 Exam
OSU
Okmulgee, Oklahoma

MAY 19-22

Basic Watchmaking II

JUNE 16-19

Basic Watchmaking III

JULY 7-10

Basic Tool & Spare Parts Making – Level III

The third course in this series designed for both clockmakers and watchmakers allows you to refine and showcase your micromechanical skills through further miniaturization. Designed for students who have mastered the skills of the first two courses, you will design and manufacture a 3/4 plate for the ETA 6497.

JULY 28-30

CW21 Exam
Lititz Watch Technicum
Lititz, Pennsylvania

AUGUST 11-13

CW21 Exam
North Seattle Community College
Seattle, Washington

NOVEMBER 10-12

CW21 Exam
OSU
Okmulgee, Oklahoma

For additional details about specific courses in comprehensive syllabi form, including complete tool lists, visit: http://www.awci.com/education-certification/education2/list-of-continuing-education-courses/ or contact Cindy Whitehead at 866-FOR-AWCI (367-2924), ext. 303.

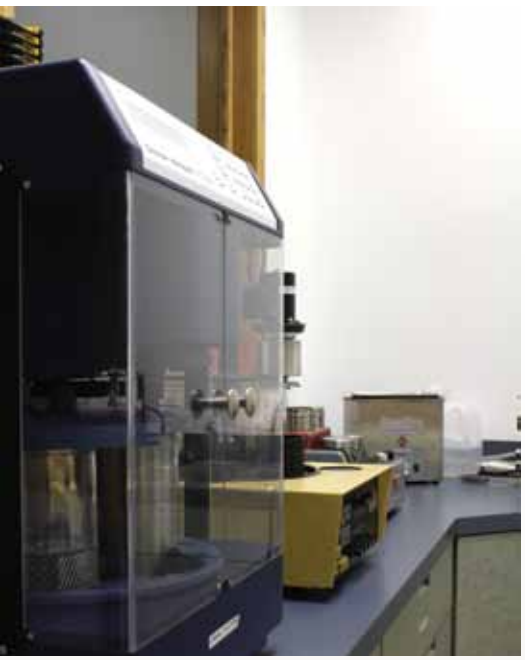
Want to work at a state-of-the-art facility?

Do you have the skills and drive to teach our AWCI students?

Then the instructor position may be of interest to you!

Apply now by logging on to our website at www.awci.com.

Click on *Career Center* to apply online.



Job Title: Watchmaking Instructor

About Us:

The American Watchmakers-Clockmakers Institute is a professional organization for watchmakers and clockmakers in the United States and across the world. We provide continuing education for professionals involved in after-sales service of watches and clocks. We house one of the largest collections of horological books and technical guides in the United States and are home to the Orville R. Hagans History of Time Museum. We produce a monthly magazine, Horological Times, and provide a wealth of benefits to our members. Our training facility is well equipped with all of the latest technology and infrastructure for teaching, including: bench camera, overhead projectors, large-screen televisions, wireless audio, and more. Thanks to generous support from partners in the watch and clock industry, our classroom also has all of the latest equipment necessary for teaching watchmaking and clockmaking, including the latest cleaning machines, timing equipment, water-testing equipment, casing equipment, and polishing equipment. We also have traditional watchmaking machinery including Horia 8mm watchmaker lathes, WW lathes, 102mm lathes, milling machines, drill presses, etc.

For more information visit our website at www.awci.com

Basic Responsibility:

Responsible for carrying out the educational mission of AWCI in concert with the Executive Director by providing technical training sessions that develop the necessary skills required to enhance the attendees' ability to deliver quality workmanship and high performance by demonstrating high professional standards.

Essential Functions:

Responsible primarily for the technical training of AWCI members with the aim of measurably increasing their skills and knowledge.

1. Designs and teaches courses that support the educational technical needs of the AWCI members.
2. Works with the BOE and the Education Committee to keep educational programs current and up to date with industry standards.
3. Facilitates the development of standardized curriculum for REC schools.
4. Prepares presentation material in electronic format to be used for in-house training and to be used on the Institute's website as needed.
5. Uses a facilitative style to motivate and encourage attendees. Models professional ethics and behavior appropriate for this role. Fosters a learning environment that assures the highest level of professional training.
6. Works with the Executive Director and Education Coordinator in planning and developing schedules for training. Prepares lesson plans based on the specific training request and guidelines provided by the Institute and the Industry (if pertaining to specific movements).
7. Takes a keen interest and looks for areas of improvement in the field of technical education and professional development. Shares observations and ideas with Executive Director.
8. Responsible for maintaining an immaculate training facility including equipment, training tools, aids, reference material, and audio visual. Creates technical information for training and education as needed.
9. Responsible for the inventory of tools, materials, and equipment in the training room. Assures the supply and proper training in the use and handling of all of tools and equipment.
10. Maintains necessary record of the training conducted and progress reports on all trainees.
11. Assures compliance with all pertinent safety requirements and instructs trainees accordingly.

Minimum Requirements:

Education: High School, preferably college graduate. Formal watchmaking education, CW21, or other industry-recognized certification. Must have participated in formal watchmaking program and/or continuing education programs.

Experience: Minimum of 5 years experience working with high-quality watches, familiarity with similar educational environments and processes.

Other: Strong technical knowledge and ability to share it with all levels of the organization, strong written and verbal communication skills, ability to interact with technical and non-technical staff members, strong computer skills and knowledge. Willing/able to travel for offsite courses, etc.

Skill Requirements:

1. Able to transfer knowledge in a compelling way and to command attention of a group.
2. Be the source for technical knowledge about watches.
3. Knowledge of high-grade watch service.
4. Must be well versed in pertinent repair techniques including escapement and hairspring adjustment, precision timing, etc., and making/altering small parts.
5. Strong knowledge of basic business software like Microsoft Word, Excel, Outlook, as well as industry tools like CAD.
6. Good oral and written communication skills in technical subjects and familiarity with researching and applying technical literature to the work process.
7. Must be familiar with all pertinent tools and equipment.
8. Must be knowledgeable of proper safety procedures in the work place.

Reports Directly To: Executive Director AWCI

Ask Huck

By J.M. Huckabee, CMC, FBHI

During the upcoming year we will reprise some columns by J.M. Huckabee, who passed away in 2013. Many members new to clockmaking will benefit from his wisdom. Experienced clockmakers are sure to pick up some useful tips.

Here we present two columns that deal with clock cases. The first one is from September 1999, and the second is from October 1999.

Paint for Cast Ornaments on Clocks

Question

What can be used for touch-up or repainting ornaments on antique clocks (for example, kitchen clock pendulums, dial pans, and the like)?

Answer

Most of the materials I've found are called antique gold, and are some form of aluminum paint. These materials rarely look like the original finish, and are not too good over a long period of time.

I restore lots of ignition magnetos for antique tractors and gasoline engines. These magnetos often used simulated brass- and silver-finished parts, the base material being cast iron, cast zinc, lead, and various sheet metal pieces. Through this work I found two finishes that are excellent for the clockmaker, made under the Krylon trade name. These are spray cans of bright silver and brass. These materials are very thin, spray in a fine mist, cover well, and not bad to run. The material is so thin that even small runs disappear when dry.

The brass spray makes a very durable and lasting finish to cast pieces, having a soft non-reflective brass appearance. The silver is also soft, bright, nonreflective, and durable.

Each of these materials is dry-to-touch in about ten minutes on a warm day. By overnight they can easily be worked with, and in a few days are somewhat scratch resistant.

Surfaces should be reasonably clean and oil free. I've used these for many years and recommend them to every clock shop. They will give your work a fresh look.

Ornaments on American Clocks

Question

Is it possible to duplicate some of the cast lead ornaments needed for old American mantel clocks? How can these be made?

Answer

I've made a number of these pieces in years past. It's not a profitable situation in most cases, but it's a good skill to add to your storehouse of knowledge.

About thirty years ago I made up several wood flasks that would accommodate the size of pendulum balls, feet, and end ornaments you mentioned.

Each time I found an unusual ornament, one piece of the flask was filled with plaster of Paris and the ornament was embedded in the material. The piece was coated with oil as a release agent. The next day the material was oiled and the second half of the flask filled. The part was later removed.

At a much later time, the material being dry, it was smoked as a release agent, and molten lead ladled into the cavity. With reasonable care, a dozen or more pieces could be cast. **Note:** Use necessary precautions when working with molten lead.

The pieces were later cleaned up, flash cut away, and spray painted.

Such items as pendulum balls require an inserted wire hook in the cavity. Kitchen clock pendulums require an inserted rod to make the internal passageway. This work was done when my boys were teenagers, and I used tools from their lead soldier casting set. I'm still using many items that we cast in the early 1960s.

Scrap automobile wheel weights work best, being harder and less expensive than pure lead. Beeswax was used as a lead-pot flux.

Certification Update

By Wesley Grau, CMW21

In 2012 discussion regarding the current state of the Certified Watchmakers exam began. From these discussions, a task force of certified members and industry representatives was formed to evaluate the program. Out of this task force came recommendations for improvements to the examination. Some of the objectives were to remove the redundancies while moving toward a more dynamic approach and to increase the consistency in the assessment process. During 2013 new exam procedures and components were developed and piloted and are now ready to be administered. The following explains how the examination will be administered in the coming year.

The examination consists of four components, and will be administered over the course of three eight-hour days. After a brief orientation, the first component, a written examination consisting of 21 questions will be administered. The questions are short-answer or label-type questions that cover 10 horological topics: basic nomenclature, calculations, diagnosing, lubrication, escapements, automatic systems, chronograph systems, quartz, timing, and hairspring adjustments. This component takes place during the morning of the first day and ends with a lunch break. After lunch the examinees choose the rest of the components (practical in nature). These components have been prepared with identification numbers and are presented to each examinee, who randomly chooses a number which is recorded under his or her assigned examination number. This system allows for complete anonymity and assures that examinees' work will not be able to be identified.

The first practical component we will explain is the quartz component. This component consists of a complete service of a quartz watch. The examinee must have a comprehension of all pertinent electronic diagnostic tests, and proper service of a modern quartz movement. In addition, the examinee may be called on to perform a proper stem replacement as well as water-resistance diagnosis and intervention on the case.

The second practical component we will explain is the micromechanical component. For this component the base movement of an ETA 2824 (movement only with no case) is used. The examinee is requested to run timing results and then replace the balance staff and fabricate a new barrel bridge bushing, service the movement, and run final timing results. The examinee must be proficient with a current method of balance staff replacement as well as proficient with the lathe for this exam component.

The third and final practical component is the complete service of a watch with an ETA 7750 movement. For this examination component, the examinee is requested to service the movement and make appropriate adjustments to the escapement and chronograph mechanism. The examinee must be proficient with adjusting watch escapements as well as the multiple adjustment of a chronograph mechanism.

With all of these exam components, the examinee must pay great attention to proper cleaning, lubrication techniques, as well as aesthetic preservation of the components. It is highly recommended that candidates preparing for this examination seek the counsel of certified members and have their practice work evaluated by them if possible.

Making a Button Cover for an 18 Size Pocket Watch

By Wesley Simmons

An unsightly pocket-watch case needing many repairs came to the bench of Wesley Simmons, a watchmaker at Illinois Watch Company. His biggest task was to create a silver cover for the button that opens the case.

A few weeks ago a customer brought in an 18 size Waltham pocket watch with a silver hunting case to be repaired. The watch was rough and needed many repairs, including putting a silver cover on the button that opens the front hunting case cover. The button had worn down to its brass core from many years of use. The brass showing on the silver case made it quite the eyesore, as seen in Figure 1.

