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COVER

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President's Message

By Mark Butterworth

We are now into the New Year and Iowa won the Orange Bowl, so now it is time for the Hawkeye fans to come back from Miami and settle in for a cold, hard winter. During this time New Year's resolutions are made and a few are already broken by now. I try to have a theme or topic for the column and the idea for this month is "Invest in Yourself." Sometimes it seems we are so busy putting out fires and living day to day that we forget the long range planning and the big picture. Investing in us ideally covers both our personal and business or professional lives. Often we claim we don't have the time or money to do this "investing." The truth is that we cannot afford not to, but often don't realize it until something blows up in our face.

On the personal side, first and foremost is our health. If we do not have that, we have nothing. I added less than a pound a year of weight since college. Unfortunately I graduated 40 years ago. Little things add up. For me, it means a lot less food and alcohol, and a program of exercise. I've always been a fanatic about maintaining my automobile and machinery; unfortunately I kept saying I didn't have time to maintain myself. Now that comes first. Regular schedules to the doctor and dentist can give us all peace of mind and head off disaster. Again, I have been the worst. The auto had regular checkups but I didn't. Explains why the auto is in much better shape than I. Don't get me wrong, with some lifestyle changes, I'm good as gold and certainly better than the dollar. But that is a different topic.

In our financial lives, I am surprised at how many folks carry a balance on their credit cards and how many we are seeing now with declined credit cards because people are at their limit. My biggest worry is that it is among older people as well who should be completely debt free at this point in their lives. Of course, there are those right now in emergency circumstances for one reason or another. For some it has been a way of life. I came across a WWII poster with the caption, "If you don't need it, don't buy it." The poster was referring to the fact that all raw materials and goods were in short supply and needed for the war effort. The depression era generation had a good understanding of the difference between "need" and "want." The grandchildren of that generation are now adults. The success of advertising has convinced many that they "deserve" something whether it is affordable to the person or not. There is nothing wrong with wanting if we can afford it, but debt is one of the great problems at every level.

In our lives as trades persons investing in us should be a continual process and the New Year is a great time to take stock. It may mean investing the money for tooling or equipment to allow us to do the job more effectively. I receive calls from repairpersons with a clock that does not keep time. I ask what the beat rate is and some have never heard of a clock timer. Others "never got around" to investing in one. It is a tool costing a couple hundred dollars. How serious or professional can a person be in this day and age when he is not willing to invest \$200-\$300 in a tool that will save many times that amount in its life? Investing in yourself can mean spending some time reading books and literature. One of the

Continued on page 33.

Executive Director's Message

By James E. Lubic, CMW21

This year membership dues are being returned at a steady pace, and I would like to thank those who have renewed their membership with AWCI, and remind those who haven't that this issue will be the last that you will receive before being purged from our membership March 1st. The trustees of the ELM Trust would like to thank all of you who generously donated to the Trust this year. So far the total cash donations for fiscal year 09-10 are \$3,233.20.

By the time you receive this issue of the *Horological Times* the 2009-10 Mid-year Board of Directors Meeting will have already taken place. The dates for this year's meetings are February 18th through 20th. AWCI's Strategic Action Plan, financial direction, educational/certification programs, member benefits will be big topics of discussion. We should have a full report in the April issue of the *HT*.

The AWCI Board of Examiners (BOE) will also be meeting. This meeting will take place Friday, February 19th. The purpose of this meeting is to review certification policies and procedures. If there is any tweaking to the certification that needs to be done, proposals will be made to the Board of Directors for consideration.

The Industry Advisory Board (IAB) will also meet on February 18th. Again this year the IAB members will be helping to facilitate the trade fair booth at the upcoming JCK show in Las Vegas, NV at the Sands Expo and Convention Center, June 4th through the 7th. We also will be participating in the second "The Smart Jewelry Show" at Navy Pier in Chicago, IL, April 24th through the 26th. The IAB has become very instrumental in the progression of AWCI's mission. We appreciate their support and volunteerism, and look forward to their input regarding our Strategic Action Plan.

Another reminder as we continue to get several inquiries a week asking for referrals – Go to the AWCI website at www.awci.com and make sure your contact information is visible to the public. How do you do this? Once you are at the AWCI website click on "Referral Directory". This is the top listing in the left-hand column. Follow the directions on that page and see if your contact information comes up. If it does great! If not, click on the "log in" in the upper right side of the page. On the "log in" page type in your member number where it is required, and then your "password". If you have never logged in to the member area before, your pass word is your member number and the first initial of your last name capitalized. Click "Submit" and a new page will come up. Now you will see a list of 18 options. The 16th option is "Update your online Referral Directory record" click that. On the next page is your record. The first item is "Make your Referral record public" with a drop down menu. Click "yes" in the menu and check and correct any other information that appears there. When everything is correct click on "Submit Form" at the bottom of the page, now you should be all set.

Have a great month and remember when making purchases from our advertisers to tell them that you saw their ad in the *Horological Times*.

**RENATA
AD**

Question

I have this watch in my possession, and frankly, I have no idea about it. It is labeled “O Fresard” and it is obviously a chronograph. It uses a single-button stop action through the primary crown. It has a minute and seconds register, plus obviously the chrono hand. It’s in good shape. What is unusual about it, although I didn’t give you a comparator in the picture, is that it measures 41+ mm across the main plate. Have you ever seen anything like it? Is it likely to have much value? The finish on the plates and armature is superb.

*Vince Schrader
Arcadia, IN*

Answer

The firm of Oscar Fresard was in business as watchmakers in the early 20th century in Lucerne.

Whether they made the chronograph mechanism in-house or had it made by a specialized chronograph maker, as was the usual case, is not known. They were also known for selling quality repeaters, watches, and as a clock importer. Your chronograph is of a typical design for the period and is built on a Swiss bar movement.

With its 21 jewels, some of which are strategically placed on the chronograph wheels, and the 5 adjustments for temperature and positional timing, your watch is a fine

example of an early 20th century Swiss-made column wheel chronograph and is well worth restoring.

In today’s economic environment it is a buyer’s market and very difficult to put a price on your watch. But a search on e-bay and other auction sites for an early 20th century Swiss chronograph might give you a sense of what people are willing to pay for such a watch.

Send your questions to:
Questions & Answers
Horological Times
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Calling All Past Presidents of AWI/AWCI

By Terry Kurdzionak
Convention Committee Chairman

We hope that you plan to join us at our 50th Anniversary celebration from August 4-8, 2010 at the Marriott Hotel on the waterfront in Covington, KY. We have missed seeing you and this will present the perfect opportunity for you to mingle with old friends and of course make some new friends.

We have four days of social and educational events planned, along with the annual meeting of the organization's Board of Directors, which of course is open to all. It is your chance to take part in the nitty-gritty of your professional organization, as well as offer suggestions, guidance and opinions on the current status of the organization.

Our hospitality suite offers the venue for the sharing of ideas and networking with old and new colleagues. Many of your old friends will not be there as we have lost so many people in the past 50 years. However, there are new generations of watch and clockmakers eager to meet you and hear about the history of this organization.

Long story—short? We are planning a party and we want YOU to be there. Further details are forthcoming in the *Horological Times* as well as at our website www.awci.com. Mark and/or clear your calendar now so that you will be able to join us for our special celebration. See you in August!



Cas-Ker

Swiss American Watchmakers Training Alliance Awards First Certificates

Following is the full version of the commencement speech given by Heinz Leuenberger to the 2009 graduating class of the watchmaking program at Oklahoma State University.

Ladies and Gentlemen: I would like to congratulate our graduates and welcome them into the community of professional watchmakers.

On this occasion, I would like to share some thoughts on the significance of this event and begin my address with four brief statements.

- Today is an important day for our graduates, as they are about to enter their professional careers and apply what they learned during the past two years of intense study.
- Today is an important day for the Watchmaking Department at OSU, as this is the first graduating class of a new and improved watchmaking program that is being partnered with Rolex Watch U.S.A.
- Today is an important day for the Watchmaking profession, as we award the very first certificates from the Swiss American Watchmakers Training Alliance.
- And last but not least, today is an important day, as another group of AWCI Twenty-First Century Certified Watchmakers enter the Watchmaking profession.

Allow me to elaborate on these four statements:

“Today is an important day for our graduates, as they are about to enter their professional careers and apply what they learned during the past two years of intense study.”

The step from school to profession is one of the most important steps in your life. It is much more than finally receiving a paycheck every month.

It is about social maturity and responsibility, about definition of one’s existence and about finding a place in society and contributing to it. The education that you received here at the Institute of Watch Technology is the end result of countless men and women who throughout history were driven to research, driven to invent, driven to teach. We need to be thankful for these individuals, for without them, mankind may still be living in the Stone Age. And it is part of your responsibility now, as professionals and fully developed members of society, to contribute yourself in your social as well as your professional environments.

At this point, I would like to acknowledge the instructors.

A common belief is that all it takes to teach watchmaking is to place an experienced watchmaker in front of a group of students...but that is far from



Heinz Leuenberger, advisory board member, congratulating Judd Jennerjahn and presenting his graduation watch - a Tudor Chronograph.

the truth. Professional watchmaking is much more than a highly developed, specialized set of skills. Professional watchmaking is a culture. Introducing an individual to such a culture requires educators who can approach the subject in a holistic way, developing in unison the hard and soft skills that are essential to becoming a successful professional. It is relatively easy to instruct someone how to service a watch. However, it is a tremendous challenge to teach someone how to service a watch, while understanding all the abstract principles surrounding it, while understanding the culture of impeccable after sales service that is essential to successfully supporting the culture of watch ownership. This is a culture in which precision, pride, authenticity, performance, a certain eclecticism, passion, history and traditional values are its driving forces. If the watchmaker is not sensitive to that, he or she will not meet the high demands of this culture. It is evident that true watchmaking educators need to develop a complete profile and not just a specific set of skills. This is a very difficult task to be completed in just two years, especially since the typical traditional attributes of watchmaking, such as persistence, patience, detail orientation, determination and respect, just to name a few, are no longer the norm in today's world of instant gratification and oversaturation.

So I want to thank Mr. Ziegenbein and Mr. Champion for their extremely hard work and for their dedication to the future of the Watchmaking Program here at OSUIT and the future of our venerable profession. Thank you, gentlemen; it is well recognized how much effort went into this success.

Let us now look at my second statement: "Today is an important day for the Watchmaking Department at OSU, as this is the first graduating class of a new and improved watchmaking program that is being partnered with Rolex Watch U.S.A."

Towards the end of the year in 2007, the College decided to upgrade its Watchmaking and Micro Technology Department and build upon its nearly 50-year-old history, taking it to a higher level by implementing a new and improved curriculum. This new program that was developed in a close partnership with Rolex Watch U.S.A. and its educational subsidiary the Swiss American Watchmakers Training Alliance (SAWTA). It sets itself apart from other watchmaking training programs by its exclusive focus on full-fledged watchmaking training for the high-end after sales service environments to support retailers and service centers. This curriculum expansion required a great investment in equipment, materials, and countless work hours; and I would like to thank everyone who contributed to the successful launch of this new and improved program, especially Mrs. Anita Watkins and Dr. Robert Klabenes, for their unwavering support and flexibility.

This investment will yield a solid return, as the outcomes of this program will meet the extremely high demand for qualified watchmaking professionals. The re-organization of the watchmaking program is another example of OSU's commitment to meet today's market needs and of their commitment to the personal and professional success of their students by providing them with a quality of education that can be applied directly upon entering the workforce.

To sum it up in simple terms: these graduates have more to offer due to a richer program, and this fact will become evident to them (having a wider choice of employment options and a steeper career path), as well as their future employers.

Now, let me explain my next statement: "Today is an important day for the Watchmaking profession, as we award the very first certificates from the Swiss American Watchmakers Training Alliance."

