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December 2003



*American Watchmakers-Clockmakers Institute*



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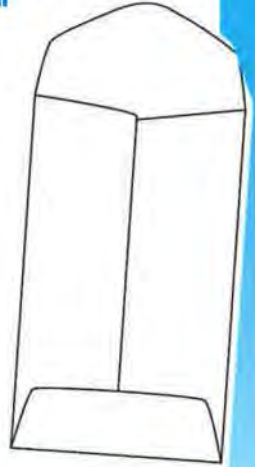
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## COVER

The staff of *Horological Times* and  
AWI wish you Happy Holidays!



## President's Message

Jack Kurdzionak, CW

A representative of a Swiss watchmaking firm and I were exchanging ideas, during a dinner conversation, about what we thought the next ten years would be like for horologists here in the USA. Although we did not agree on every point that was discussed, we did agree that our traditions as watch and clock makers would survive and thrive. Watch and clock makers have been around for over five hundred years. Since the first mechanical timepieces were produced there has been a need of someone to repair them. Of course any craft that has been practiced that long develops traditions, which are a customary pattern of thought, action, and behavior for those who practice that craft. In the late 1940s, Norman Rockwell drew an illustration for the watchmakers of Switzerland picturing a young boy standing, somewhat in amazement, in front of the bench of an elderly watchmaker. Even today, some fifty-five years later, most of our members would have little difficulty identifying the tools as shown in that illustration and appreciating the personal qualities of the traditional watchmaker as he was portrayed.

As the year closes, it is time to consider the role traditions play in our lives as horologists. Each of us has been gifted with a unique set of mechanical skills that sets us apart. It is our duty to use those skills to the best of our ability in our chosen craft. Our continuing education and utilization of new techniques and technology must never end. Then we will fulfill our destinies as horologists.

Although this is a busy time of the year for everyone, we must never allow our business interests to take precedence over our holiday traditions. The holiday season is a time for us to celebrate with family and friends and to appreciate the gifts that life has given to all of us. The writer of Ecclesiastes has told us there is a time and season for all things. Please heed his advice and allow yourself enough time to serve those who need your help, your alms, and your companionship. This is holiday tradition at its very best. On behalf of all of us here at AWI, your officers, directors, and staff, we wish you a joyous holiday season and please, share it with all of your family, friends, and community.



## Executive Director's Message

James E. Lubic, CMW

In this month's issue of *Horological Times* you will find the names of the AWI members that generously give of their time by volunteering to work on one or more of AWI's committees. Each committee member is appointed by AWI President Jack Kurdzionak. President Kurdzionak also gives each committee goals and objectives that they are to work towards during the Institute's fiscal year. The AWI Committees are the back bone of the Institute. They are the grass roots of our members along with the Affiliate Chapters and REC Schools. This is where all communication starts. You will also notice that each committee has an e-mail address. This address is set up in order to facilitate communication between committee members while at the same time making it easy for you the member to get your ideas or suggestions to the complete committee. If you don't have e-mail capabilities you can send a letter to AWI addressed to the various committees and we will be sure to forward it to the proper committee.

It is each committee chairpersons' responsibility to facilitate the work being done towards the assigned objectives, and receive suggestions/ideas from the members at large as they pertain to their committee. When a member contacts a committee with an idea for change, the committee must then work with the AWI office to investigate the impact of the suggestion. Will it have a positive impact? What will the impact on the budget be?

Twice during the year, once at the Institute's midyear meeting and once at the annual meeting, the committees file written reports to the Board of Directors. Their report will inform the Board of the progress that has been made towards the assigned objective and any other committee business that may have come up, such as member suggestions. The committee then has the option of making any "recommendations" that they feel the Board should vote to further the committees' work. The Board can then ask questions of the committee in order to get the information that it needs to make a good decision. After this process is complete, the office then budgets for the project in the next fiscal year or asks the Board to amend the budget for the present year to reflect the impact of the approved change. This is the process that we like to see followed.

If you would like to contact anyone in the AWI office, the contact information for all AWI employees is always published on the last page of the *Horological Times*.

E-mail addresses for the AWI Board of Directors are published at different times throughout the year. The format for their AWI e-mail address is always first initial of their first name and complete last name@awi-net.org; example: President Jack Kurdzionak's e-mail is jkurdzionak@awi.net.org. For a complete list please turn to page 47.

Don't be shy, get involved in your AWI. Please feel free to ask questions, and give suggestions. If you would like to get involved with a committee for next year please feel free to send information to my attention here at AWI for next year. It's never too soon to plan, or too late to get involved.

Have a wonderful holiday season, and best wishes for the new year.

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# Questions & Answers

## Question

I am trying to identify a very nice 16-size, 23-jewel Ball watch. My customer said he found the serial number in the Hamilton list but there is a medallion on the plates such as that used by Waltham.

The watch also has a motor barrel. The hairspring stud does not

match any of those in Cooksey Shugart's book *Complete Price Guide to Watches*.

I am inclined to believe that it may be an error on the serial number.

*E.M. Lewis  
Indianapolis, IN*

## Answer

There is no error in the serial number of your watch. It is indeed a Hamilton-Ball, grade 999, made in about 1918 according to Hamilton serial number lists. The gold "RR" medallion, which is actually a plug set into the barrel bridge, was Ball's official seal used on both the Hamilton-Ball and the Waltham-Ball models.

Ball started buying 16-size "Official Railroad Standard" watches from Hamilton in 1908. Ball 21- and 23-jewel movements were made with motor barrels. By 1922 the 21-jewel Hamiltons were fitted with going barrels. The 23-jewel movements retained their motor barrels, but about this same time the gold seal was dropped. Earlier movements like yours had a hairspring stud retainer screw on the side of the balance bridge. Later ones had a retainer like those you noted in Cooksey Shugart's book.

I also noted that your watch has the Ball patented "safety stirrup bow" which was designed to prevent the watch chain from becoming tangled with the pendant and crown of the watch. With the 23-jewel movement, motor barrel and safety bow, your watch would be considered a "Ball Twentieth Century Model," marketed by Ball beginning around 1915.

All of this information above helps to confirm that the serial number listing showing an approximate date of manufacture of 1918 is correct.

*David Christianson,  
CMW, CMEW, FAWI  
Technical Editor*



*(Continued on page 18.)*

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J.M. Huckabee,  
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# Ask Huck

## American Clock Fails to Run in Its Case

### Question

An American clock movement was repaired and runs well in a test-stand. When it is placed in its case, it frequently stops and often runs a few days per winding. It must be demon possessed. Can you help?

### Answer

Yes, I can help. No, it does not have an evil spirit. And, no, it does not have a weak mainspring.

Mainspring strength should be checked on each repair of this class of clock. If the free spring will expand to about eight or more inches diameter, it will power the movement eight or more days. Do not include the outside spring last six inches in this test. The fact that it runs in a test stand indicates the spring is good.

A back mounted movement can easily be racked (twisted) when affixed to the case. Adjust the mounting feet so that they all sit firmly on the case before the screws are installed.

Your problem is apt to occur on a movement that has had one, or more, bushings installed. Unless you checked each wheel to be upright in its respective pivot holes, you probably have a semi-bind that is a "power robber."

These movements do not have a strong framework and are subject to the problem you experienced.

Be cautious when fitting new plate bushings. Do not fit them to the close pivot tolerance that is commonly practiced in finer movements.

## Bushings for Worn Pivot Holes

### Question

What are the problems in installation of bushings?

### Answer

To those of us who deal in restoration of older clocks, bushings are "a way of life". In simple terms, we open the pivot area of the plate, and insert a bushing that is sized to the pivot. The job can give "like new" life to that portion of the movement. To the skilled this is a routine job. However, many pitfalls lurk in the process.

A myriad of methods, tools, and materials are found across our trade. When used with caution, skill, and understanding, almost all will result in a good-to-excellent job.

I never attempt to obscure the fact that a bushing has been installed. On the other hand, I'm a hard taskmaster on the job being excellent in function and appearance. That job is the trademark of my skill.

Here are some very important guidelines: 1.) The bushing must be on the exact location of the original pivot hole. 2.) Bushing axial length must be equal to exact plate thickness. 3.) The pivot must be round and polished, and a nominal fit in the bushing hole. 4.) The oil sink must be nominal to the original oil sink. 5.) The bushing must be secure in the respective plate. 6.) Chamfer in bushing hole ends to be nominal to other pivot holes of the movement. 7.) The arbor and pivot must stand perfectly upright to its companion hole to the opposite plate.

Workmanship should be such that you will be glad for the inspection of your peers.





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Fred S. Burckhardt,  
FAWI

# Rock Quarry

Once again, it's the time of year that brings out the best in people. Children are happy and go around singing carols, wishing for every toy that was ever made. Customers are joyfully buying gifts, not thinking about spending too much because they know the credit card company will cut them off when they charge more than their mortgage is worth. Store and shop owners are gleefully rubbing their hands together, thinking about how they may make enough profit to pay their bills.

Most importantly, those working in the repair shop are joyous because they are almost finished getting the last minute repair jobs back in the hands of their customers. What a feeling of relief it is getting grandfather Isaac's watch, which hasn't run for forty-two years, delivered to the sweet little old lady, who, when she left it had tears in her eyes while begging to have it ready in time for Christmas. How can you turn down such a request, especially when she threatened to tear off your knee caps if it wasn't done in time. It was hard not to get a little bit upset when she called on Christmas Eve to say she changed her mind and wouldn't need it until March for a birthday present.

Along with the happy memories of the Yuletide season are those that don't quite fit in with the cheerful attitude expressed by most. For example, how can one forget the tired, weary, exhausted salespeople who continue to smile through all their trials and tribulations. There was a store where I worked one time that issued flak jackets to all the store personnel. This wasn't to protect us from the customers, but from each other. If you made it through the season without any injuries, it meant you were a sissy.

The first job I had was at one store that was in the "not too nice part of town". It was a tough neighborhood. A few doors away was an elementary school, Our Lady of the Emergency Ward. One of the females from the school came in one Christmas Eve dressed in leather pants and jacket, motorcycle boots and had a large tattoo on her shoulder. It was a heart with an arrow running through it and underneath was the word MOM. I came to find out it was Sister Mary. I was glad when I found another job in a nicer part of town. I got tired of screaming while running to the subway stop each night.

I was asked one time if I would give up all the wonderful experiences I've had in jewelry stores over the years. The answer is very simple, yes! Now don't get me wrong, there have been many good times, only I can't think of any right off hand. On second thought, there was one that I remember. It happened about forty years ago, the boss was handing out Christmas bonuses. When he got to me he didn't hand me an envelope, only put his hand on my shoulder and with a smirk on his face, he said, "The best present I can give you is a pink slip. You're the worst employee I ever had. You should get out of the jewelry business and find some other kind of work like carpentry or cleaning out sewers!" He thought he hurt my feelings but I got back at him when I told him I was thinking about quitting anyway.

It was then I made a promise to myself to become the best at what I do. All these years I've kept that promise. Next week, I'm going to receive an award for being the best sewer cleaner west of the Mississippi.





# SEEKING CANDIDATES FOR THE AWI BOARD OF DIRECTORS

The committee involved with securing candidates to run for the AWI Board of Directors is seeking recommendations from the membership. If you plan to suggest a possible candidate, please send that individual's name and background to: Nominations for Board of Directors Committee; AWI; 701 Enterprise Drive; Harrison, Ohio 45030-1696.

Each recommendation will be carefully considered by the committee. Candidates will be selected on the basis of their local association or AWI experience, geographic location, present job status, horological experience, and willingness to serve.