Fig. 1

First, I needed to create a plan of action for how to fix this problem. I decided to purchase a silver plate and cut out a long strip that would wrap around the existing brass core; I would also make a disc to be laser welded on the top of this silver cylinder. Lastly, I would add a buffed finish to match the case.

Once the 1mm-thick silver plate was in the bench vice, it was time to cut out the strip that would form a cylinder around the brass core. To begin, I measured the brass core's diameter and height. I had to find the silver's functional height as this button presses down to activate the front cover, so I had to leave some room toward the bottom to allow this action. I did this by pressing the button down until it stopped and then measuring what still stuck out. As seen in Figure 2, this was done by putting the plate in a bench vice and cutting the piece out with a jeweler's saw. Once the piece was fully cut from the plate, I smoothed the edges down on a power hone.

Fig. 2

The next step was to form this into a cylinder that fit on the brass core. I did this by finding aluminum stock that was 6mm in diameter. I bent the silver around this piece until it formed a tight ring. The 6mm diameter was very helpful, as it was slightly smaller than my brass core. The aluminum was also great as it took the damage rather than the silver. When the ring was nearly perfect, I took it off the aluminum stock and laser welded the ends together to form the ring. As seen in Figure 3, the finished part should be as round and as flat on the top and bottom as possible. Lastly, I chucked the part up in a lathe to add a beveled inside edge to the bottom of the cylinder; this was to fit around the sphere the button goes into.


Fig. 3

The newly made piece now friction fit onto the brass. I then proceeded to laser weld the silver to the brass. I welded it on the top of the button, as it will be covered up by the silver disc. I made sure all was level before welding. The cylinder was now welded on the brass piece as shown in Figure 4.

Then I cut the silver disc from the same silver plate. I did this with a bench vice and a jeweler's saw. The way I decided to do this was to get the silver disc mostly round and then chuck it up in a lathe. When it was in the lathe, I used a graver to cut out a circle slightly larger than the silver cylinder so that the disc could sit on top. Once the


Fig. 4

circle was cut down (about halfway into the disc), I was able to use a Jacob's chuck to hold the disc on the inside where there was a perfect circle. As the disc was chucked up in this manner, I was able to use the graver to take metal off the edges, which made it into a circle. The finished disc is shown in Figure 5.


Fig. 5

Now that the disc was finished, I could laser weld the two pieces together. Before this, I cleaned up the silver cylinder to make it more round and uniform. I put the disc on top of the button and proceeded to laser weld. Silver does not seem to like to laser weld very much, so I recommend marking it with permanent marker to reduce reflecting the shots. I made a weld completely around the base of the disc to make it very secure.

Figure 6 shows the button cover fully assembled but not yet cleaned.

Before cleaning the assembled cover, I put a beveled edge on the top of the disc as well as a small one on the bottom. I did this to create a rounded edge after buffing. I proceeded to buff and get the button cover the way I wanted it to look.

In Figure 7 you can see the finished button cover polished.

End result: I was happy with it and, more importantly, so was the customer. It was still fully functional with the cover on. I did use a laser welder for most of my welding, but I believe that soldering would work just as well. In Figures 8 and 9 you can see the finished button cover on the case.

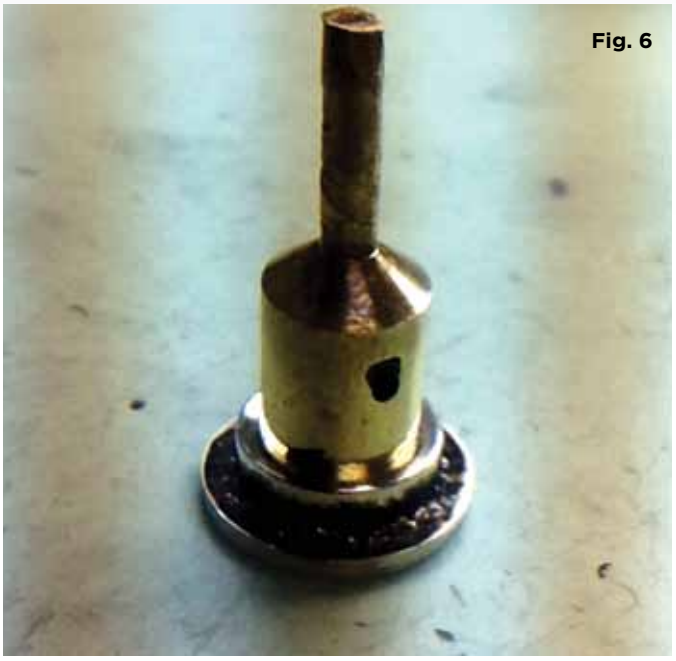


Fig. 6


Fig. 7


Fig. 8


Fig. 9

Safety First: When using the buffing machine or any rotary device, be sure to use extreme caution. When laser welding, be sure your settings are as desired and that the water is full. Always put safety first in your projects and be sure to wear appropriate personal protective equipment.

Q&A with David Christianson

Do you have a question about a watch or a clock repair?

Ask David Christianson, renowned horological historian and a certified Master Watchmaker. A past president of the American Watchmakers-Clockmakers Institute and a Fellow of the British Horological Institute, David has written for *Horological Times* and *Professional Jeweler* magazine. He has also taught watch and clock restoration.

Send your question with a photograph of the case, dial, and at least the back of the movement. A photo of the front of the movement would also be helpful. Include a phone number or an email address. Email your question to editor@awci.com or mail it to

AWCI
701 Enterprise Drive
Harrison, OH 45030-1696
Attn: Editor

From the Orville R. Hagans History of Time Museum

The Art Deco Style

The style of the Carré is known as art deco. It is a form of Modernism that flourished in the United States and Europe in the 1920s and 1930s. It emphasizes geometric forms that are often arranged in symmetrical patterns. Colors are bold and vivid and often high-contrast. It employs Machine Age imagery and materials, such as aluminum, stainless steel, and chrome. There are many examples of art deco architecture in the United States: two very famous ones are New York's Chrysler Building and Radio City Music Hall.

Gruen Carré, circa 1931
Pocket or Purse Watch
Art Deco Style
Donor: Robert D. Gruen
AWCI Horological Museum
Display # 1029

Here is an entirely different concept of a watch. It can be carried as a man's pocket watch or in a lady's purse. When opened up it can be placed on a night table or desk as a small clock. The name Carré is the French word for square.

The example here is the epitome of the Art Deco period. The case is cloisonné enamel with a nickel-based metal case. When opened it could be used as a desk or night table timepiece. The case is green, black, and red enamel, and is on display in its original green velvet box. The case measures 35mm square and is the larger of the two series. The smaller series measures 32mm square.

This watch has a 10-1/2 L round movement, 15 jewels, series 315 with serial number 188582. The case was made in Switzerland and the unenameled part is nickel chrome. The serial number is1570. The innovative design was introduced as the Great Depression was deepening. It never was a particular sales success, but created quite a lot of interest in the marketplace. It was later copied by other companies.

Photos by Donna Hardy

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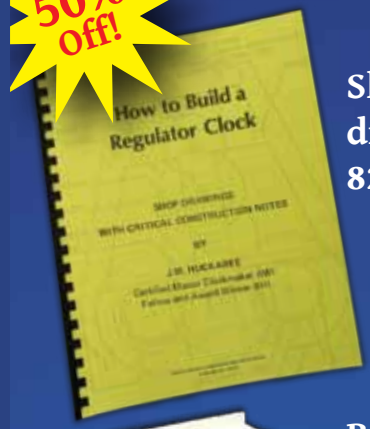

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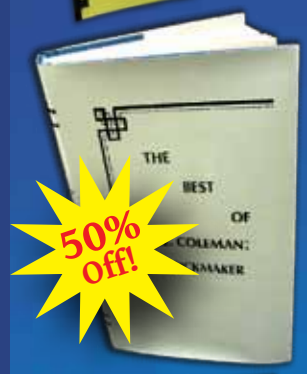

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The Evolution of the Gruen Watch Company

By Kathy Ortt

Dietrich Gruen (1847-1911)

Dietrich Gruen's aim was to make his watches smaller, thinner, and more comfortable to carry in a vest pocket.

Though Dietrich Gruen was the man responsible for germinating the seeds of the ideas behind the Gruen watches in our museum today, The Gruen Watch Company didn't actually operate under that name until 1922, 11 years after Dietrich Gruen's sudden death at sea. The first company started by Dietrich Gruen was the Columbus Watch Company in 1874.

Dietrich Gruen was a native of Osthofen, Germany, and was born in 1847. Dietrich began his watchmaking career as an apprentice to a noted horologist named Martens in Freiberg, Germany. After his apprenticeship, Dietrich Gruen worked for three years in Switzerland before joining his older brothers in America. Once in America, Dietrich migrated to Delaware, Ohio, where a friend of his father's lived. Dietrich eventually married the family's daughter, Pauline Wittlinger, and worked in his father-in-law's jewelry store.

On December 22, 1874, at age 27, Dietrich Gruen received a U.S. patent for an improved safety pinion. He had started the Columbus Watch Company in Columbus, Ohio. For a time, movements were made for Dietrich Gruen in a suburb of Biel, Switzerland. The movements were then finished in Columbus. In 1882 Dietrich built a factory in Columbus so the movements could be made in America. Dietrich pioneered the 16 size movement. His interests were in reducing the size and thickness of movements prevalent at the time. Dietrich Gruen lost his company in the Panic of 1893; his business could not survive the recession that followed.

In 1894 Dietrich Gruen began again with his eldest son, Frederick, who was born in 1872, with their new company, D. Gruen & Son. Frederick had studied at Ohio State University and graduated from the Horological Institute in Glasshütte, Germany. Dietrich and Frederick designed a new series of movements in the 16 and 18 size with the help of the Assman firm in Glasshütte. The movements were made in 18- and 21-jewel quality, in both open-face and hunting-case arrangements. The escapement was designed by a man named Moritz Grossman. These D. Gruen & Son watches were considered as fine as any watch being made at the time.

In 1898, George Gruen, the second son, also joined the firm and the name was changed to D. Gruen & Sons. The product line remained the same and a subsidiary company, D. Gruen & Sohne, was formed in Glasshütte to handle the manufacturing of the products. Around the turn of the century, D. Gruen & Sons purchased the Queen City Watch Case Company of Cincinnati; the name was changed to Gruen National Watch Case Company. Shortly after this expansion, D. Gruen & Sons moved from Columbus to Cincinnati. The new company made their gold cases from then on.

Gruen Watchmaker's Guild, Time Hill. The original building still stands in Cincinnati, Ohio, and is on the National Register of Historic Places in Hamilton County, Ohio. Time Hill is about 20 miles southeast of the AWCI Headquarters in Harrison, Ohio. If you are visiting headquarters, it might be worth the drive to take a look at this piece of watchmaking history.

While still obtaining movements from Germany, Gruen also began to get other movements from Switzerland. The Gruens felt the Swiss were moving ahead of the Germans in technology; they formed a new subsidiary called the Gruen Watch Manufacturing Company in Biel, Switzerland.

Dietrich Gruen's aim was to make his watches smaller, thinner, and more comfortable to carry in a vest pocket, without sacrificing reliability or accuracy. In Biel, in 1904, the new Gruen Veri-Thin movements were created and put into production. They were a major breakthrough in that they had the same parts as a traditional watch but were rearranged to achieve a thinner watch. From this point on, D. Gruen & Sons specialized in thin, elegant pocket watches.

