HOROLOGICAL TIMES

June 1998

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President's Message

By Charles Cleves

There seems to be a growing spirit of cooperation between AWI and several kindred organizations. I was speaking with a couple of material supply house executives last week, and they reported how impressed they were when Bill Ewbank came to the annual Jewelry Industry Distributors Association (JIDA) meeting to give a talk about AWI and its activities. For the past couple of years we knew we were on the right track at AWI. Now, it seems that other people and organizations are starting to take notice and are becoming more interested in AWI.

Last month, upon our invitation, Doug Cowan sat in on part of our strategic planning committee meeting. Doug is the Second Vice President of NAWCC and is Chairman of that group's planning committee. We discussed several ideas on how we could help each other. One idea was to exchange columns in each other's magazines. There was a positive feeling among those present at this meeting that our two organizations can continue to build a better relationship in the future.

Another direction that has recently developed is the AWI Jewelry for Watchmakers Program. Members and other interested persons can now increase their earnings potential by doing some of their own soldering and jewelry repair. Just the hands-on practice will give a better idea of which jobs cannot be done. The first class has already been taught at AWI's headquarters. The Jewelers of America (JA) has expressed interest in recognizing this program as credit toward their own certification program. This extremely large organization is also interested in learning more of what AWI is all about.

I think we are definitely on the right track. We now have the respect of many of the organizations within the jewelry and horological fields. If we continue making progress at the rate we have shown in the past couple of years, there is no telling where we will be five years from now.

Executive Director's Message

By William J. Ewbank

By now you may have noticed that we've been fooling around with the cover again. Actually this month's cover is reporting a significant event. The cover displays the new home page for the AWI internet website and supports our feature article by Fortunat Mueller-Maerki. We've noticed that our old site, as drab and tired as it was, proved to be the single best source for new members. Adding some life, color and action to the new home page was an easy decision. By the time this magazine arrives at your home, the new site should be active. If you are on-line, look us up @ www.awi-net.org.

We are also reaching our busiest time of the year at AWI headquarters when we prepare for our annual Board of Directors meeting, prepare a new annual budget and review and report on the successes and failures of the year past. It has been a very introspective time for me. As our readers will recall, my fiscal year began on the operating table and included a lengthy period of recovery from two major surgeries and radiation therapy. I learned that I am indeed mortal and that no matter how tough you think you are; if you are sick and injured, you simply cannot perform at your peak. If I were grading myself, I'm afraid I would have to give an incomplete.

A major responsibility for the Executive Director is to present a "State of the Institute" message at the annual Board Meeting. This report not only covers the highlights of the past year, but is also the opportunity for the executive to make recommendations to the Board for future action. I'm going to give the members a little sneak preview of what I plan to request: AWI needs to continue to work to secure its financial stability. Our Perpetuation Fund endowment has proven to be both a wonderful gift and a burden. The gift is that, with competent management, AWI can be secure from fear of financial disaster. The burden is that too much dependence on the Perpetuation Funds can breed a dependency mentality that does not require the Institute to work to justify a fair return for its goods and services. The simple fact is that while our annual expenses have grown to over a million dollars, our revenues outside the Perpetuation Fund have not kept pace. Trying to charge our members more for the same old products is not the answer. AWI must develop services and programs that are of value in and of themselves to the purchaser.

We must start on a resolution to this thorny spare parts problem. Actually, this "problem" could present the greatest of opportunities to AWI and its members. Many years ago, a decision was made to divorce AWI from the threat of industry control. Echoes of that old debate still resound today. The real question is: Did we also intend for AWI to become totally isolated from any contact with industry at all? One solution to our current debate is to revive the Industry Advisory Board.

(Continued on page 34)

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Questions & Answers

Question

I was wondering if you could answer a couple of questions concerning a W.W.I-era military wristwatch I would like to see run some day.

The first question is, what caliber is it and who was it made by? Please excuse the quality of the attached photocopy, but it was fast and cheap. The particulars are: unsigned military-type porcelain dial, 13" gilt movement, jeweled lever escapement, only two setting lever parts (could not find in Bestfit Identification section), only markings are on dial side of movement SFG and 988, triangular dial washer, held in case with only one screw and lug on opposite side.

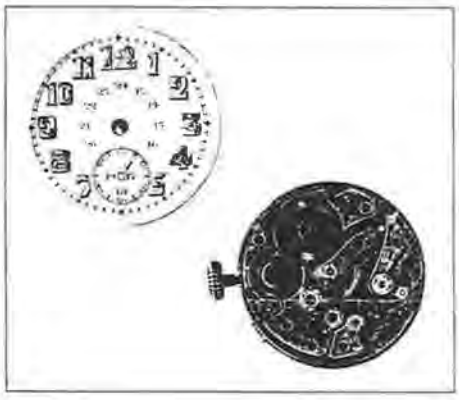
The second question, which is really the source of this "quest," involved the missing pallet bridge. How much would it cost (approximately) to make a replacement pallet bridge?

I realize this watch is from the very beginnings of the wristwatch era and the answers may not be available, but it appears to be a quality movement with a lot of "character" and perhaps it could run again some day.

I look forward to your answer.

PS. The inside back cover of the case is engine turned and marked only: 1.

Peter Lamborghini, Dallas, Texas



Answer

These early wristwatch movements, circa the early part of the twentieth century, are often very difficult to identify. On yours, the SFG trademark identifies Schild Freres & Co. of Grenchen, Switzerland, as the maker...not to be confused with Adolf Schild of A. Schild fame.

In 1907, Schild Freres became Eterna, Schild Freres with Theodore Schild, as its principle. The name Eterna was used as a brand name with the Schild Freres Grenchen (SFG) as the registered name of the company, and until 1924 they used both the Eterna, Schild name and the Schild, Freres name on their ebauches.

I could find no specific reference to your movement, however, the 1951 Swartchild & Co. catalogue lists an "Old Style SFG" (Figure 1). The setting and clutch levers of this movement are very similar to yours. As you know, the setting lever, clutch lever and setting bridge are like fingerprints for watches—each being unique for a specific calibre. The train and bridge layouts are also very similar but, are not the same. I could find no other SFG movements even remotely like yours.

Now, curiously enough, the A. Schild calibre 485 shown in Figure 2 from the same catalogue has a 12-ligne dial-side main plate just like your 13-ligne SFG movement, although the setting and clutch levers are very different. I say curiously because, as far as anyone knows, the Schild Freres Co. and the A. Schild Co. were not at all related when these movements were made (although the founder of each were brothers).

It would have been nice to identify the calibre of your movement because spare parts are filed by maker and calibre, and someone with old assortments might have what you need. But, in reality, it will be necessary to have a pallet bridge custom made for your movement, a fairly involved process, but not one beyond the skills of many competent watchmakers.

Figure 1

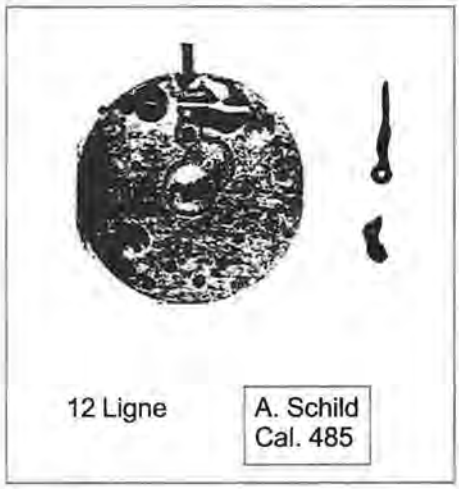


Figure 2

It is quite possible that one of our readers might have one of these very early wristwatches in their collection and have additional information for Mr. Lamborghini.

David Christianson

Kreisler Collection Watchbands

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KDL-78-3T	78 leather	$399.	$ 1334.
KDM-72-3T	72metal	499.	1252.
KDC-91-3T	73 leather,18 metal	499.	1549.

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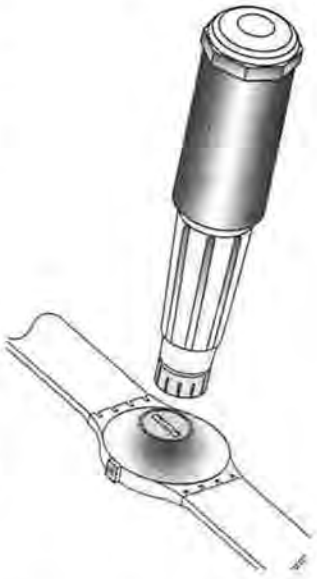

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IN MEMORIAM
M. R. CARPENTER
1932-1998

The immediate Past President of the American Watchmakers-Clockmakers Institute, M. R. "Buddy" Carpenter passed away on April 25, 1998. A craftsman to the end, Buddy died while setting up a clock during a service call. Buddy Carpenter was born in Tarboro, North Carolina on October 5, 1932. He was a lifelong resident of Tarboro, attending the city schools and playing football during high school. He met his lifelong partner, Alice Boswell, during his formative years. "Buddy always liked to say that he had been carrying my books since fourth grade, and indeed, he was to be seen many afternoons, riding by my house on his bicycle at this time of our lives."

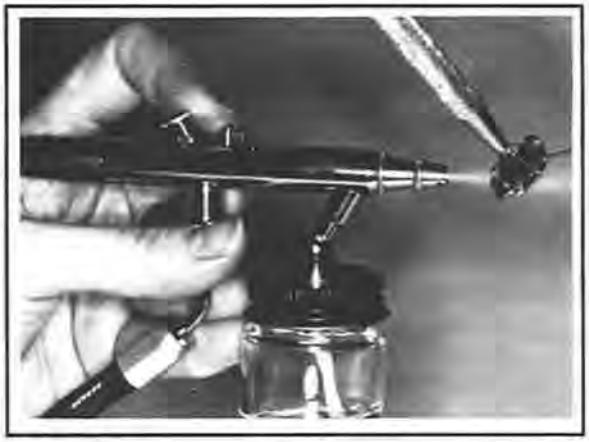
Buddy and Alice were married in November of 1952. They had two children, a daughter, Ellen Baker, and a son, George, who died in 1983. Buddy served in the army from 1952 to 1954, and worked for Carolina Telephone & Telegraph Company (later Sprint) from 1950 to August, 1995, when he retired with forty-five years of service.

Buddy apprenticed as a watchmaker under A.J. Boswell, his father-in-law, during the late 1950's. He often said that with a father-in-law, brother-in-law, sister-in-law, and wife who were watchmakers, he was forced to learn the trade in order to join the conversation at family gatherings.

Buddy was President of the Coastal Plains Guild (NC) from 1976 to 1998; Technical Director of North Carolina Watchmakers Association, 1979-1998; President of the North Carolina Watchmakers Association in 1986-1987. Buddy performed many services for AWI, including as traveling workshop instructor from 1979 to 1998. He was a Trustee for the Education, Library and Museum Trust, and after holding the offices of First and Second Vice President, was elected President of AWI in 1996-1997.

The family requests that any memorials in Buddy's memory be made to the scholarship fund of the AWI Education, Library and Museum Trust.