Recommendations must be received before December 31, 2003 to be considered for the 2004 election.

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David J. LaBounty,  
CMC, FBHI

# Alarms of American Mantel Clocks

## Part 1

### Introduction

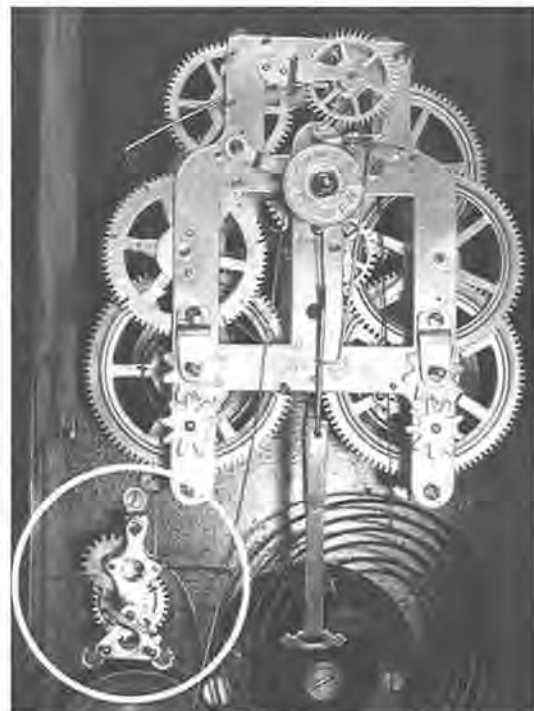
I can remember one of my greatest fears as an apprentice clockmaker. It would happen while I was working the front counter, handing back clocks I hadn't seen before to customers who expected me to be the expert on every minor detail of their timepiece. I was sure they would ask me an in-depth question I didn't know the answer to and I would then show my ignorance by calling for help from the Master. This overwhelming feeling of stupidity was particularly evident when I was handing back American mantel clocks with alarm mechanisms. "How does the alarm work?" they would invariably ask. My pat reply for many years was, "Let me get someone to help answer that question!" Now, I think I've overcome my hang-ups of not knowing it all and don't have any problem telling a customer, "I don't know, but I'll find out!" Clockmaking is a lifelong learning process and there is no way anyone can know it all. But we can pass along what we do know to others in the hopes they will benefit. So, to finally get over my fear of alarms, I'll pass on what I've learned and hopefully prevent other apprentices from having the same fear.

### The Alarm

Clocks with alarms are easy to spot. They have a set disk in the center of the dial, under the hour hand with either Roman or Arabic numerals. (Of course, there are exceptions but I'd like to stick to the most common.) Once you spot the disk, look for the alarm mechanism itself. It is usually in the lower half of the case.

### How It Works

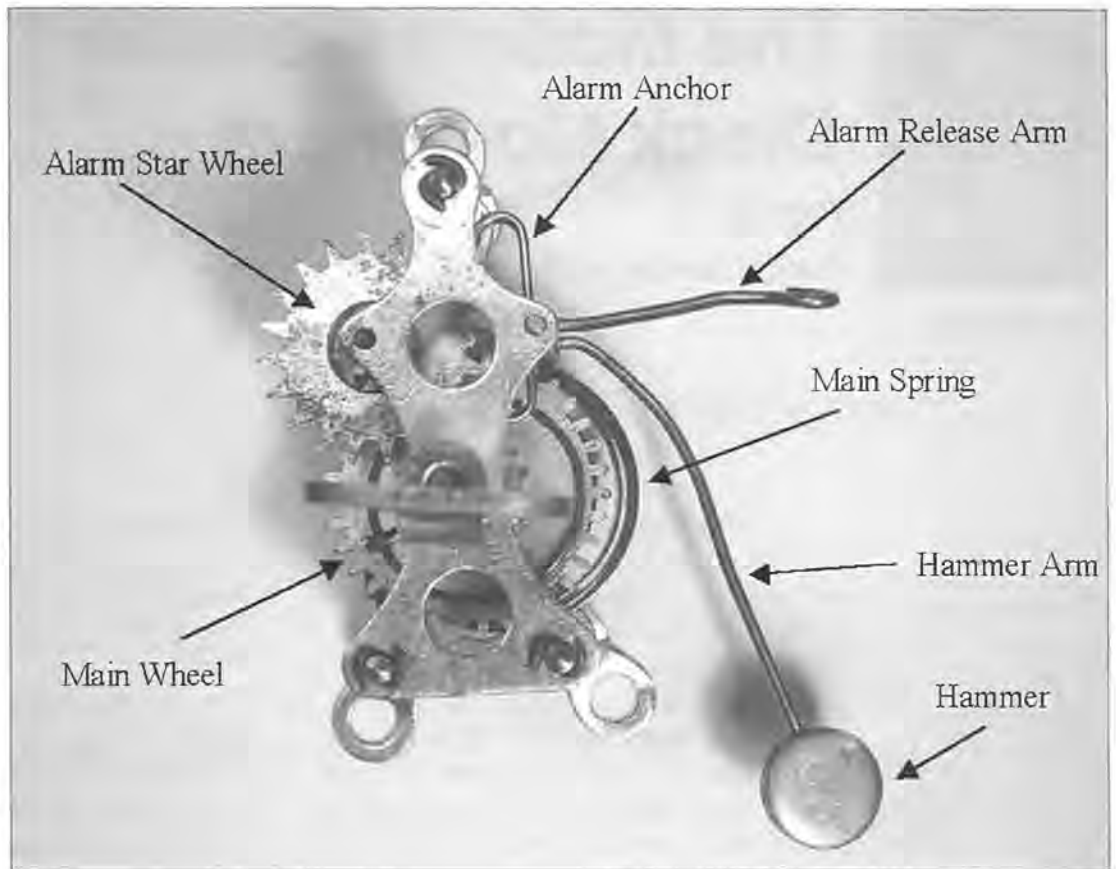
The alarm mechanism itself is a relatively simple affair consisting of a two-gear train that runs what is essentially a miniature pendulum (the hammer). Close examination will



*Typical American mantel clock alarm mechanism.*

show how similar the alarm is to the time train. There is a main wheel consisting of an arbor with a spring hook, a ratchet wheel, click, click rivet, click spring, and a mainspring. There is an escape wheel (alarm star wheel) with non-cycloidal, evenly spaced, radial teeth on an arbor with a pinion. There is an anchor, with entrance and exit pallets, attached to an arbor, that functions to regulate the release of the mainspring. In this instance it is recoil and acts exactly the same as in the main clock mechanism with entrance and exit drop as well as lock. And finally there is a pendulum (hammer) that gives momentum to the anchor and keeps it in motion. The purpose of the alarm mechanism is quite different than that of the time train however, since time-keeping accuracy isn't important. All it has to do is move the pendulum at a high rate of speed.





*Detail of the "rattling" alarm mechanism.*

Once the mainspring has been wound and is putting pressure on the train, the alarm will vibrate or rattle unless something is done to keep it from doing so. That is why there is an alarm release arm attached to the arbor of the alarm anchor. A slight pressure against the release arm will lock the anchor in place arresting the motion of the star wheel. This pressure is usually upward causing a tooth of the star wheel to lock on the entrance pallet of the alarm anchor. Once the pressure on the release arm has been removed, the alarm anchor will rotate, releasing the tooth of the star wheel, starting the rattling process. The rattling will proceed until the mainspring is completely unwound or until the pressure is restored to the release arm.

The release of the pressure on the alarm anchor must be done at a specific time. This is accomplished by the use of a cam and lever attached to the main clock mechanism and a wire connecting the release lever to the alarm release arm. The release cam, mounted on a set disk, is friction fit to the hour pipe and rotates with the hour hand as the movement runs. There is a notch cut in the cam to allow the alarm release lever to fall and remove the pressure on the alarm release arm once in a twelve-hour period. The release lever keeps tension on the alarm release wire (and thus the alarm release arm), arresting the rattling process, until the notch in the release

cam is reached. The set disk may be rotated on the hour pipe to a specific position so at a pre-determined time the alarm will be released to rattle.

### Servicing

Now that I've identified my fear, let's talk about how to deal with it. Servicing the alarm mechanism should be part of servicing the main works. It may not be necessary to even take the alarm mechanism apart but special attention should be paid to undue wear especially in the area of the click and click spring. Any looseness in the rivet, burrs on the click, or miss-shaped click spring should certainly be addressed. If you've ever had your fingers smacked by a run-away mainspring you know why this area takes priority! Don't be fooled by the size of the alarm mainspring. It will still hurt if it gets away. Oiling should be done as in the main movement: pivot holes, click, pallet faces, hammer pivot points, and light weight grease on the mainspring.

Another part of servicing the alarm is the condition of the release wire. This is the thin, relatively soft, steel wire connecting the release arm to the release lever on the movement. It should be 20 gauge (0.032") steel, be fairly straight and attractive, and have proper looking ends.

©



Mark Butterworth

# The Modern German Clock Movement

## Part 40

### Record Keeping on the Patient

When I go out on a service call for a tall clock, when I enter the house I ask where the "patient" is located. The customer seems to enjoy that word and it conveys to him/her that I have a personal feeling for the heirloom, which I do. Just as the person expects to receive 1<sup>st</sup> rate health care, I am expressing the fact that I do not intend to do anything 2<sup>nd</sup> rate on their clock, which is now a member of the family. Over a period of time, the clock may be subject to a number of services calls, routine or otherwise. I was up at Mayo clinic this past summer and did a tour, during the course of which the guide explained how they still had paper medical records going back to the beginning of the clinic and they were still keeping paper records in spite of the computer system. It was explained that every doctor, nurse, etc. that sees the patient in the course of visit or procedure signs off on that encounter so that there is a physical paper trail on everything said or done. Ultimately it will be computerized in a way to maintain the authenticity of that trail.

I think there is a lesson here for us. If the three most important words in real estate are "location, location, location," then I think the parallel to that in our business is "document, document, document." I have received over time many calls from a service person about a clock 30 miles away from him with a broken cable; all he knows is that it is a Howard Miller clock and could I tell him what cable he needs. Another recent situation was that in which a repair person returned a clock movement and dial and the owner stated that the dial had all its numerals when he took it from the house and now a couple of them are missing. The most common one is the customer that claims he/she brought the key in with the

clock and it was not returned. One of our customers always writes on the invoice service ticket which his customers countersign "customer has key" and they still claim he steals the key.

Fortunately, the modern German clock makes it especially convenient to develop this tracking system as the movements are usually well marked for identification purposes in the event that information or parts are needed later. There are a number of good ways to document our work and I don't claim to have the best. As my good friend Helmut Mangold often says, "the worst plan in the world is usually better than no plan at all." I might also add that it does not require a sophisticated computer system, although they do make it very easy. I first started with a recipe box and a stack of 4"x6" index cards long before I had a computer.

As a suggestion to get going you can start with:

Name

Address

Phone

Date clock in: 3/5/03

Date clock out: 3/25/03

Clock Name: Sligh

Clock model/type: Grandfather Hermle  
1161-853BS/114

Age: Date code "B" 1989

Pendulum type: 45" Lyre w/10.5" diameter bob

Service: overhaul with 12 bushings

Anecdotal: customer declined movement replacement option, pendulum bob scratched.

Declined that also.