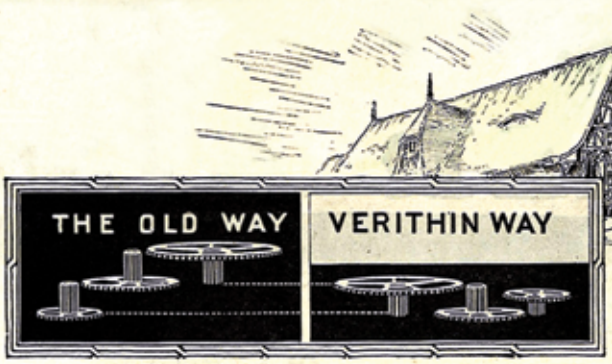
Around 1908 D. Gruen & Sons was a pioneer in manufacturing ladies' wristwatches and featured them in their early ads. In 1911, D. Gruen & Sons began their first national magazine advertising campaign by placing an ad with the *Saturday Evening Post*. At the time of World War I, they introduced men's wristwatches. These watches were difficult to sell to men until it was learned that all British officers in the trenches wore wristwatches.

The Gruen Watch Company's pentagon-shaped pocket watch was patented in 1922 and ushered in a new design of the then art-deco period.

In 1917 the Gruen brothers, Dietrich's sons, built a new headquarters in Cincinnati and named it Time Hill. The building was inspired by the medieval guildhalls of old. Time Hill contained the administrative and sales offices, as well as the Gruen National Watch Case Company. A similar plant was then built in Biel.

A few years after Dietrich Gruen's death in 1911, a top-of-the-line series of Dietrich Gruen watches was introduced in honor of the founder of the Gruen business. They were a 19L size, with 23 or more jewels and were cased in platinum and 14K and 18K gold. Later the Ultra-Thin and the Ultra-Ultra-Thin models were introduced, and these also carried the Dietrich Gruen name. They also were only sold in fine cases.

In March of 1922 a new company was formed, the Gruen Watch Company, which replaced the former D. Gruen & Sons as well as the case and the manufacturing companies. A third son of Dietrich's, Francis W. Gruen, born in 1879, joined



How the Gruen Pat. Wheel Construction made an accurate watch thin. The shortness of staff makes watch more durable

Exact reproduction of the Gruen Watchmakers Guild "Service Workshops" on Time Hill, Cincinnati, where duplicate standardized parts are always on hand

THE GRUEN IDEA THAT MADE AN ACCURATE THIN WATCH POSSIBLE

FIFTEEN years ago men were saying, "Watches cannot be made thinner, more beautiful, without sacrificing accuracy and durability." The wheel train illustration above shows how Gruen did it.

A very simple idea—you wonder why no one thought of it before. Just a rearrangement of the wheels that saved half the movement space without cutting down the size or strength of parts. So the Gruen Verithin—America's first accurate thin watch—was made possible.

Cased in the specially designed, hand-wrought cases of the Gruen Guild, this watch quickly set a new standard for Precision accuracy in a pocket timepiece of beautiful form.

When you compare it with other watches, open the back of the case and note that even the inside dust protection cap is not sacrificed to gain its thinness. (See illustration.)

Since the production of the Gruen-Verithin, further achievements of the Gruen Watchmakers Guild have resulted in the production of the Very-Verithin, the Ultrathin and the Ultra-Ultrathin.

For many years the demand from jewelers for these fine watches has so far exceeded the supply that we have been obliged to confine their sale to about 1200 jeweler agencies—the best in each locality. The one nearest you will be glad to show you these famous products.

Gruen Ultra-Ultrathin Model. Solid Gold, Precision Movement, $315 and up

Gruen Ultrathin Model. Solid Gold. Precision Movement, $210 to $315

Gruen Very-Verithin Model. Gold Filled, $47.50 and up. Solid Gold, $80 to $250. Prices vary according to movement

Gruen Verithin Model. Gold Filled, $42.50 and up. Solid Gold, $70 to $250. Prices vary according to movement

The inside dust protection cap is not left out to gain thinness in the Gruen

Write for the Gruen Guild exhibit

A book of etchings and photographic plates showing Gruen Watches for men and women will be sent if you are sincerely interested.

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Canadian branch, Toronto, Canada

GRUEN
Verithin and Wrist
WATCHES

Dietrich Gruen aimed to make watches smaller, thinner, and more comfortable to carry in a vest pocket. This Gruen advertisement from 1919 shows the various Verithin models, which progressed from the Verithin model to the Ultra-Ultrathin model. As the thinness of the watch increased, so did the price.

the company. He worked in the legal profession and resided in Dayton but was also a vice-president, director, and legal counsel for the Gruen Watch Company for many years.

The Gruen Watch Company's pentagon-shaped pocket watch was patented in 1922 and ushered in a new design of the then art-deco period. Almost all of their 50th anniversary models along with their other fine pocket watches were cased in this style.

The Gruen 50th anniversary model, a special limited edition, was produced in 1924 to mark 50 years in business. Gruen Watch Company produced 600 of this model, one for each month, numbered 1 to 600, plus 50 more, one for each year, and these were numbered 01 to 050. In 1935 the Gruen Curvex Watch was introduced. The "curved to fit the wrist" design was immediately accepted and was widely copied by other watch companies.

Over the years, four of Dietrich's grandsons joined the Gruen Watch Company in various capacities. Carl W. Bieser had an engineering degree and was involved in the design and production of the Gruen gold cases. During the Depression years, he converted the plant to also make gold-filled cases.

Another grandson, George T. Gruen, was a horologist. He spent four years in Switzerland. He studied watchmaking at the Technicum de LeLocle, and also spent time in the Gruen factory in Biel. He learned all facets of watch production and headed the Horological Department in Cincinnati. He was also one of the founders of the American Watchmakers Institute and was a member of its original Board of Directors (1960–1963).

The third grandson, Irvin Gruen Bieser, was Carl's brother. He graduated from Harvard Law School and practiced law in Dayton, but in the 1930s he served as legal counsel to the Gruen Watch Company.

The fourth grandson, Robert Dietrich Gruen, worked as a co-op student in the Gruen factory while attending the University of Cincinnati. He worked in every department in the office and in the case factory. He was managing director for the Gruen Watch Company of Canada Limited in 1936 and 1937. He returned to Cincinnati in 1938 and worked as a salesman for the Gruen Watch Company before leaving the firm.

A new company, Gruen Industries, was created during the Korean War to supply the military with artillery fuses. As the focus of business shifted the Gruen Watch Company became a division of the new company. The Gruen family sold their business in 1953, and in 1958 the new owners moved the firm to New York City.

Bibliography

Gruen Watches, A Special Collection, donated by Robert Dietrich Gruen to the AWI-ELM Charitable Trust Orville R. Hagan's Museum.

Brief History: Gruen Watch Company, Renaissance Watch Repair, www.PocketWatchRepair.com.

Gruen History, Northern Partners, www.northernpartners.com.

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Using the Jeweler's Lathe II (WS-425)	Sept. 29-Oct. 3

Courtesy of Hodinkee.com

John Reardon, author of *Patek Philippe in America* and a regular Hodinkee.com columnist, writes:

"Not too long ago, I had the opportunity to attend a two-day 'Servicing a Pocket Watch for the Beginner' workshop at the NAWCC in Columbia, PA. After experiencing this class firsthand, I recommend this watchmaking experience to anyone interested in learning more about how their watches work and appreciating the incredible talent that watchmakers have in keeping a vintage or modern timepiece properly preserved and in good running order. For the watch enthusiast, this is about as good as it gets for a horological weekend getaway."

Read the full story of John's workshop experience at: http://www.hodinkee.com/blog/john-reardon-pocket-watch-beginner-nawcc

From the Workshop

MAKE LEMONADE

By Jack Kurdzionak, CW21, FAWCI

When a watch repair looks impossible, maybe all you need is some ingenuity.

About 40 years ago, during my career as a high school science teacher, I worked with an enthusiastic young teacher who had a large poster in her classroom that stated, "When Life Hands You Lemons, Make Lemonade." That poster accurately reflected the personal enthusiasm she generously shared with students and faculty members alike. Karen was her name and she remained a biology teacher while I moved into the watchmaking profession, but that lesson from her poster has remained with me all these years.

Occasionally, watches look like lemons during the repair process, especially when unanticipated problems present themselves during the course of the repair. What comes to mind this month is an old 16 size, 23-jewel American railroad watch with conical pivots on the escape wheel, which is fitted with capped jewels on both ends. A watchmaker called to order two new convex hole jewels, with settings, for this watch, which was produced around 1902 by a company that went out of business when Herbert Hoover was president. The watchmaker expressed deep disappointment as I explained that those jewels, as ordered, are not available and have not been for generations.

The watch may have resembled a lemon to this watchmaker, but it was easy to make some lemonade in this case. The old settings were in good condition. The escape wheel pivots were also okay. The old settings needed new jewels, and once fit with new jewels they would be as good as any the original manufacturer could have supplied. The broken jewels were burnished into the settings, but burnish-fit jewels are obsolete, so we needed to use friction jewels.

Here is how to make some lemonade from this lemon. In Figure 1 you can see the setting with its broken jewel. Remove that old jewel by supporting the setting on the hole of a bench anvil and cleanly break the remaining parts of the jewel out of the setting. Then ream out the setting with the reamer of the jeweling tool. I clamped the setting in an old-fashioned hand-broaching vice, which holds it firmly while the reamer brings the inside diameter of the setting to the correct size.

In Figure 2 you can see the cleanly reamed setting. The next step involves the selection of a friction balance jewel that has the proper inside diameter for the escape wheel pivot and the proper outside diameter (0.01mm larger than the reamed hole). All that remains is to push the jewel into the setting to the proper depth. The newly set jewel is ready for use again. When properly done, this procedure maintains the original endshake and division for the escape wheel and looks good to the eye and the camera, as seen in Figure 3. This particular lemon now tastes like sweet lemonade.

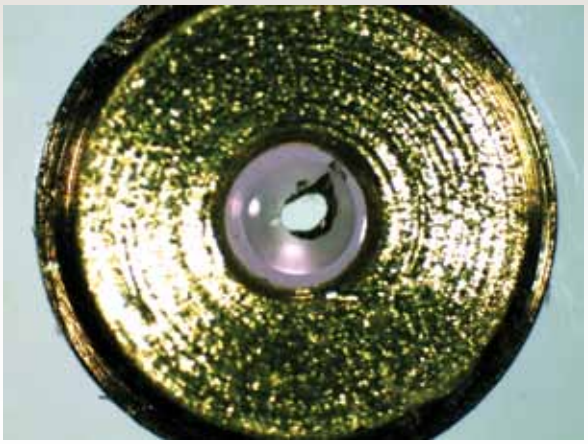

Fig 1. Broken Jewel

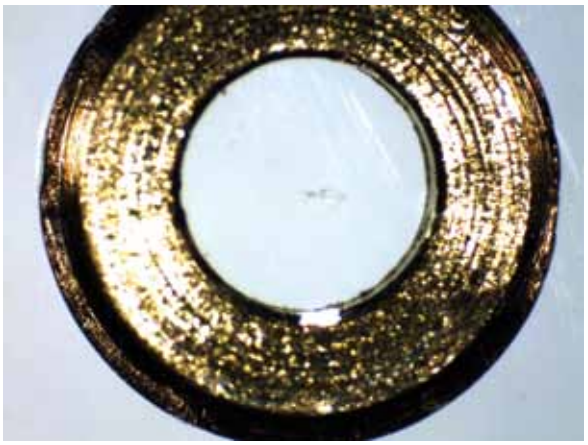

Fig 2. Setting Reamed to 1.39mm inside diameter

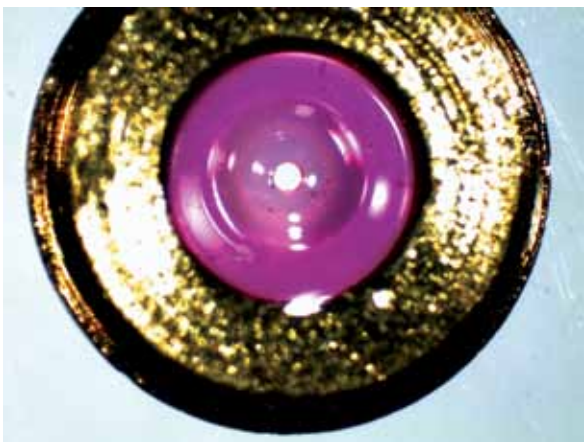

Fig 3. Setting with 1.40 convex jewel installed

Rusty Barrel Arbor Repair Part 2

By Dale LaDue, CMW21

In the first part of this article I described a method to restore a rusty barrel arbor by turning the rust away (while in the lathe) and creating a sleeve that would friction fit the turned-down shoulder.