CLEANING SYSTEMS FOR THE SERIOUS WATCHMAKER



Zantech's **Quartz Clean** and **Plasticlean** aerosols have revolutionized the movement cleaning process by safely dissolving dry oils and other contaminents without disassembly of the gear train. Now take the next step in movement cleaning with our compressor system. The unique dual trigger action of the spray gun is capable of spraying dry filtered air as well as the cleaning solutions. **No more need for expensive disposable air cans.** The compressor is foot-switch activated and quiet enough for a retail environment. The cost of cleaning one movement with the compressor system averages ***only 10 cents per movement!***! Discover the Quartz Clean compressor system and reduce cleaning time ***to seconds.***

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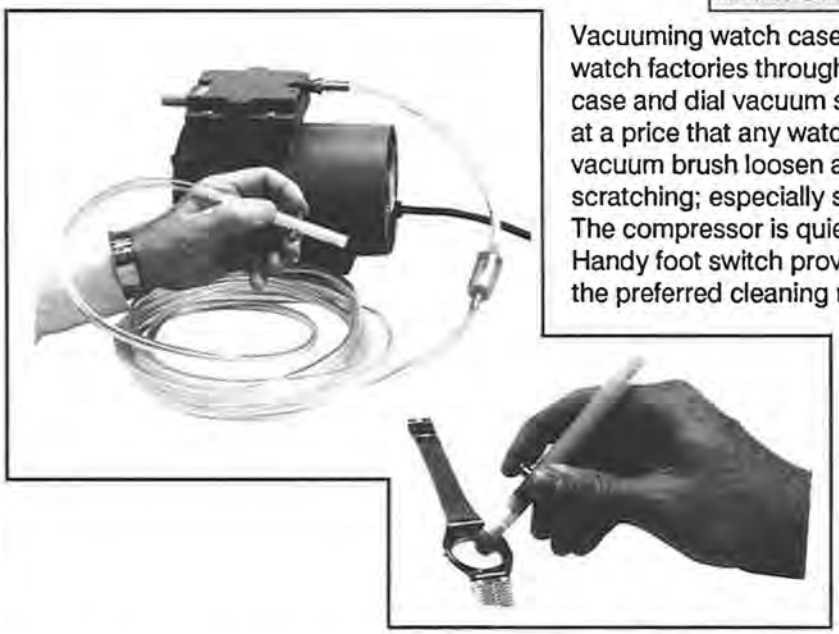
WATCH CASE VACUUM SYSTEM



Vacuuming watch cases has been the preferred cleaning method of watch factories throughout the world for many years. Zantech's case and dial vacuum system offers the same vacuuming capability at a price that any watchmaker can afford. The soft bristles of the vacuum brush loosen and vacuum dust and debris without scratching; especially suited for cleaning **black dials.**
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Ask Huck

J.M. Huckabee,
CMC, FBHI, FAWI

Roller Pinions

Question

Are roller pinions really better than other lantern pinions? Those in a Birge clock are very interesting. What do you think?

Answer

I have had only a limited experience with this type of gearing. Based on a Birge & Mallory clock I own, the gear trains are probably the most friction-free gearing I have experienced. However, if I were in the clock manufacturing business, I would not even consider the use of roller pinions. The reason being that they are labor-intensive and parts-expensive. Cut pinions are completely satisfactory and lend well to automated manufacturing.

I have designed and built one roller pinion, about 18 years ago. This was the drive pinion missing from an antique tractor of the 1910-1915 era. A faded parts catalog had part of a picture of the piece. It meshed into an internal ring gear about four feet in diameter. The pinion diameter (shrouds were about 16 inches) was made from 5/8" hot rolled sheet. Shroud-to-shroud was about seven inches. I made the layout on a piece of steel, drilled the two pieces in a stock, and welded the shrouds to a tubular spacer. The rollers were made of steel, hardened, and journaled on 3/4" hard tie-bolts through the shroud. It had 16 rollers. The finished pinion weighed about 60 pounds. The owner did the welding and made the rollers. I made the design, shrouds, etc. The tractor is in a nearby town. Come visit my shop and we will go see that pinion! This is an interesting tractor that may have been inspired by an old Birge clock.

Weak Mainsprings in Old American Clocks

Question

Do you replace the mainsprings in old American clocks you service? Many of them are weak.

Answer

The first question: What is weak, and how is strength measured?

Mainsprings are the scapegoat for poor workmanship. Along with the springs, another scapegoat is the choice of lubricant. Many clocks that are latent-stoppers, or fail to run 8-9 days on a full spring wind, are assumed to have weak springs or wrong choice of lubricants.

Oils sold for medium-sized clocks are usually suitable. Try this thought: One of these clocks will run with no oil at all; otherwise, how can we explain many of them going for 25 years without being oiled. From clocks in my own home, I know this to be true.

Now, how can we test the spring strength? There is no really easy way to do that at the repair shop. Here is what I do. Let the spring unwind (not in the clock) and look at it. If it expands to about a foot in diameter, you can bet your Texas boots it will power a properly repaired clock for 9-10 days.

If the movement is in good repair, it will run until the spring is pressing hard on the second wheel pinion shrouds.

A mainspring is the only thing in a clock of which I'm afraid. When a fully wound spring breaks, it can wreck a fine clock. I have no fear of so-called weak springs.

OVER 100 DAYS OF A GUARANTEED POWER RESERVE.

A quartz watch's superior precision combined with the ecological advantages of traditional automatic winding.

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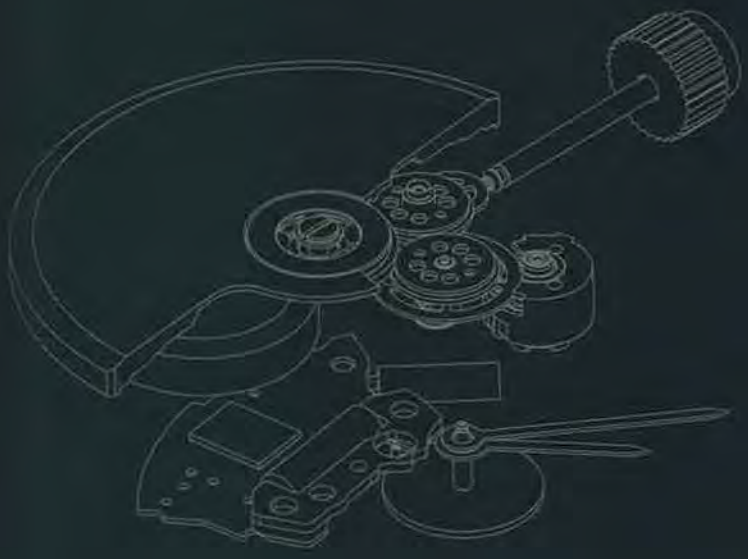

Research and development took a little time. But now it's arrived: ETA's new Autoquartz technology. Introducing the perfect meeting of micromechanics and microelectronics, of high tech expertise and ecological excellence.

This high-precision caliber accumulates power like a selfwinding movement then turns mechanical energy into electric power and stores it until it's needed. With a full power charge, the ETA Autoquartz will show the exact time for over three months. Without a battery. Without arm movements. As accurately and reliably as a quartz watch.

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Fortunat F. Mueller-Maerki

Horology on the Internet

Fortunat F. Mueller-Maerki, a native Swiss, but long-time resident of the New York area, is a partner in the executive search firm of Egon Zehnder International, Inc. in New York, and a dedicated amateur horologist.

He is a member of AWI, NAWCC, BHI, DGFC, BAWCC and Chronometrophilia, and currently subscribes to (and tries to read) 18 horological periodicals, if he has any time left over after his professional duties and maintaining his ever growing website Horology-The Index. He got interested in horology on the Internet after setting up the first website for NAWCC in 1995. His e-mail address is horology@horology.com.

Let's face it, horologists are few and far between. That is true both for horological professionals and dedicated hobbyists. This means that traditional horological information is inherently scarce for those who want or need knowledge and data. Your next-door neighbor probably cannot answer your questions. Your hometown library lacks even the most basic texts in the field. The nearest school teaching a course is hundreds of miles away. The information, texts, and expert advice that you need really do exist. The problem is that this expertise is spread very thin.

That is precisely why horology has flourished on the Internet. In cyberspace, distances don't matter. The e-mail correspondent in La Chaux-de-Fonds is as close as the one in Elgin, Illinois. The data base in Upton (UK) is as easy to use as the one in Harrison, Ohio. The library catalogue in Columbia, Pennsylvania is as close as your neighborhood library.

As always, there is a catch. The Internet can be a bewildering place for the newcomer to navigate. Even for the frequent user, information can be hard to find. This article is intended to provide both the novice and the cyberspace veteran with a guide to horological sites on the net.

The Internet

Simply put, the Internet is a global network of computers. Each computer in the network is electronically linked to all the others. If you have access to one of the network's computers, you have access to them all. Some people have direct access to the Internet from a desktop work station at their place of employment, but most will use a personal home computer to gain access by signing on with an Internet Service Provider (ISP). You can hook up with the ISP's computer through a telephone dial-up connection, and soon will be able to connect through a cable TV box or satellite dish. For many ISPs, like America-On-Line (AOL) or the Microsoft Network (MSN), providing access to the Internet is only a part of what they have to sell the user. Their primary business is providing access to their own "Content." Other ISPs, like Netcom, provide only a telephone access point to a computer that links directly and exclusively to the Internet. The ISPs will also provide the necessary software to interface with the various parts of the Internet. You can use your ISP's proprietary software or the free software provided by Netscape (Navigator/Communicator) or Microsoft (Explorer.)

The Internet itself is made up of various applications. Three of these applications will be of most use to the horologist. These are the World Wide Web (WWW), Internet e-mail (including mail lists) and Newsgroups. Other older applications like Telnet, Gopher, etc., have been mostly supplanted by the first three. Newer applications like Voice-Telephone through the Internet are not yet widely available.

The World Wide Web (WWW)

The WWW consists of millions of pages of information that people have posted publicly on Internet computers for anyone who has Internet access to see. Each of these pages has an address, called a URL (Unique Resource Locator, usually starting as http://.). The power of

the WWW derives from "Links." Certain words, sentences, or images can have a URL attached to them. By clicking your mouse cursor on these links, you can automatically pull up the WebPages at that URL. Following the linkages, you can effortlessly jump to even more related pages. Links are used to move around between the various pages within a website, and also between different websites. The WWW becomes ever more useful and user friendly as pages install more links to other related sites. Gordon Uber (http://www.ubr.com/clocks/) and Mike Murray (http://www.webcom.com/~z4murray/) were two pioneers who created websites with much more horological content. Eventually many other sources posted information on the Internet, including AWI (http://www.awi-net.org/).

The problem soon becomes how to find what you are looking for among those millions of pages of information. One tool is the "search engine." These are websites that allow you to type in a string of key words. The search engine in turn will seek out those websites that contain the key words. AltaVista, HotBot, Webcrawler, Yahoo, and Infoseek are a few of these search engines providing an automated catalog to the web. For the skillful user these search engines can be very powerful tools. Beginners be warned, they can also produce garbage—endless, confusing lists of hardly relevant URLs! For example, if you search for the words "clock, repair, ithaca, and calendar," your results may well include a page of public service announcements about the "Garbage pickup calendar in Ithaca, NY," or "the canceled 3 o'clock pickup due to repairs on the XYZ bridge." As the web continues to grow and there are billions, rather than millions of pages to search, this problem will become even worse.