Charge: \$XXX

With this basic information, one can build a case history on each clock. It can be





Slat wall at Dykmans Time Shop, Madison, WI. Courtesy of Glenn Gardner, owner.

added to for each servicing, house call, etc. By knowing the model number of the movement, in the event a cable breaks, crank gets lost, dial needs replaced, if the customer calls and is 30 miles away, the replacement part can be ordered without first going to the home. Likewise, now that the job is done, the customer may decide he wants the new pendulum after all and that can be ordered w/o the service call also. In the event the customer later claims the clock was tied up for 4 months, the facts are there. If the clock has an out of warranty but early failure, it can be pointed out that the new movement was offered to the customer and he was told it would last longer, but the option was declined.

### Tips of the Month

1. Many of the new movements have a plastic guard over the rear portion of the suspension post. It's function is to keep the leader or pendulum hanger from accidentally falling off. Do not remove it.
2. The Hermle cable wound units come from the factory with an orange colored "keeper ring." Make certain these are removed before installing the unit. They are to keep the cable secure during shipping.
3. If you are looking for a new professional-looking way to hang clocks on a wall check out a product called "slatwall" It comes in sheets and has horizontal strips that you can hang brackets from and is very versatile. Normal load strength is rated at 36 lb. per bracket, but will go to 75 lb. with metal inserts installed at the factory. An Internet search under that name will bring up a number of sources. Spacing is adjustable and it can be used both for individual clocks and also shelves.
4. Put an individual tag with each item or box that is not your personal property in the shop. We recently received a call from a customer who had several grandfather movements in for repair and he did not remember which weights

went with which clock. We have received similar calls regarding pendulums. The old time watch tags with strings are still invaluable for this purpose.

Final thought: "While we may not be able to control all that happens to us, we can control what happens inside us."—Benjamin Franklin



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Laurie Penman

# Making a New Barrel Ring

Most modern clocks have spare barrels available when the worst happens and several (if not all) teeth are given the run around and have their tops removed. However this is rarely the case with clocks older than about thirty years - a new barrel ring has to be made. If the damage is not too gross and the clock is not 19th century, simply measuring the outside diameter of the undamaged part of the ring is sufficient to specify the diameter that the new blank must be turned to, but what do you do when this is not the case?

A barrel with the dimensions shown in Figure 1 has damaged teeth and requires a total replacement. If this were a British or a French clock, the ring would most probably be soldered onto a tube - a German clock earlier than 1890 would also be likely to be soldered. However this is a solid barrel, the ring and tube

were formed by forging or casting. The normal method of separating barrel from ring will not work here of course. Before beginning the machining job there are one or two things to sort out and draw; the dimensions of the winding arbor (and its placement - the pivot diameters are normally different in diameter so the arbor's position relative to the barrel is clear, but it is not always so); and, in order to cut the ring teeth properly, the distance between centers of the barrel and the next pinion (intermediate pinion), and the dimensions of that pinion must be established.

These are set out in Figure 2.

If you refer back to Figure 1 you will see that I have quoted an outside diameter for the gear teeth. This is fine if the barrel has not

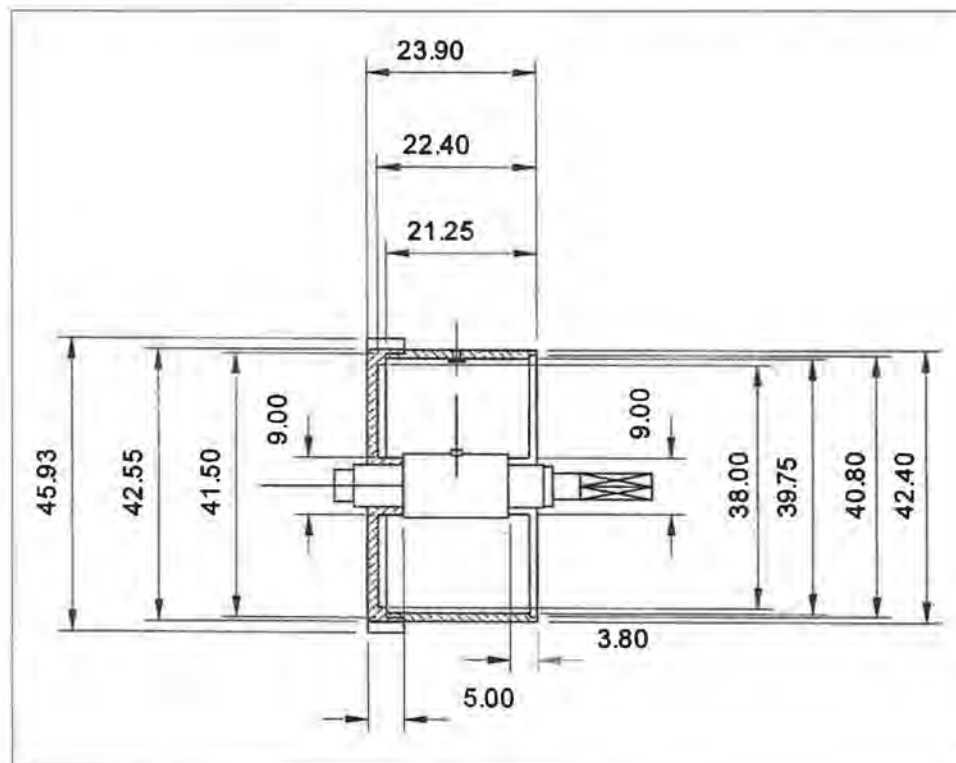


Figure 1

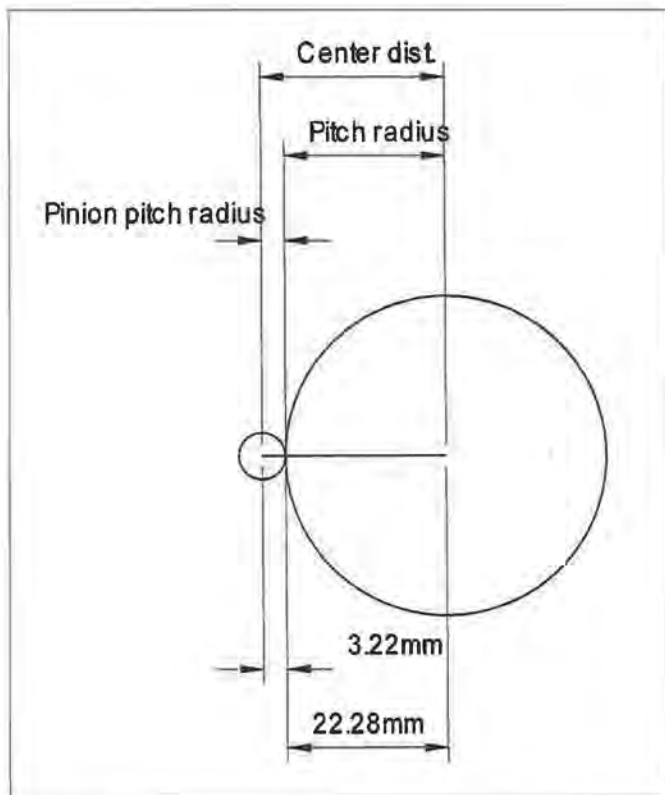


Figure 2

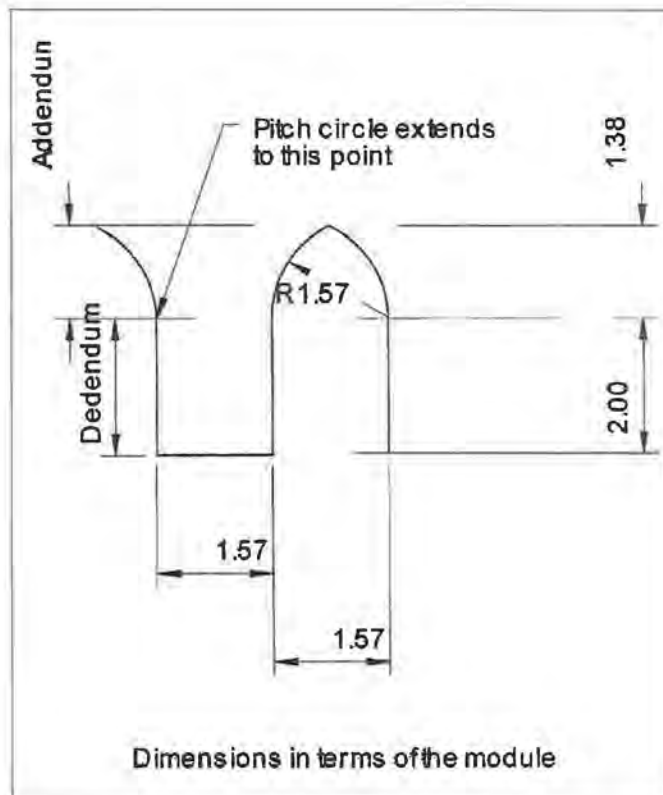


Figure 3

skidded all the way around - you can measure the old one - but clocks more than a hundred years old often have gear tooth forms that are very different from the ones we cut today. In particular the distance from the pitch circle (where the gears mesh) to the tip of the tooth may vary. This portion is called the addendum and it is very important to know what it was using the old form and what it will be using a modern form, because we will produce the pitch circle needed by defining the outside diameter. When the outside diameter is turned to the correct diameter, simply cutting the gear tooth to give a full form (pointed top with very little flat showing) automatically places the pitch circle correctly too.

So we must calculate the correct pitch circle of the barrel ring.

The center distance between the two gears is the sum of the two pitch radii. Having measured the center distance we can have a stab at discovering the pitch circle (and hence the pitch radius) of the pinion. Then if we subtract the pinion pitch radius from the center distance we have the barrel pitch radius - double it and we have the pitch diameter.

The outside diameter of the pinion is 7.3mm and it has 12 teeth. If this were a modern pinion its outside diameter would be calculated from the formula:

$$o/dia = \text{Tooth module} \times (\text{No. of teeth} + 1.71)$$

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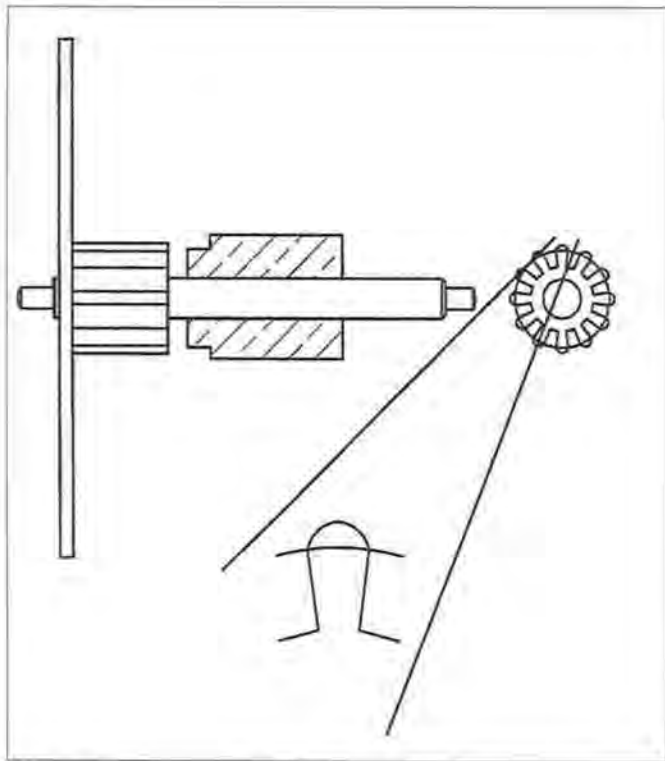


Figure 4

*The 1.71 is a 'factor' that is employed to allow for the addendums of the pinion teeth.*

Therefore Module  $7.3 + 13.71 = 0.532\text{mm}$ . (Not a modern cutter size).