I held the headstock with the barrel in it up to the headstock with the completed sleeve and marked the comparative height of the shoulder on the sleeve as shown in Figure 13. I faced the end flat. A toothpick tip was then inserted in the end of the sleeve, and a handheld graver tip was applied at the reference line, Figure 14. As the graver cut through the sleeve wall, the toothpick controlled the tiny cylinder as shown in Figure 15. This little piece could have been easily lost, which is one reason why I drilled the sleeve, as I mentioned in Part 1, deep enough to include another one. The toothpick captured the sleeve completely as shown in Figure 16. In order to give my client and my readers a comparison as to the actual size of this sleeve, I photographed it spanning just two epidermal ridges, resting on the tip of my finger, Figure 17.

I carefully placed the sleeve over the arbor's shoulder and pressed it in place with finger pressure as shown in Figure 18. The headstock was then remounted on the lathe and a small amount of "red" permanent stud and bearing locker was applied, Figure 19. I then used a flat-faced hole stake, from a staking tool set, that fit over the lower arbor pivot, and as the arbor slowly turned I cautiously tapped the sleeve fully in place as shown in Figure 20. As previously stated, if the sleeve

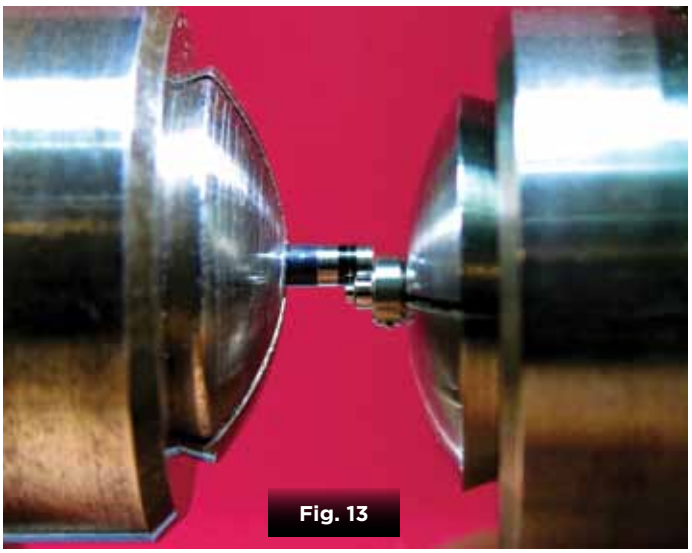

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Fig. 14

Fig. 15

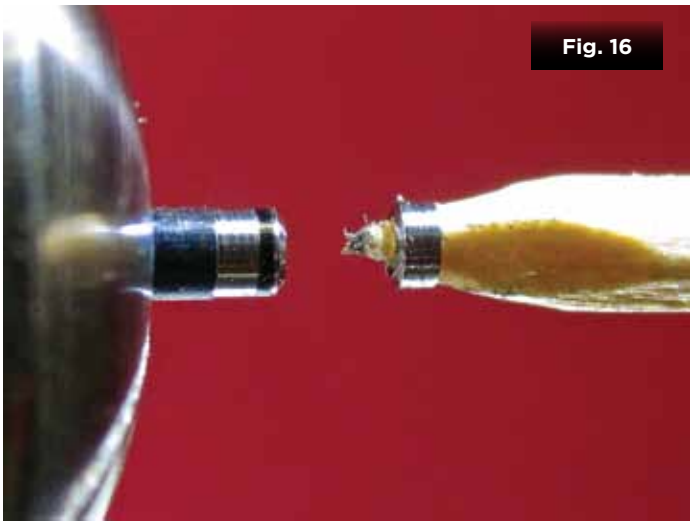
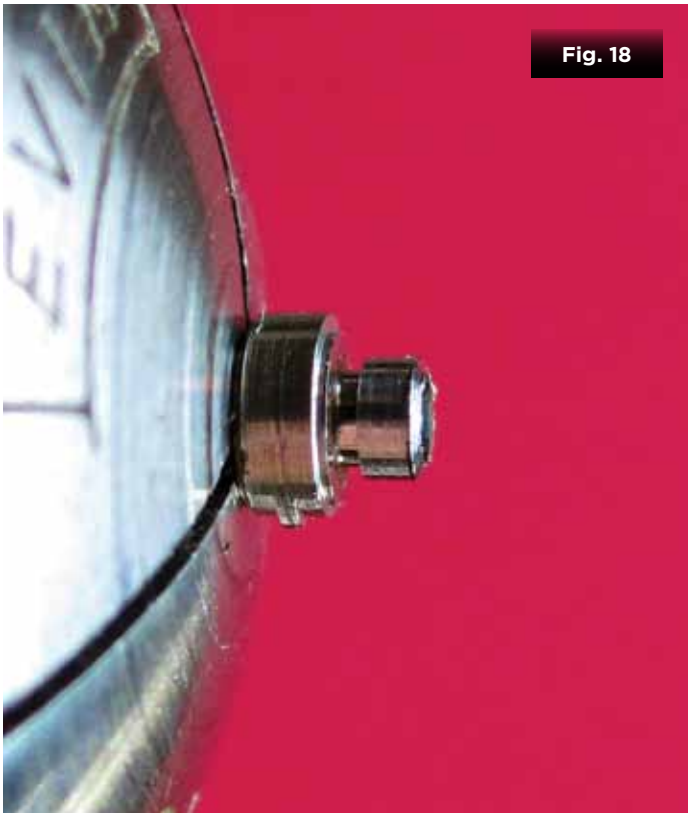


Fig. 16


Fig. 17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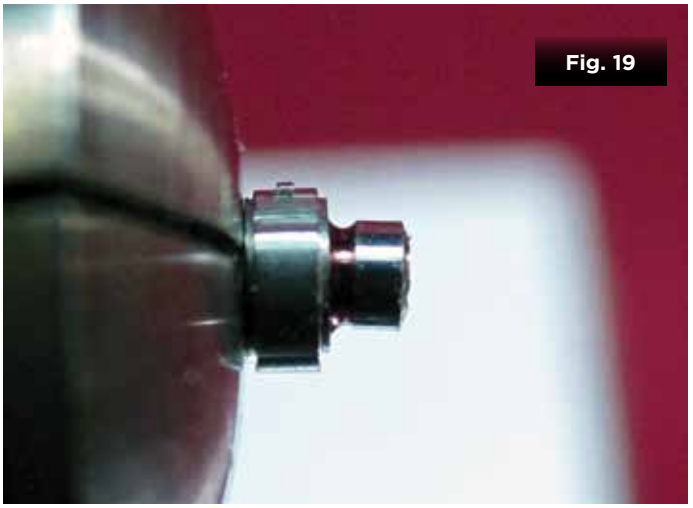


Fig. 19

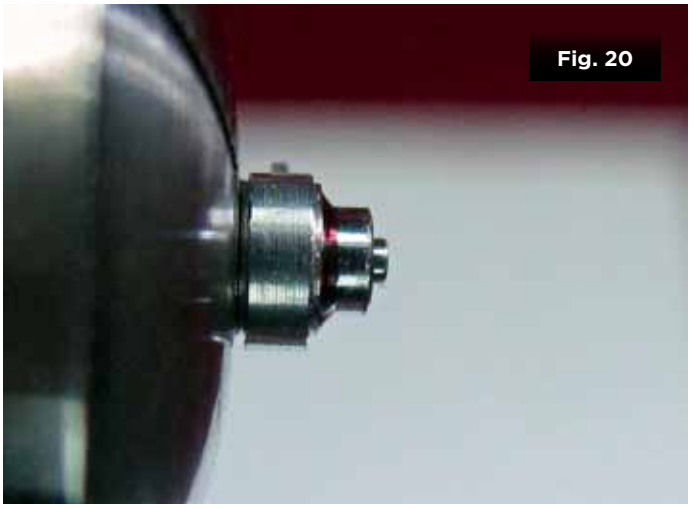


Fig. 20

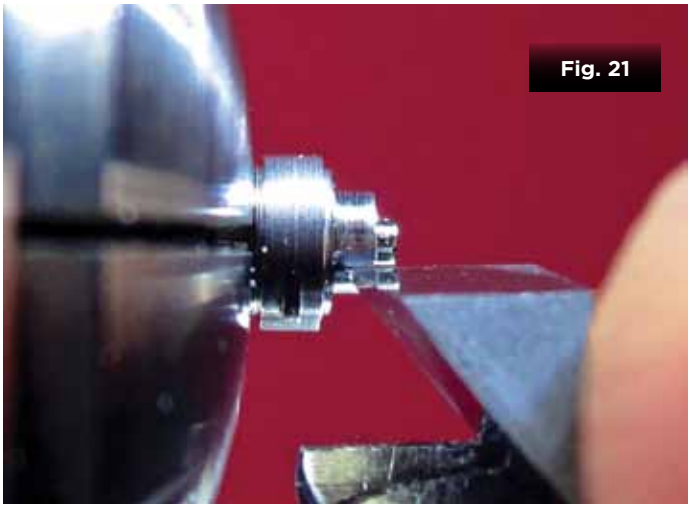


Fig. 21


Fig. 22

split or cracked, I had made a provision for an extra sleeve to be parted from the steel wire if need be.

The barrel arbor shoulder was carefully turned down using a handheld graver as shown in Figure 21. Light

cuts and frequent testing for fit of the barrel cover was imperative, Figure 22. The barrel cover slipped over the arbor shoulder without binding and virtually no side shake as shown in Figure 23. At this point I cleaned up the inside corners of both shoulders with a sharp graver tip, Figure 24. Thus insuring that neither the barrel cover nor the pivot jewel would bind.

Side shake on both of the shoulders was created as they were first smoothed with a ceramic slip (not shown) and then a jasper slip, Figure 25. The shoulders were then burnished using a polished jasper slip that was lightly coated with clock oil as shown in Figure 26.

The barrel arbor shown in Figure 27 is a far cry from the arbor I saw when I removed it from the movement! The lower barrel arbor pivot jewel was chosen to fit the reduced diameter of the pivot, as stated previously, with future repairs in mind. If indeed this barrel arbor needed to be replaced, and an original was located, the jewel could then be replaced. Figure 28 shows the arbor in its barrel and lower plate jewel.