The renaissance of the mechanical watch has led to a shortage of qualified watchmaking professionals. Over the past several years, millions of high-grade mechanical timepieces were sold in the U.S. market. A proud owner of a watch such as this expects competent care of this prized possession at the local retail level. Indeed, most watch owners prefer their watches to be serviced at their area retail jeweler by a competent watchmaker with whom they are acquainted. The craftsmanship that goes into the creation of such a timepiece is expected to find its complement in its after sales service and care. Individual and direct relationships between the watch owner and the professionals who service these timepieces are becoming increasingly important, as the passion for high-end watches gains a stronger technical dimension.

However, due to this lack of qualified watchmakers, the scenario of professional after sales service at the retail level has become the exception, and the majority of watches in need of service are being sent to factory service centers. This, of course, creates a significant gap in customer service at the retail level that needs to be filled.

Until now, no organized vocational watchmaking training in the United States has addressed this lack of qualified watch service professionals by creating a specific curriculum to meet the challenges of high grade retail watch service. Today's watchmaker needs to be proficient, not only in movement service, but in a wide range of additional skills such as, comprehensive case and bracelet service and refinishing, waterproofing, estimating, customer consultation and spare parts logistics, just to name a few. These watchmakers are key representatives of our watchmaking culture; and therefore, are equally important to the ownership experience as the quality and the features of the timepiece itself.



Not yet at the finish line - current watchmaking students at Oklahoma State University Institute of Technology.

SAWTA was established as a collaborative initiative between Rolex Watch U.S.A., the American Watchmakers-Clockmakers Institute (AWCI) and three of the largest watchmaking schools in the U.S. Its goal is to establish, implement and maintain a comprehensive watchmaking curriculum that provides students with the level of skills and expertise that is necessary for successful employment as full-fledged professional watchmakers in today's market. These schools are: Oklahoma State University-Okmulgee, North Seattle Community College and the Lititz Watch Technicum. I understand that Saint Paul Technical College is also currently in the planning phase of transitioning to this new program. This course of study over a period of two years is understandably very demanding and intense; however, the efforts are rewarded by attractive positions with respectable income and outstanding job security.

With SAWTA, a re-definition and a renaissance of the American watchmaking landscape is taking place,

bringing the after sales service of a timepiece within direct reach of the watch owner once again. A new level of qualification has been created that can be applied in rewarding positions which are outside the sheltered and centralized service environments of the watch brands.

You are the first generation of graduates to earn this prestigious qualification, and you will realize the benefits of having received a wide and thorough vocational education soon after you have entered employment.

My fourth and last statement was: "Today is an important day, as another group of AWCI Twenty-First Century Certified Watchmakers are entering the Watchmaking profession."

The AWCI, the American Watchmakers-Clockmakers Institute, celebrates its 50th anniversary in 2010 and is the recognized trade association for professionals repairing watches and clocks in the U.S. The CW21 certification was established in order to address the need

for a recognized standard of knowledge and skills in the profession. As an AWCI CW21 certified watchmaker, you have proven the knowledge and skills whereby others will recognize you as being a qualified practitioner in your profession. As such, you will be required to perform at a standard that others may not. As such, you will represent the AWCI and the CW21 standard as you progress throughout your career.

On behalf of the American Watchmakers-Clockmakers Institute, I would like to present each of you with a one year complimentary membership to AWCI, which will be presented to you together with your Diploma.

Your SAWTA certificate documents your qualification as a professional and however, with it come some obligations:

- Represent our profession well. You are now within an exclusive circle that perpetuates the pride and craftsmanship of many generations over several hundred years. Please keep this in mind in all your future actions.
- Join and actively support the professional watchmaking organization in the U.S., the AWCI. Being just a member is not enough. Get active! Define and promote your profession, and do anything you can to uphold high standards of knowledge, skills and ethics.
- Support the perpetuation of our profession by maintaining your ties to your alma mater. Always be aware that the reputation of your alma mater is very closely tied to yours and vice versa. Promote the profession and promote the institution where you were given this opportunity to acquire its fundamentals.
- Be a responsible and active member of society. There are countless opportunities to contribute. You have the obligation to use them. You have a mind, you have a voice, and you have a limited time to spend here on this earth. Use it wisely.

Best wishes for your future.



AWCI 21st Century Certified Watchmakers

The AWCI members listed below have successfully completed the AWCI 21st Century Certified Watchmakers exam.

Certified Watchmaker 21

Baizerman, Arek—Norwalk, CA

Bale, Joshua—Ironwood, MI

Champion, Jason—Okmulgee, OK

Defilippo, Joseph—Lititz, PA

Emslie, Charles—Boyertown, PA

Fike, Joshua—Lititz, PA

Harbison, William—Lititz, PA

Hayes, Cody—Mission Viejo, CA

Hayes, Kelly—Mission Viejo, CA

Jennerjahn, Judd—Tulsa, OK

Kizy, Jalil—Troy, MI

Lam, Benjamin—Sun City, AZ

Leece, Brian—Lititz, PA

Loos, Jennifer—Pine City, NY

Morales, Jonathan—Elizabethtown, PA

Peca, Anthony—Leslie, AR

Pei, Lindsey—Lancaster, PA

Shiver, Justin—Auburn, AL

Throckmorton, David—Austin, TX

Smith Supply
House

Wheel and Pinion Cutting

Centering the Cutter

By J. Malcolm Wild, FBHI

Reprinted Courtesy of the BHI *Horological Journal* (July 2009)

There are various methods of centering the cutter when wheel and pinion cutting. It is particularly important when pinion cutting that the cutter is dead central over the blank. Even 0.003 in. (0.08 mm) off center will show a pinion leaf leaning and cause problems in the efficiency of the transfer of power through the wheel train.

When wheel cutting, there are a number of simple methods that can be used. Figure 1 shows a fine-point needle held in a collet in the lathe headstock. If the cutter profile is presented toward the point, then using a 2.5X eyeglass, it is possible to obtain fairly accurate results.

Figure 2 shows the ellipse method. The revolving cutter should be advanced down onto a piece of scrap brass that has been turned true and the cutter moved sideways. This will form a slight ellipse. The cutter can then be positioned in the center of the flat using an eyeglass.

Both these methods will produce acceptable results if care is taken.

For pinions, a more accurate approach is required. You can, of course, chuck a small piece of brass and cut leaves

as a test piece, then check with an eyeglass and keep correcting cutter position. This takes time.

A point worth noting here is that the profile of PP Thornton's cutters is exactly in the center of the blank form, see the drawing in Figure 3. It is then possible to measure accurately from the blank face to center the cutter to the work.

A centering micrometer is shown in Figures 4 and 5. I have made these for most of the lathes I have; a No. 2 Morse for the Myford Super 7, W12 for the Schaublin 70, and a smaller unit for the watchmakers lathe having an 8 mm arbor. A master dowel is used to accurately set the micrometer head before using the tool to center the cutter.

Another method is to use a microscope, if available, but this can be expensive. Figure 6 shows the set-up on a Myford Super 7 lathe. While the microscope is set up in the headstock, which is the most accurate method, this is often not the most convenient. It entails removing the work first or re-mounting once the cutter is on center. A more convenient method is to mount the microscope in the tailstock. This can only be carried out if the tailstock is true with the headstock.

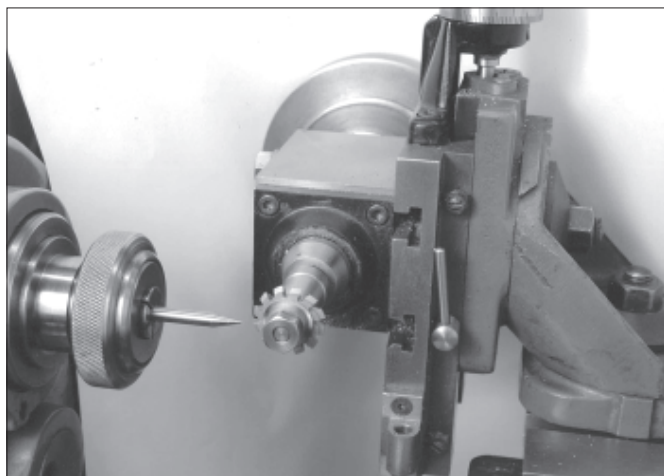


Figure 1

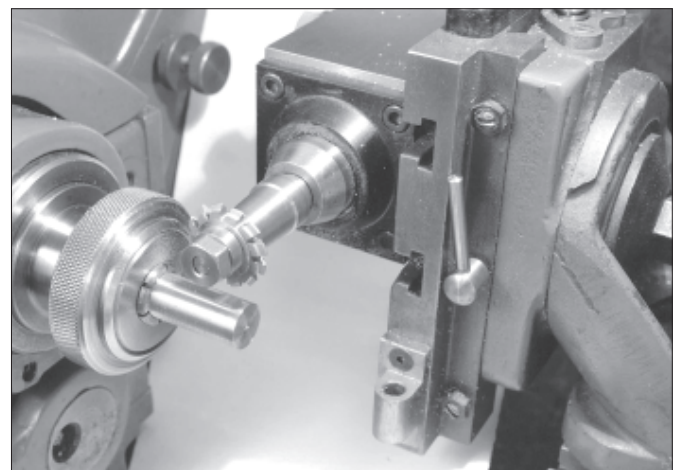


Figure 2

I made a special tailstock for my lathe which had the bore machined accurately from the headstock. This proved very successful and has the advantage of the work being machined in position without the problem of being re-chucked and the possibility of inaccuracies. (See Figure 7.)

A special microscope holder was often supplied as an accessory for the Schaublin 70 and 102 precision lathes, Figure 8.

As most readers will be aware, there are electronic edge finders available for larger machines but not for lathes and mills with small work spindles. With this in mind, I designed an edge finder suitable for the W12 arbor for my Aciera precision milling machine. The collet size is, of course, the same as for the Schaublin 70 lathe. This set me thinking that it may be possible to make an electronic cutter-centering device also.

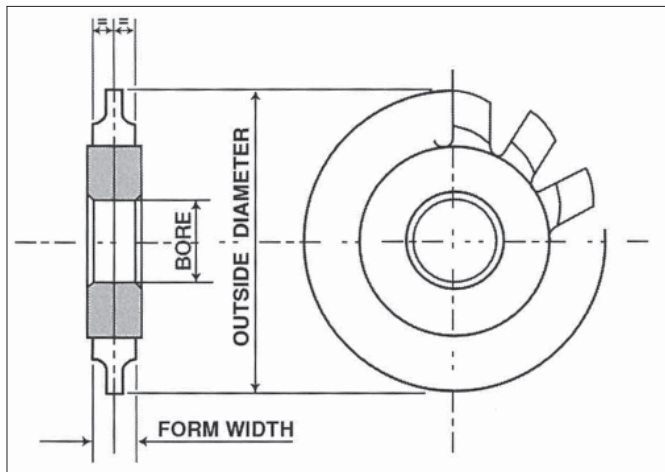


Figure 3

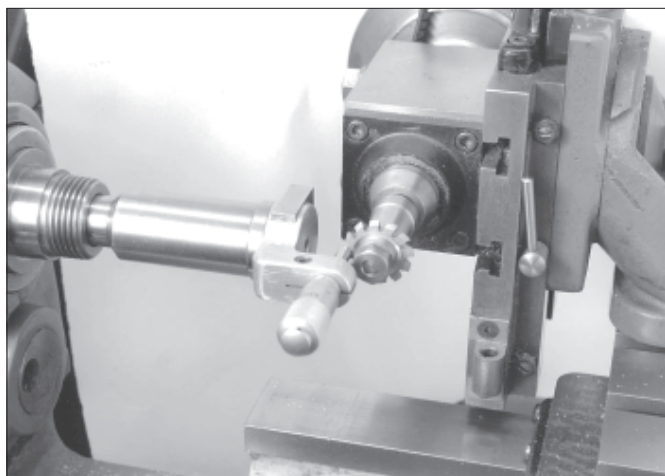


Figure 4

The first unit I made had a 6 mm stainless steel ball. The stainless is tough but can be machined for a small thread to enable a screw to be fixed with a small crosshole to accept the loop end of a tension spring. Figure 9 shows the set-up on the Aciera. Tests carried out showed repeat accuracy of 0.0002 inches or 5 microns! It was then possible to set the work on the Aciera very accurately.