It soon became apparent that there was a need for catalogues of WebPages that did not just attempt to find matching words on any WebPage, but would list only prescreened URLs on a given subject in a logical, hierarchical order. Yahoo (http://www.yahoo.com) became the leader in this field, cataloging websites by subject rather than by keywords. Unfortunately, since horology is such a multifaceted field, using Yahoo to find horological websites is not easy. One must still pursue many avenues (and a few blind alleys) like Recreation>Hobbies>Collecting>Time pieces, which yields 14 entries or Business>Companies>Jewelry>Watches, (190 entries) or Science>Weights & Measures>Measurement>Time>Horology (10 entries) or Education>Vocational>Profession Specific>Horology (3 entries). It is virtually impossible to find everything you need in one place.

With my dual passion for the Internet and horology, in the Fall of 1995 I set out to create a common entry point to the Internet for all horological sites and "HOROLOGY-The Index" (http://www.horology.com) was born. HOROLOGY-the Index is a nonprofit public service to further the cause of horology. If I had known how much effort it would eventually absorb, I'm not certain that I would have begun. Today HOROLOGY-the Index contains virtually no horological information of its own, but has over 3,000 links, organized in a logical systematical manner, to other horological WebPages. There is a page devoted to links to websites of horological museums (200 links, including some virtual museums allowing one to retrieve images of the collection online). There are 250 links to WebPages dedicated to a specific brand of watch or clock. There are nearly a hundred links concerning horological repair tips, including links to such sites as the British Horological Institute, which itself maintains an online repair tip library of hundreds of items.

HOROLOGY-The Index tries to be a worldwide resource. There are connections to specialized horological websites in dozens of countries, including major foreign language horological sites. The index is constantly

The World's Leading Horological Websites

(English Language Sites Only)

Horology-The Index - (Fortunat Mueller-Maerki's comprehensive list of 3,000 horological links.) http://www.horology.com

AWI - (American Watchmakers-Clockmakers Institute) http://www.awi-net.org/

BHI - (British Horological Institute) http://www.bhi.co.uk

Clocks + Time - (by Gordon Uber, a pioneer in horological information on the WWW) http://www.ubr.com/clocks/index.html

Mike Murray - (many downloadable lists of interest to horologists) http://webcom.com/~z4murray/

NAWCC - (National Association of Watch & Clock Collectors, Columbia, PA) http://www.nawcc.org

Timezone - (A Singapore-based watch retailer, no clock information, includes an active Forum) http://www.timezone.com

The Time of Internet - (a broad-based site in Italy by Fabrzizio Pollastri, more focused on "Time" than on Timepieces) http://www.cstv.to.cnr.it/toi/uk/toi.htm

changing, with some fifty links being added each week, and a score or more becoming obsolete. Today more than 15,000 horologists visit HOROLOGY-The Index each month and access over 50,000 pages of links. In any given week, users from over twenty countries use this resource.

There are, of course, other horological websites that also contain many links. The BHI site at http://www.bhi.co.uk is probably the most comprehensive. Most are more narrowly focused, link a German site devoted to designer watches or "Timezones" which concentrates on contemporary wristwatches. These specialized indexes can also be accessed through HOROLOGY-The Index.

Several of the commercial websites also maintain bulletin boards, where one can post questions and discuss horological issues. The bulletin board at Timezone has a particularly active wristwatch section. The BHI website has an access-restricted, members-only section that includes a bulletin board.

Various horological websites accept classified advertisements or have areas to post notices for trading. There are several sites that operate online auctions of horological items. For example, E-bay (http://www.horology.com/hoc-auct.html) is a site where at any time one can bid on dozens of clocks or watches.

Internet E-mail and Related Mail Lists

E-mail (electronic mail) has long been around for written messages and increasingly, visual images between various workstations within an organization. The globally connected computers of the Internet allow anyone to send and receive e-mail once they have obtained a valid e-mail address through an ISP and the necessary software. Compared to postal mail, e-mail has the advantage of being free and much faster. E-mail becomes a very powerful communications tool because it is easy to do mass mailings, as unfortunately the "junk mailers" have learned. If you complete a user profile for one of the commercial ISPs, you are likely to get a bombardment of electronic junk mail.

The ability to communicate easily with other people interested in the same specialty or subspecialty in far flung corners of the world is of particular interest to horologists. With a digital camera, you can also send pictures. Once you have stored a list of e-mail addresses, it is possible to write to ten friends or colleagues simultaneously with little extra effort. This idea has been expanded upon in several existing horological mail lists. Interested subscribers can put their name on a mail list by contacting the list administrator. Each mail list has its own address. Anything accepted at this address is automatically distributed to all subscribers. For more information on how to join a mail list, check http://www.horology.com/hi-elect.html/. The best known horological mail lists include:

CLOCKS. A fully automated, public mail list (anyone can join) maintained by John Wyman on the computer of Syracuse University. This list has about 800 subscribers and receives about forty messages a day. More clock oriented than watches, it has broad subjects and a good mix of professionals and hobbyists. With few rules (no selling, no images), it includes some joking and banter to accompany the mostly horological talk. The list includes some first-rate craftsmen with worldwide reputations, who are willing to share their knowledge on particular problems.

CLOCKERS. A mailing list open only to professional clock repairers was started by Mike Murray (it now has an anonymous owner) and is strictly limited to clock talk and does not allow cross postings.

CLOCKZONE. A public list operated by Jess Hamilton and includes mostly clock talk. It receives up to ten messages per day including many cross postings from CLOCKS.

NAWCC MEMBERS FORUM. A private mailing list open only to NAWCC members. It is limited to discussion of NAWCC events and policies.

SUNDIAL. An European site dealing only with subjects related to sundials. In addition, there are several closed horological mail lists open to new members by invitation only. These private lists may deal with highly specialized areas of horology or be restricted to people who have distinguished themselves in the field. Several commercial horological websites also maintain mail lists for their customers.

Newsgroups (alt.horology)

Newsgroups are an Internet feature that function like Internet-wide bulletin boards. Messages and Questions and Answers are organized by common themes. The user has to sign onto the bulletin board each time to read or post messages, but they are open to all. The newsgroup for horologists is called "alt.horology" and generates ten to twenty-five messages a day. The messages are mostly watch related, mainly by wristwatch collectors and include FOR SALE and WANTED notices.

In Conclusion

We horologists are mostly solitary craftsmen, and there are relatively few of us around. In the future, no serious horologist can afford to be cut off from these valuable and expanding sources of information available on the Internet. The equipment seems expensive. but the prices keep coming down. Newly on the market are inexpensive computer/modem combinations developed exclusively for internet use. If you don't have access to a personal computer or feel that you can't afford the investment at this time, check out your local public library. They may offer free Internet access.

The Internet has given us a wonderful tool to share our knowledge. Let's use it!

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Letters to the Editor

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Dear Editor:

I am pleased that Mr. Clark has chosen to respond to my article and I would like to respond to some of the points that he has made.

IN REGARD TO MY SPEAKING OUT WHERE OTHERS HAVE NOT: One can only wonder why this subject has not been brought forth earlier. Perhaps the long-term effects were not noticeable or perhaps failures were being attributed to other causes. Certainly there was enough "Public Domain" literature written on the subject. There must have been a reason why one of the suppliers invested in the development of a non-ammoniated cleaning solution many years ago (unfortunately it contains amines instead.)

Because I am a Professional Associate of the AIC, I am bound in writing by the AIC Code of Ethics which states, in part, that I, as a Professional Conservator, "must strive to select methods and materials that, to the best of current knowledge, do not adversely affect cultural property or its future examination, scientific investigation, treatment, or function," and that I have a "responsibility for preventive conservation by endeavoring to limit damage or deterioration to cultural property..."

IN REGARD TO FOCUSING ON THE HOROLOGICAL COMMUNITY RATHER THAN ON THE CONSERVATION COMMUNITY: The AIC and other conservation associations worldwide have been aware for many years of the relationship between ammonia and brass. There is and remains a need to increase the awareness of the professional clock repairers, restorers, and hobbyists in hopes that potential damage from chemicals to historical (present and future) horological objects will be reduced.

By making the horological community aware of the potential consequences of using ammoniated cleaning solutions, I am addressing the preservation issue of horological objects overall. I think that this is a perfect opportunity to open a dialogue regarding how to accomplish this task.

IN REGARD TO MY TRAINING AND CREDENTIALS: My training in Horology and Conservation came from reading many books (I would be pleased to supply a list to those who request it as it is too long to be included here) as well as attending lectures and gaining practical experience by interviewing other professionals in the same or related fields. Mr. Clark, you are correct, I formally trained under no one. I do have a machinist and an engineering background and these experiences were drawn upon to augment the texts. I believe that John "Longitude" Harrison was trained as a carpenter and that a lot of us in the horological field have as diverse an education as he. Many times questioning one's credentials is a technique used to draw attention from the main subject.

I have not had formal schooling in metallurgy but I have read more than thirty books and papers on brass and the effects upon brass by ammonia as well as those on SCC. I have also read about how brass is made and the phases that it passes through and how it develops grain structure and what happens when it is work hardened and some of the theories on why the ammonia does what it does. Part of researching a subject is reading about it. I spent at least 100 hours reading, researching, and locating sources of information about SCC. I understand that one of the ways that students learn is by reading books but perhaps I am mistaken.

IN REGARD TO MY ABILITY TO SPOT SCC AT A SINGLE BOUND: Before announcing to the world that I had seen SCC, I submitted the wheel sample to two metallurgists for their comments and review. They

also viewed the SEM photographs of the wheel. Their conclusion was that the cracking on the wheel appeared to be SCC. It did not appear to be season cracking as a result of casting or work hardening. I have presently spent at least twenty hours with metallurgists while they performed additional tests and examinations on this wheel. I am not ready to release the results at this time. Testing is presently being done on this wheel to determine stresses on the surface and internally as well as the grain structure and hardness.

Some museum conservators (not restorers) are versed in metallurgy and some have had a brief exposure to it. It would depend upon whom you questioned and upon their experiences as to whether they could identify SCC. I am able to identify if a component is cracked but whether it is SCC or season or another type of cracking would need to be determined by people more qualified than I. The results of a study on SCC would go quicker if a grant were made by the various horological organizations to an independent testing organization to study the effects of ammoniated cleaning solutions upon horological components.

IN REGARD TO THE USE OF A SUBSTITUTE CLEANER: Ammonia is a hazardous chemical to humans and has been proven to have a detrimental effect upon stressed, hardened brass: Stoddard's Solvent is a low health hazard but is flammable and has not been proven to be harmful to either brass or steel regardless of hardness. It is a question of which of these is the lesser evil to the clock.

IN REGARD TO MY CLAIM THAT AMMONIA COULD CAUSE CLOCK COMPONENTS TO DEVELOP SCC: A very good point has been addressed and that is an assessment of the claim made. I invite and challenge metallurgists, members of the AWI, NAWCC, BHI and any Museum staff as well as Conservation Scientists *who are knowledgeable in the field of Chemistry and Metallurgy* to come together and formally examine my claim. Prove the claim wrong or show the limitations where ammonia will not affect the clock components: such as the exempt years or models or components, the mix, the hardness or whatever it is that with confidence one could say: "the use of ammonia on this particular year or model or component *will not* cause SCC, guaranteed."