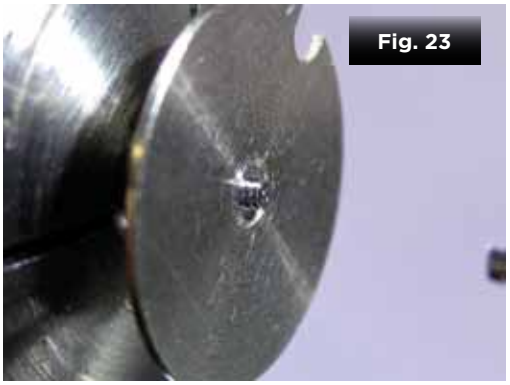


Fig. 23

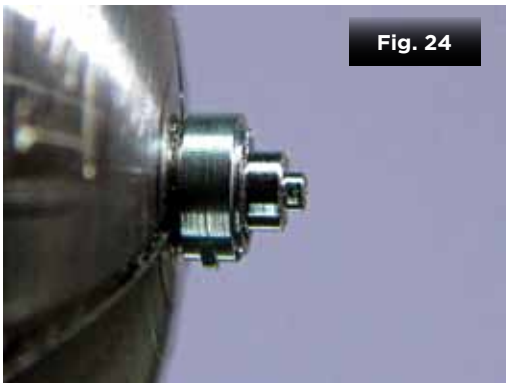


Fig. 24

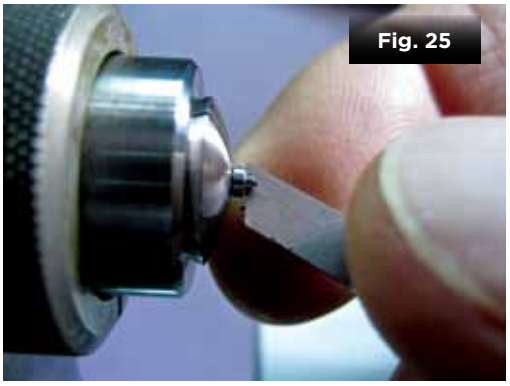


Fig. 25

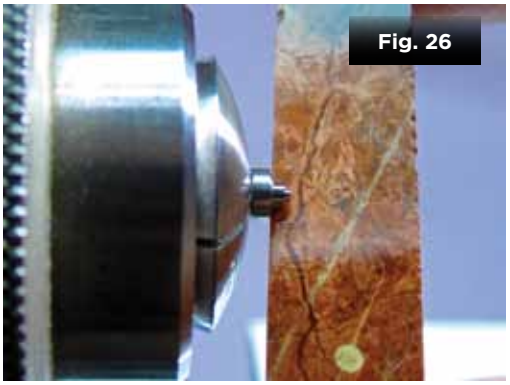


Fig. 26


Fig. 27

Fig. 28

Help Shape the Future of Our Organization

Dear Members,

Please take a few minutes to answer some questions about AWCI at www.awci.com/about-us/survey/. The information collected from this survey will help us to shape the future of our organization as we evaluate the success of each of our programs and implement new programs to serve watchmakers, clockmakers, and everyone involved in horology.

Please encourage your fellow professionals, co-workers, business contacts, and others involved in the business of horology both members and non-members to take this survey as well. Seven minutes of your time will help determine the future of AWCI!

Scan the QR code below with your cell phone to go directly to the survey or visit the url below.

www.awci.com/about-us/survey

Clockmaking—The Tools

Using the Lathe's Back Gear as a Spring Winder

By Laurie Penman

Mainspring extraction is a problem that is satisfactorily solved by most of the commercial spring winders as long as safety measures are observed:

- Keep to one side of the possible path of a spring breaking free of the anchor studs or jaws.
- Wear thick glove when possible.
- Wear a face mask.

However, as far as I know there is no commercial spring winder available for the enormous springs that drive Polyphon-type musical boxes; these can have "strengths" or thickness of 1mm (0.040") or more, widths of around 80mm (3"), and wound diameters of around 100mm (4")—they are very strong. I have only had to deal with a couple, and one of those had bent the next arbor in the train when the spring broke. The arbor was 14mm in diameter and probably a low-carbon steel; I replaced it with drill rod (silver steel).

The point of this anecdote is that the spring had to be extracted from the barrel (which needed repair) and, of course, had to be installed when the barrel ring had been cut and replaced and the cause of the breakage removed. The tool involved was my Myford lathe, which had a "back gear," Figure 1. This is a normal feature of engineer's lathes (center lathes) with belt drives to the mandrel; it provides three or four more speeds to a headstock with a three- or four-step pulley. "Stepped" pulleys are groups of different-sized pulleys mounted on the same shaft. Figure 2 shows the arrangement of stepped pulleys and the back gear on a Southbend 10", which is a very nice machine.

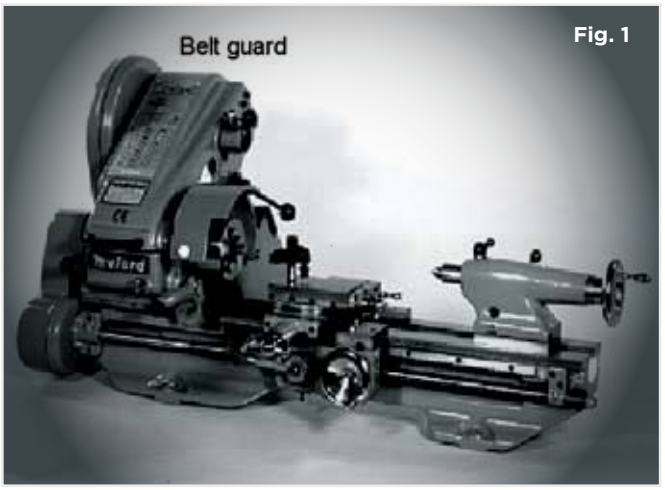


Fig. 1

A back gear not only allows a very low gearing from the drive to the chuck (1700 to 50 on the American version with a 1700 rpm motor) but also allows the machinist to free the chuck from the drive so that it can be rotated manually and very easily. It can also be used to lock the mandrel and chuck rigidly.

Operation of Back Gear

There are four gears involved in the back gearing, and they can be seen plainly in Figure 2, starting with the small one at the front.

Gear A is directly connected to the stepped pulley.

Gears B and C are mounted directly on a common shaft (the counter shaft) and can be moved using the handle at top left to mesh or unmesh with gears A and D.

Gear D is connected directly to the chuck and *not* directly to the pulley.

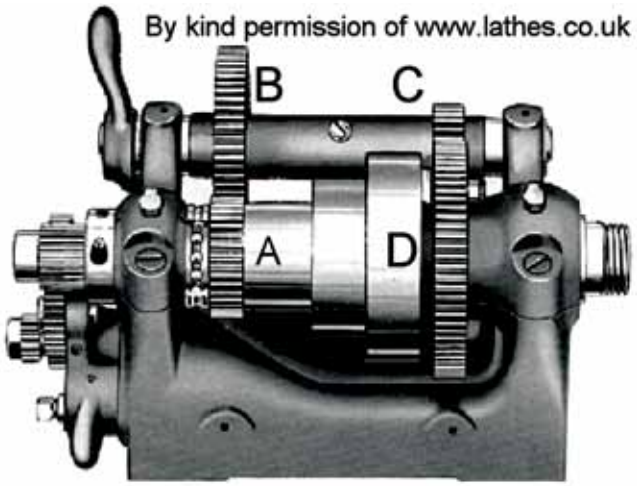
Gear D can be connected to the pulley by means of a sliding bolt in a slot on D. When loosened and slid towards the center of the mandrel, it engages with a disk mounted on the pulley shaft, thus achieving a drive directly to the chuck.

When the gears B and C are disengaged by moving the lever, the chuck is entirely free and may be swung by hand. If the bolt is slid inwards and locked, the pulley and chuck revolve together, giving the top three speeds in the range.

When gears B and C are engaged with A and D by moving the lever, and with the bolt unlocked and moved outwards, the drive is from Pulley to A, A to B and C, C to D and chuck, which produces the lowest rpm in the range of chuck speeds.

If B and C are in mesh with the other two gears and the bolt is left engaged, the system is locked solidly (do not switch on the motor).

Fig. 2



Spring Winding Using Back Gear

A hook is needed before starting on this task; it needs to be comfortable to use and easy to mount in a four-way or two-way tool post. Figure 3 shows the hook and spring, and Figure 4 shows what I mean by four-way and two-way tool posts. The spring will be wound onto its winding arbor (held in the chuck) and supported from the tailstock; how this is arranged will depend upon whether the winding square is at the toothed end of the barrel or not, because the barrel must be slid onto the support before the spring is wound and be positioned so that when the spring is fully wound the barrel may be slid over it.

Make sure that the arbor is anchored securely to the inner coil, and then grip the end of the arbor in the chuck, place the barrel on the

Fig. 3

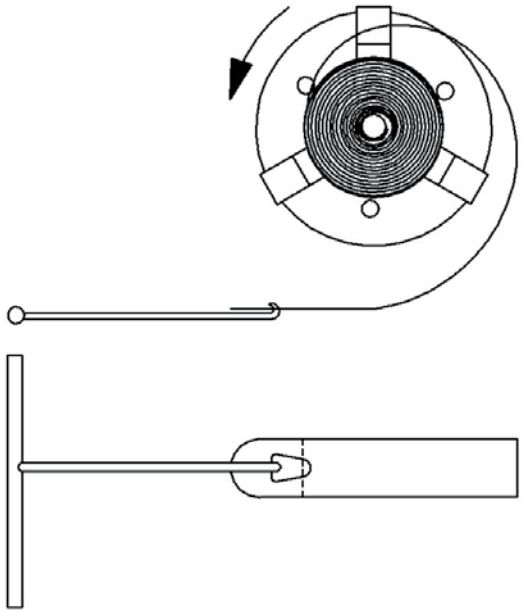
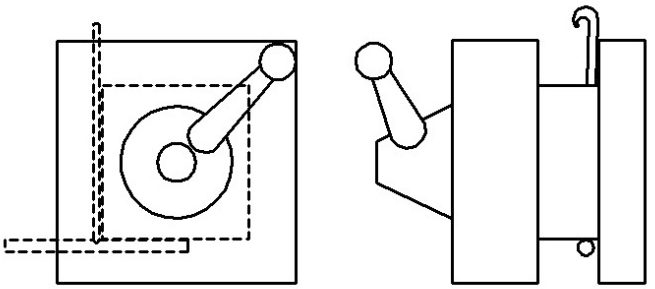
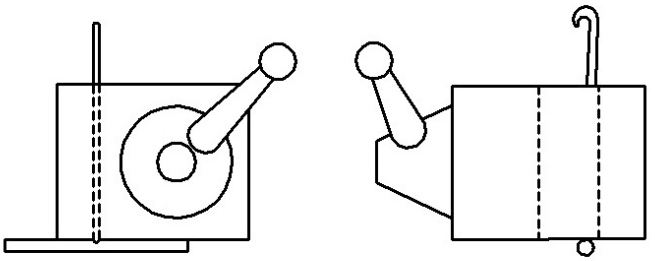


Fig. 4



Four-way chuck; the locking screws are not shown



Two-way tool post; locking screws not shown

It is always best to rotate the chuck in the normal direction because this allows the hook to be horizontally and not vertically (which makes for a hook that is awkward to use). Because the barrel must be placed so that it can be slid over the wound spring, it may be necessary to support the arbor at the square end. This requires a support with a square hole to be made and sufficient length to hold the barrel in readiness for insertion of the spring. I will show the cutting of a square hole on the lathe in a future article.

tailstock support, and locate that end of the arbor in the support (Figure 5). Disengage the back gear and sliding bolt so that the chuck runs free.