Very small hearing aid batteries are now available and it was possible to obtain batteries small enough to fit inside a 12 mm arbor leaving enough wall thickness to receive an insulation sleeve. I use a very good company who specialize in electronics and they fitted LEDs and resistors and completed the miniature wiring in the main body. Three blue LEDs were fitted, equally spaced.

The unit is so designed that when the ball touches the work the LEDs light up and if traversed too far the ball



Figure 5

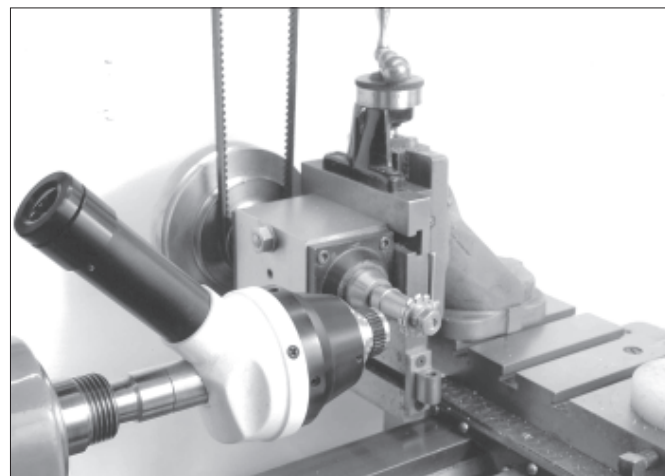


Figure 6

will leave its seat without damage. When the machine table is reversed the ball will accurately reseat itself. On my machine I have an Accurite electronic readout on both X and Y scales.

With the success of the first design suitable for use on the milling machine, I commenced the design of MKII with a small probe of 0.100 inches or 3 mm diameter to enable accurate cutter centering. This wasn't easy.

While it was quite simple to machine an accurate radius for the ball to seat in on the original design, to accurately reposition the probe after touching the cutter was more difficult. Much head scratching and many prototypes later, I came up with a design that worked extremely well.

Figure 10 shows the set-up in the Schaublin 70 lathe. The cutter is advanced towards the probe until slight contact is made. The LED will light up; two or three touches will obtain the most accurate position.

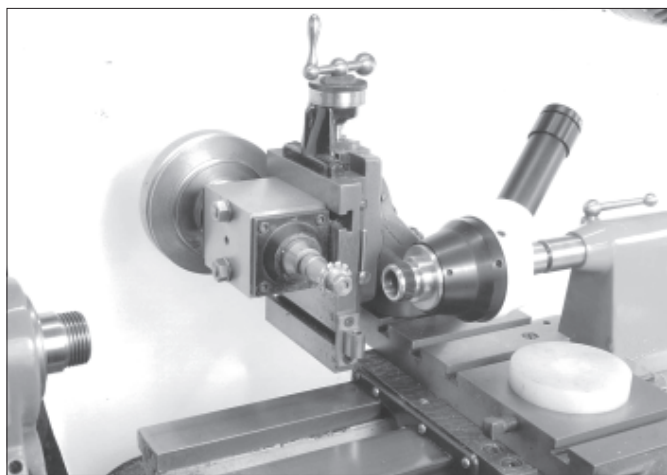


Figure 7

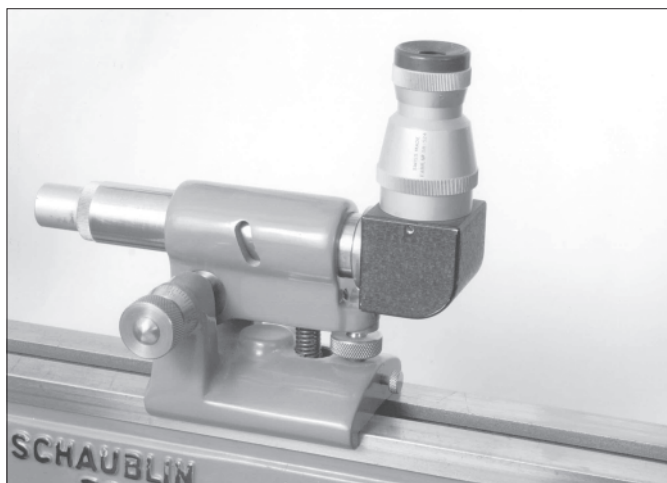


Figure 8

The lathe cross slide should be moved half the distance of the probe plus half the distance of the cutter blank as shown in Figure 11. This will position the pinion cutter in the center of the blank. Ensure all backlash is removed when positioning the cross slide.

A unit was made up for the Myford Super 7 lathe with a No. 2 Morse arbor, Figure 12, also a smaller unit for an 8 mm watchmakers lathe. Note the size of the special battery, only 4 mm diameter, Figure 13. The set-up in Figure 14 shows the electronic edge finder in position on the Favorite No. 3 precision lathe. The unit proved very successful and extremely accurate.

While the photographs show the set-ups mainly on the lathe for cutting wheels and pinions, those set-ups can equally be carried out on the milling machine. When wheel and pinion cutting, it is essential to have a rigid set-up to give satisfactory results. This particularly applies to pinion cutting

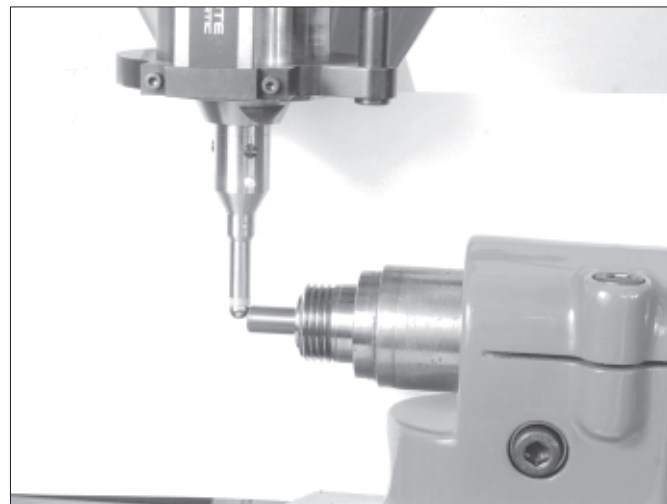


Figure 9

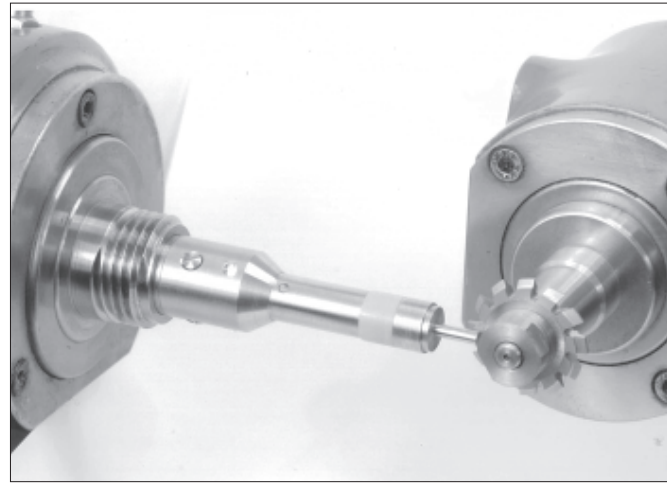


Figure 10

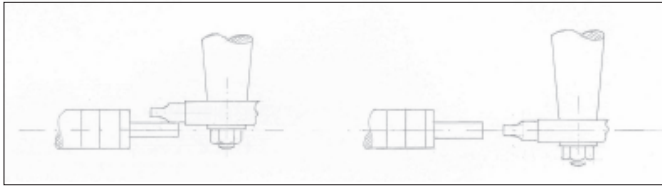


Figure 11

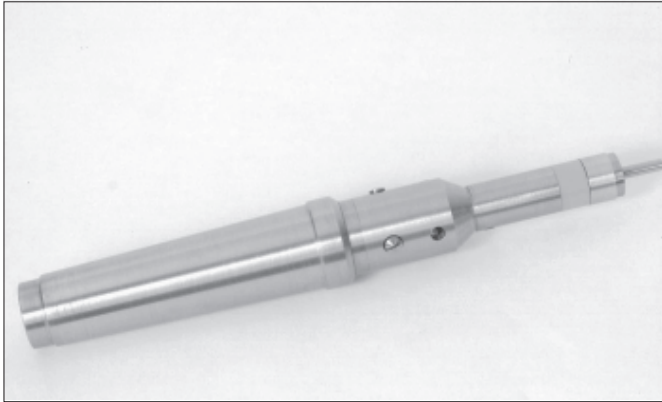


Figure 12

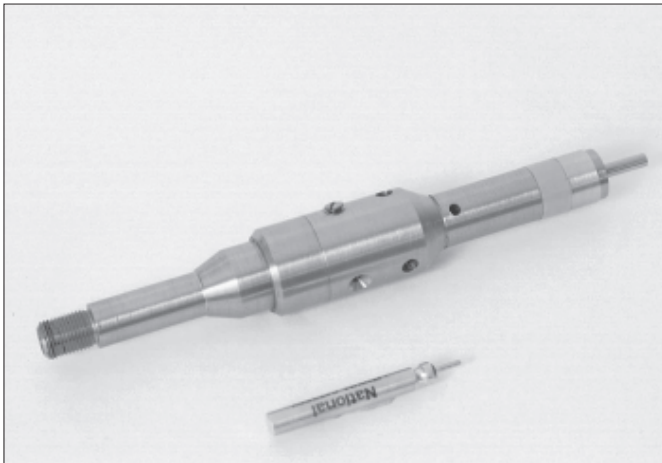


Figure 13

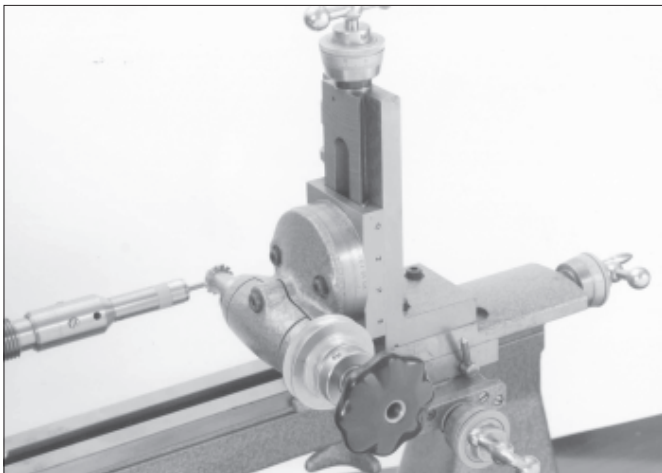


Figure 14

Bulletin Board

NEW REQUESTS

Patek Philippe 8180 Detent Lever

Donald Yax, Howell, MI, is looking for a source for a detent lever for a Patek Philippe 8180.

ITEMS STILL NEEDED

Caliber and Setting Bridge

Mario Perotto, Lake Ariel, PA, is looking for the following information on this watch. The movement diameter is 43 mm.

He is looking for:

- 1) The caliber number of the movement.
- 2) A possible source where a setting bridge could be purchased.



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

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The '60s

By Anthony Riggio, CMW21

50 years. A Golden Anniversary. 5 decades. Years that produced some of the most radical changes in not only technology but also society and life as we know it.

The '60s opened innocently enough. It appeared that we had recovered from World War II and the Korean "conflict". Industry was revving up, baby boomers and their families were easing into a modern world. Many of the revolutionary ideas that began then are still developing today.

After the joint meeting of HIA and UHAA in late 1959 it was determined that 1960 would be the "Charter" year for the association. Final details for the first convention to be held in June of '60 were put into place and the committee began cementing the key players into place.

John F. Kennedy, then a candidate for president stated "{We need} a new generation of leadership – new men to cope with new problems and new opportunities". AWI certainly recognized the value of this philosophy and new leaders emerged from all corners of the industry.