Clearly the pinion tooth form does not fit a modern cutter but we can still use one for the barrel ring - the two will mesh if the pitch circles are correct. Nevertheless we must first make as accurate a measurement of the pinion pitch circle as possible - we cannot trust to the formula.

The pitch circle marks the boundary between the addendum and the dedendum and is also the point at which the curve of the top of the tooth springs from the straight line of the flank (Figure 3). The easiest way to judge this is to turn a piece of brass and drill it to fit the arbor. Since it is the intermediate wheel and pinion the portion of the arbor 'behind' the pinion is a plain cylinder and the piece of brass can be slid up against the back of the pinion. Begin reducing the diameter of the brass and then sliding it up to the pinion so that the turned diameter and the pinion leaf can be studied through a magnifying glass. It is not difficult to see when the turned diameter matches the boundary of curve and line on the pinion (Figure 4). A magnification of five should enable you to obtain a result that is within 0.002" (0.05mm) of the correct pitch diameter.

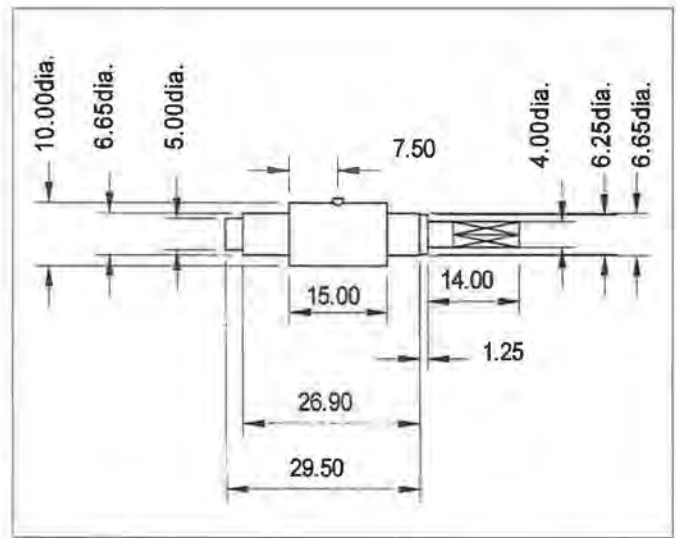


Figure 5

Let us assume that your best estimate is 6.45mm for the pitch circle. The pitch radius is, of course, half this = 3.225mm.

The measured center distance was 25.5 and since this is the sum of the pitch radii, the pitch circle radius for the gear to be cut is  $25.5 - 3.225 = 22.275\text{mm}$ . The pitch circle of the barrel ring is twice this at 44.55mm.

What sized cutter?

The pitch circle of the pinion is 6.45mm and it has 12 teeth therefore the module of the teeth is  $6.45 + 12 = 0.5375$  (we do not need to use this figure except to confirm that the pinion size matches the wheel and to indicate a modern cutter size).

The number of teeth on the ring is 84 and the other basic formula for gear cutting tells us that the pitch circle divided by the number of teeth equals the module. We cannot expect it to work out to a modern cutter size precisely, but  $44.55 + 84 = 0.53\text{mm}$  which is near enough to either 0.5mm or 0.55mm module. If we use a cutter that is a little smaller than the theoretical 0.53mm the addendum and dedendum will be a little more shallow (an advantage when cutting barrel ring teeth) but the space between teeth may be a little tight.

If 0.55mm is chosen the gear teeth will be a little 'loose' in its mesh and the addendum and dedendum will be a little deeper.

Cutters frequently run a little out of truth and cut very slightly larger than if they ran absolutely true, and if the teeth are found to be tighter than they should be, the cutter can always be run around the barrel again to widen the tooth space. I would choose 0.5mm module.

It is time to calculate the outside diameter.

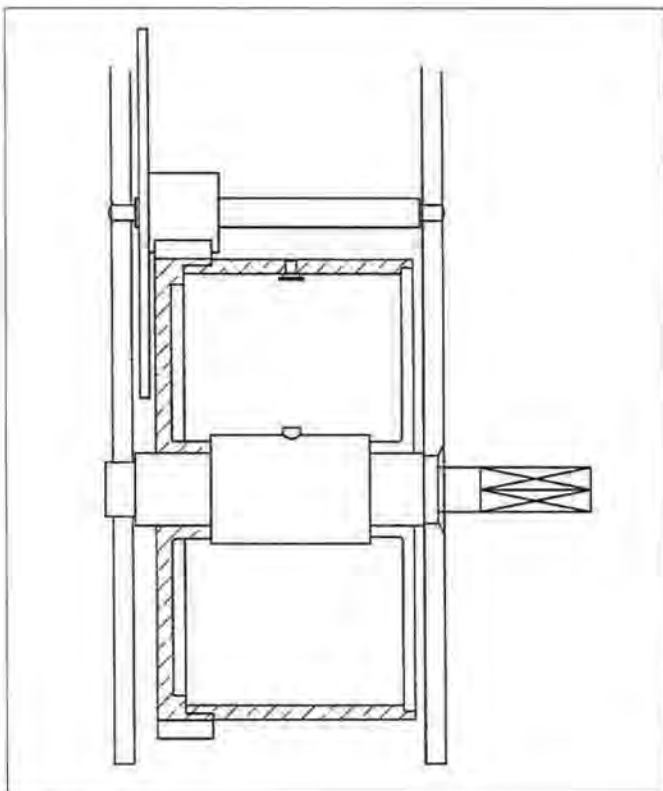


Figure 6

Thornton cutters use a 'factor' of 2.76 for wheel teeth.

$o/dia = Module (No. teeth + 2.76)$ . The difference between the PCD and O/D is the module x 2.76

Which is another way of saying that if we add  $0.5 \times 2.76$  to our calculated pitch circle we will produce an outside diameter which will allow a Thornton cutter to produce a gear with the correct pitch circle diameter.

It is as simple as that; we calculated a pitch circle for the barrel ring that would match the pinion and the given center distance and then we added an amount equal

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to the addendum of a Thornton 0.5mm module cutter. If you use another make of cutter you must use the factor that the manufacturer specifies.

The outside diameter of the gear is  $44.55 + (2.76 \times 0.5) = 45.93\text{mm}$

It would be nice to know what the root diameter of the gear is; we do not want the cutter to cut too deeply into the barrel tube.

Thornton's use a factor of 4 for the dedendum so if we subtract  $4 \times 0.5\text{mm}$  (module) from the pitch circle we will have a root diameter of 42.55mm (and a dedendum of 1mm).

The outside diameter of the barrel tube is 42.4mm which means that the gear root diameter is larger than the outside of the barrel by 0.15mm on the barrel. (A short tooth cutter is available which would leave even more 'meat' above the outside diameter of the barrel tube.)

If you examine Figure 1 again you will see that the dimensions for the gear ring have been established by the calculations above.

Figure 5 is a drawing of the winding arbor. We had difficulty establishing all these dimensions correctly. When simply measuring what we had, there was a misalignment of the stud on the arbor and the one on the inside of the barrel - it also looked as though the length of either boss or that of the central diameter (10mm) had been altered in some fashion because there was not quite

room for the arbor inside the barrel unless the cap bulged outwards slightly.

My own feeling was that either the cap was not original or the winding arbor was not. It did not really matter, everything was close enough for adjustment of the boss lengths (one of which would be new, of course). The width of the spring is 18mm and when this is centered on the anchor studs there is at least 1.5mm clearance between the coils and both ends of the barrel. The boss in the bottom of the barrel will be 5mm long and that on the cap is to be machined very slightly to 3.8mm which gives clearance between the bosses and the shoulders of the winding arbor of 0.1mm. Which is sufficient.

Finally the position of the gear ring relative to the next pinion (intermediate pinion) was checked to make sure that full contact was made on the leaves and that the face of the new barrel ring would not rub on the intermediate wheel (Figure 6).

It is noticeable that the winding arbor pivot at the square end is desperately short - which again makes me think that it has been machined to suit this barrel. There is room on the smaller diameter that bears the actual square to drive on a ring of steel and machine a suitable bearing surface. That, and the machining and attachment of the barrel ring will be dealt with in the continuation of this article.

⊙

## Questions & Answers

*(Continued from page 4.)*

### Question

The recent time change brought a number of inquiries about why we have daylight savings time.

### Answer

I must admit that I hadn't thought too much about the origins of daylight savings time. I simply thought that it was invoked to provide more daylight hours for the farmers to work in relation to the rest of industry around them.

But further research into this showed how misinformed I was. The facts were that farmers didn't care about what time it was, they worked round daylight hours no matter what the clock said.

In reality daylight savings time evolved from an effort to save fuel and promote efficiency during World War I. On March 19, 1918, Congress approved an act to "save daylight and provide standard time for the U.S."

At the end of World War I Congress repealed the act amidst a deluge of protests, mostly from farmers who worked, not from the clock, but from the sun.

At the onset of World War II, the U.S. adopted daylight savings time to promote the conservation of electricity and to give time for citizens to work in their "victory gardens." Daylight savings time continued until the end of September in 1945.

It was not until the Uniform Time Act of 1966 that a national time legislation again took effect to provide more daylight for normal daylight working hours and again to conserve energy on a nationwide scale. Even still, Arizona, Hawaii, parts of Indiana, Puerto Rico, the U.S. Virgin Islands and American Samoa still stubbornly resist observing daylight savings time.

*David Christianson,  
CMW, CMEW, FAWI  
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# Disaster Planning

## Part 1

Linda Chrysler

You are sitting in your store working on a delicate watch movement when you sense a vibration in the building. Suddenly your bench lamp starts to sway and books start falling from shelves. You quickly realize this is not an airplane flying low, but an earthquake. Everything begins shaking violently, cracks begin to appear in the ceiling. Would you know how to protect yourself, customers that may be in your store, your shop and your family? Would you know where to start with the recovery process?

Disasters, whether natural or man-made, can occur with or without warning at any time. These range from earthquakes, flooding, hurricanes, tornadoes, blizzards, or fire to someone slipping and falling in your store. The world we live in today is dangerous, but the world has always had dangers. Natural disasters have existed since the beginning of time, yet humans have lived and prospered in spite of these disasters.

Total protection from disaster is impossible and cannot be provided by any government agency. Protection is also not a simple measure that an individual acting alone can achieve. Your local, state and federal governments have spent countless hours and resources working together in preparation for many types of disaster. Procedures and plans have been developed and rehearsed by government agencies to help save lives and reduce damage.

There are choices you can make in how you live with the possibility of natural and man-made disasters. One choice is to ignore them and take chances with your security and your business by leaving your safety completely in the hands of others. The other choice is to take steps to protect yourself, your loved ones, your home and your business.

This is the first in a series of articles designed to help you develop a disaster contingency plan for your business, which can be adapted for your home. We will cover basic items to be considered in developing your plan. Although this is not a pleasant subject, it is one that could affect anyone at any time, with or without warning.

You may question why a plan for your business and your home is necessary. If you are ever faced with a disaster, you will understand the necessity of advance planning. As a business owner, your concern should be with

continuity of business, safety of customers and employees, as well as recovery in the event of a disaster. While each type of disaster presents different challenges, the development of a plan remains the same.

Your plan should be written and will serve as a recovery guideline during a stressful time when you may not be able to think and react as you normally would. As your business changes, so should your contingency plan. It should be reviewed annually and discussed with your employees and family. Everyone should be familiar with the plan and its contents. Remember that the plan is designed to protect the lives of you, your family, your employees and to protect your property.