IN REGARD TO THE INTERNET SURVEY: When doing the Internet survey, it would have been appropriate to ask those 500 "subscribers" (not clockmakers) of the clocks@listserve what their horological or scientific training level was and if they had ever studied or read papers, articles, and books on metallurgy and specifically on the relationship between ammonia and brass and if they had ever seen a sample of SCC. My hypothesis for the low response is that very few of the "subscribers" knew what was being asked of them and that, in general, the respondents to an inquiry will be only a small percentage of the population queried. I suspect that, at the time of your query, if you randomly showed those 500 subscribers four pieces of brass (one of which has SCC) and asked them to identify the piece of brass with SCC, the response would almost equal the score of a random selection process.

IN REGARDS TO THERE BEING NO CLOCKS AFTER 100 YEARS OF USING AMMONIATED CLEANING SOLUTIONS: I hypothesized that if a clock is washed once every five years in ammoniated solutions in an average manner as done in a typical repair shop (20 minutes per "cleaning"), that after 10,000 years (not 100 years), some of the brass components may well be etched away. (This would be equivalent to soaking a clock movement in ammonia for about 1½ to 2 months.)

DISCLAIMER: I have no financial interest in any company that produces horological or any other cleaning solutions. Any cleaning solution formula that I develop will become property of the public domain. I have nothing to gain except to hopefully extend the time a horological artifact survives.

CONCLUSION: Once again, until serious research has been done in regard to the effects that ammoniated cleaning solutions could have on horological components and the results published, I would still urge the avoidance of these solutions when cleaning clocks or watches.

IMPORTANT NOTE: I have received reports that the suggested Safe Solution #1 (Aqueous) listed in my article has produced surface rusting of clock arbors and other steel components and thus I would recommend only using the Safe Solution #2 (Hydrocarbon) with the following modifications:

To 10 ml Triton X-114, add 330 ml Isopropyl Alcohol (IPA) and mix thoroughly. To use above mixture, add 330 ml Methalol, mix thoroughly, and then add 330 ml of Stoddard's Solvent to the solution and mix thoroughly.

To rinse, the first two rinses should be an equal mixture of Methanol and IPA and the last rinse should be IPA only. Dry, using warm air as suggested in my February article. Change the rinse solvents often, even if to the eye they look clean!

James Moss
Littleton, MA

Letters on this subject were also received from members Moe M. Goldy, Port St. Lucie, FL; James Williams, Cortez, CO; Tim Schlotter, Kendallville, IN; and Kenneth Fuhr, Littleton, CO. All commented on Mr. Clark's response to Mr. Moss's original article. We regret that there is only so much space in Horological Times *that can be devoted to this feature and concluded that Mr. Moss's rebuttal would have to do.*

Sigh! I wish I had never heard of ammoniated cleaning solutions. Perhaps the best last word on the subject came from Jim Lubic, AWI's Education and Technical Director. Jim speculated that after several thousand of our members read the article and gave vent to their feelings on the matter; they would each go back to the cleaning methods that they had been using for the last twenty or thirty years.

William J. Ewbank
Editor-in-Chief

How to Make a Winding Pinion and Clutch

Part 4
A Sine Bar Lathe Attachment

Robert D. Porter
CMW

We made a cutter blank in Part 3. To finish the blank we now need a way to hold the cutter forming tool we made in Part 2, and to accurately set the tool to the radial flank angle of 4.7 degrees. The sine bar slide rest attachment shown in Figure 14 will allow us to do this. The attachment is being set square to the spindle nose of the lathe with a 3/16" square lathe tool bit.

Figure 15 is a drawing of the components that make up the sine bar. The main plate is made of 1/8" thick brass and the forming tool support plate is 1/6" thick while the sine bar, top plate, and backstop block are made of 1/4" thick by 1" wide aluminum bar stock. The pivot post, button, and alignment buttons are made of steel. The dimensions can be varied to fit your particular slide rest. The important thing is that the top of the form tool must be on, or ever-so-slightly below, the centerline of the lathe spindle. An easy way to get this important dimension is to mount a lathe center in the spindle and then measure from the point to the top of the slide rest with your caliper.

The other important dimension is the 76.20 millimeter (3.0000 inch) dimension between the .2503" reamed holes for the pivot post and the button. The pivot post should be a close sliding fit to its hole and the button shank should be turned .2505" for a tight press fit. It's okay if you are a little short or long on the 76.20 mm dimension as long as you know exactly what it does measure.

The sine of the radial flank angle we want times the actual length between the *center* of the .2503" holes gives us the "x" dimension for setting the sine bar. Figure 16 illustrates how the sine bar is used. In this case we take the sine of 4.7 degrees, .08194, (from a calculator) times

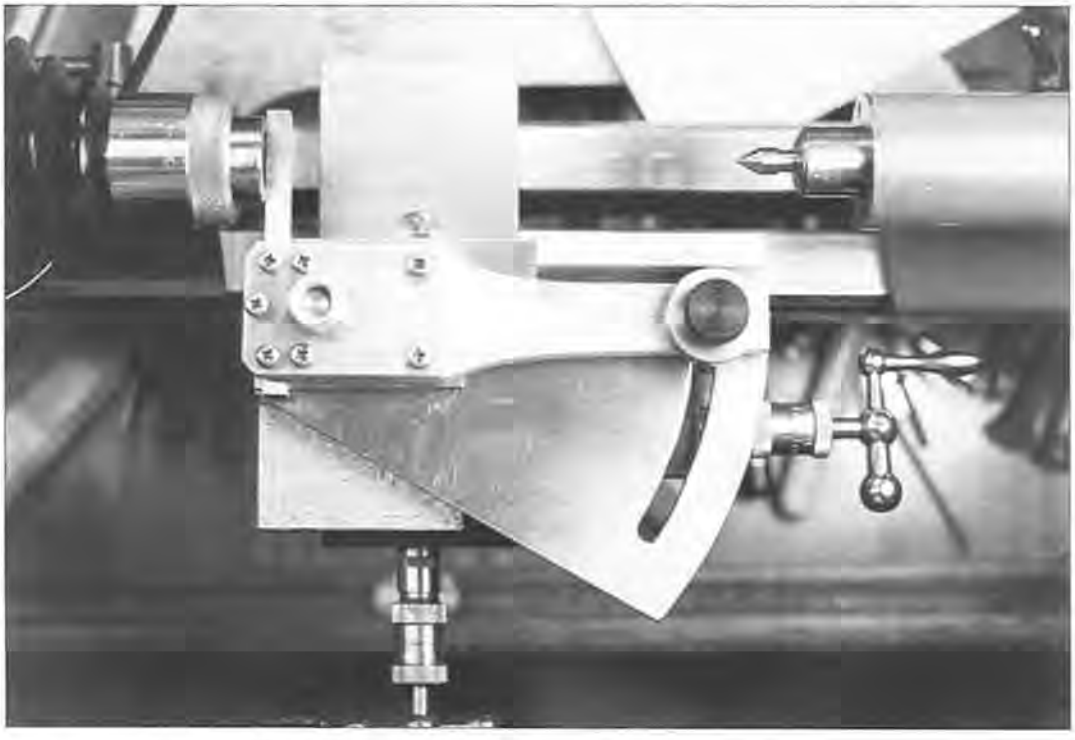


Figure 14

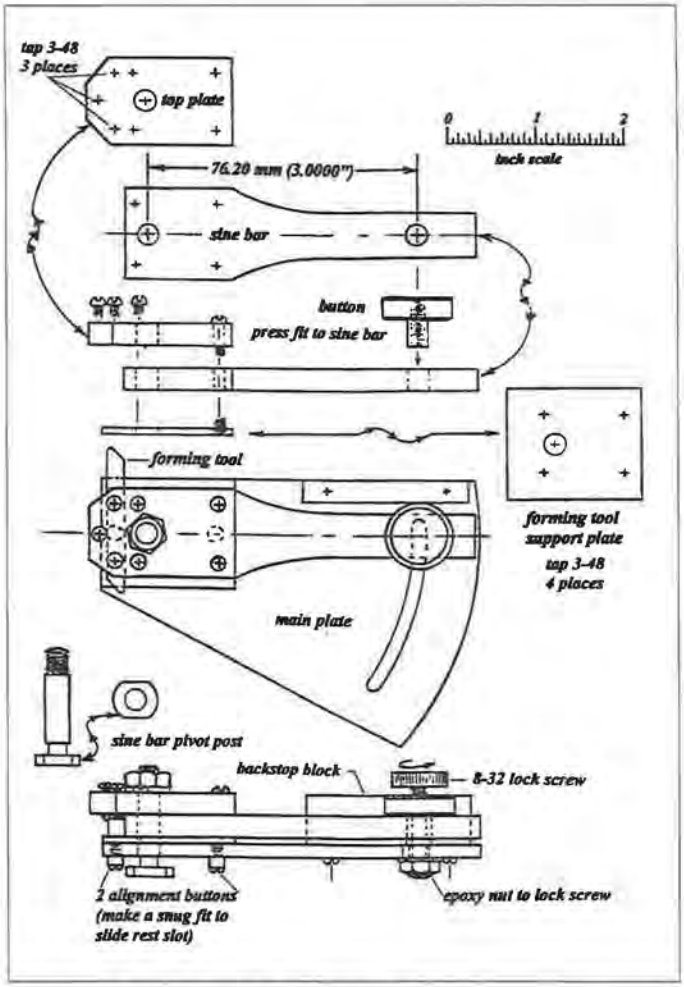


Figure 15. Sine Bar Slide Rest Attachment

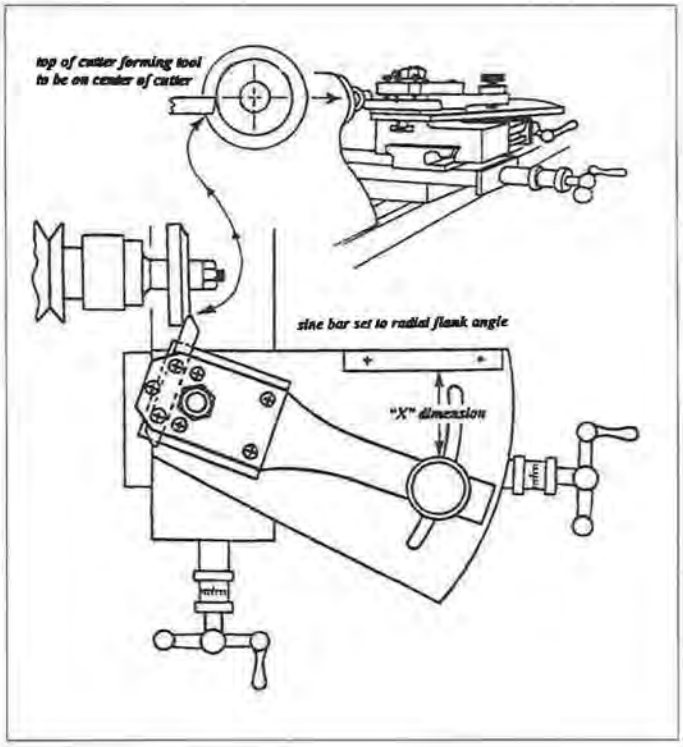


Figure 16. Cutter Forming Tool Sine Bar Slide Rest Attachment

76.20 mm equals the 6.24 mm "x" dimension, being set in Figure 17 with our digital caliper. I also use a feeler gauge for setting small angles. The 1/4-28 hex nut of the pivot post and the 8-32 lock screw are tightened to hold the setting.

Once these attachments are made they should last a lifetime and make our work at the bench a lot easier, more fun, and profitable. You might even consider making that watch or clock you've had tucked away in the back of your mind for years. We will do some more work on our pinion cutter in Part 5.