Meanwhile, the times they were a changing. In 1960 Echo 1, the first communications satellite was launched. The digital display was invented as well as the Laser. Culturally and musically "The Twist" was the #1 single. Marshall Dillon protected Dodge with sensitivity, we sang along with Mitch Miller and laughed at Jack Benny, and sadly Lucy and Ricky were divorcing. The Stone Age would never be the same after The Flintstones premiered on TV, quite possibly a black and white Philco 17" portable.

In our world, that of horology, the automatic wind watch pretty much came into its own. Watchmakers were still recovering from changes in service opportunities due to shock resistant devices and "unbreakable" mainsprings. Were that not enough, Hamilton had introduced an "electronic" timepiece in the late '50s and one of 1960's prized holiday gifts was the Bulova Accutron which bragged in true '60s advertizing fashion that it was 99.9977% accurate. Adding insult to injury for watchmakers the battery was "as easy to replace as a lighter flint" as promoted in a December *Life* magazine ad.

June 18 – 19th 1960 were the dates of the Charter convention and John M. Farrell, employed in the Research Laboratories at General Motors, became the first president. The first Board of Directors meeting was held in May of 1961 with most of the activities concerned with the first "International Watchmakers and Mechanical Instrumentation Congress" to be presented by AWI and held in New York in March of 1962. Over 1,000 people would attend. Much of the energies of the meeting were concerned with "Microminiaturization Technology" and "Watchmaking Technology". As the Institute matured the direction AWI's future focused much more specifically on horology rather than "Microminiaturization".

Finally hitting its stride in 1963, AWI held the first member voting, general election of the Board of Directors. By popular vote 5 newly-elected Board members accepted the challenge of new 3-year terms. Likewise, the Industry Advisory Board came into being and the first annual Certification Award was presented for the highest score on the certification exam. All the while the new "Pepsi Generation" was driving to work in their VW Bugs. Amazingly, that venerable import retailed for \$1,588 including the luxuries of a heater and defroster that were no longer "optional" items. Incidentally, the gas gauge was also no longer an option.

Tragically, in November of '63 the world said goodbye to John F. Kennedy. Culture and society began to morph into the '60s as we remember it. Later in the decade Martin Luther King changed race relations yet he too went to his reward far too soon. And let us not forget Bobby Kennedy. Three men that changed the world but could have done so much more. Sadly, the '60s were a time of heart tugging emotion.

The space race Kennedy championed had officially begun in April of 1961 when Russian Yuri Gagarin orbited earth once and returned. Alan Shepard of the U.S. followed a month later and in '62 this boy's hero, John Glenn, Jr., circled the earth 3 times in Friendship 7. Of more interest to us horologists, Wally Schirra, another hero of the Mercury Astronaut corps, wore an Omega Speedmaster manual wind chronograph during his ride into space in

the Sigma 7 rocket and capsule. It bears mentioning that Bulova's Accutron traveled into space as well. During the last Mercury mission L. Gordon Cooper wore an Accutron 214 with a rotating GMT bezel as well as his manual wind Omega chronograph.

AWI's progress continued deeper into the '60s and during the Presidential terms of James Dodson, '65-'67 AWI established the "Code of Ethics" to detail and express the high ideals of the Institute. The "Research and Education Council" came into being with 9 of the country's more progressive schools joining to strengthen the relationship between AWI and watchmaking scholastics. Also under Dodson's leadership the Institute brought a Cincinnati native, Milt Sevens, into the organization as the first "Executive Secretary" to serve as essentially, the Institute's managing director.

Education continued to be one of the primary functions of AWI and the travelling bench-training program was developed in conjunction with the educational Audio Visual training programs. Harold Herman, president from '67 through '68 promoted and developed not only time studies and production methodology for watchmakers he championed the travelling bench courses that traversed the country training technicians and courses covered dozens of states.

Of course the '60s wouldn't be complete without the Beach Boys, the Beatles, long hair and love-ins and the counter culture. An unpopular foreign war had crept up on us and although America was on a roll we still had to contend with the Cold War and inflation. America's Astronauts were still flying and in July of '69 our spirits were boosted when the U.S. reached the moon; wearing Omega Speedmasters, Neal Armstrong and Buzz Aldrin landed on the moon. Color TV was becoming a standard and the Mustang and other Pony cars were scrambling up and down "Route 66". And let's not forget the summer of love and finally the counterculture's high point, Woodstock. If you remember being there you probably weren't.

AWI President Jerry Jaeger took the oath in June of '68. Under Jerry the "Research and Educational Council" was charged with producing a training journal and the *Questions and Answers* manual was written. Jerry also worked with the FTC to change standards for the industry to benefit the watchmaker. He pressed the Certification Committee to expand certification to include the Certified Watchmaker classification to recognize proficiencies that had never been addressed and partnered with law enforcement and the IAB to develop the AWI case mark system.


Rounding out the decade, Harold Calvert assumed the reigns of President in June of '69. A CMW and secretary of the Indiana Board of Examiners, Harold's tenure would provide the clockmaking community with certifications, CMC, Certified Master Clockmaker and CC, Certified Clockmaker. Icing the cake, AWI's certifications were praised by the U.S. Department of Labor and were assured the Department would officially endorse the Institute's certifications.

It would go without saying that the '60s were a dynamic decade both in the human arena and at AWI. Whole libraries hold the cultural sum of these 10 years making it impossible to touch on but the most impactful events. AWI channeled the energies of an historic assemblage of watchmaking associations and talented individuals laying the foundation for an Institute without peer. The challenges of the '60s will almost pale in comparison to industry upheavals to come. Still, those pioneers that brought us AWI from what is truly a different age should be fondly remembered and commended for their foresight and vision.



CLOCKS

m a g a z i n e



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by
Ian Beilby

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Omega Stainless Steel Watch Bracelet Repair

By Dale LaDue, CMW

The cost of a new bending bracelet can be quite costly. For some customers who have enjoyed their watch for 10 to 20 years, it may be impossible to obtain a bracelet.

Any unique repair is an exercise in thinking, planning and executing the process. A jeweler referred a customer to me who had a broken clasp on his stainless steel watch bracelet. It was an Omega Constellation quartz wristwatch with an integral bracelet that utilized a push piece foldover sliding

clasp. In this instance, the stud that limits and prevents the slide from separating completely was missing. It appeared to have rusted away. The customer said that the bracelet had not been repaired in the past. However, I was skeptical and thought a carbon steel stud had been installed. Close inspection showed that the stud was threaded and rusted solidly in place. A carbide spade drill was used to drill through the remainder of the stud as shown in Figures 1 and 2. A taper broach was then used to grab the steel piece and screw it out as shown in Figures 3 and 4. The hole, Figure 5, was found to be a number "one" size on the die plate by running the corresponding tap through it, Figures 6 and 7. This particular thread die plate is

calibrated in millimeters. The #1 thread die is 1 millimeter and the other numbers correspond to millimeters as well. There are three holes per row, two are thread cutting dies and the center one is a gauge for determining the proper diameter to cut the thread.



Figure 1. A carbide spade drill was used to drill through the threaded and rusted stud.

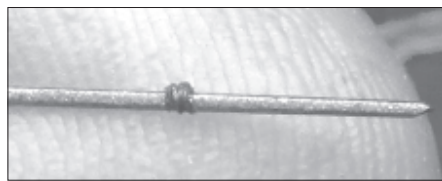


Figure 3. A cutting broach was used to remove the threaded piece.

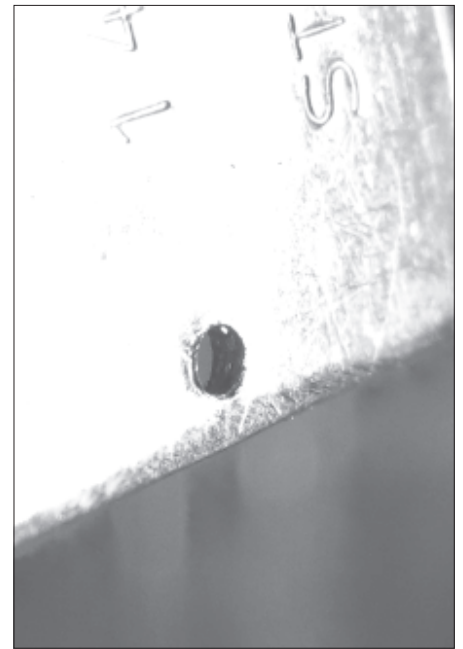


Figure 5. The hole with threads intact

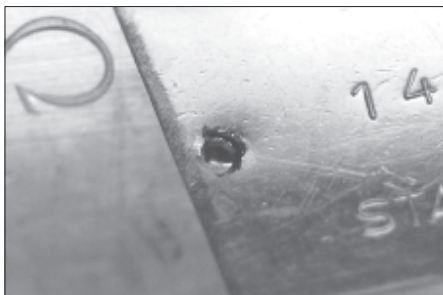


Figure 2. A close view of the drilled stud

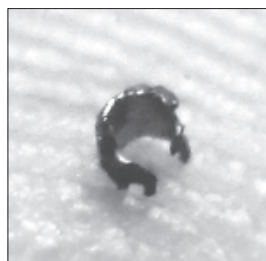


Figure 4. A close view of the remaining threads



Figure 6. The number one tap corresponds to the #1 thread die in the screw plate.



Figure 7. The dies in the screw plate are numbered in whole millimeters. The center hole between each die determines the proper diameter prior to threading.

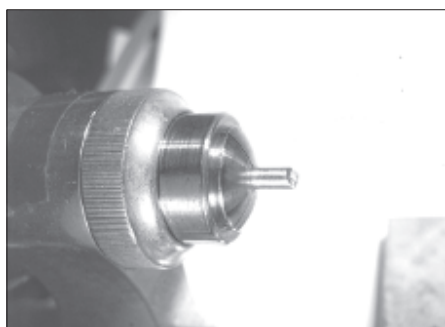


Figure 8. A piece of stainless steel automobile antenna mounted in the lathe.



Figure 9. The opposite end of the lathe spindle was threaded with a .275 x 40 tap. A collet that fit the antenna was threaded into the spindle to prevent any whipping action.

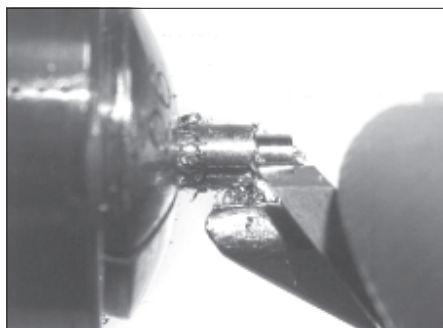


Figure 10. The antenna was turned down by hand.

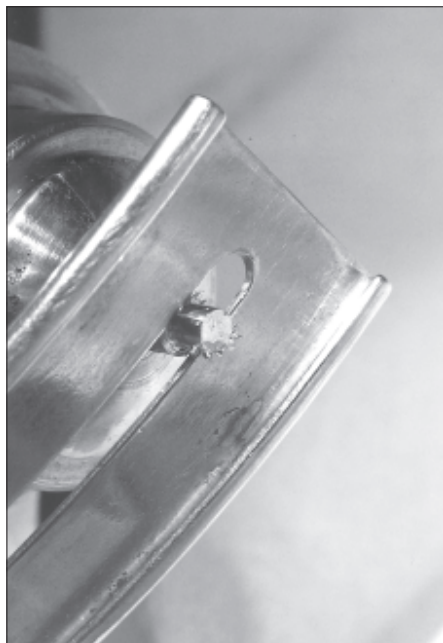


Figure 11. The turned section fit freely in the clasp slot.



Figure 12. A shoulder was turned down to the correct diameter for threading.

I used a stainless steel automobile radio antenna to make the stud for the bracelet. Figure 8 shows how far the rod extends from the collet end of the headstock, and Figure 9 shows the rod extending from the opposite end. I had



Figure 13. The shoulder was tested for fit in the center clearance hole of the screw plate



Figure 14. The shoulder was turned down to fit properly in the clearance hole.