There are four basic phases of emergency management. The first phase is **Mitigation** - knowing how to prevent emergencies. The second is **Preparedness** - knowing what to do when an emergency happens. Third is **Response** - acting in a responsible and helpful way in an emergency. Fourth is **Recovery** - knowing how to repair and recover from the damage caused by the emergency.

An example of the four phases for a severe thunderstorm would be: **Mitigation** - know when severe thunderstorms are approaching your area. **Preparedness** - designate a safe area in your home to shelter your family. Teach all family members what to do in a storm, wherever they are. Stock your shelter with a battery-powered radio, flashlights, extra batteries, non-perishable snacks and bottled water. **Response** - get away from any body of water, stay away from tall objects, extinguish any fires started by lightning, give first aid and call for emergency assistance. **Recovery** - have damage assessed by your insurance company, clean up broken branches or fallen trees.

Analyzing the Risks: In developing your emergency plan, you need to first consider the types of disasters that could occur in the area where you live. It would be worthless for someone living in Miami to plan for a blizzard where their major concern would be hurricanes. Every plan should consider workplace accidents and fire, which could affect any business regardless of where you live and work. Some examples of the types of disaster which should be considered would include: bomb threats,

chemical spills, domestic disturbance, drought and extreme heat, earthquake, flood, freezing, hurricane, landslide, radiation leak from nuclear power plants, structural fires, terrorism, thunderstorm, tornado, tsunami, volcanic eruption, winter storm and workplace injury.

After you have listed every type of disaster that might occur in your area, rank them in the order of probability of occurrence. In ranking the different types, be sure to consider any past history of these types of occurrences, weather patterns, geographical considerations (i.e., proximity to rivers, oceans, fault lines, etc.), and community characteristics (i.e., location of military bases, nuclear power plants, etc.).

Once you have determined the types of disasters that are likely to occur, you will then need to focus your plan with an eye toward those types of disasters. Your plan now should focus on the top five or six possible disasters. Your plan can be written in minute detail for each type of disaster or can be generalized to cover many types of disasters. Either way, it must be written.

Next: Questions to Ask and Answer in Your Disaster Plan



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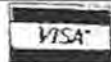
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Jack Kurdzionak, CW

# From the Workshop

## 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's easy. Just e-mail me at AWI <magazine@awi-net.org> or write using the old standby known as the postal service. You can even fax me at 513-367-1414.

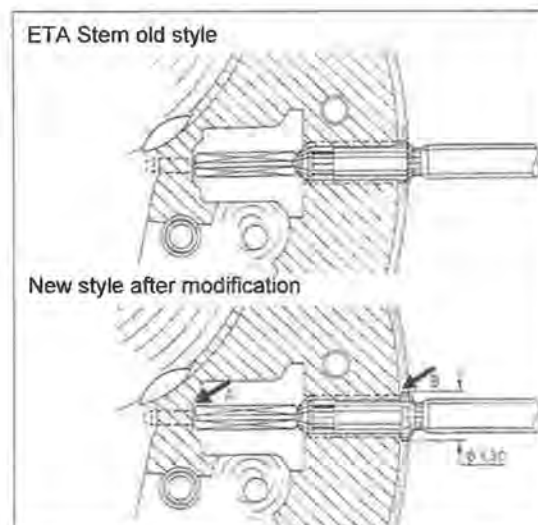
I will do my best to help you help the membership. By sharing your questions and suggestions all of our members can benefit from our combined knowledge and experience. The ideas, tools, techniques and products presented in this column are suggested by the author and contributing members and are not endorsed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

## A Serendipitous Discovery

Director Manuel Yazijian needed a plate jewel for an ETA 251.251 chronograph movement and did not have a new replacement on hand in his shop. However he did have some scrap ETA 980.002 movements complete with plate jewels, many of which are the same size as the jewels used in the ETA 251.251. Using a jewel from the scrap movement, Manuel was able to complete the repair that same day rather than having to wait for a replacement to arrive from the material supplier. Watchmakers servicing quartz watches should have a number of used ETA 980.002 movements in their scrap collection, from which they can salvage jewels. ETA 901.001 movements have superceded them. They are a more reliable, exact replacement for this troublesome caliber (ETA 980.002).

## A Shock Resistant Stem

When fitting replacement stems and crowns, watchmakers usually leave a small space between the bottom of the crown and the watchcase itself to facilitate pulling the crown out into setting position. Wedging a



finger nail between the crown and the case pulls out the crown. This slight extension of the crown away from the case exposes the main plate of the watch to damage if the crown receives an accidental shock. This forces the square tip of the stem into its supporting bracket on the main plate. This damage can only be remedied by replacing the entire plate. As a preventive measure, ETA has modified the stem and plate design on 11 1/2 ligne calibers 2801-2, 2824-2, 2834-2, 3836-2 and 2846. The plate has been milled at the point where the stem enters the movement and the replacement stem is now fitted with a collar to block the forceful entry of the stem into the movement. Please refer to the accompanying drawing of these modifications. ETA literature states that the new style stem with a collar cannot be fitted to a movement plate that is not milled. They do indicate that the older style stem, without a collar, can be used with either milled or non-milled plate. If the old style stem is used, ETA advises making the space between the bottom of the crown and the watchcase smaller than customary thus reducing the risk of plate damage from a shock to the crown.

Jack Kurdzionak

## Work Smarter Part 1 - In My Estimation

We have all heard the expression, "Work smarter, not harder". In this series of articles we will examine some ways that watch and clock makers can improve their productivity by getting more paying work done in less time. Anytime more work can be done in less time translates into more dollars per hour for the worker. This is called increasing productivity. It is really the best way to increase income without the necessity for increasing the cost of the product to the consumer. Successful businesses continually seek ways to increase productivity. If they didn't, their competition would; consequently driving them out of business. Henry Ford, a pretty good watchmaker himself, was able to increase productivity in the early 1900s by instituting the assembly line method to produce the Model T. He was so successful that he raised employee wages and lowered the price of the car simultaneously. Horologists only have to be half as successful as Henry. They only need to raise their own wages. There is no pressure to lower prices as there was in Henry's time.

The ideal workshop does not have to estimate work. The customers bring their timepieces in and ask for them to be repaired regardless of the cost or length of time involved. These customers all guarantee payment with cash, check or credit card (even if the repair is unsuccessful and the work does not have to be guaranteed). The horologist is paid regardless of the outcome of the repair. The world is not an ideal place and the above scenario is not going to occur. We have to operate in the marketplace, deal with customers (some are even unreasonable), and successfully repair timepieces if we expect to earn a living. In this real world, we must provide estimates of repair charges before performing repairs.

Horologists generally separate themselves into three groups when dealing with estimates. The first group gives free estimates, the second charges for all estimates while the third charges for some estimates while not charging for others. Regardless of one's policy regarding estimates, there are some common skills that apply to

all. Successful estimators have several characteristics in common. They include visual acuity, repair experience, and spare part expertise. Excellent visual acuity and attention to detail permit the estimator to rapidly form a mental picture of the overall condition of the timepiece rather than just focusing upon the suspension spring replacement requested by the clock's owner. The estimator immediately sees the electrical solder on a wheel, the mismatched set of hands, the Rathbun bushings on the back plate, etc. This set of skills is just as important to the watchmaker when estimating an eight-year-old watch for a crystal replacement only. He immediately sees the water stains on the hands, the corroded crown, and the bracelet held together with paper clips. The clock and the watch both need much more than the requested repair, and the skilled estimator understands that a partial repair on these timepieces is really not in order.

Estimators with considerable bench experience are invaluable. Every timepiece has its unique characteristics that, if overlooked during the estimating process, can become a costly mistake for the horologist. Some watches and clocks just take longer to repair, presenting unexpected complications during repair than other models. There is no substitute for experience and knowledge.

Spare part expertise is the third qualification for the estimator. Spare parts, namely their cost and availability, can create a major headache for the horologist. Some companies distribute spare parts to all with no restrictions; others put limits on parts distribution, while others will distribute no spares whatsoever. Distribution is one facet of spare part distribution, pricing is another area entirely. Just because one luxury watch company sells a stainless crown for about \$15 does not imply that another company selling lower cost watches will sell crowns for less. In fact, one not so luxury company sells their crowns for about \$30. The estimator has to be aware of the cost of spare parts and the policies of the various companies that sell spares. There is no substitute for experience and knowledge for successful estimating.

Jack Kurdzionak

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Glenn D. Gardner,  
CMW

# Affiliate Chapter Report

The affiliated chapter column was initiated many years ago and we fought for this page, so I want it to contain information for the chapters or about them. I will be contacting all the chapters to send me information and also send me their newsletters. In Wisconsin we tried one but couldn't get enough to put into it. My first newsletter came from the Western Pennsylvania Watch & Clockmakers Association (WPWCA) and AWI Past President Bob Bishop. Bob had an article which he wrote 25 years ago. I am reprinting it because it is what AWI and the affiliated chapters is all about.

## FROM THE PRESIDENT'S BENCH

*Debts. We all have them in varying degrees. Most of them involve money, mortgages, car payments, charge accounts that are familiar to us all. The debts I want to talk about, however, are not financial. I don't think there is one of you out there that has not been helped at one time or another in your career by another watchmaker. Some of us have been helped many times by watchmakers who cared. These are debts that should be paid. Just as we pay our bills, we should pay these debts. Of course, I do not mean that you must pay that person that helped you. He shared his knowledge and experience with you probably because he wanted to see a neophyte watchmaker grow to be a fine craftsman. Now, for those of you who have learned your craft well, it is time for you to pay some of those debts. You can do this in several ways.*

*You can help your fellow watchmaker solve a problem. You can contribute to your Association's Newsletter with bench tips and articles. You can make a point of*

*attending your Guild meetings and share your ideas and experiences. You can work on committees and serve as an officer.*

*I know this sounds like a pep talk to get you to contribute more to our Association and it is partly true. We do need to overcome the apathy that happens in most organizations, but mostly you should help yourself by sharing. It seems there are still those who guard their "secrets," and have the attitude. "I know all I need to know and I have all the work I can handle—so who needs this extra work." You don't know it all, especially today. Quartz watches have an increasing share of the market, and someday they will be the major item in the repair market. So, pay your debts. Share your knowledge. You will be the better for it.*

*A quarter of a century later, I find that this article does not apply to our group. We have a mixed membership, consisting of professional watch and clockmakers, who are earning their living at the bench and those who are interested in collecting and servicing timepieces. More than one member has called me to express his appreciation of the help fellow members have given. Those of us who are experienced have shared our knowledge willingly and as a result, some of our members are well on the way to becoming skilled craftsmen. What more can you ask of WPWCA?*

*- Bob Bishop*

Thanks Bob for those great words of wisdom. Send your newsletters or information to me at Glenn Gardner, CMW, 2 W. Spyglass Ct., Madison, WI. 53717 or e-mail to [ggardner1@charter.net](mailto:ggardner1@charter.net)







# AWI Home Study Course in Clock Repair

Based on the original correspondence course written and administered by Laurie Penman, AWI's resident clock instructor, this course is constructed to provide information and instruction in a manner that is immediately useful in both learning and practicing clock repair. The course contains 16 lessons. At the completion of each lesson you will receive comments and suggestions from Laurie Penman, and a pass or fail grade. Those who achieve a pass grade in each section will receive a certificate of completion. Mr. Penman will be available to answer questions or offer suggestions to each student.