Strong as these springs are, several coils can be wound on manually (this is why the hook has a "T" handle) by rotating the chuck with the left hand.

Make the tool post ready to accept the hook when hand winding becomes difficult.

At this point, the back gear is engaged and the sliding bolt left disengaged (the chuck is no longer directly connected to the pulley). The drive to the chuck is now through all four gears A to B to C to D.

Mount the hook in the tool post, Figure 4, and make sure that the tip of the hook enters from the outside, otherwise the body of the hook will be trapped between the end of the spring and the wound portion, and you will have to start again. (The body of the hook will not enter the barrel.) Rotate the chuck by pulling the belt round, thus taking advantage of the back gearing.

It is a good idea at this point to make *sure* that the motor is isolated from the power by unplugging it. Do not rely on switches at any time that you intend to touch the belt or when the belt cover is raised. Particularly do not trust a switch with a lever for reversing the drive—they can be moved easily by a loose work jacket snagging the lever.

When the spring has been wound fully, the wound portion should be about three quarters of the inside diameter of the barrel. While the spring is still hooked, bend the end inwards so that it does not "bridge" the anchor stud and does not bend further than the tip of it, Figure 7.

Fig. 5

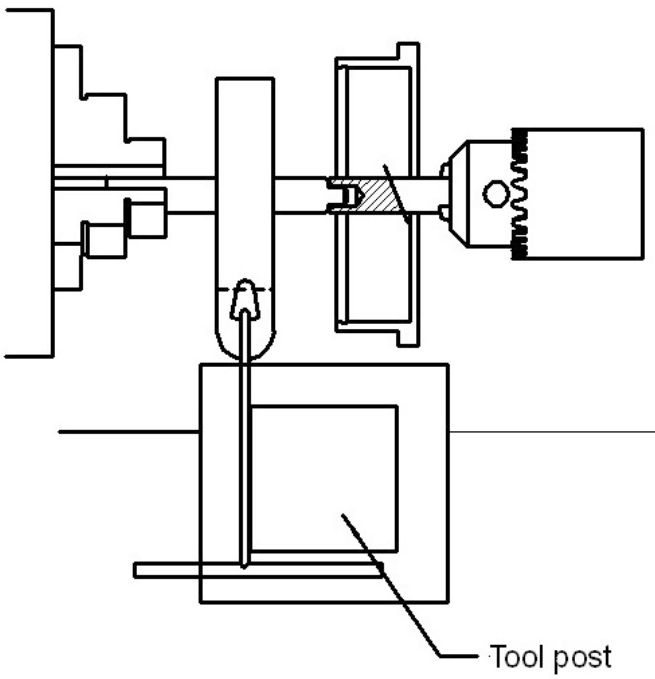
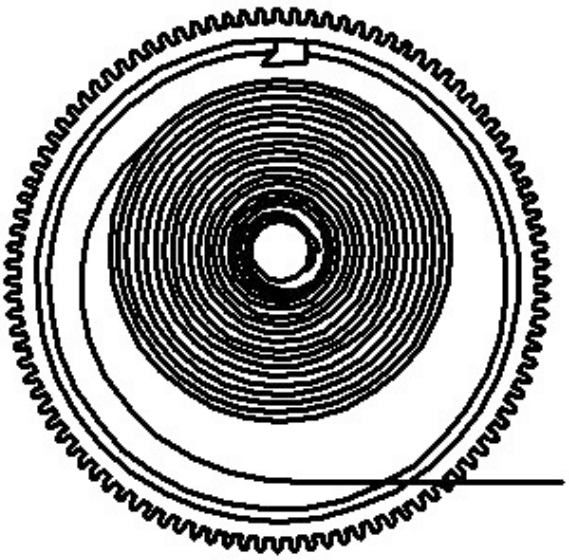


Fig. 6



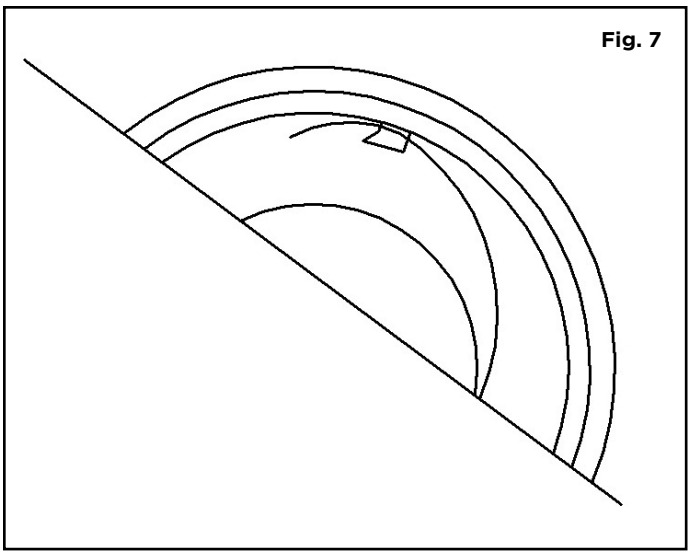


Fig. 7

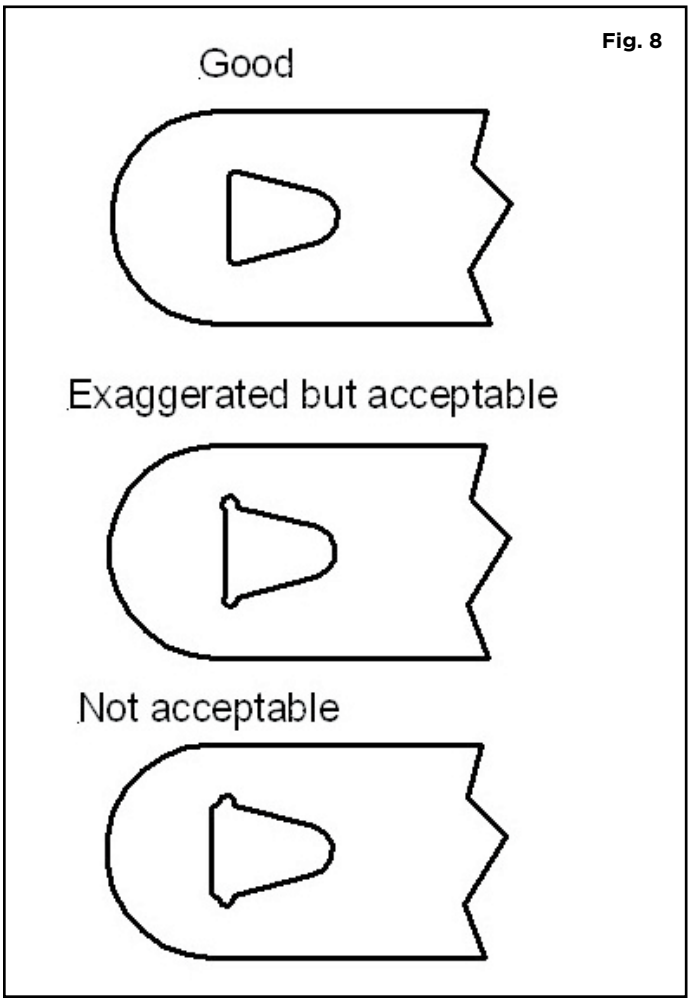


Fig. 8

This is the difficult bit, and it really needs two people; take a piece of soft steel wire about 1mm in diameter; it has to be soft because it is to be wrapped around the outside of the spring and the ends twisted together as tightly as possible holding in the wound condition when the hook is removed. Put on a pair of stout leather gloves and position the barrel so that the internal anchor stud is diametrically opposite the hooked end, Figure 6. Push this part of the wound spring so that it enters the barrel and passes inside the stud. Hold it there and slowly let the chuck rotate backwards, helping it if necessary (by pushing the belt backwards). When the chuck stops rotating you should be able to withdraw the hook; bend the twist of wire to the side so that it can be reached when the spring is wholly inside the barrel—and push the wound-up spring inside the barrel. This will involve bending the end of the spring towards the winding arbor. Make sure that the end of the spring "encourages" the anchor stud to enter the end hole.

Untwist the protruding wire ends and heave the wire out; use the back gear to wind the spring while you wrap the barrel ring in cloth and hold the barrel still. If all goes well there will be a satisfying "click," and the spring end will be caught on the stud. Disengage the back gear and let the mainspring unwind fully.

Always inspect the end hole for cracks around its edge and use a loupe. Any crack must be filed out with a round file, and you must not leave a corner anywhere because this will encourage cracks, Figure 8.

Clock Case Refinishing and Cleaning Techniques

By Robert Little, CC, CW

Clockmaker Bob Little shares his secrets for cleaning, refinishing, and touching up wooden clock cases.

This article is about some of the techniques and products I have used over the years when cleaning, touching up, and refinishing clock cases. I have tried and used many different types of finishes on many wood projects, but what I will discuss is what I have come to like the best with the most common problems encountered. The two different types of finishes I use are lacquer- and oil-based rub-on products.

Lacquer-Based Finishes

Lacquer-based finishes set up by the solvent evaporating. The product I use is Deft's Clear Wood Finish Semi-Gloss Brushing Lacquer, Figure 1. It applies easy, by brush or by spray, and it sets up usually within 30 minutes. It can then be scuff sanded and recoated. Even when applied by brush, it levels beautifully with almost no brush lines or marks. While I use it almost exclusively on new work, such as newly built clock cases, book

Fig. 1

cases, and cabinets, I do use it to touch up scratches on modern clock cases. I use one of the art brushes in Figure 2, to fill just the scratch and build up two or three coats and allow several hours for it to set up between applications. I then wet sand any buildup standing above the surface with 600-grit and then 1200-grit wet or dry sandpaper glued to a


Fig. 2

craft stick. On small scratches, I might only use a tiny piece of the sandpaper, 1/4" x 1/4", to prevent over-sanding. The finish is then buffed with 3M buffing compound. I have projects I built in high school woodshop that are a little over 40 years old, and the finish looks as good as the day I put it on. The downside to using lacquer-type finishes is that if they are accidentally exposed to a solvent, it will almost immediately mar the finish. However, it can be repaired easily. I do not use this product over an entire existing finish since the solvents in the lacquer can lift and ruin an old finish. I use it primarily for scratch repair and on new wood projects.

Oil-Based Finishes

Oil-based finishes set up by curing, or polymerization. They take longer to set up and usually have a 24-hour waiting period before you can recoat. Wipe-on finishes are easiest to use because they can be applied with a special lint-free shop cloth or used panty hose. An old gunsmith introduced me to using old panty hose years ago because they are lint free, have a good finish-leveling ability, and can be used to wipe off excess finish and buff the coat before curing. They out-perform by far any other type of shop towel or rag I have ever tried. The oil finishes I use most are the Formby's

Fig. 3

Traditional Tung Oil, low gloss, and Watco's Danish Oil Finish, Figure 3. They can be used to touch up small scratches in older oil or shellac finishes by applying a coat with a small brush, waiting about 15 minutes, and then buffing with old panty hose. If more buildup is needed, I wait 24 hours and repeat the application. Oil finishes are beautiful on new work as well as on an older, dried-out finish. As with any other product, it is wise to try an application on a small, inconspicuous spot on the case to insure it dries properly and doesn't cause any adverse changes. A light coat of tung oil applied with a square of old panty hose will rejuvenate an old finish and clean some of the old, oxidized finish off in the process. The oils I use give a low-gloss to no-gloss look that comes the closest to an old finish that you can find. Higher-gloss, more modern-appearing tung and Danish oils are available.