Figure 17

Technically Watches

Pocket Watches and Their Maintenance
Part 1
Types and Styles of Pocket Watch Movements

Archie B. Perkins, CMW, FNAWCC, FBHI

Watch movements are identified by their different characteristics, such as whether the watch is an open face or hunting type or a full plate, 3/4 plate, bridge model, or bar type of movement. The movement may be key wound and set or stem wound and set. These characteristics will influence the design and type of material needed in repairing the watch in many cases. The make, size, model, and grade of movement are also most important.

A Hunting Style Movement

A hunting style movement is shown in Figure 1. This style of movement is designed so the fourth wheel pinion that carries the second hand is planted on a line running from the center of the movement which is situated 90° from a line running through the winding stem. View A shows the position of the fourth wheel pivot and View B shows the position of the winding stem. The dial of this watch is placed on the movement so the winding stem is situated at the 3 figure on the dial with the seconds bit opposite the 12 figure.

An Open Face Style Movement

Figure 2 shows an open face movement. This style of movement is designed so the fourth wheel pinion is placed exactly opposite the winding stem. View A shows the position of the fourth wheel pivot and View B shows the winding stem. The winding stem is situated at the 12 figure on the dial with the second hand at the 6 figure.

Full Plate Model Watches

Full plate model watches are identified by the balance wheel being planted on the outside of the upper plate. A potence is fastened to the underside of the upper plate for supporting the lower pivot on the balance staff. The upper balance staff pivot is supported by the balance cock which is fastened to the top side of the upper plate. In other words, the balance cock stands higher than the top of the upper plate.

Figure 3 shows a full plate English watch movement powered by a mainspring driving a fusee and mainwheel. This watch was made in the late 1700s.

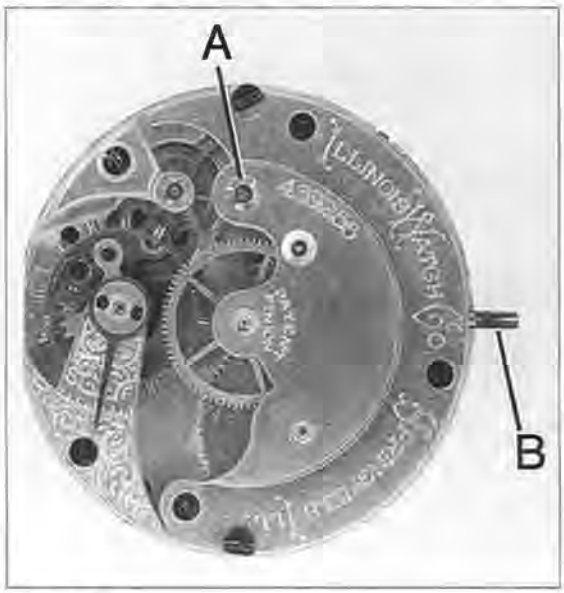


Figure 1

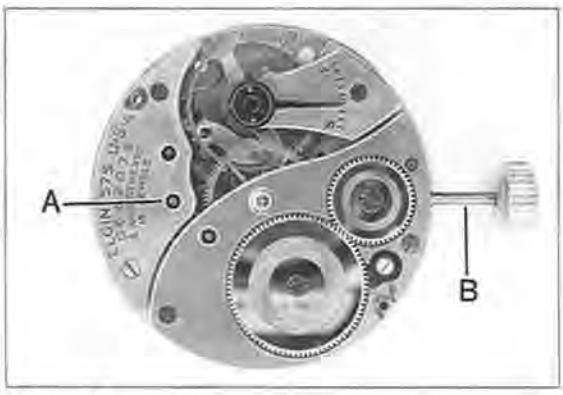


Figure 2

Figure 4 shows an 18-size Waltham P.S. Bartlett brass full plate movement. This watch is an 1877 model that is pendant wound and set. This is a hunting style movement.

Figure 5 shows another 18-size full plate Waltham movement, Model 845, 21-jewel, open face style railroad grade lever set. This movement is of much higher grade than the one shown in Figure 4, and it is an open face movement.

Figure 6 shows an 18-size full plate movement made by the Dueber Watch Company in the late 1800s. This particular model is nickeled and has 15 jewels. It is an open face movement.

Figure 3

Figure 4

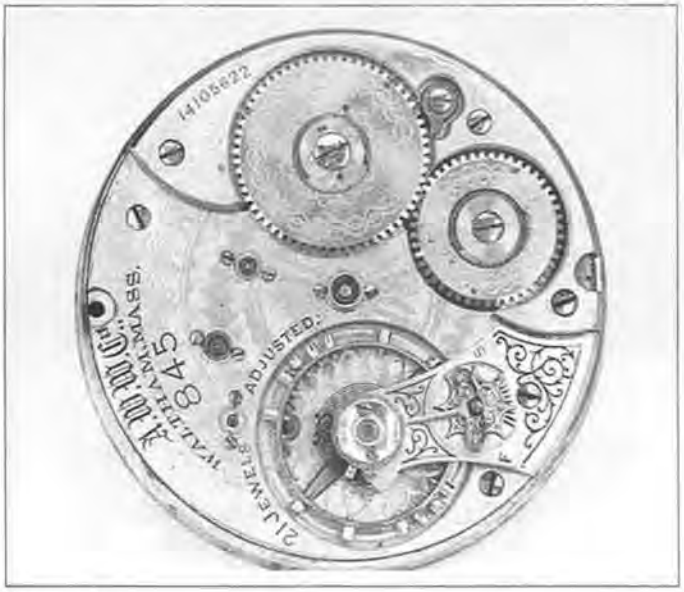


Figure 5

Figure 7

Figure 6

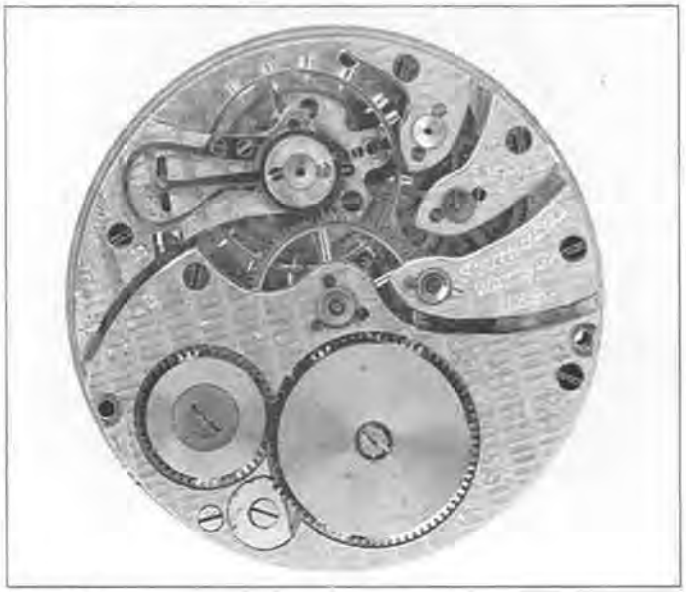


Figure 8

3/4 Plate and Bridge Style Movements

Figure 7 shows a 3/4 plate English movement. The upper plate supports the barrel, fusee, center wheel, third wheel, and fourth wheel. The escape wheel and pallet are supported by a small bridge which is lower than the upper plate. Many early American movements were made in this style.

Figure 8 shows a bridge style movement. This is a 16-size open face, 21-jewel, lever set South Bend Watch Company movement. Many movements made after 1900 were of this style or similar styles.

Figure 9 shows a Swiss bar style movement. Each wheel is supported by a separate bridge. Many of this style of movement were made between 1800 and 1900 in Switzerland. This is a key wound and key set watch.

Figure 10 shows a fusee watch with a skeletonized upper plate to form bar type bridges. Sometimes these bars were made in the form of animals. The bars on the watch that is shown are in the form of ribbons. This watch is key wound and set.

Watch Movement Sizes

Watch movements are sized with one of the following systems of measurement:

1. American sizes using the Lancashire system based on 1/30 inch.
2. The Dennison system based on 1/16 inch used by the Howard Watch Company.
3. The ligne system used by the Swiss watch companies which is based on the Paris inch.
4. The metric system used by Japanese companies and other companies based on millimeters.

These will be discussed in this order.

Figure 9

Figure 10

American Watch Sizes

American watches are sized by the Lancashire system which is based on the English inch. This system divides the inch into 30th of an inch. An 0 size watch measures 1 inch plus 5/30. Each size larger, we add 1/30 inch to the 1-5/30 and each size smaller than 0 size, we subtract 1/30 from the 1-5/30 inch. The following are examples of this system:

A 16-size watch measures 1-5/30 + 16/30 = 1-21/30 or 1.700 inches.

An 8/0 watch measures 1-5/30 - 7/30 = 28/30 or .933 inches.

Another way to interpret the Lancashire system is by using the following method. A 6/0 watch measures 1 inch or 30/30 or 1.000 on the inch scale. For each size larger, we add 1/30 to the 30/30. For each size smaller than 6/0 size, we subtract 1/30 from the 30/30.

TABLE 1

AMERICAN WATCH SIZES

Size	Inches	Inches	Millimeters
37	2 12/30	2.400	60.96
36	2 11/30	2.367	60.10
22	1 27/30	1.900	48.26
21	1 26/30	1.867	47.42
20	1 25/30	1.833	46.56
19	1 24/30	1.800	45.72
18	1 23/30	1.766	44.86
17	1 22/30	1.733	44.02
16	1 21/30	1.700	43.18
15	1 20/30	1.666	42.32
14	1 19/30	1.633	41.48
13	1 18/30	1.600	40.64
12	1 17/30	1.566	39.78
11	1 16/30	1.533	38.94
10	1 15/30	1.500	38.10
9	1 14/30	1.466	37.24
8	1 13/30	1.433	36.40
7	1 12/30	1.400	35.56
6	1 11/30	1.366	34.70
5	1 10/30	1.333	33.86
4	1 9/30	1.300	33.02
3	1 8/30	1.266	32.16
2	1 7/30	1.233	31.32
1	1 6/30	1.200	30.48
0	1 5/30	1.166	29.62
2/0	1 4/30	1.133	28.78
3/0	1 3/30	1.100	27.94
4/0	1 2/30	1.066	27.08
5/0	1 1/30	1.033	26.24
6/0	1	1.000	25.40
7/0	29/30	.966	24.54
8/0	28/30	.933	23.70
9/0	27/30	.900	22.86
10/0	26/30	.866	22.00
11/0	25/30	.833	21.16
12/0	24/30	.800	20.32
13/0	23/30	.766	19.46
14/0	22/30	.733	18.62
15/0	21/30	.700	17.78
16/0	20/30	.666	16.92
17/0	19/30	.633	16.08
18/0	18/30	.600	15.24
19/0	17/30	.567	14.40
20/0	16/30	.533	13.54
21/0	15/30	.500	12.70
22/0	14/30	.467	11.86
26/0	10/30	.333	8.46

TABLE 2

HOWARD WATCH SIZES

Size		Inches
A	=	1"
B	=	1-1/16"
C	=	1-2/16"
D	=	1-3/16"
G	=	1-6/16"
H	=	1-7/16"
I	=	1-8/16"
J	=	1-9/16"
K	=	1-10/16"
L	=	1-11/16"
N	=	1-13/16"

A 16-size watch would measure 1-21/30 or 1.700 inches. An 8/0 watch would measure 28/30 or .933 inches. See Table 1 for American sizes and their equivalents.