The AWI Home Study Course in Clock Repair package contains all the material and information necessary to successfully learn the fundamentals of clock repair, including *The Clock Repairer's Handbook* by Laurie Penman and a one-year subscription to Steven G. Conover's monthly publication, *Clockmaker's Newsletter*. Course participants will be invited to attend a 2-day meeting at AWI to confer with Mr. Penman and meet other students.

**AWI Members - \$750**

**Non-members - \$825**

Contact Nancy Wellmann, AWI Education Coordinator  
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# AWI Beginning Lathe Class San Rafael, CA

The fifth AWCI Beginning Lathe Class was held on October 18 and 19 in the clock repair shop of Mr. Allan Lipney. We thank Mr. Lipney for allowing us to hold the Beginning Lathe class in his shop, thereby saving AWCI the cost of renting a hotel room. Allan operates a very well equipped and efficient clock repair business. One wall

of his shop is covered with many letters and notes he has received from satisfied customers. While this was the first ever lathe experience for some of the participants, they all demonstrated considerable talent making parts and tools.



*Left to right: Mary A. Maier, Ed Barbero, Cheryl Barbero, Allan Lipney, Karen Lipney, Vincent Cardinale, and instructor Bob Porter. Two other people who signed up for the class could not attend for personal reasons.*



*Cheryl Barbero and Vincent Cardinale pause for a picture.*



*A view of the activity during the class*



*Karen Lipney adjusts her lathe.*



Mary Maier, Ed Barbero, and Alan Lipney taking a break from their projects.



Allan demonstrates two of his favorite "clock repair" tools. He is just kidding, of course.

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12/03





Lucy Fuleki, Assistant Executive Director

# Member Benefit Spotlight

Education – Publications

The American Watchmakers-Clockmakers Institute (AWI) is a publishing company for the industry, keeping in print those publications that are crucial to watchmakers and clockmakers as they ply their trade. Some of the print jobs are for reprints of books written as far back as *The Best of J.E. Coleman*, 1979; *Repairing & Restoring Pendulum Clocks*, by John Plewes, 1984; and, of course, a recent reprint of Laurence E. Penman's *Clock Design & Construction* which was first published in softback in 1983.

*Clock Design & Construction*: This 6½ x 9¾ hardcover book has 144 pages and 200+ black and white diagrams and photos. It has been out of print since 1989 and a limited number have now been reprinted by the American Watchmakers-Clockmakers Institute (AWI), \$19.95. The author is Laurie Penman, a foremost expert on clocks from Devon, England. His qualifications were gained through a mechanical engineering apprenticeship at ICI

Ltd. and through technical colleges at Aston, Handsworth and Central College Birmingham. In addition, Mr. Penman is the author of several other books on clock repair, including *The Clock Repairer's Handbook*, 1986; *Making Clocks*, 1999; and *Cutting Clock Gears on the Lathe*, 1999.

Skilled clockmakers and restorers who enjoy teaching the craft are few in number, and Laurie Penman is probably one of the best known. In *Clock Design and Construction* Penman has brought together his experience at the bench and in teaching, to provide a source book of information that a clockmaker needs, including the information that many previous books have assumed the reader has acquired through apprenticeship.

Each aspect of the movement and dial of a clock is considered in the book, and the instructions needed to actually carry out the work are clearly given in the text and line drawings. Whether the reader needs to know how



Laurie Penman



to make a deadbeat escapement or how to set about painting or engraving a clock dial, the methods and design considerations are provided in a very practical, down-to-earth manner. Thus *Clock Design and Construction* is written to assist both the beginner and the experienced clockmaker, in language understandable to both.

Penman, known to all as "Laurie" is a fixture at AWI headquarters and he adds so very much to the character of the office. He has considerably increased AWI's visibility as reporters and cameramen just naturally gravitate to his beautiful English speaking voice and dramatic flair. Laurie joined the staff of AWI in February, 2002 after an illustrious career as a watchmaker, instructor and author in his native England

Laurie first visited this country in 1999 for six weeks where he did a series of workshops in Pennsylvania and Massachusetts with Steve Conover, editor of the *Clockmakers Newsletter*. A year's subscription to this newsletter is given to all 40 of Laurie's Home Study Course students.

The Home Study Course in Clock Repair allows students to sign up any time and work at their own pace. The course is based on the original correspondence course written and administered by Laurie. The AWI Home Study Course in Clock Repair is constructed to provide information and instruction in a manner that is immediately useful in both learning clock repair and practicing it.

The course consists of 16 bench sets (lessons) that provide a fount of information. At the completion of each project, students receive comments and suggestions from Laurie and a pass or fail grade. In order to receive a certificate, a pass grade in each section is required. Mr. Penman is available to answer queries and supply information by telephone or e-mail. This is an important

feature of the course and students are encouraged to make use of it.

The course package contains all the material and information necessary for students to successfully learn the fundamentals of clock repair. Among the items included is a copy of *The Clock Repairer's Handbook*, by Laurie Penman, Home Study Course students will be invited to attend one of two 2-day meetings at AWI and will be able to confer with Mr. Penman and meet other students.

The cost of the course for AWI members is \$750; nonmembers will pay \$825. For additional information or to become a home study course participant, please contact AWI's Education Coordinator, Nancy Wellmann at [nwellmann@awi-net.org](mailto:nwellmann@awi-net.org), local phone (513) 367-9800, ext. 303 or by toll-free telephone (866) 367-2924, ext. 303. For technical questions concerning the content of the course, contact Laurie Penman at [lpenman@awi-net.org](mailto:lpenman@awi-net.org).

Laurie is a family man and is in this country with his wife Betty whom he met in 1950 in Birmingham, England. The Penmans met at a dramatics society when they were both performing in a play in the round, "Boy With a Cart." The acting turned into real life drama and the couple eventually married in 1955, following Laurie's two-year stint with the Royal Air Force. Their eldest son Lance was born in 1957; followed by Rosemarie in 1960 and Jerry in 1970.

Beginning in 1972, Laurie, who had been an engineer and raised in a family of engineers, was disabled and required to find work that he could do from home to support his family. He was first asked to make gears for a clock. He did this for four to five weeks and then decided to repair a clock. Within three months he was making a clock. But, he suffered from over ambition. "I made all the engineer's mistakes, every one of them, didn't miss a one," Laurie stated. It was all "too close fitting," and clocks must "rattle" or they won't work, he adds.

Laurie appears to have quickly corrected these problems and went on to become a recognized authority in his field. He still tends to be overly ambitious. He has been a welcome addition to AWI and although considered a part-time employee, has worked with the AWI Education Committee to revise the book, *Questions and Answers of and for the Clockmaking Profession*, and has given bench courses during annual meetings in Minnesota, Virginia and North Carolina at the request of their Affiliate Chapters; has instructed three sessions of night classes, 10-weeks each; has repaired three of the six Cincinnati Observatory clocks entrusted to him as well as implementing the home study course described above. Laurie is an inspiration to those students he mentors and an example for all horologists that there is more than one way to make a living in the field and you are never too old to start. ☺



Steven Jones

# AWI Audiovisual Department

Over the past couple of years, the Audiovisual Department here at AWI has made a concentrated effort to improve the services and products it supplies to you, the member. We are continuing that effort with the introduction of our newer videos being offered on DVD as well as VHS.

There have been some concerns raised, however, as to why DVD prices are considerably higher than those of the cassettes. This can be explained for several reasons. First of all, the DVD disc format, if cared for properly, has a much longer life expectancy than video tape. In addition, our DVDs are divided into subject chapters which the viewer can access through the video's main menu. This means no more fast forwarding or rewinding through your video to find the piece of information you may wish to review.

Another explanation behind the higher costs of DVDs is due to outsourcing. In 2002, AWI purchased a video cassette duplication system which allows us to make copies of our titles in larger quantities as we need them. This means that our on-hand inventory and duplication costs are both considerably lower now than they were two years ago.

However, AWI currently does not have a DVD duplication system. As a result, we must outsource this work to another production company. We have worked out a favorable agreement with the other business which enables us to order minimum numbers while still receiving a bulk rate, but we are still facing larger costs than if we were doing the work ourselves.

I can probably imagine what some of you are thinking right now; "Well, why doesn't AWI go get a DVD burning system? I saw one at Video Towne for only \$299!" Unfortunately, at this time and place, this would not

be advantageous due to the current climate of DVD creation software. Unless a business is prepared to spend over \$6,000 for a DVD burning system, you run the risk of serious compatibility issues. You see, there are numerous different ways that a DVD can be created, and each duplication software package out there works in some DVD players, but not in others. With the current technology available in a reasonable price range (meaning under \$6,000), the best we can hope for is a compatibility ratio of 74%. This means that for every four members who purchase a DVD, one of them will not be able to watch the disc because their player or DVD drive cannot read the disc. Until this percentage increases, we have decided not to make that kind of an investment at this time and simply outsource the work.

While our provider's duplication system has a much greater percentage rate (over 90%), there is still always the possibility it may have issues in your player. If you experience any trouble and before you send a DVD back, try running it in another player or on the DVD drive on your computer. Chances are one of the other players will work with the DVD.

Speaking of returns, lately we have seen an increased number of members trying to return videocassettes shortly after they have been purchased. Please remember that once you have purchased and received a video cassette or DVD from our department, you cannot return them unless they are determined to be flawed or defective. In that event, we will gladly exchange the video for another copy, but we will not refund the purchase. As it clearly states on the AWI order form, no refunds can or will be accepted on video purchases. The reason for this is obvious; once the video has been watched, the viewer has



been exposed to the information on the tape or DVD, and it is that information that accounts for the cost of the video.

Finally, please remember that the Audiovisual Department is here as a service to you. The department is able to provide quality educational videos and informational tapes through the sales of those products. Without sales, the department cannot continue to operate. Therefore, "bootlegging" or pirating copies of videos from other members seriously hurts our productivity. In addition, pirating copies of videos or DVDs can be construed as theft and therefore a direct violation of the AWI Code of Ethics, so please consider your actions before taking them. As a business owner myself I understand the need to cut costs, but I would never want to hurt the people who are working hard so that I can better myself and my industry.

Thank you for your time and good luck in 2004!



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Gary Richards,  
Director of  
Development  
AWI-ELM  
Charitable Trust

# AWI-ELM Trust Update

News That Is Worth Your "Time"

Well, it's that time of year again and Christmas is right around the corner. Because everybody is in the holiday spirit (or so I hope) and in a generous mood, I thought the time was right for the AWI-ELM Charitable Trust to put together its Christmas "wish" list. In the September edition of *Horological Times Magazine*, I made a plea for several items that we could definitely use and since we did not receive any of these requested items, I thought I would go ahead and place these same items on our Christmas wish list. These are items that we need, could use and/or would greatly appreciate from you, our friends, supporters, and professional colleagues. They include the following:

- 1) Atmos clocks
- 2) American-made time and strike movements
- 3) Any books related to horology or the horological crafts for our Henry B. Fried Resource Library (e.g., Dava Sobel's *Longitude: The True Story of a Lone Genius Who Solved the Greatest Scientific Problem of His Time*)
- 4) Any museum-quality watches, clocks, tools or timepieces that we could permanently display in our History of Time Museum
- 5) A clock timer with an optical attachment

Don't forget, these in-kind gifts from you can be just as important as cash donations to not-for-profit organizations like the AWI-ELM Charitable Trust, so please keep that in mind.

In the July edition of *Horological Times*, I listed and thanked all of the individuals that became members of our "Friends of the AWI-ELM Charitable Trust" membership program as of the end of June. Now, I want to do the same thing again, but this time our list of "friends" and "patrons" represents those individuals who have signed up as of mid-November. So at this time, I want to personally thank the following individuals for their membership contributions and support.