One of the earliest oil finishes, along with tung oil, is raw linseed oil. It takes probably the longest to dry of all the oil products, and probably provides the least surface protection. However, after it ages for several years, especially on walnut, it takes on a beautiful reddish-brown appearance. The surface can be freshened up by another application of oil, whenever desired. It is typically rubbed into the wood, allowed to soak in for 15 to 30 minutes and then the excess is wiped off. It has a slightly gummy feel after application, and when cured has a "warm" feel.

If I have an old, dark-finished case with a scratch in that has raised the fibers enough to show a lighter wood beneath, I use Fiebing's dark-brown leather dye to darken it so it doesn't stand out visually. I use one of the smallest point brushes I have and sparingly apply the dye to the scratch. If you use a magnifying loupe or headband, it is possible to precisely apply it to the scratch only. Any dye that gets outside the scratch can be wiped right off and won't show. I use this particular Fiebing's leather dye because I like the color it imparts to the wood. It blends in well with the dark reddish-brown to black finishes on the old American clock cases. It is basically like any alcohol-based wood dye that can be purchased at Woodwork-

> I usually discourage anyone from stripping and refinishing a clock case in good condition.

Whenever you use any cleaner or finish product, mix it according to directions and pour about as much as you think you will use in a small bowl. Do not dip a brush or rag into a container directly. You run the risk of spilling a whole can, and you will contaminate the whole can with any residue picked up from the case. Keep the container closed as much as possible. When I am done and close any container of finish, I use a product called Bloxygen. A two-second shot of this in the container right before closing prevents oxidation or surface skinning over in the container. I got this from Woodcraft, and you can also get it from Rockler or Amazon.com.

Please note that whenever using a rag or panty hose, or any material for that matter to apply or wipe off an oil finish, put them in a container of water right after use. The oil, when polymerizing will heat up and they can spontaneously combust. Completely submerging in water will eliminate that risk.

er's Supply, Woodcraft, Rockler, or any other supply house. After an application of alcohol-based dye, let it dry for at least 24 hours, or the finish applied to it can lift it out and will lighten in appearance. The alcohol-based dyes can even be thinned with rubbing alcohol if a lighter application is needed, and can be thinned and sprayed easily with a Preval self-contained sprayer unit if a larger touch-up area is to be covered. Parts that might need to be sprayed include replacement wood turnings for missing finial parts and wooden pendulum sticks.

> Old wood that is already finished behaves much differently than new wood.

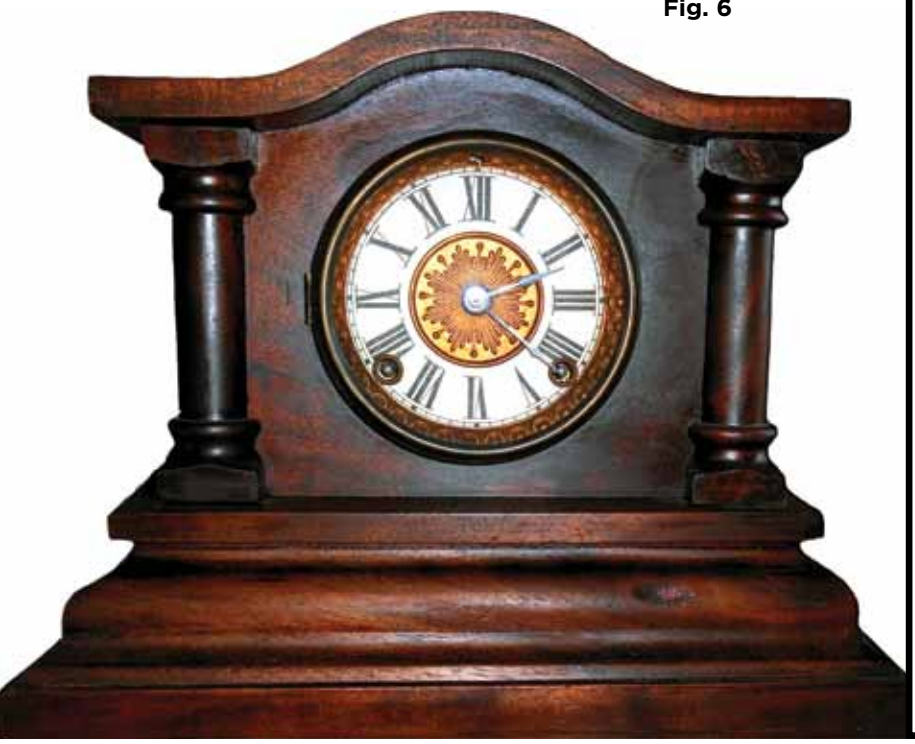
Removing a Damaged Finish

I usually discourage any one from stripping and refinishing a clock case in good condition. Once a decades-old finish is removed, it is extremely difficult to duplicate. However, in cases where the clocks have been damaged by flood, fire, and mildew, there is no other option if cleaning won't help. I have a clock that a customer gave me, which was in pieces, and horribly mildewed. The mildew had actually etched into the finish, Figure 4. I reassembled the case, and then removed the old finish with Formby's Conditioning Furniture Refinisher. This does a beautiful job of removing the old finish and, unlike other finish removers, does not require washing off with water. I got a shallow Rubbermaid storage container and put the case in it to keep spatter down and just kept brushing the refinisher on until the wood was clean. This product has wood conditioners in it to actually enhance the aged wood. I then applied two coats of the low-gloss tung oil, Figure 5, installed a new dial paper and bezel (I antiqued the bezel with a brass-oxidizer solution from Rio Grande), rebuilt the movement, and reassembled everything. I have a beautiful clock now that otherwise would have been discarded, Figure 6.

Fig. 4

Fig. 5

Fig. 6



Probably the best thing to do if you are getting started in more detailed case-finish repair is to get an old clock or other old, finished wood item that could use some work, and practice on it. Old wood that is already finished behaves much differently than new wood. New wood is good to test for staining and finish for a new-wood finishing project, but use like kinds of wood. In other words, if you are going to finish new white oak, test your stain and finish on new white oak, not red oak or pine. As with any project using chemicals and solvents, have good ventilation and use personal protective equipment such as gloves and safety glasses.

Resetting Loose Nails

After I take a clock in for repair, and have removed the movement, I check for and reset all loose nails, Figures 7 and 8. Usually, clocks with wood frame doors have loose or missing nails in the thin, wooden glass glazing or retainer strips. I reset these and install new nails, using a pair of Channellock pliers with a piece of sheet copper formed over the jaw, Figure 9. This keeps the pliers' jaw from slipping off the nail head and causing damage. The other jaw has a scrap piece of high-density plywood placed between the jaw and frame to prevent damage. With the leverage of the vice grip, the nail inserts easily, and you avoid the risk of glass breakage using a hammer and nail set.


Fig. 7


Fig. 8


Fig. 9

Cleaning

I don't do any cleaning of the case other than brushing the dust off, dusting out the interior, and cleaning the glass. If the customer wants the case exterior cleaned, I use a product called Clean-A-Finish Wood and Upholstery Soap made by Howard Products. I got this from a local antique store, but you can buy it on Amazon.com. It is a very mild, odor-free product that works well on all the finishes I have cleaned. I first dust off the outside of the case with about 10 psi compressed air (avoid all decals and paper instructions attached to the case back), then dust out the cracks with a disposable paint-chip brush, Figure 10. I then apply a small dab of the wood soap to a clean paint-chip brush and brush out the cracks and crevices, Figure 11, and then wipe the entire surface down with a used panty hose wrapped around my finger, Figure 12. The cleaned case looks almost new. You can also see the effects of cleaning on the clock case top in Figures 13, 14, and 15. Figure 15 has a fluorescent bulb reflection in it that wasn't even visible in the "before" picture, Figure 13.


Fig. 10


Fig. 11

Fig. 12

Fig. 13

Fig. 14

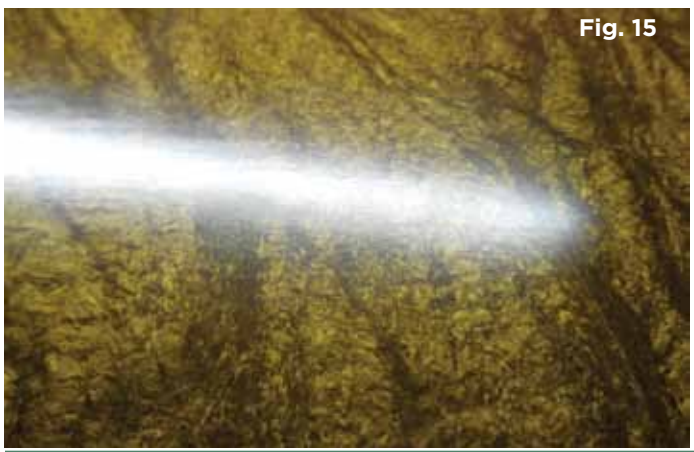


Fig. 15

Old-Time Resources

Elgin Service Manual, published 1965

By Jordan Ficklin, CW21

Because we often find ourselves repairing vintage pieces, it is important to familiarize ourselves with the expectations and techniques of those time periods. Even if the vintage watch you are repairing isn't an Elgin, the *Elgin Service Manual* is a great resource for the general service techniques, and, of course, it also includes comprehensive parts information for Elgin wristwatches.

The first thing that stands out for me is the irony that in 1965 manufacturers like Elgin were trying to convince the watchmaker to buy parts directly from them, while today the watchmaker is trying to convince the factory to sell parts to the watchmaker.

> A watchmaker's reputation for skilled workmanship is his most valuable asset. By paying too little for cheap, imitation parts he can lose his reputation. Be sure you guard your reputation for good work by using parts that you know will be satisfactory.


WHY YOU
SHOULD USE
GENUINE
ELGIN PARTS

"When you buy something and pay too much, you lose a little, but if you pay too little you may lose everything, because the item is not capable of doing the job it was designed for."

John Ruskin

A watchmaker's reputation for skilled workmanship is his most valuable asset. By paying too little for cheap, imitation parts he can lose his reputation. Be sure you guard your reputation for good work by using parts that you know will be satisfactory.

A fine jeweled Elgin watch represents the watchmaker's art at its finest. Only genuine parts will maintain this perfection.

All Elgin parts are made to exact tolerances and specifications. Balance staffs for instance, are held to a tolerance of less than .0002. This means there is never a loose fit with a genuine Elgin staff, it matches the component part exactly all the time.

Remember also that no altering or sizing is necessary when you use genuine parts. In a majority of instances imitation parts require additional work before they will fit and perform properly. This additional work takes time, valuable time that means money to a watchmaker.

Elgin National Watch Company, Elgin, Illinois — Printed in U.S.A.

The book consists of five sections:

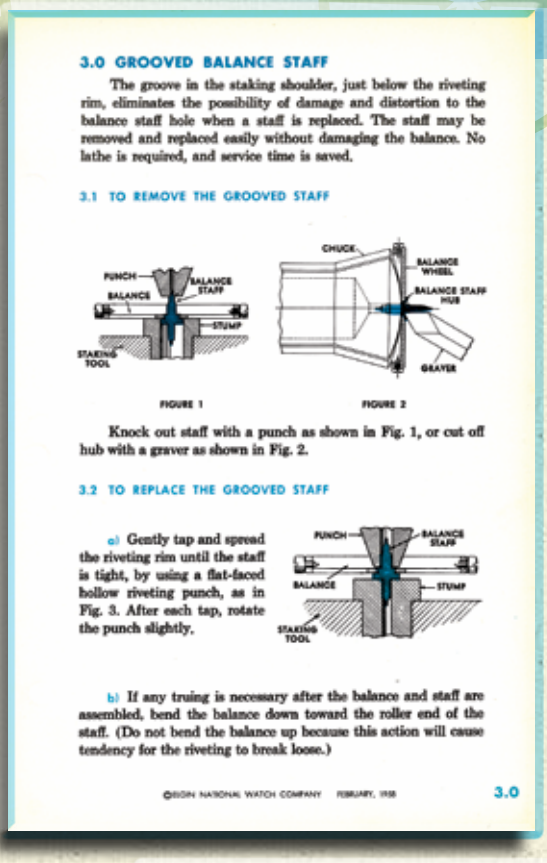
Section I (Aids to Servicing) covers service procedures for Elgin watches that can be applied to almost any watch from the same time period. Included are nomenclature charts. It is important to note that Elgin uses the "American" terminology, so these charts can be extremely valuable for anyone who was trained in the "Swiss" environment who may not be familiar with the American terminology. It is always better to be fluent in more than one "language," so if you know both sets of names for the part, you can always communicate with your peers about the component.