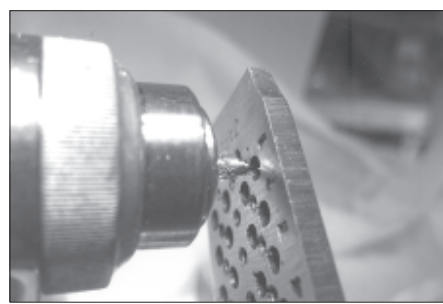


Figure 15. The shoulder was carefully threaded.

tapped .275 x 40 in the spindle end so that a collet can be threaded into it. This stabilizes and helps prevent a long rod from whipping around as the lathe is spun.

The rod was turned down to a diameter that slides easily inside the bracelet clasp slot as shown in Figures 10 and 11. The height of the stud head was determined by the thickness of the clasp, as was the length of the threaded section. Figure 12 shows the stud being turned down to fit the clearance hole in the thread die plate. The stud

was tested for fit until it fit easily into the hole, Figures 13 and 14. It was then carefully threaded using light oil as a lubricant, Figures 15 and 16. The finished thread is shown in Figure 17 and Figure 18. I had to relieve the base of the threads where the die could not reach because the stud would not seat fully in place. Comparing Figures 18 and 21 one can see the slight relief. Figure 19 shows the thread seated fully into the clasp sliding piece. The stud was then parted from the rod, Figures 20 and 21. The finished threaded stud, Figure 22, was reversed and held by its head in a proper size collet, Figure 23. It was then slightly ground with a fine stone such as an Arkansas or ceramic slip and then brought to a high polish using a hard fiber disc charged with Fabulustre® compound, Figures 24 and 25.

The stud was screwed in place by finger pressure and 3M Rite-Lok™ Threadlocker #TL90 was applied to the

threads as shown in Figure 26. Rite-Lok™ Threadlocker #TL90 is labeled “post assembly wick and lock, low viscosity”. For permanence the screw threads were riveted utilizing a round nose stake followed by a flat faced stake in a staking tool that has its platen covered with tape. This prevented marring the polished head of the stud, Figures 27 and 28. A conical stake was then used to taper the edge and create a bevel, Figures 29 and 30. A view of the underside of the clasp with the new stud in place is shown in Figure 31. The closed and latched one-button

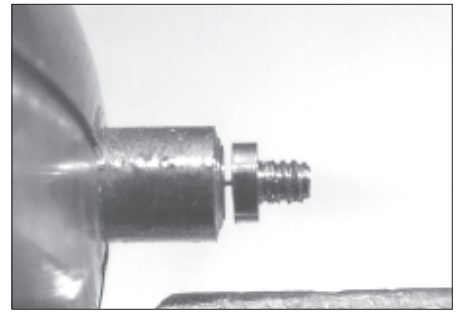


Figure 21. The new stud showing the relief

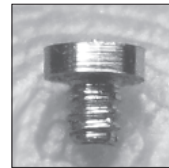


Figure 22. The completed stud

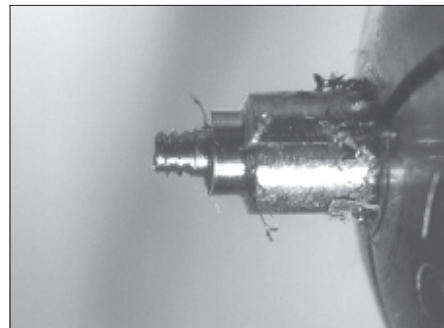


Figure 18. The die would not allow threads to be formed fully to the head.



Figure 23. The stud was reversed, held by its head and slightly ground to remove tool marks.

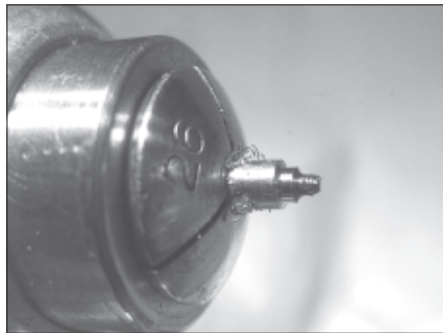


Figure 16. A generous amount of cutting oil was used



Figure 19. A relief cut was made at the head to allow the stud to seat properly



Figure 24. A hard fiber disc charged with compound imparted a fine polish.



Figure 17. The finished thread



Figure 20. The threaded stud was parted.



Figure 25. A close view of the polished stud

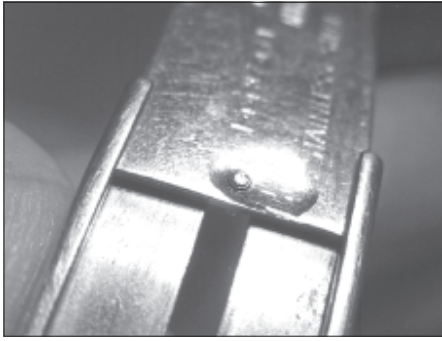


Figure 26. The clasp was assembled and the threads were flooded with post assembly green low viscosity threadlocker.

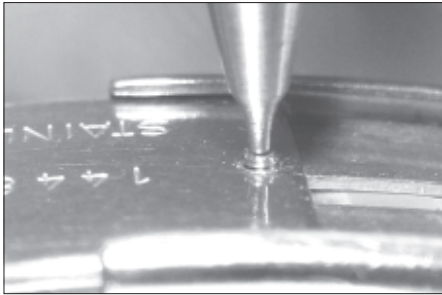


Figure 27. The stud threads were riveted in place using a round nose stake.

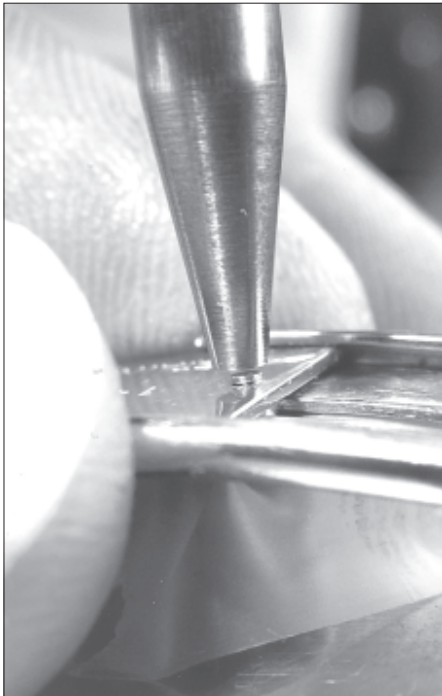


Figure 28. A flat nose stake was used after the round stake



Figure 29. A conical stake was used to chamfer the sharp edge.

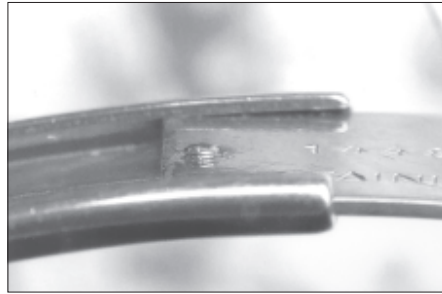


Figure 30. A close view of the riveted and chamfered edge

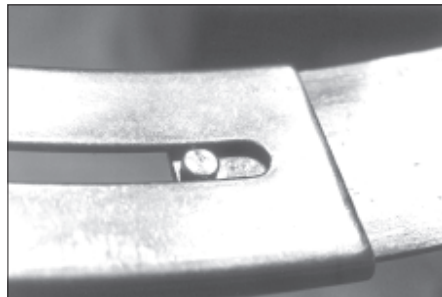


Figure 31. An underside view of the clasp

clasp is shown in Figure 32. The Omega Constellation watch can now be worn securely for many more years, Figure 33.

This completed repair reminded me of another Omega bracelet I had worked on almost four years ago. I went back through my photos and found that I had only a few. I was disappointed that I did not take more comprehensive photos. I was in the process of writing the previous bracelet repair article when this watch was brought in for a new cell. It looked familiar and the customer verified that he had it in my shop for repair about four years ago. I asked



Figure 32. The Omega one-button clasp completely hides the foldover sliding mechanism.

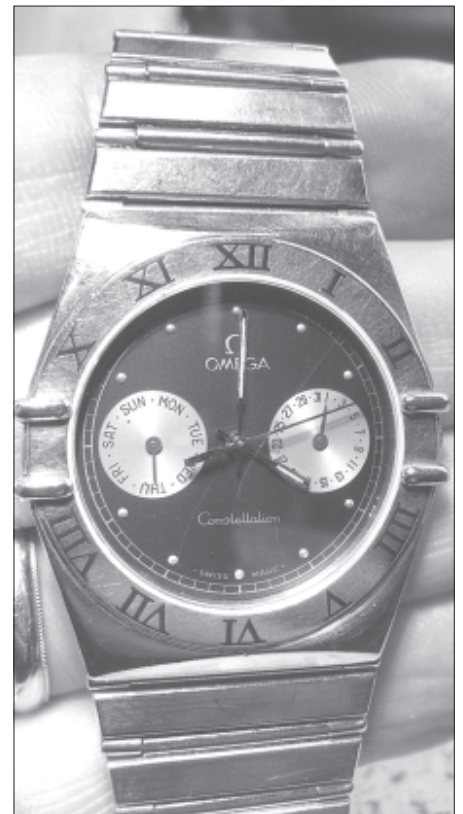


Figure 33. A view of the Omega Constellation



Figure 34. The end cap was missing.



Figure 35. Stainless steel wire was turned to shape and drilled.



Figure 36.
The new end cap



Figure 37. The new end cap was turned down to a tight press fit in the case lug tube.

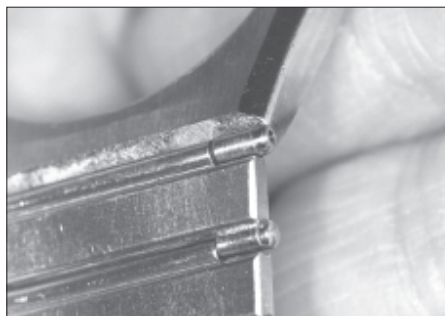


Figure 38. The new cap pressed in place.

if I could take a few photos and he agreed. I now have a more comprehensive photo review and am able to present this as a repair technique.

This Omega bracelet was missing an end cap at the case lug as shown in Figure 34. A piece of stainless rod was turned to press fit into the tube attached to the case. It was then drilled to clear the pin inside the tube, Figure 35. The drilled hole was sized to match the other open-ended caps. The finished

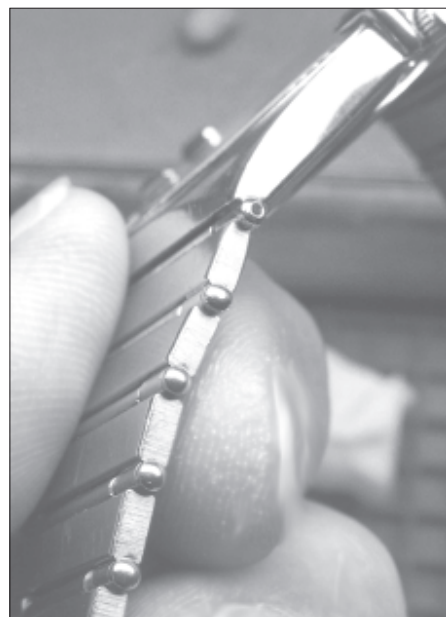


Figure 39. Both case lug tube caps were drilled. One side of the bracelet had solid end caps.



Figure 40. A view of the opposite side of the bracelet showing the drilled end caps.

cap piece is shown in Figure 36 and in Figure 37. It was started in the tube before it was pressed completely in place, Figure 38. I do not believe I used an adhesive of any type and this has held up very well as the “four years later” Figure 39 attests. Notice in Figures 39 and 40 that except at the lug, one side has solid caps on the bracelet links and the other side has drilled caps. There was an interesting difference between the previous slide clasp and this one. The first clasp used a stud and slot to secure the slide. This slide utilized a screw that obstructed a flange on the side of the slide to secure it. The Omega Constellation watch still cherished by its owner after many years in service is shown in Figure 42.