At the \$25 level, we have our "Friends" of the Trust. They include: Benjamin Matz (Boca Raton, FL), Dean Sarnelle (Staunton, VA), Rene LaFreniere (Calgary, Canada), David Fahrenholz (Fishers, IN), Richard Mazza (Beverly Hills, CA), Charles & Janice Bailey (Westfield, IN), Ronald

Price (Natick, MA), Gary Cochran (Chesapeake City, MD), Donna Kalinkiewicz (Marietta, GA), Richard Johnston (Temple, TX)

At the \$50 level, we have our "Supportive Friends" of the Trust. They include: Robert Bishop (Glenshaw, PA), Glenn Gardner (Madison, WI), John Snyder (Sarasota, FL), Angela Morio (Columbus, IN)

At the \$100 level, we have our "Sustaining Friends" of the Trust. They include: Don Patterson (W. Harrison, IN), Archie Perkins (Denver, CO), James Sadilek (Carson City, NV), Dotty Schmit (Phoenix, AZ), Jim Door (Kennewick, WA), Robert Porter (Ellisville, MO), Gerald Kincaid (Baltimore, MD), Metro St. Louis Watch & Clockmakers (Shipman, IL), Jacque Lingenfelter (Loudonville, OH), Glenn "Bud" Craft (Indianapolis, IN), Ann Marini (Kensington, MD)

And at the \$1,000 level, we have our "Patrons" of the Trust. They include: David Christianson (Kendallville, IN), Bernhard Stoeber (Glen Rock, NJ), Mark Butterworth (Muscatine, IA), Robert Uhrich (Omaha, NE)

Thank you everybody for your generosity and support. Remember, the AWI-Educational, Library & Museum Charitable Trust is the philanthropic branch of the American Watchmakers-Clockmakers Institute. It was organized and is operated to aid in the advancement of horology and the horological crafts through activities in education. And, because the AWI-ELM Charitable Trust is a not-for-profit organization with 501 (c) (3) status, your membership and contributions may be deductible from federal and state income taxes. Please contact your accountant for more information.

So this holiday season, please keep us in mind whether it be with an in-kind or a cash donation. Whatever you elect to do, we want you to know that we greatly appreciate your support, that your contributions truly make a difference to our organization and that we never take your support for granted. We certainly hope we hear from you. In the meantime, have a safe and fun-filled holiday season.



# BULLETIN BOARD

## RESPONSES

### Seth Thomas Metronome

Bob Pary, New York Mills, MN, was able to supply the Seth Thomas metronome mainspring for Wm. Cracraft, Nitro, VA.

## ITEMS STILL NEEDED

### Schatz Clocks

We are seeking a distributor or someone who services Schatz clocks.

### New Hermes Engravograph CA300 Calligraph Attachment

Joseph Verruni, Plymouth Meeting, PA, is seeking information and operating

instructions for a Calligraph attachment for his New Hermes Engravograph. The Engravograph was made by Richardson's, Berkley Heights, NJ.

### Pegna Glue

George Costantino, Schenectady, NY, is trying to locate a heat reactive crystal glue he has used for years and found to be superior to all others for certain applications. It is called Pegna Glue and used to be sold through Bergeon



along with a kit that included a small heater for curing it. It was widely used by high-grade manufacturers.

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@awi-net.org



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# 2003-2004 AWI Committees, Objectives & Goals

## ELM TRUST

Trustees

Chairman: Jim Door  
Secretary: Robert D. Porter, CMW  
Treasurer: Mark Butterworth  
Trustee: Mark A. Baker, CMW  
Curator: Fred S. Burckhardt, FAWI

E-mail: elmtrust@awi-net.org

### Objective

The AWI Educational Library and Museum Charitable Trust was organized to aid in the advancement of the art and science of horology through activities in education. Its purposes are:

1. To lend practical assistance to the schools that engage in the teaching of horology.
2. To establish and maintain a horological library.
3. To establish and maintain a horological museum.
4. To encourage and assist students in their horological studies.

## CONSTITUTION & BYLAWS COMMITTEE

Chairman: Jim Door  
Members: Mark Baker, CMW  
Gene Bertram, CC  
Paul Wadsworth  
Dennis Warner

E-mail: constitutioncomm@awi-net.org

### Objective

The Committee shall consider and report on all matters referred to it as specified in the Constitution.

### Goals

1. Continue to study our Constitution, bylaws and policy manual and to make recommendations for changes in those documents it deems necessary.
2. Develop a procedure to organize, publish, and file the minutes and voting records of ALL board and committee meetings, including teleconferences. These records must be stored, filed and maintained in a central location so that they are always accessible to anyone with the need and the right to view them.
3. Define a policy to allow AWI members to exercise their right to have access to our membership records. Our attorney has informed us that members have a right to access certain records pertaining to our membership. A written policy is needed to

define the circumstances for access, to clarify which records can be accessed, and the reasons they may be accessed.

## FINANCE COMMITTEE

Chairman: Mark Butterworth  
Members: Lou Esselman  
Glenn Gardner, CMW  
Dennis Warner

E-mail: financecomm@awi-net.org

### Objective

The finance committee will be responsible for monitoring the financial stability and effectiveness of all AWI financial transactions within the scope of the Constitution and Bylaws. The committee and its members will establish a strong working relationship with the Executive Director, his staff, and the Board of Directors to facilitate its duties.

### Goals

1. Review and monitor our current expenditures to be certain they are in accordance with Board policy.
2. Review the financial considerations of new expenditures or programs and report these to the Board.
3. Present a balanced budget for the next fiscal year.
4. Ascertain the financial needs of the other committees and assist with their inclusion in the budget.

## JUDICIAL COMMITTEE

Chairman: Robert D. Porter, CMW  
Members: Ron DeCorte, CMW  
David A. Christianson, CMW, CMEW  
Charles Cleves  
Joseph L. Cerullo, CMW, CMC  
Wes Door, CMW  
Alice B. Carpenter, CMW, CMEW  
Robert F. Bishop, CMEW, FAWI  
William I. Biederman, CMW  
Fred S. Burckhardt, FAWI  
Marshall F. Richmond, CMW  
Leslie L. Smith, CMW, CMEW  
James H. Broughton, CMW, FAWI  
Robert A. Nelson, CMW, CMEW, FAWI  
Ewell D. Hartman, CMW, FAWI  
Harold K. Calvert, CMW  
Gerald G. Jaeger, CMW, CMC, CMEW, FAWI

E-mail: [judicialcomm@awi-net.org](mailto:judicialcomm@awi-net.org)

#### Objective

The Judicial Committee, in cooperation with AWI's legal representative (attorney or attorneys), shall make final decisions in all areas of dispute that cannot be resolved through any other means. Strict adherence with the AWI Constitution and Bylaws is of paramount importance.

#### Goal

To fulfill its constitutional duties when duly requested by the Board of Directors or the members of the Institute.

#### **NOMINATING COMMITTEE**

Chairman: Glenn D. Gardner, CMW  
Members: Wesley Grau, CMW, CMEW  
Joseph Juairé  
Dan Spath, CMW

E-mail: [nominatingcomm@awi-net.org](mailto:nominatingcomm@awi-net.org)

#### Objective

The Nominating Committee will be responsible to search amongst our membership for the best-qualified candidates to run for the available positions on the Board of Directors in our annual election. The work of this committee is of the utmost importance to the future of the Institute because those candidates nominated and subsequently elected will be expected to provide the leadership of this Institute.

#### Goal

This committee will nominate a number of candidates for the Board of Directors, all of whom shall meet the Constitutional requirements for serving as directors.

#### **PERPETUATION COMMITTEE**

Chairman: Jack Kurdzionak, CW  
Members: Mark Butterworth  
Alice B. Carpenter, CMW, CMEW  
Charles Cleves, CMW  
Wes Door, CMW, FAWI  
James Lubic, CMW

E-mail: [perpetuationcomm@awi-net.org](mailto:perpetuationcomm@awi-net.org)

#### Objective

The Perpetuation Committee will be responsible for monitoring and making strong recommendations in regard to the investments entrusted to them through the AWI Constitution.

#### **EDUCATION COMMITTEE**

Chairman: Jerry Faier, CMC  
Members: John Bryant, CC  
Brien Dews, CC  
Mike Gainey, CC  
Keith Lovett  
Hermann Mayer  
Vince Schrader, CMW  
William O. Smith, CMW, CMC, FAWI  
Dominique Wieland

E-mail: [educationcomm@awi-net.org](mailto:educationcomm@awi-net.org)

#### Objective

This committee's responsibility is the formulation and implementation of AWI's educational policies and programs. This committee and its subcommittee, Certification, shall work together to accomplish their mutual objectives.

#### Goals

1. Complete the work begun last year to make our new watch-making certification examinations available to our members.
2. Work with our educational director to design modular training units and educational classes that will be made available to our members. These units are to be designed to aid the candidate's education and skill development for a given certification standard.
3. Establish a practical and current set of standards to be used as a guide with and for the development of the courses and exams.
4. This Committee is to work together to establish a Board of Examiners, setting membership requirements, practices and policies of this group.

#### **CERTIFICATION COMMITTEE**

(Education subcommittee)

Chairman: Ron DeCorte, CMW  
Members: Jerry Faier, CMC  
Jerry Jaeger, CMW, CMC, CMEW, FAWI  
Joseph Juairé  
Chip Lim, CMW, CMC, CMEW  
James Zimmerman, CMW, CMC, CMEW

E-mail: [certificationcomm@awi-net.org](mailto:certificationcomm@awi-net.org)

#### Objective

To oversee the certification of AWI members.

#### Goal

Continue current work of administering and grading AWI's certification examinations until the Education Committee establishes a Board of Examiners.

#### **MEDIA COMMITTEES**

#### **HOROLOGICAL TIMES COMMITTEE**

(Media subcommittee)

Chairman: James Sadilek  
Members: Lloyd Lehn, CC  
Chip Lim, CMW, CMC, CMEW  
Robert D. Porter, CMW

E-mail: [htcomm@awi-net.org](mailto:htcomm@awi-net.org)

#### Objective

Work with our executive director, magazine editor, and president to formulate policy for our magazine.

#### Goals

1. We need a significant increase from our advertising revenue. The Executive Director may elect to hire a sales representative to sell more advertising in the *HT*. Work with the Executive Director and the sales representative to sell our advertising space.
2. Review submitted articles for content and accuracy before publication. It is imperative that this committee seeks the aid of

professional horologists who have been trained in recognized schools both in the USA and abroad to review our published articles. The president has a list of horologists who may volunteer their services, but due to their employment status, their names must remain confidential.

#### **BOOK REVIEW COMMITTEE**

(Media subcommittee)

Chairman: Robert D. Porter, CMW

Members: Gene Bertram, CC

E-mail: bookreviewcomm@awi-net.org

#### **Objective**

This committee is responsible to review and file a written report on the quality and content of all horological publications in all formats received for its consideration.

#### **TECHNOLOGY COMMITTEE**

(Media subcommittee)

Chairman: Manuel Yazijian

Members: Ray Cherry

Matthew Clark

Ron Price

E-mail: technologycomm@awi-net.org

#### **Objective**

This committee is responsible for making recommendations to the board for further development of our electronic media efforts, including Internet capabilities and CD productions.

#### **Goal**

To guide and assist the Executive Director in the implementation of our new web site project. This will be the continuation of the fine work begun last year.