The Dennison System

The E. Howard Watch Company used the Dennison system to size their watch movements. This is an inch system based on 1/16th of an inch. An "A" size movement measures 1 inch and each size larger increases by 1/16 inch. See Table 2.

The Ligne System

The ligne system is mainly used by Swiss watch companies. This system is based on the Paris inch which is larger than the English inch. One ligne is equal to one-twelfth part of a Paris inch or 1.06577 English inches. The ligne is broken down into twelve parts and each part is called a douzieme. One douzieme equals 1/144 of a Paris inch or 1/12 ligne.

Lignes	English Inches	Millimeters
1 Douzieme =	.0074	.18796
12 Douzieme = 1 ligne =	.0888	2.256
12 Lignes = 1 Paris inch =	1.0657	27.0688
12 Paris inches = 1 Paris foot =	12.789	324.85568

(Millimeters = inches X 25.4) or (Inches = $\frac{\text{Millimeters}}{25.4}$)

See Table 3 of Swiss watch sizes in lignes and their equivalents.

The Metric System

Some watch companies use the metric system for measuring their watch movements. The instruments used for taking metric measurements are more exacting than the instruments for measuring lignes. The metric system is broken down into smaller divisions than the ligne

TABLE 3

SWISS WATCH SIZES

Lignes	Millimeters	Inches	Lignes	Millimeters	Inches
1	2.2556	0.0888	11-1/2	25.9420	1.0214
1-1/4	2.8198	0.1111	11-3/4	26.5060	1.0436
1-1/2	3.3384	0.1332	12	27.0700	1.0658
1-3/4	3.9477	0.1554	12-1/4	27.6340	1.0880
2	4.5117	0.1776	12-1/2	28.1979	1.1102
2-1/4	5.0757	0.1998	12-3/4	28.7619	1.1324
2-1/2	5.6396	0.2220	13	29.3258	1.1546
2-3/4	6.2036	0.2442	13-1/4	29.8998	1.1768
3	6.7675	0.2664	13-1/2	30.4537	1.1990
3-1/4	7.3315	0.2886	13-3/4	31.0177	1.2212
3-1/2	7.8954	0.3108	14	31.5816	1.2434
3-3/4	8.4594	0.3330	14-1/4	32.0456	1.2656
4	9.0233	0.3553	14-1/2	32.7095	1.2878
4-1/4	9.5873	0.3775	14-3/4	33.2732	1.3100
4-1/2	10.1512	0.3997	15	33.8375	1.3322
4-3/4	10.7152	0.4219	15-1/4	34.4015	1.3544
5	11.2792	0.4441	15-1/2	34.9654	1.3766
5-1/4	11.8432	0.4663	15-3/4	35.5291	1.3988
5-1/2	12.4071	0.4885	16	36.0933	1.4210
5-3/4	12.9708	0.5107	16-1/4	36.6573	1.4432
6	13.5350	0.5329	16-1/2	37.2212	1.4654
6-1/4	14.0990	0.5551	16-3/4	37.7852	1.4876
6-1/2	14.6629	0.5773	17	38.3491	1.5098
6-3/4	15.2266	0.5995	17-1/4	38.9131	1.5320
7	15.7908	0.6217	17-1/2	39.4770	1.5542
7-1/4	16.3548	0.6439	17-3/4	40.0410	1.5764
7-1/2	16.9187	0.6661	18	40.6049	1.5987
7-3/4	17.4827	0.6883	18-1/4	41.1689	1.6209
8	18.0466	0.7105	18-1/2	41.7328	1.6431
8-1/4	18.6108	0.7327	18-3/4	42.2968	1.6653
8-1/2	19.1745	0.7549	19	42.8608	1.6875
8-3/4	19.7385	0.7771	19-1/4	43.4247	1.7097
9	20.3025	0.7993	19-1/2	43.9887	1.7319
9-1/4	20.8665	0.8215	19-3/4	44.5527	1.7541
9-1/2	21.4304	0.8437	20	45.1166	1.7763
9-3/4	21.9944	0.8659	21	47.3724	1.8651
10	22.5583	0.8881	22	49.6283	1.9539
10-1/4	23.1223	0.9103	23	51.8841	2.0427
10-1/2	23.6862	0.9325	24	54.1399	2.1315
10-3/4	24.2502	0.9547	25	56.3958	2.2204
11	24.8141	0.9770	26	58.6516	2.3092
11-1/4	25.3781	0.9992	27	60.9074	2.3980

system. This makes the metric system more accurate.

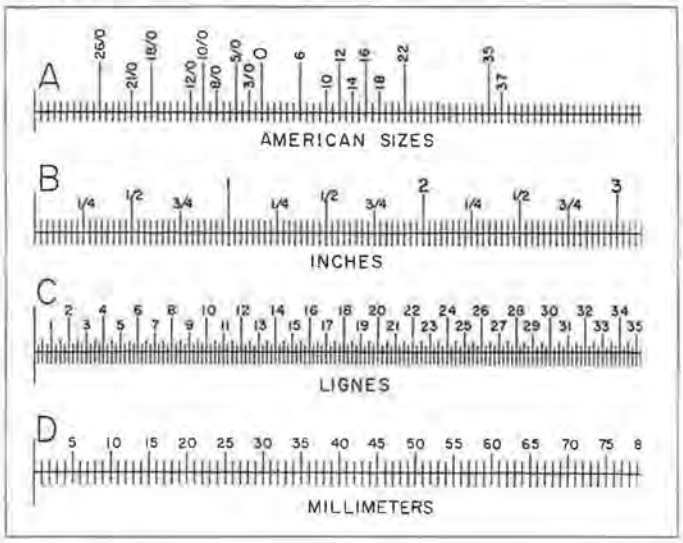
MILLIMETERS		LIGNES	INCHES
.01 mm	=	.004433	.0003937
.1 mm	=	.04433	.003937
1 mm	=	.4433	.03937
1 centimeter	=	4.433	.3937

To transform millimeters to inches, multiply millimeters by .03937. To transform inches to millimeters, multiply inches by 25.4. One inch = 25.4 millimeters.

Comparison Between Different Measuring Systems

Chart 1 shows the relationship between American sizes, inches, lignes, and millimeters. This chart is reproduced in actual size and can be used to actually measure

Chart 1



watch movements. Also, a straight edge can be placed squarely across the scales at a given place to show what the size would be on the other scales.

Gauges for Measuring Watches

Usually the local watch supply house has watch movement gauges for measuring watch movements with their advertisement on them that they will supply at little or no cost to the watchmaker. One of these gauges is shown in Figures 11 and 12.

Figure 11 shows an American watch movement being measured with the American movement scale of the gauge. The measurement is taken of the pillar plate from the dial side of the plate, exactly across the center of the plate.

Figure 12 shows a Swiss movement being measured with the Swiss movement scale of the gauge. This scale is in French lignes.

Figure 13 shows a watch movement being measured with a millimeter ruler. For more accurate measurements, a metric vernier caliper can be used. For extreme accuracy, a metric micrometer can be used to measure a watch movement.

"Pocket Watches and Their Maintenance" will continue next month.

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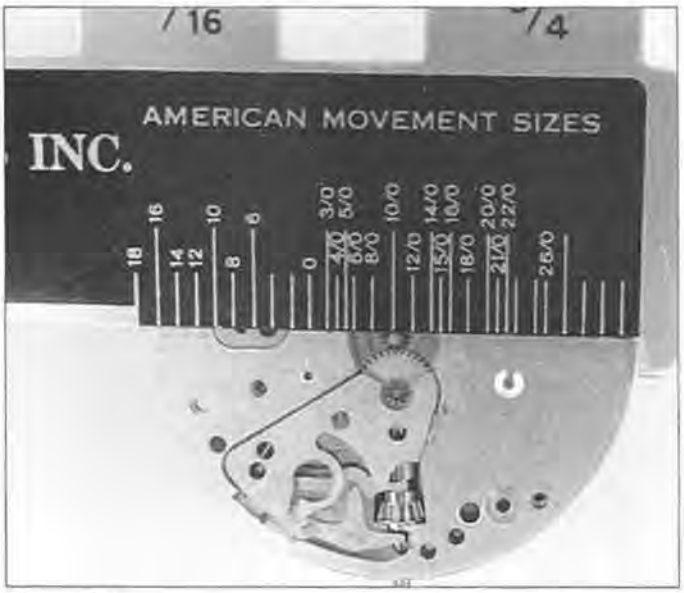

Figure 11

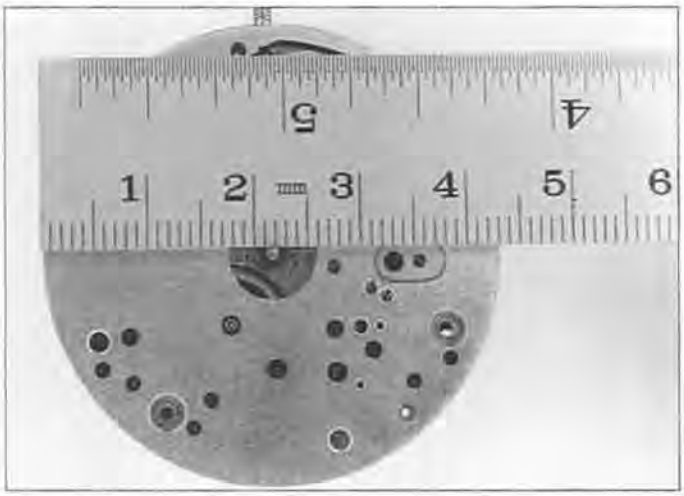

Figure 13

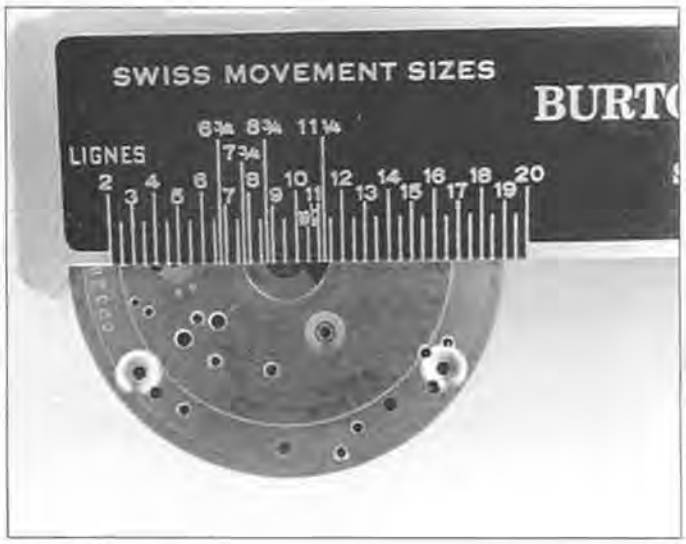

Figure 12

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Jack Kurdzionak

From the Workshop

The most commonly sold high-grade watch in the USA is the Rolex. These fine watches are found in virtually every city and town in this country. This presents an excellent opportunity for our skilled membership to provide high-quality service for these excellent watches. This month's column is dedicated to helping our members provide a higher quality of service for these watches and their owners.