Figure 41. The sliding clasp utilizes a screw that blocks a flange on the sliding piece to prevent separation.



Figure 42. The Omega Constellation model and its integral bracelet

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The Trustees of the AWCI Education, Library and Museum Charitable Trust would like to recognize the following people for their donations to the ELM Trust:

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Education Notes

I hope your year is taking off and bringing in some needed business. It was a quieter Christmas than I would have liked but it seems that everyone was just waiting for the holiday to end and then make his or her way to my shop. I have so many interruptions every day now that I am considering altering the hours the public has access to me so I can get some of that wonderful work out the door. Ours is an unusual profession. We complain when we don't get enough business in the door and yet if we are not at the bench, we can still go broke, as we can't pay the bills with work that is coming in for repair! The only useful work is that which is back in the customer's hands to enjoy and helps to pay my bills!! Don't forget to prepare for one of your New Year's resolutions—get certified! Keep working on it!

This month, I want to cover just a few items that are in the works, which I am sure most of you are anxiously waiting to hear about. The EDU discussion is now in the hands of the Education Committee members and being discussed, debated and hopefully coming to a conclusion soon for AWCI to use with all its members. EDU is the Educational Development Program, which includes continuing educational materials and much, much more. Just to give you a better idea of the philosophy that we are using to develop this program, consider the philosophy that the committee was given as it started: *“For any organization to develop, thrive and grow, the participation of its membership is critical. If members do not grow, then neither does the organization that represents them. For the benefit of the total membership and for the development and/or maintenance of a member's knowledge, skills, disposition and service to the horological trades, this program was developed to set the guidelines for the educational programming of AWCI. It is incumbent on those members who carry current certifications to act as “stewards” and help horology grow in any way they can by contributing their knowledge, skills and service to the organization, industry and the membership. The future of our organization depends on your efforts to help foster this spirit*

through encouraging the development of others.” We are too small a trade to not support each other and support the development of our careers. If not us, who else? The use of mentors for our clock program has been a huge help towards that end. It has been inspiring to have so many come forward to help. Like I said before, if not us, who? If not now, when? For those of you, who have already certified, please continue to be patient, as you will have plenty of time to gain whatever credits you will need to maintain your credentials for industry, and I think you will find there are many avenues to pursue that will be even more rewarding and satisfying toward building your careers. I will keep you posted. This is the most challenging work that any committee could ever undertake as it covers all members. This is the reason it has taken so long. We want quality, and that has taken a lot of work!

The clock certifications are well under way and it seems a few comments may help those of you about to embark on this trail. There are two items to look at closely and think about before you start. The pivot exercise requires some solid precision. We are measuring your skill in hold tolerances and uniformity. For example, when we score the pivot, we measure it in 3 places along its length. To get a perfect score requires that the pivot be the same dimension at the shoulder as at the tip. If your scores are 1.1 mm (shoulder), 1.2 mm (center) and 1.3 mm (tip), you are tapered or trapezoidal. That's not good. It may run, but as it wears two things happen. If the pivot wears, it will be out of tolerance quickly as the 1.3 wears to 1.1. Secondly, it is likely to wear the pivot hole more quickly as it has one specific, small point of contact and burrow, which can stall the train. Not good. Keep it flat. Even a reading of 1.1 mm (shoulder), 1.1 mm (center) and 1.0 mm (end) is very good. It doesn't cause any of the above. Don't forget to burnish your final work. Don't know how? Take a course, get Mr. Penman's program CD and study it, talk to a mentor who does, do whatever you need to do to master the skills.

When you put in wheel teeth, we don't care if you put in one plug or cut a slot and set in one tooth at a time, but we do care that they fit well. That means easy on the solder. The teeth should match all the other teeth both in spacing and shape and ogive. Tips should match as well. Even if we can tell that you set the teeth, this will not reduce your score. If the teeth you put in are noticeably different from the others in shape, size, ogives, spacings and file markings, and with solder remnants, this will affect your grade. Be neat and precise.

Remember, this is a test! Show us your best skills, not your hastiest. We want to know that you know how to make it last! That's what it means to carry the distinction of Certified Clockmaker.

One last note, I personally am working on an Atmos project at this time. As a result of some challenges with Atmos mainsprings, in cooperation with Mr. Jeff Hamilton, I have been studying the torsional properties of properly running clocks and have made some interesting finds. I will be publishing more on this in the next several months as I get more time from bench work to write. Just a heads up, if you take a micro-torque gauge (watch torque gauge) and clamp it to the barrel arbor and begin to make one revolution wind and check the torque at each wind, the best springs are those that will give you about 6.5 oz./in. at 3 complete revolutions. If it reaches the 6.5 mark sooner, the clock will overbank and cannot be slowed down. If less, there will not be enough torque to provide the proper power to the train and may require that the mainspring be fully wound to get closer to the minimum of the 6.5-7 oz./in. (this equates to about 220 (440) degrees to 240 (480) degrees of balance rotation) for the best and stablest timing. Most often these latter springs will not support good timekeeping over the long haul. More on this later.

Happy Valentine's Day and remember to keep those resolutions—especially the one about certifying.



Livesay's

Clockmaking Elements

Part 1

By Laurie Penman

This is the first of a series of articles about clock design and making. I intend to take a look at various aspects of designing and making clock movements and try to make it easier for readers to build their own, modify a clock design that doesn't quite suit them or replace broken, worn or missing parts of an existing clock. It will not, (of course), be either purely theoretical or purely practical and I hope to be able to put forward ideas that may make a clock project simpler, easier to make or possibly better from the point of view of timekeeping.

Let me begin with the gear trains, in particular the time train. It has a great effect upon the efficiency of the clock movement and it is probably the most expensive part of the clock to make. However, before we can begin to design the train, or indeed, any part of the clock, we need to know what sort of clock is wanted (time duration for instance).

Generally speaking, clocks will be either thirty-hour, eight-day, one-month, three-months or one-year. There are exceptions of course but they are not important from the design position. Let us look at the advantages and disadvantages of these different types of movements.

Thirty-hour

Advantages: Usually cheap to make, it can be designed to have maintaining power. The drive is uninterrupted by winding. It is lightly loaded and even a clock with relatively soft pinions and pivots will last for a century or more. You will find that I place a lot of importance upon the longevity of a clock. If you are prepared to put the effort into making a clock, you ought to expect that it will last long enough to pass on to your children, grandchildren and great grandchildren.

Disadvantages: You have to wind it every day.

Figure 1 shows a typical British thirty-hour clock from south of the Midlands, an east/west band that has its borders very roughly about fifty miles south of Birmingham and eighty miles north. It is likely to have come from the eastern side of this area. A rope drive can be seen, these

are an alternative to chain and sprocket, and neither type gives a secure guide to date.

Eight-day

Advantages: It only needs winding once a week. You can take a seven-day holiday without making special arrangements for winding.

Disadvantages: Dearer than a thirty-hour, but probably by no more than a third. Heavier loading and needs pinions that are tough and pivots that are hard. Figure 2 is a rather special eight-day clock, a regulator that is capable of working to a few seconds a month. The layout before the center arbor of a barrel driving the center arbor directly (or a toothed barrel ring driving an intermediate

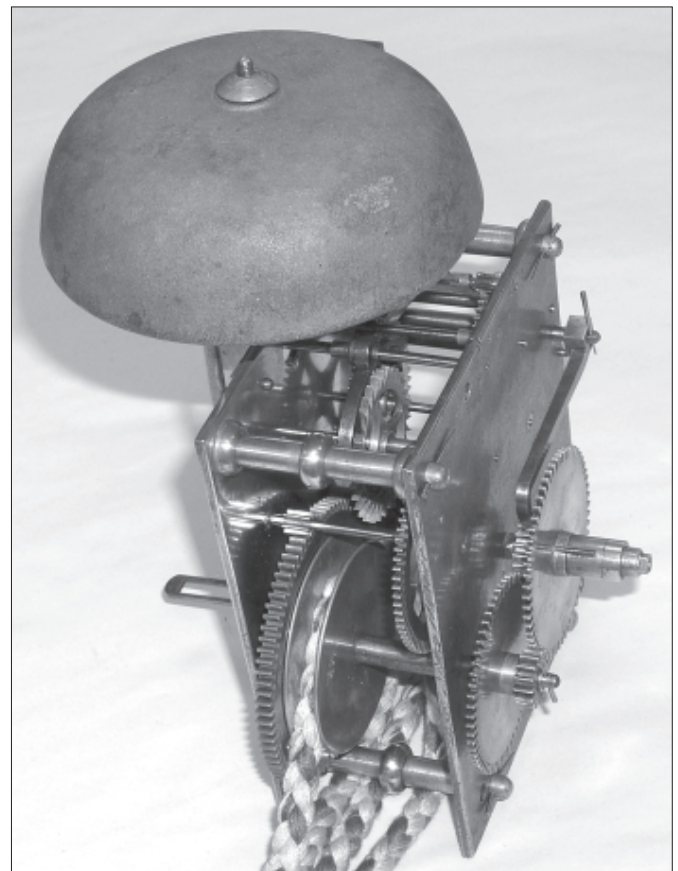


Figure 1

wheel and pinion and then the center pinion) is common to ordinary European eight-day movements.

One-month

Advantages: Longer holidays. The timekeeping is not affected so much by winding. Regulators are frequently month going or longer duration.

Disadvantages: More difficult to make, and needs good maintenance.

Longer Duration Clocks

Advantages: The clock may be ignored, so far as winding is concerned, for long periods.

Disadvantages: Much more expensive to make, pivots and pinions must be hard and highly polished, because it is not checked frequently (as an eight-day or thirty-hour is); the timekeeping ought to be very precise. After all, a clock that is accurate to one minute a week may be thirteen minutes "out" at the end of its running time.

The Physical Size of the Clock

This is important mainly because it governs two things: where the clock is going to stand or hang, and the difficulty of making the parts. Large wheels and pinions are easier to make but expensive in material.

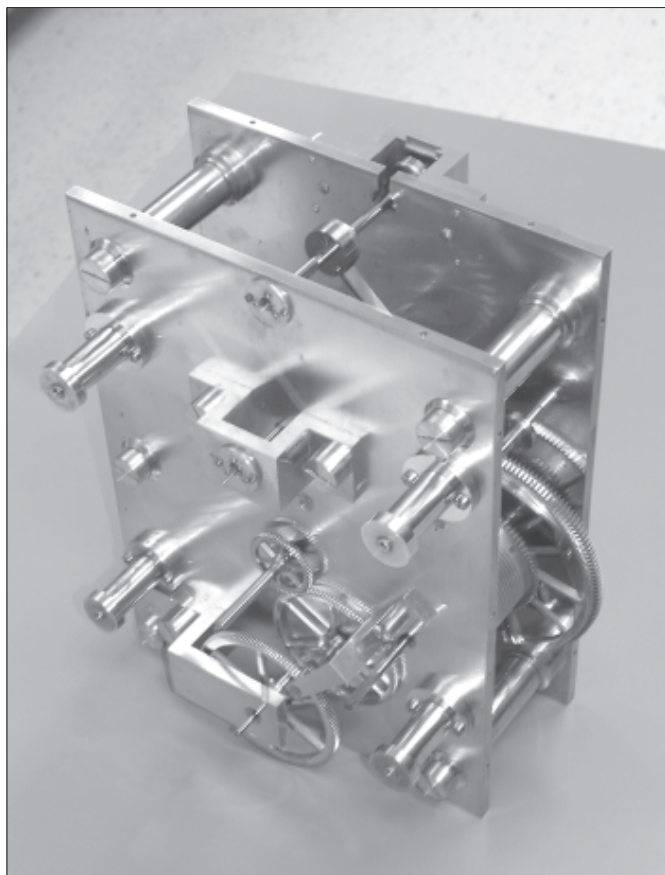


Figure 2

Other important aspects of the design are not normally governed by the train. Although it is not a good idea to give a clock an expensive and accurate escapement, if designing a crude train with small pinions that deliver a very variable amount of power to the escapement. The "power" is, more accurately, torque, which is a force applied to the periphery of the escape wheel and multiplied by the lever arm of the wheel's radius.