#### **MEMBERSHIP COMMITTEE**

Chairman: Terry Kurdzionak

Members: Mack Shuping

Daniel Spath, CMW

James Zimmerman, CMW, CMC, CMEW

E-mail: membershipcomm@awi-net.org

#### **Objective**

Increase AWI's membership and promote our organization both within the horological industry and to the public at large.

#### **Goals**

1. To work with the Affiliate Chapters to help each of them increase their membership and to encourage all of their members to join AWI.
2. Encourage the publicity subcommittee chairman to get AWI's image into industry publications every month.
3. Assist the staff with the planning of the annual meeting and convention with attention given to optimizing this opportunity for the both the membership and the vendors.

#### **PUBLICITY COMMITTEE**

(Membership subcommittee)

Chairman: James Zimmerman, CMW, CMC, CMEW

Member: Bert Kalisher

E-mail: publicitycomm@awi-net.org

#### **Objective**

Make AWI more visible to persons in our industry and to the public at large.

#### **Goals**

1. To get AWI, its activities, its membership, and what it does for our industry into the print media every month.
2. To implement last year's suggestion from this committee to provide a basic testing service for watch manufacturers regarding several measures of quality. Timepieces meeting minimum quality standards will be permitted to use an AWI seal of quality in their advertising.

#### **HONOR AWARDS COMMITTEE**

(Membership subcommittee)

Chairman: Daniel Spath, CMW

Members: Wes Door, CMW, FAWI

Jerry Kincaid

James R. Pettit

E-mail: awardscomm@awi-net.org

#### **Objective**

The committee is responsible for making any and all recommendations for special awards such as, but not limited to, AWI Fellow, Lifetime Achievement, etc.

#### **Goals**

1. The committee will formulate written criteria to guide its selection of all award candidates in this and future years. Adherence to these guidelines will allow our awards to be administered as fairly as possible.
2. Recognize eligible AWI members with the appropriate award for their contributions to AWI, its members, and our industry.

#### **STRATEGIC ACTION COMMITTEE**

Chairman: Tony Voight

Members: Joe Schrader, CMW

Doug Thompson, CW, CEWT

E-mail: strategicplancomm@awi-net.org

#### **Objective**

Recommend to the board steps that we can take to insure AWI's future success as the premiere horological institution in the world.

#### **Goals**

1. Review last year's recommendations to the board.
2. Update or modify them as necessary before recommending to the board the three most important policies this committee believes we should implement beginning in 2004 for AWI to prosper five years from now.



**ETHICS COMMITTEE**

Chairman: Paul Wadsworth  
Members: John F. Kurdzionak  
Jerry Faier, CMC

E-mail: ethicscomm@awi-net.org

**Objective**

To review AWI's Code of Ethics found in the Bylaws Article II Sec. 3.

**Goal**

The existing code of ethics may be outdated, unenforceable, and/or irrelevant to AWI's current mission. This committee will examine the current code and make its recommendations to modify, replace, or not change the current code.

**SPARE PARTS DIRECTORY COMMITTEE**

Chairman: Manuel Yazijian  
Members: Wesley Grau, CMW, CMEW  
Dick Redman  
James Sadilek  
Doug Thompson, CW, CEWT

E-mail: sparepartscomm@awi-net.org

**Objective**

To ascertain the spare parts distribution policy of major watch and clock manufacturers and distributors and publish the results of their findings.

**Goals**

1. This committee will propose guidelines to AWT's executive director in order that he may make a survey of the spare parts distribution policies of various companies.
2. The findings of this survey shall be published in *Horological Times* and on our web site for use by our membership in order that they may be aware of the spare parts policy of each major company in our industry.

**PRICE SURVEY ADVISORY COMMITTEE**

Chairman: Tony Riggio, CMW  
Members: David P. Kurdzionak  
Manuel Yazijian

E-mail: pricesurveycomm@awi-net.org

**Objective**

AWI intends to compile and publish a repair price survey for our industry.

**Goal**

The committee will work closely with the Executive Director to compile an appropriate set of questions to be answered by the respondents to our survey. These questions should reflect and anticipate the needs of our membership for an overview of prices actually charged in the recent past for horological services.

**AWI vs AWCI ACRONYM ADVISORY COMMITTEE**

Chairman: Jack Kurdzionak, CW  
Members:

**Objective**

Are we AWI, AWCI, or what?

**Goal**

This special committee will be composed of Certified Watchmakers and Certified Clockmakers. They will recommend their selection of one or more acronyms the American Watchmakers-Clockmakers Institute can use. Their recommendation(s) shall be presented to the membership for a decisive vote at the time of the annual election of directors.

**INTERNET TRAINING COMMITTEE**

Chairman: James Sadilek  
Members:

**Objective**

This committee was requested by the Affiliate Chapters at their last meeting to pursue subscription watchmaking training to be made available by Internet.

**Goal**

This committee will study the feasibility to provide, via the Internet, training for members to prepare them for our certified examinations.

**PARLIAMENTARIAN**

Paul Wadsworth

**Objective**

To ensure the board adheres to parliamentary procedures.

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Address .....

..... Zipcode ..... Country .....

Telephone No ..... Email address .....@.....



## New Members

### Alabama

Seiger, Michael D.—Opelika, AL\*

### Arizona

Simpson, Bobby R.—Phoenix, AZ\*

### California

Baker, Tony—Trabuco Canyon, CA  
Doan, Thanh D.—Los Galtos, CA\*  
Eckert, Brian M.—San Diego, CA\*  
Ellison, Burton—Bakersfield, CA  
Feldman, Clayton—Merfee, CA\*  
Lubow, Cynthia—Berkeley, CA  
Lyon, David—Los Angeles, CA  
Rountree, Douglas B.—Clayton, CA  
Sykes, James—Bakersfield, CA

### Colorado

McDade, James—Windsor, CO

### Connecticut

Morton, David A.—Stratford, CT

### District of Columbia

Floyd, Harry—Washington, DC

### Florida

Gress, Roy—Mount Dora, FL  
Merel, Melquiades—Miami, FL\*  
Rysko, Jorge—Sarasota, FL

### Georgia

Gittings, Joseph C.—Rome, GA

### Idaho

Ransom, Ray—Boise, ID

### Illinois

Earles, Jim—Glendale Heights, IL  
Jansen, Greg—Homewood, IL  
Le Jeune, Jacques—Quincy, IL  
Mendel, Larry—Quincy, IL

### Indiana

Banks, Steve—Indianapolis, IN  
Bertram, Rhett W.—Monticello, IN

### Kentucky

DeSieno, Joseph—Lexington, KY  
Swinford, Stanley—Covington, KY\*

### Louisiana

Allain, James F. Jr.—New Iberia, LA

### Maryland

Elson, Lane—Clinton, MD  
Suidikas, Gary—Westminster, MD

### Massachusetts

Dalby, Clive D.—Methuen, MA  
Demeter, Andrew—Topsfield, MA  
Rosenthal, Erik—Longmeadow, MA

### Michigan

Bronsink, Michael—Whitehall, MI\*  
Cathey, Ryan D.—Warren, MI  
Fay, Leonid R.—Wolverine Lake, MI\*

### Minnesota

Anderson, Elroy—Burnsville, MN\*  
Disher, Scott—Savage, MN  
Drude, Sarah Jane—Minneapolis, MN  
Edwards, Matthew—Lakeland, MN  
Frommes, Michelle M.—Minneapolis, MN  
Gingerich, John M.—Minneapolis, MN  
Hagen, Marcus P.—Minneapolis, MN  
Jackson, Mark—Red Wing, MN

### Missouri

Greenwood, Vic—Edwards, MO  
Palm, Stephen—Saint Louis, MO  
Riley, Mark D.—Villa Ridge, MO

### New Hampshire

Antonucci, Louis—Nashua, NH

### New Jersey

Miller, Charles—Jersey City, NJ\*

### New York

Kuyt, David—Rochester, NY

### North Carolina

Destival, James—Pinehurst, NC  
Han, Eunsuk—Asheville, NC

### Ohio

Disher, Carl—Dayton, OH  
Michaelson, Miles—Cincinnati, OH

### Oklahoma

Perlowin, David—Okmulgee, OK

### Oregon

Webb, Robert M.—Beaverton, OR

### Pennsylvania

Beeman, Jonathon—Cochranville, PA  
Hummel, Charles A.—Pottsville, PA  
Logsdon, Howard P.—Lititz, PA  
Swords, Herman G.—Gordonville, PA\*

### Tennessee

Siepel, Wiley—Franklin, TN

### Texas

Bennett, Duane—Austin, TX\*  
Bishop, Lewis—Plano, TX\*  
Finch, Clint M.—Hurst, TX  
Harmon, Douglas—Hurst, TX  
King, Tom—Denton, TX  
Weekley, George E.—San Antonio, TX\*

### Washington

Espinoza, Calvin J.—Tacoma, WA  
Peterson, Kenneth J.—Lynnwood, WA\*  
Sponsor: Jeff Grieff—Seattle, WA

### Wisconsin

Dohm, Rusty—Sun Prairie, WI  
Matthews, Paul H.—Sun Prairie, WI  
Zuckerman, Sam—Mequon, WI

### Wyoming

Murphy, Morris M.—Laramie, WY\*

### Canada

Carter, Barry—Victoria, British Columbia\*  
Thomassen, Orla—Brandon, Manitoba\*  
Clarke, Tim—Kingston, Ontario

### International

Junichi Igimi—Tokyo, Japan

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

# ETASWISSL@B: New Calibers Included In the ETA SA Training Concept

Encouraged by the success of its first CD-ROM ETASwissl@b presenting the caliber ETA 7750, the Swatch Group firm ETA SA continues the development and marketing of its interactive training concept ETASwissl@b. Four new CD-ROMs will be launched in order to introduce the calibers ETA 205.911, ETA 251.471, ETA 6497-2 and ETA 2892A2.

Every CD-ROM ETASwissl@b is a training concept aimed at all participants in the watchmaking industry. ETA SA has created a medium that helps to provide technical information about special calibers, particularly about the more complex movements. This tool is presented in the form of a CD-ROM which is mainly intended for qualified watchmakers, service centers, training instructors, watchmaking schools and other professionals of the industry on a world-wide scale. In a simple and interactive way the material shows how to service a movement, perform adjustments, and how to use the specific functions of the individual movement.

Every CD-ROM features the complete program for a specific caliber. Different animated and interactive modules show how to disassemble and assemble the caliber. They also explain the electric controls (for the quartz calibers), the working principle of the caliber (e.g. the Autoquartz principle), and furnish information about lubrication. Additionally, they include operating instructions for the chronographs.

The modules on disassembling, assembling and how to use can be printed out separately to be employed as instruction material and to provide the customer in the shop with technical documentation. The documents are available in Adobe Acrobat Reader (PDF) format, also included in the CD-ROM. They can be printed out beforehand or at the seminar location.

ETASwissl@b presents the movement in a pedagogical way. Thanks to the combination of a computer and a laser beamer, a general overview and instructions

can be shown on a large screen for a larger audience. The following languages are available in the main menu: English, French, German, Spanish, Danish and Italian. The ETASwissl@b system makes it very simple for small watchmaking shops to organize an in-house seminar. The only thing that is required is an ordinary computer with a CD-ROM drive. No additional software is needed.

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Type of Business \_\_\_\_\_

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# 2003 Horological Times Technical Index

## Volume 27, Year 2003

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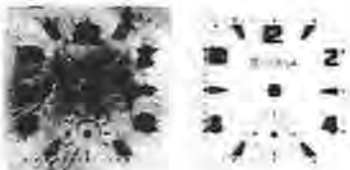
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