Protex for Rolex

Mr. Richard D. Frye of Tennessee has offered some suggestions for protecting Rolex watch cases during the removal and installation of plastic crystals on these watches. The crystals are mounted snugly upon a raised portion of the case, machined to accept the crystal, that acts as a seat for the crystal. The bezel ring, either steel or karat gold, is pushed down around the crystal and compresses the crystal between the ring and the seat, effecting a secure water seal. The factory-recommended procedure for removing the bezel is to carefully insert a single-edge razor blade under the bezel and tap it with a hammer until the bezel is slightly lifted. This is continued around the bezel until a case-opening blade can be inserted under the bezel to lift it free of the case. This method has the disadvantage of possibly damaging the crystal seat with a scratch, or marring the finish of the case and bezel.

When Richard Frye removes these bezels, he first removes the movement from the case. He pushes the crystal and bezel off the case together, as a single unit, by using his BB crystal press. He utilizes a short section of PCV tubing which has an inside diameter slightly larger than the bezel's outside diameter. This becomes the lower fixture in the press. The PCV will not mar a steel case; however, he does protect gold cases from scratching with chamois cloth between the PCV tube and the case. He then puts the case upside-down on this PCV tube in the press and pushes on the inside of the crystal with a flat pusher on the upper part of the press. He reports that the crystal and bezel separate from the case as a unit in most cases. This has the advantage of not scratching the case, the bezel, or the crystal seat on the case with a blade. If the crystal breaks, nothing is lost as the bezel still can be removed with the razor blade technique.

This must be done very carefully because any scratch on the crystal seat is almost certain to result in water leakage and is very difficult, if not impossible, to repair.

When he replaces these crystals, he lightly lubricates the inner surface of the bezel with a silicone lubricant before pushing it on so that it slides down around the crystal more easily. This does not disturb the holding friction of the bezel but does prevent scratching of the side walls of the crystal, thus preventing any stress cracking. The aluminum pushers of the BB crystal set can mar bezels when they are being pushed onto the case. It is a good practice to protect these bezels with chamois. Some of our advertisers are now supplying sets of plastic pushers and dies that fit a BB crystal press that are very effective in preventing damage to these bezels.

Rolex Case Tubes

For many years I have been saying that someone should make a set of wrenches to install the case tubes on Rolex watches. These threaded tubes have an internal spline that allows them to be easily installed, if one has the matching external splined tool for the job. Unfortunately, these tools have not been widely available to watchmakers. We have been forced to install these tubes with all sorts of makeshift methods that include forcing a broach into the tube and firmly turning the tube until it seats and seals tightly. One watchmaker told me he uses old crowns he has modified to use as wrenches to screw these tubes into the cases.

Finally, someone has produced a set of splined wrenches to install these tubes into these cases. They have been advertised in *Horological Times*. I purchased a set and can report to you that they are a vast improvement over any makeshift method of tube installation. If you cannot locate the advertisement, please contact me at The Watchmaker, 379 Main Street,

Stoneham, MA 02180 or e-mail to <watchmakerl @juno.com> for the name and address of the supplier of these wrenches.

Jack Kurdzionak

Is There a Better Way?

Rolex watches are equipped with an automatic weight axle that is staked on to the webbing portion of the weight. I have never seen any literature that suggests an acceptable way to remove and replace that axle even though the axles and installing punches are widely available from our advertisers. A number of watchmakers have confidentially told me that they merely punch out the old axle and install a new one by peening over the riveting surface utilizing whatever punches and stumps they have at their disposal. I have discouraged this since punching out a riveted arbor always seems to do some damage to the part from which it is removed. There must be a better way to replace this often needed part. Do you have a better way? Please send it to me at The Watchmaker, 379 Main Street, Stoneham, MA 02180 or e-mail to <watchmakerl@ juno. com>. I have used the following method with success in my shop.

In my shop we treat the axle as we would a balance staff. The lower portion of the axle is grasped in a lathe collet and trued so that the upper large surface can be cut away with a sharp, carbide graver. Caution must be used so that the webbing portion of the weight is not cut or damaged. Cut near the outer edge of the axle's top until a ring of steel falls away, just as it would when removing a balance staff by cutting away the hub of the staff. The axle can then be easily removed from the weight without any damage to the weight itself.

The flat upper surface of the new axle is placed atop a flat staking stump in the staking tool. There are three different sized punches available which have been designed to rivet these axles in place. Choose the correct one and with one or two sharp taps with your brass staking hammer, securely rivet the axle in place. Test the security of the axle by grasping it with a pin vise and making certain that it is tightly staked in the webbing of the weight.

Jack Kurdzionak

A Practical Course in Clock Repair

The Floating Balance (Oscillating) Escapement

John P. Kenyon, CMC

The floating balance (oscillating) escapement is a variation of the pin lever escapement (see Figure 1). It employs a fork slot end of a pin lever pallet to engage with two steel impulse pins that rotate at right angles in a vertical position. During the 1970s and 1980s the floating balance was used on bracket and tambour clocks containing German movements. During the late 1980s, the unit was redesigned and the floating balance was replaced with a conventional balance wheel.

Design

In Figure 2, the balance wheel (A) hangs in an oscillating manner on a spiral hairspring (B) with one half of the windings to the right and the other half to the left. As illustrated in Figure 3, the balance staff (balance shaft) is a hollow tube (C), with a jewel friction-fitted into each end (D). A length of spring steel wire (E) is tightly drawn through the balance shaft and end jewels and then attached to the upper and lower arms of the balance carrier assembly at (F). At the upper end, the helical spring is attached to a collet on the balance carrier assembly (G). The lower end is attached by a collet on the shaft (H). Two weights, (I) in Figure 2, are fitted clutch-tight and held by a spring against the inside track of the balance rim. These are used for regulating. As illustrated in Figure 1, the pin pallets (K) are located on the verge at the bottom of the lever and travel in and out between the teeth of escape wheel (J). With the balance hanging in a floating mode from a spiral spring there are no arbor pivots to support the weight of the balance wheel, eliminating that source of friction. Contact friction at the end jewels is negligible.

Operation

The floating balance is a modification of the conventional balance and the principles of operation are basically the same. As illustrated in Figure 4, the escapement is made up of a roller that is a flat "C" shaped ring of about 330 degrees (A), and two highly polished steel impulse pins (B). The upper end of the pins are fitted into the bottom of the balance wheel hub near its center, while the lower ends are attached to the "C" shaped ring to hold the ring suspended from the rest of the balance assembly. Impulse is furnished close to the center of oscillation, which is necessary in this type of escapement. The fork slot end of the pin lever pallet (C) is set at right angles to permit the slot to engage with the impulse pins while the pallets operate on a vertical plane. One fork arm (D) is made longer than the other to serve as a guard. A part of this arm is bent parallel to the lever and extends down beside the "C" shaped ring to provide safety action to the escapement. As the balance turns, the long (bent) arm passes in through the gap in the "C" shaped ring providing safety at the inside surface of the ring, as illustrated in Figure 5. Banking is provided by having the lever operate between two pins that are extended out from the balance bracket. As the balance wheel oscillates, one half of the helical spring expands while the other half contracts an equal amount. This eliminates the tendency of the balance to travel up or down on the wire, so it will always rotate in the same plane.

Cleaning

There are conflicting opinions with respect to whether or not to "wet" clean this type of balance. With an overhaul, it must be either cleaned or replaced. For cleaning, remove the unit from the plate but do not disassemble it. Attach it to a dip wire and immerse it into any good clock cleaning and rinsing solutions. Dry thoroughly over gently blown warm air. It is essential that the balance tube is thoroughly voided

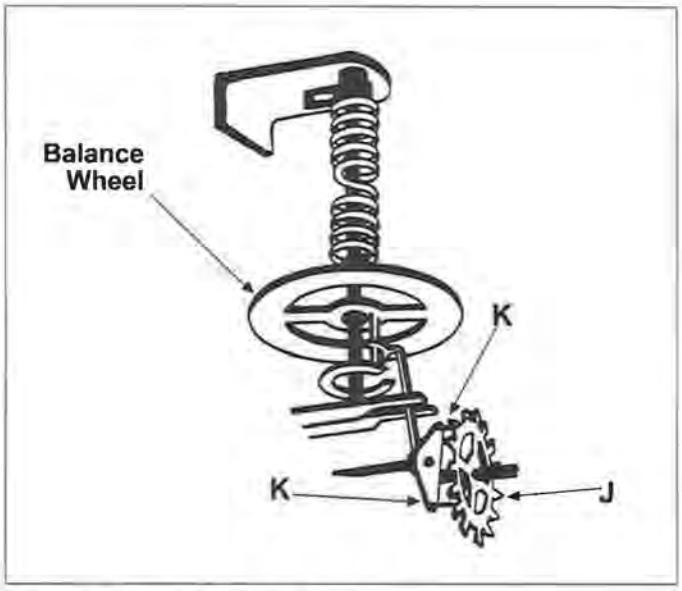

Figure 1. Floating Balance Escapement

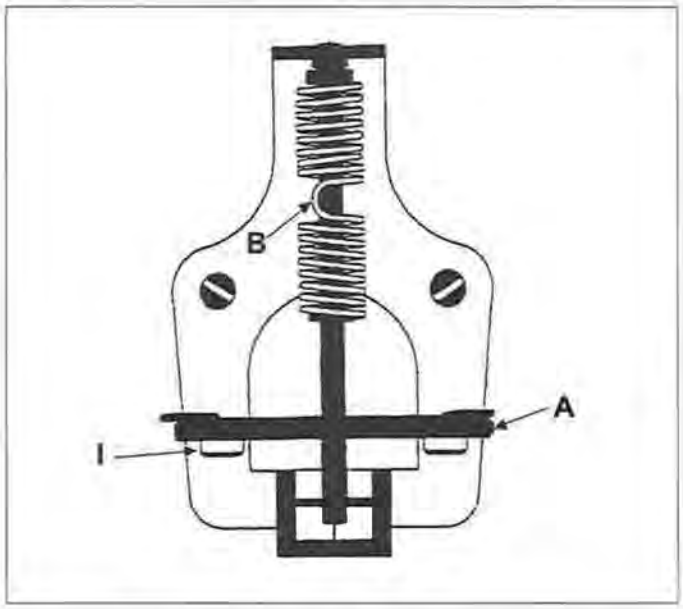

Figure 2. Parts of a Floating Balance

of all cleaning residue after the process. Otherwise, the residue will solidify at the jewels and create impeded motion. Do not oil the jewels. Oil eventually congeals, gets "gummy" and retards the motion.

Adjustment and Repair

A clock movement operating with a floating balance unit must be in excellent overall repair to be a good timekeeper. Often, attempts to repair sluggish motion are directed to the floating balance assembly when the trouble is actually caused by friction in the movement itself. Generally, the balance unit will not need repair unless it has been dropped or mishandled. If the wire on which the balance wheel travels should become bent or distorted, sluggish movement of the balance up and down the wire will occur, in which case it will be necessary to replace the wire. If a replacement wire is not available, a polished piece of piano wire of the same diameter (approximately 0.25 mm) will work. The wire replacement procedure is outlined below:

1. Remove the balance assembly from the back plate.
2. Open the tabs that hold the wire ends to the back of the balance bracket and remove the old wire.
3. Secure the new wire at the lower tab.
4. With the wire held beneath the bracket, place the balance unit between the support arms and feed the wire through the balance shaft tube.
5. Apply slight pressure (with your fingers) to force the support arms towards each other; then, bend the wire over the top of the support bracket and secure it at the upper tab. When you release the pressure, the wire should be taut.
6. Check the floatation of the balance wheel on the wire. It should be centrally located. If not, in sert the blade of a small screwdriver into the lower collet slot and carefully move the collet up or down to center it.