The Count

The number of teeth on the wheels and pinions of a clock becomes greater as the duration increases. This is almost an accurate statement and certainly good enough for the straightforward gear trains that we will be considering now.

The type of escapement and oscillator (pendulum, balance wheel, etc.) also affects the number of teeth. This is because the train between the minute hand and the oscillator is calculated from the number of beats per hour made by the latter, and the fact that we nearly always make the minute hand rotate once an hour.

Our first formula (and there are very few) will define the wheels and pinions of the train. If we state that the minute hand will make one rotation per hour and the train will run directly from that to the oscillator then:

The multiples of all the wheel teeth x twice the number of teeth on the common escape wheel, divided by the multiples of the pinion teeth. Produce the number of beats per hour.

Figure 3 is a schematic of a different type of thirty-hour movement from Figure 1, with a direct run of wheels and pinions to the pendulum. Note that the pinion on the center arbor (carrying the minute hand) does not come into our calculation at all because it is not between the minute hand and pendulum. In this train we have:

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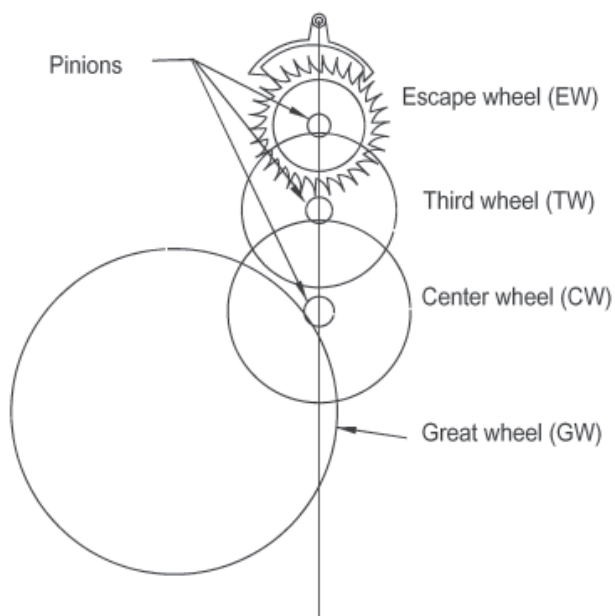
center wheel (CW) third wheel (TW), escape wheel (EW), third pinion (TP) and escape pinion (EP). So the statement above can be rendered as an algebraic formula:

$$\frac{(CW \text{ or } GW) \times TW \times 2(EW)}{TP \times EP} = \text{the beat per hour}$$

What makes this a thirty-hour movement is the arrangement of the gears before the center wheel. The part of the train we calculated is concerned only with adjusting the rotation of the minute hand to the beats of the pendulum. What comes before the center defines how long the movement will run. A thirty-hour clock will have either a direct drive to the center pinion—a spring driven great wheel, or a rope or a chain sprocket.

An eight-day clock (Figure 4) will have a spring driven great wheel and an intermediate wheel and pinion, or a barrel with many turns of chain or cord around it instead of the thirty-hour sprocket (multiplying the number of turns available from one fall of the weight).

Longer duration clocks mostly modify this part of the train to extend the “wind” of the clock by inserting wheels and pinions. However, the 400-day clock employs a very slow oscillator to extend the wind and is a straight train from spring barrel to oscillator, with the rotation of the minute hand being taken off at a position where it will make one revolution per hour. Some British thirty-hour clocks, (outside the Midlands) also have a direct drive from great wheel to escape pinion with a parallel feed to the hands.



Layout for thirty hour (Midlands) or eight day weight driven time train.

Figure 3

By far the most popular movement is the eight-day clock and so I will work through that design of train. The drive (spring or weight) will be tackled in another article. All the clocks illustrated are plated clocks and will bear little resemblance to the mass-produced American “Strap” clock.

Eight-day Train

Three factors govern the numbers involved in this exercise: the physical size desired, efficiency of the train and the number of beats per hour required. The last depends upon the oscillator and I am going to take it as a given 7,200 beats per hour.

Clockmakers generally make the size of the gear teeth (and hence the wheels and pinions) as large as they can. A Grandfather clock can carry a large movement and therefore the gears will be large, a French mantel clock may have room for no more than a three-inch diameter movement. It needs small wheels.

The efficiency of a train improves (produces a smoother drive) as the number of teeth increase, or the effectiveness of the gear teeth themselves. Considering the first half of that sentence, a train that has pinions with counts of seven teeth each will not drive as smoothly as one with pinions having ten teeth apiece. The last half of the sentence is a little less obvious but the design of the teeth affects the efficiency of a gear and a lantern pinion is “better” in this respect than a traditional gear form. A lantern pinion has teeth (trundles) that are round in section, presenting a less variable radius of contact than a solid pinion. Figure 5 shows two circles centered on each of the pinions (the solid and the lantern). The space between the two circles is the distance that the contact point of wheel and pinion travels with respect to the pinion center. The importance of this is that if you consider that the contact point is the position at which the load is transmitted from the wheel to the pinion, it is clear that the leverage (let me call it that for clarity) varies less in the case of the lantern pinion than in the solid one. The two circles on the lantern pinion are so nearly the same that I doubt if the printing of the page will show them clearly.

The drawings need some explanation. They attempt to show the radii to circles that represent the beginning and end of gear tooth contact. There are two circles for each pinion and wheel and the radii are quoted on the drawings. Using the radius of the wheel and the pinion to produce a ratio, we can see that this changes as the pair rotates. The pair with a lantern pinion show much less variation and this is directly related to the torque transmitted by each pair. There are three meshing pairs in the train shown and as the running of the clock continues these

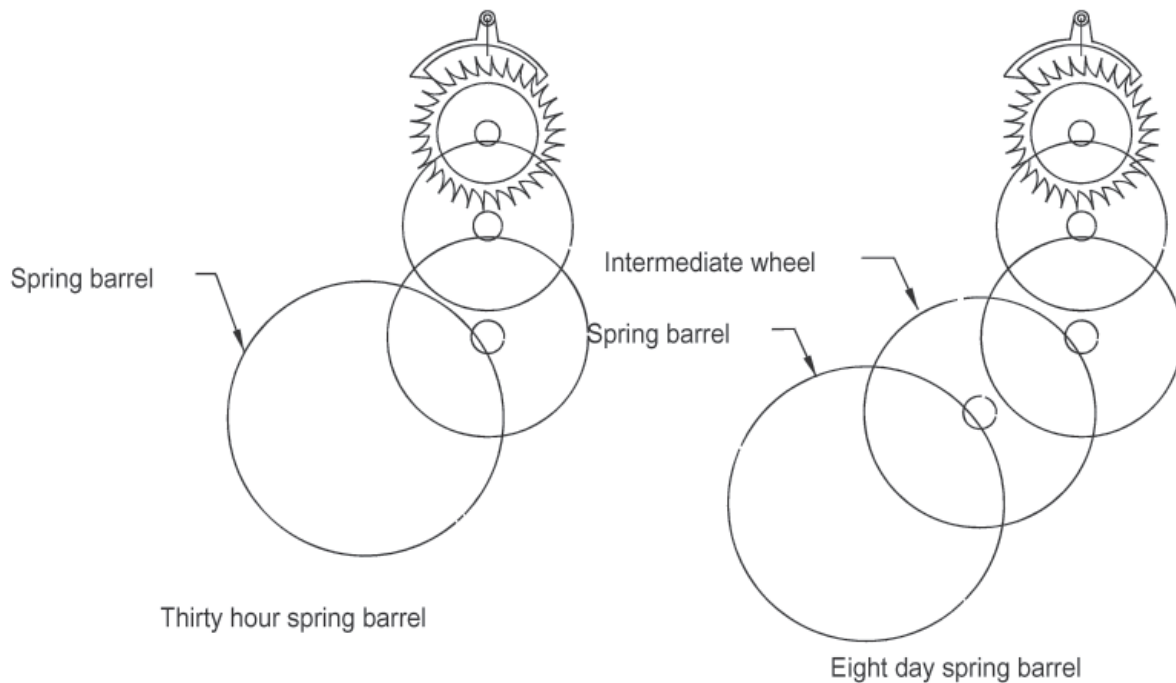


Figure 4

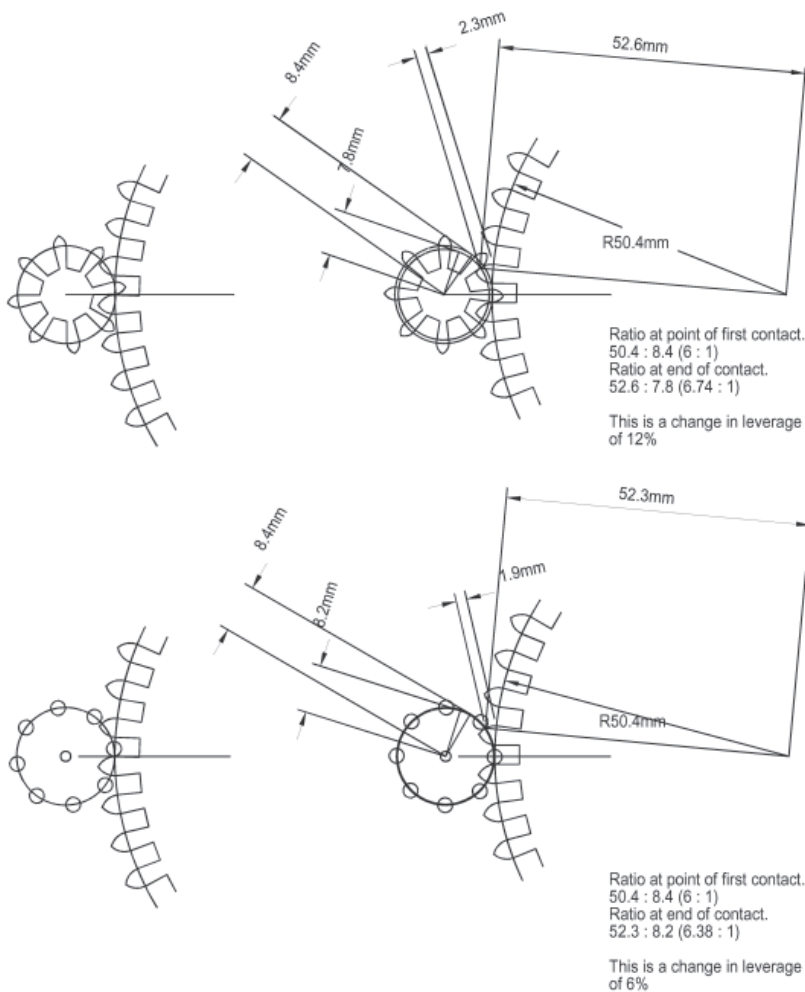


Figure 5

variations may be added together or subtracted. This means that over the whole train, the variation in transmitted torque may be almost nil as one meshing pair compensates for another and the third is at a more or less neutral stage in its rotation, or all three are showing the greatest variation. In the drawing, the variation will be up to a maximum of 36% for the solid pinions and a possible maximum of 18% for the lantern pinions.

Increasing the count of the pinion teeth also decreases the travel of the contact point; a ten-leaved pinion is more “efficient” than an eight-leaf. It is that aspect of gearing that led to the rule of thumb, which states that a lantern pinion is the equivalent of a solid pinion having one more tooth.

“Efficient” is not a good word to use in clock design. What is required is a decrease in variability and that can be achieved without improving mechanical efficiency. Nevertheless, it is a useful word so long as its meaning here is properly understood.