Some of the valuable information in this section includes:

- A description of the terminology of the escapement (again, using American terms not Swiss)
- Procedure for removing and replacing a balance staff. See photo on page 39.
- Fitting crystals in cases
- Procedures for servicing automatic watches
- How to adjust expandable bracelets from Hadley (including the scissor type with a nice illustration of the appropriate tool so you can make one if you don't have one)
- An explanation of the Elgin bonding method for hairspring collets
- Proper treatment of "waterproof" cases
- Procedures for Elgin's double-sweep seconds wheels
- Elgin Durabalance Assembly

Section II consists of an interchangeability list for components for domestic Elgin wristwatch grades.

Section III consists of an interchangeability list for components for imported Elgin wristwatch grades. Unfortunately, it does not indicate the base movements, i.e. A. Schild 1396. Their justification for not listing the base caliber was that import parts come in multiple grades, and Elgin used the highest quality only. By specifying only the Elgin caliber interchangeability, they encouraged the watchmaker to order genuine parts and not order the lower-quality "generic" part.



3.0 GROOVED BALANCE STAFF

The groove in the staking shoulder, just below the riveting rim, eliminates the possibility of damage and distortion to the balance staff hole when a staff is replaced. The staff may be removed and replaced easily without damaging the balance. No lathe is required, and service time is saved.

3.1 TO REMOVE THE GROOVED STAFF

FIGURE 1

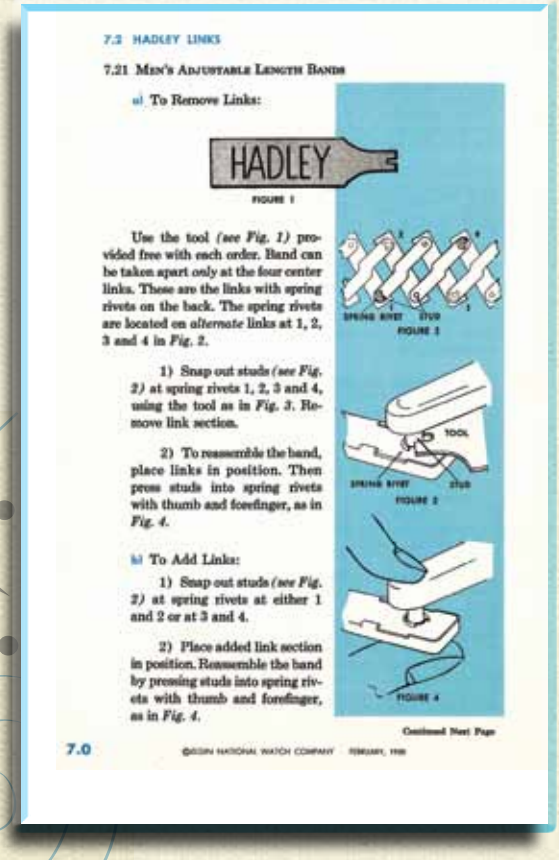
FIGURE 2

Knock out staff with a punch as shown in Fig. 1, or cut off hub with a graver as shown in Fig. 2.

3.2 TO REPLACE THE GROOVED STAFF

a) Gently tap and spread the riveting rim until the staff is tight, by using a flat-faced hollow riveting punch, as in Fig. 3. After each tap, rotate the punch slightly.

b) If any truing is necessary after the balance and staff are assembled, bend the balance down toward the roller end of the staff. (Do not bend the balance up because this action will cause tendency for the riveting to break loose.)



7.2 HADLEY LINKS

7.21 MEN'S ADJUSTABLE LENGTH BANDS

a) To Remove Links:

FIGURE 1

Use the tool *(see Fig. 1)* provided free with each order. Band can be taken apart *only* at the four center links. These are the links with spring rivets on the back. The spring rivets are located on *alternate* links at 1, 2, 3 and 4 in *Fig. 2*.

FIGURE 2

1) Snap out studs *(see Fig. 2)* at spring rivets 1, 2, 3 and 4, using the tool as in *Fig. 3*. Remove link section.

FIGURE 3

2) To reassemble the band, place links in position. Then press studs into spring rivets with thumb and forefinger, as in *Fig. 4*.

b) To Add Links:

1) Snap out studs *(see Fig. 2)* at spring rivets at either 1 and 2 or at 3 and 4.

2) Place added link section in position. Reassemble the band by pressing studs into spring rivets with thumb and forefinger, as in *Fig. 4*.

FIGURE 4

Continued Next Page

Section IV includes General Parts Data like mainspring dimensions and part numbers and movement sizes.

Section V is a list of watch hand styles and part numbers indicating which models they fit.

While sections II through V will prove useful in locating Elgin parts for your repair and restoration projects, there is a lot of value in Section I, which, if nothing else, reminds the experienced watchmaker that high-quality repair techniques, including full disassembly and cleaning of components with careful application of lubricants, was considered just as important in 1965 as it is today. For those entering the profession, this section includes lots of useful tidbits like instructions on how to size three different expandable bracelets, which may prove confounding if nobody has ever demonstrated the proper technique. [Photo: 7.21 Men's Adjustable Length Bands] This book is located in the Henry B. Fried Library at AWCI, and like many other "old-time" resources can probably be picked up at your local mart, ebay, or simply by "friending" an experienced watchmaker at your local affiliate chapter or guild meeting.

Get Your Own Elgin Manual

If you'd like to peruse this classic manual, log in to awci.com, enter your member number, and scan the QR code. Or if you prefer, use this: http://www.awci.com/for-watchmakers-clockmakers/for-the-watchmaker/watchmaker-technical-guides/elgin/

You can download the PDFs for your personal use.

Editor's note: If you have a favorite "old-time" resource you'd like to share with HT readers, let us know. It must be out of print. Email donna@awci.com with your idea.

Minnesota Clockmakers Guild (MCG)

The January meeting was to be held on Thursday, January 9, 2014 at 7:00pm at the Hopkins Pavilion in Hopkins, MN. The program was "Making and Using a Part Grinding/Cut-off Table." Participants were asked to bring their lathe with tool rest holder so the table post could be turned to the correct size to fit. They were also asked to bring a high quality diamond cut-off wheel with arbor (Time Savers or Dremel) so the table slot size and location could be made to fit. Stock for the table and post was provided.

The program for December was on sharpening various types of turning gravers and how to set-up the tool rest for hand turning. Demonstrations and examples were shown and brass stock was available for practice on various machines and lathes to refine members' skills.

Election of officers was held and for 2014 the MCG officers will be:
President: Richard Zielike
Treasurer: Garth Antila
Secretary: Dean Ziegenbein

The next several meetings will be a series of skill and tool building procedures for use in clock building and repair. The next Clock Building Class will be announced after further discussion. The next build class will be dial making.

For "Show and Tell," Ron Sikkema showed a very old, 1789 grandfather clock movement with a single hour hand and short train movement.

Future MCG Meetings/Topics

February 6, 2014 - Skill building procedures

March 6, 2014 - Skill building procedures

Two future road trips are being planned for this summer: Bily Clock Museum, Spillville, IA; Jim Borden, Woodworks Clocks, La Crescent, MN.

MCG Officers

President: **Richard Zielike,**
Phone (952) 938-0681
Email richard@edinaclock.com
Treasurer: **Garth Antila**
Phone (715) 386-3575
Email 3mgarth@gmail.om
Secretary: **Dean Ziegenbein**
Phone (952) 322-4776
Email dpz72@hotmail.com

Richard Zielike demonstrating graver sharpening on a slow-speed angle grinder with adjustable table.

Ron Widenhoefer demonstrating graver sharpening with a shop-built pivoting holder and Wahler diamond lap.

Jeff Pomeroy practicing graver turning of soft brass on a jewelers lathe.

Susan Wood instructing Paul Engebretson on some of the finer points of graver turning on the jewelers lathe.

Ron Sikkema showing an old grandfather clock movement with large engraved dial and single hour-hand movement.

1798 date engraved on front of dial and the short train movement for driving only the hour hand.

George McNeil's Potomac Guild
(A Guild of the Horological Association of Virginia)

The January meeting scheduled for January 7, 2014 at the Fairfax City Senior Center in Fairfax, Virginia, was postponed due to weather until February. The presentation will be by Pat Conahan, "Wood Identification Used in Antique Clock Cases" along with some tips on refinishing clock cases. The Potomac Guild always includes a show-and-tell, the 50/50 drawing and any material wants/needs. Don't forget to bring your clock/watch questions. Come early (6:30) for an informal get-together with other members and pizza dinner.

They held their annual Christmas Dinner and gift swap in December. According to Potomac Guild newsletter editor, "Our numbers were small, so Bob Stone had no problem winning our special prize, which was a mini drill press. We had an archery contest, which 'Robinhood Bob' won. If you wish to look at our form, please check out http://george.smugmug.com/Potomac-Guild/Guild-Meeting-Christmas-2013 Try not to laugh too loud."

Officers

President:	**Ryan Johnson**
Vice President:	**John Enloe** (Acting)
Secretary:	**Barry Boling**
Treasurer:	**Dick Riegel**

BASELWORLD

BASELWORLD 2014 runs from March 27 through April 3. Held in Basel, Switzerland, it's the world's largest trade show for the watch and jewelry industry and brings together exhibitors and attendees from all over the world.

Opening Day at BASELWORLD 2013

Let's take a look back at a watch brand that was new to BASELWORLD in 2013

Breva was a new brand on the scene at BASELWORLD 2013. Breva was founded by entrepreneur Vincent Dupontreué, who wanted to create a mechanical timepiece that would forecast the weather. He found the watchmaker Jean-François Mojon of Chronode to create the Génie 01, which is intended to be a mechanical mini-weather station for the wrist. Breva claims that it is the world's first watch with mechanical time, altimeter, and barometer, plus a power-reserve display.

The open, transparent design reveals layers of displays, which are easy to read. Hours and minutes are displayed on a tinted, semi-transparent subdial at 8 o'clock. Small seconds are positioned below 12 o'clock. The altimeter display arcs around the perimeter in the upper-left quadrant of the display. Barometric pressure is indicated on a second tinted subdial at 2 o'clock, where a single hand points to icons representing forecast sunny, cloudy, and stormy conditions. There is a 65-hour power-reserve indicator at 4 o'clock. An anaerobic capsule measuring air pressure dominates the lower portion of the dial, with another identical capsule underneath it to maximize sensitivity. The sapphire caseback features a circular scale engraved around the perimeter providing correlations between altitude and air pressure.

Editor's note: Jack Kurdzionak will be visiting BASELWORLD 2014 and reporting on what he saw and learned in an upcoming article in HT.

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