Next month I will describe the dimensioning of wheels and pinions, and a “cogged” wheel that has a number of advantages apart from not needing form cutters.

Celebrating 35 Years of the Daniels Co-Axial Escapement

A New Collaboration Between
Dr. George Daniels C.B.E., M.B.E. & Roger Smith

It is with great pleasure that George Daniels and Roger Smith announce a new collaboration for 2010, celebrating 35 years of the Daniels co-axial escapement, with the creation of a new series of Daniels' wristwatches. These limited edition timepieces will utilize a new English co-axial caliber created by Dr. Daniels and will be executed by Roger Smith using combined workshop facilities, making them direct extensions of this great horological master's creative concepts.

The Daniels name is well known to watch collectors and serious connoisseurs of horology everywhere as a legendary pioneer. In the 1970s his single-handed revival of the handmade mechanical watch, at a time when quartz watches were *de rigueur*, was historic. Even in the 21st century, with the advent and popularity of large numbers of mechanical, mass-produced watches, his ideas and standpoints are as poignant and applicable as ever.

Adding to this already exceptional background, he is the author and co-author of several major horological treatises, creator of a series of unique pocket and wristwatch designs and inventor of the first truly new watch escapement of the 20th century. Without question, Daniels' horological efforts encompass several lifetimes of achievement. Recognized as a master watchmaker, he has been awarded a C.B.E. in the 2010 Queen's New Year's Honours list for his services to horology.

The collaboration between these two men is a natural one, due to the fact that Roger Smith was the only apprentice of George Daniels. Already long established as an independent watchmaker of renown in the same tradition as Dr. Daniels, Roger Smith is able to understand the concepts, principles and designs of Daniels' visionary creations like no other, having studied and worked with him closely through the course of many years on the Isle of Man. It is for this reason that George Daniels is pleased to entrust the execution of his designs and ideas for this new series of watches to the Roger W. Smith workshop.



Details about the watches will be officially released in the spring of 2010, with first deliveries planned for 2011. For more information, please contact:

Caroline Smith
Roger W. Smith Limited
PO Box 67
Ramsey, IM99 4LN
British Isles
Telephone: +44-(0)1624-897943
E-mail: rogersmith@rwsmithwatches.com
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The title above is not a secret code, but rather the specific Swiss part reference for the sliding pinion that is used in movements, both mechanical and quartz. When all movements were mechanical, we, here in the U.S., used the American terminology for this part and called it the “clutch”. When coupled to the winding pinion, it transmits the winding torque through a series of wheels to wind the mainspring. Disconnected from the winding pinion, with the stem moved to its fully extended position, it engages the setting wheel to set the hands. In some calendar movements, it operates the calendar corrector when in its intermediate position. That has not changed. The clutch/sliding pinion still performs those three basic functions in modern mechanical movements. Because it transmits considerable force from the crown to the mainspring this part is robustly constructed and seldom causes any problems due to breakage. The same cannot be said of the sliding pinions used in thin quartz movements. We no longer call this part the “clutch”. The sliding pinion has no Breguet teeth, used in its mechanical watch counterpart to wind the mainspring. It still is used to set the hands and correct the calendar, but neither of these two functions requires very much torque. Because of this, the design of the sliding pinion allows its construction to be far more delicate. The teeth at its lower tip are often prone to wear and breakage.

Experienced watchmakers, especially those who have had to replace, under warranty, numerous broken or worn sliding pinions, now routinely replace this part during every movement overhaul. They know it is far less costly to replace the part during service than it is to wait for it to

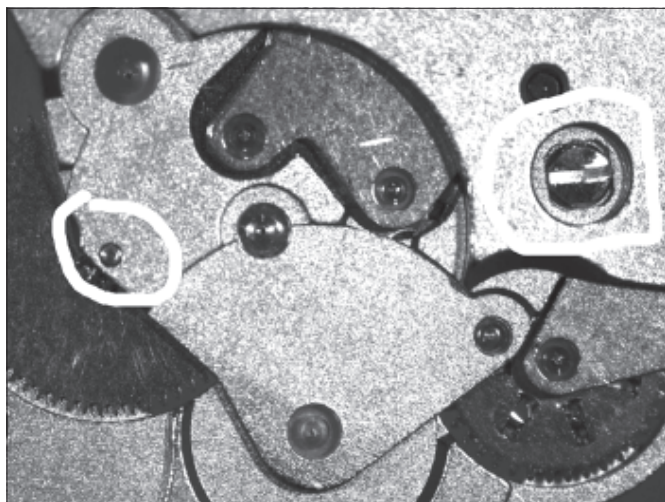
fail a few months after the overhaul. They also know, through experience, which movements have troublesome sliding pinions. Not all quartz movements fall into that category. The next time you service an ETA 256.111 or ETA 255.111 or one of their many varied executions, compare the teeth on the old sliding pinion with those on a new one using a very strong loupe or even a microscope. Very often the teeth will exhibit wear on their flanks or one or two teeth will be slightly shorter than the others. Often, the damaged teeth can be felt by stroking the sliding pinion lengthwise with one’s fingertip. A worn pinion will feel rough when compared to a new one. The accompanying photos comparing a new sliding pinion to one that is worn, graphically makes the point of how these delicate pinions fail with ordinary use. If you repair any of these models, you should consider stocking replacement sliding pinions: part reference 407.255111 and 407.256111 and routinely replacing them with each overhaul. Include the price of the part in the overhaul. By doing that, you will not need to provide a free sliding pinion, along with the requisite labor needed to install it, during the warranty period.

Jack Kurdzionak

Strange Screw

Last month’s “From the Workshop” posed two questions about the special shape of the lower automatic bridge screw found on the ETA 2824-2 movement. That screw (part reference 51141) has a head unlike any other found in the movement. Look at it carefully to see that its top is rounded. The head of the screw, rather than being cylindrical, has a noticeable taper for about 55% of its upper length. Below the tapered section the head is cylindrical, and the underside of the head is chamfered. In addition to securing the lower automatic bridge to the upper bridge, the head of the screw performs a few other functions. First it acts as a positioning guide, somewhat like a tapered steady pin found in many vintage watches, to lead the automatic bridge into its proper place on the base movement. The tapered screw head fits into the square shaped hole on the train bridge below. Notice in the accompanying photo that





the hole is not perfectly square, but rather has a slight outward curvature on each of its four sides. The cylindrical portion of the screw head fits snugly into the rounded sides of this square hole. In addition to guiding it into position, it also keeps the automatic bridge from moving around as the watch is being wound by the motion of the oscillating weight. Without this screw and the extended post (as shown in the photo) that supports the driving wheel, the two blued screws holding the automatic bridge in place would loosen and allow the bridge to move around. Examine an earlier generation of an ETA automatic movement and you will find two steady pins machined into the bridge. This execution is a great example of a simply designed part performing multiple functions while at the same time simplifying production of the movement.

Those who answered the questions correctly will be acknowledged in next month's column.

Jack Kurdzionak

Jack of All Trades

A few weeks ago, the laptop computer I use to write this monthly column got infected by some nasty virus. Like many other mature American men, I refuse to let small glitches in life deter me. They become challenges which must be met and overcome. The sink drain clogs. No problem, I become Jack the plumber. The car needs an oil change, Jack the mechanic appears. One of the grandkids writes on the wall, Jack the painter appears, brush in hand. So when the computer became ill, Jack the IT guy went into action. Well, computers are not sink drains or painted walls. They are some kind of infernal machine that can be

studied for endless hours and still not yield any of their inner secrets. Finally, after spending too many hours trying to heal the sick computer, I gave in and visited Thatcher. Thatcher owns a one man computer shop in a nearby town. I left the laptop at his shop and in a few days received a call that it was ready to go home. But, before it could go home, it needed a bit of customization to make it work as before.

Thatcher asked a few questions and then began clicking the mouse and clicking the keys as I responded to his queries. After about 20 minutes or so, the computer was back to health and ready to use again. Thatcher was paid for his efforts and we, the computer and I, went back to the shop. It did not take long to realize that my mistake was not visiting Thatcher earlier when the problem first presented itself. I wasted far too many hours of fruitless effort trying to fix the computer, a task for which I am totally unsuited. Had I immediately abandoned my effort as a "Jack of all Trades" and visited Thatcher straight away, I would have been able to produce enough revenue at the watchmaker's bench to pay Thatcher's bill and have some funds left over. What I did was waste time, hence money, and still pay the professional for his service.

Many of us need to be reminded that rather than trying to be a "Jack of all Trades"; we need to master our own.

Jack Kurdzionak

You Are Invited

Do you have a solution to a watch or clock repair problem that you want to share with our membership? Do you have a question about a repair problem you would like to ask? I invite you to participate in this column with your suggestions, questions, and comments. It is easy. Just e-mail me at AWCI <magazine@awci.com> or write using the old standby known as the postal service. You can even fax me at 513-367-1414.

I will do my best to help you help the membership. By sharing your questions and suggestions, all of our members can benefit from our combined knowledge and experience. The ideas, tools, techniques and products presented in this column are suggested by the author and contributing members and are not endorsed by any manufacturer, supplier, advertiser or AWCI itself.





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April 26-30, 2010	Basic Quartz Watch & Quartz Chronograph Repair
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AWCI Watch Repair Course schedule is subject to change



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AWCI Watch Certification schedule is subject to change

President's Message

Continued from page 2

goals of the ELM Trust is to get more of our material scanned and on the website, but they are also available to those without computer access from our lending library. Continuing education is very helpful, whether it comes from attending guild meetings, the courses that the AWCI offers, or the annual meeting itself. I do hear from folks who tell me they cannot afford to close for a week or a few days or even a weekend to attend these instructional sessions. I understand that. I also understand that I along with many other young people could not afford to go to college, but we did what was necessary to make it happen. We are fortunate to have Tom Schomaker as our watch instructor. He is one of the very best and those who have taken his classes are anxious for more. Having said that, my hope is for the AWCI to increase on-line and long distance learning as rapidly as possible. David LaBounty

is partnering with the AWCI in exactly this type of thing on the clock side. He is extremely talented and those who take the opportunity to learn from him are greatly rewarded. For many, the certification programs will more than pay for themselves over time.

There are many ways in which we can invest in ourselves. The old proverb states "A long journey begins with the first step." This is the time to take that step.



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AWCI CONTINUING EDUCATION

Modern Automatic Watches

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The purpose of this course is to teach the student all the fundamentals of modern mechanical automatic watch repair that are most prevalent on today's market. The student will learn how to perform the various diagnostics in evaluating the condition of the various components, cleaning, assembling, adjustments, dialing and casing.

Prerequisites

- At least three (3) years experience in mechanical watch repair, or having participated in the AWCI Basic Watch Repair course as well as owning the required tools listed in the course outline (www.awci.com/services/continue-edu.php)
- Reading pages 169-188 of the book *The Theory of Horology* (essential prior to attending the course)

The student will learn:

1. The most common differences between manual wind and automatic watches
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For all AWCI courses, AWCI will provide cleaning machines and solutions. Hand tools should be provided by the student. Lathes, staking tools, poising tools and truing calipers, etc., will be available, but students should provide their own whenever possible. Ownership of quality hand tools is an expectation of a Professional Watchmaker. The brand names mentioned in the recommended tool list are used to help you identify the tools from the most popular tool catalogs. You are welcome to choose a brand of your choice, as long as it is of equal or better quality. You will notice that in some instances, we have listed more than one type of tool, this indicates you may bring the tool of your preference.

Contact Daniela Ott, Education Coordinator, dott@awci.com or call toll free (866) FOR-AWCI (367-2924), ext. 303 or visit AWCI's website: www.awci.com for more information.



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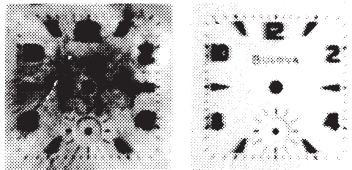
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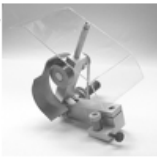
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