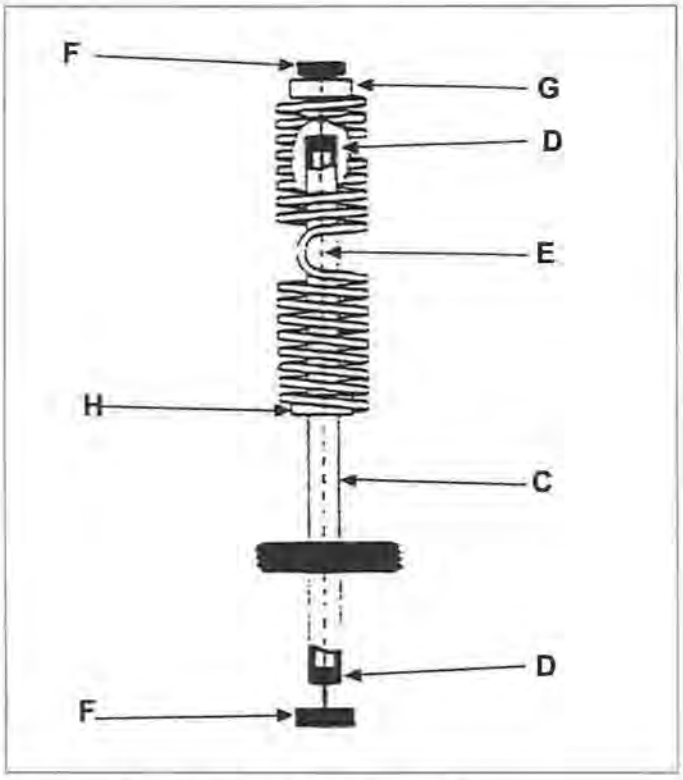

Figure 3. Cross Section of the Balance Tube

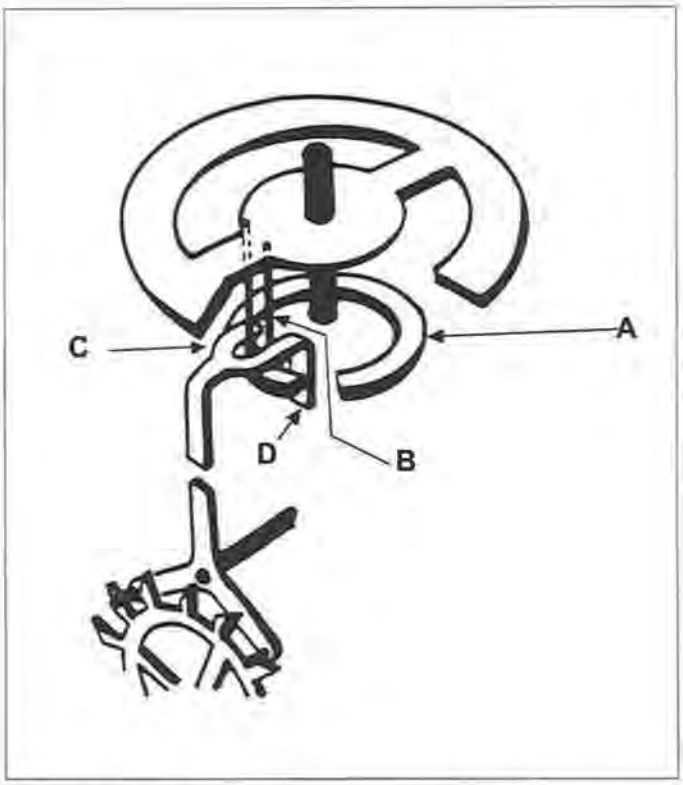

Figure 4. Floating Balance Escapement Detail

The movement is in beat if the lever is at a standstill halfway between the banking pins, when the balance is at rest and there is no torque on the escape wheel. To adjust the beat, shift the upper collet in the appropriate direction. When power is applied to the escapement, it should start running. If not, move the minute hand slightly, or stroke the balance wheel with a camel hair brush. When in beat the balance will move back and forth in a rhythmic cadence.

To check the safety action of the escapement, observe the action of the impulse pins and the fork. The bent-over guard finger on the long horn must clear the "C" shaped ring at all times. If necessary, it can be adjusted. The impulse pins should enter and leave the fork slot with minimal play and no interference. Penetration into the fork should be deep enough to insure that the lever is under the control of the balance during the escaping action and is released when slide occurs and the lever moves towards the banking pin. End shake of the lever (pallet) arbor must be kept to a minimum to sustain the correct fork depth. It is controlled by the use of one or two endplates at these pivot holes. On movements with two endplates, the back endplate is usually ridged, while the front endplate is made of thinner gauge with enough spring to restrict end shake.

Lock should be safe but not too deep. To test for lock, move the balance wheel slowly until an escape wheel tooth drops on a pallet pin. The penetration of the pallet pin, below an imaginary circle passing through the corners of the tooth, should be a little over one half, but not exceed the diameter of the pin.

To test for a bent lever, apply a small amount of power to the escapement. Move the balance wheel slowly until an escape wheel tooth drops from a pallet pin and the wheel is captured by the other pin. At the moment the tooth drops, observe the distance the lever has moved on one side of center; then, repeat on the other side. The angular distance of movement should be equal. If not, ascertain tightness of the pallet assembly on the arbor, then carefully bend the fork away from the side that shows the greatest displacement. Banking pins should be adjusted to the minimum amount of slide required for the escapement to function.

A good indicator of the condition of the movement is the amplitude of the balance. When the clock is fully wound, the amplitude should show 1 to 1-1/2 turns with vigor, and not drop below one complete revolution during an 8-day period.

Regulation

A movement with a sluggish balance assembly cannot be properly regulated. Any problem in the movement or balance wheel assembly must first be corrected.

Fine regulation is attained by adjusting the spring-loaded weights on the inner track of the balance wheel. Moving the weights in toward the center will increase the rate, while moving them out, away from center, will retard the rate.

Coarse adjustment can be made by adding or

Figure 5. Floating Balance Action

removing small round weights (in poised pairs) from the balance wheel rim. Removing (or adding) weight from the outer rim will result in a greater rate change than the sliding adjustment at the inner rim. To remove weight, the balance wheel should be supported on a bench block over a cavity large enough to admit the plug. It is then tapped out with a small punch and hammer. To add a plug, tap in gently over a solid block. Do not discard the plugs. They are interchangeable in pairs.

The rate of these movements can be adjusted with an electronic timer. Most of these balances run at 9000 or 10800 vibrations per hour, depending on the model.

I will continue next time with the modified Hermle balance wheel unit that replaced the floating balance.

Dennis Warner

Affiliate Chapter Report

Writing a column each month can be a bit trying. I have been quite fortunate this year because of the many members of the Affiliate Chapters who are willing to submit ideas, photos, and articles to make this an interesting forum.

This month I have asked the Austin, Texas group to tackle an area where they have been very successful. I had the opportunity last summer to take an introductory Lathe Course with them in Austin. I met many of their members and felt right at home immediately. The feeling of pride they displayed during the course, lunch, and days leading up to their annual convention was contagious. One of their energetic members Nino Gonzales agreed to prepare an article and supply some photos. Many thanks to him. He went one step further in asking members of his guild for some input. Two gentleman submitted letters. Because of the lack of space I have taken excerpts from the letters and included them. You will see that dedication and pride are very evident. Thanks to the entire Austin Guild.

Dennis Warner

The AWI Lathe Program at Austin, Texas

The watchmaker and clockmaker of today are not only obligated to have the skill and sensitive touch of a brain surgeon, but must be craft persons of the highest degree, capable of making and fitting delicate replacement parts in timepieces.

Accurate and reliable timekeeping demands precise workmanship when service and repairs are needed, particularly when replacement parts are not available and must be constructed to accomplish the work.

The AWI Lathe program has been most beneficial in providing new skills to the novice and improving the skills of those repairers who have been in the trade for some time. The lathe program is presented in several segments designated as phases and is designed with these objectives:

1. To serve the needs of the watchmaker and clockmaker who are AWI members and use lathes and milling machines in their trade.

2. To support students preparing to take exams conducted by AWI which require the use of watchmaker's lathes, milling equipment, and other microcutting machinery.

3. To provide all members of the horological community seeking to improve their skills on lathe, wheel cutting engines, and micromills with the best training available.

The lathe program has been very successful in the Austin, Texas area. The Capital Area Guild located in Austin has been fortunate in being involved with this program. As a result of our involvement AWI has very graciously answered our requests in bringing the bench courses to our location. Phase I took place in September 1994, Phase II in October 1994, Phase III in February 1995, and Phase IV was completed in April 1996. In early April 1998 we completed Mr. Roy Hovey's Phase V, "Making Cutters." It was another great success.

We think that one of the reasons the

February 13, 1995 graduates of Phase III of The Lathe Program in Austin, Texas. From left to right: Roy A. Hovey (Instructor), Mark Headrick, David Langston, Sue Ann Wysong, Michael Stafford, Ronald Robbins, Nino Gonzales, Robert Fesler, Michael Webb, Carroll Bell, Brian Stokes, and Bob Dodd.

program has been so beneficial and successful is because of the attitude of those persons involved with the program. AWI's training and scheduling staff Jim Lubic, and Mary Sansalone have been most helpful. The instructor Roy Hovey is truly qualified, dedicated and goes all out to provide a learning environment. He always makes sure his instruction is understood, even if it means spending long hours after the class has ended. He always makes certain the students are provided with adequate training aids, materials, tools, and clear instructions. Believe it!! Toting around 3 or 4 steamer trunks full of tools and books is not as simple as putting on one's morning slippers.

We feel that we have good communications with AWI. Constant cooperation is needed, from finding a suitable hotel for the training sight to seeing that funds don't get wasted. We get information to the prospective students and register in a timely fashion. We make sure that a sufficient number of students are registered to take the scheduled courses lest it will be canceled if enough do not attend.

So we can see that for a successful program, the requirements involve: interaction, coordinate, planning, cooperation, communication, the right attitude, and the collective efforts of many people. The Austin Guild has designated a member who serves as the training coordinator between the Texas Watchmakers and Clockmakers Association and the AWI Training and Education Director. It has worked effectively and satisfactory.

Ben Conner sharpens a graver as David Margraves looks on during the Phase I Bench Course conducted in Austin, Texas between September 7-10. Mr. Conner brought two of his employees to participate in the course.

Sue Ann Wysong and Robert Fesler work on a project during Phase II of The Lathe Program conducted in Austin, Texas on October 6-11, 1994.

George Kiser looks on as Nino Gonzales works on a student project during the Phase I Bench Course conducted in Austin, Texas between September 7-10, 1994.

Marybess Grisham works on a student project during the Phase I Bench Course conducted in Austin, Texas between September 7-10, 1994.

Guest instructor J. M. Huckabee explains one of the many lathe accessories he brought for his presentation during the Phase I Bench Course conducted in Austin, Texas between September 7-10, 1994.

We are looking forward to continuing our AWI education through future bench courses.

Nino Gonzales

Excerpts from a letter from Austin Guild member Michael Webb:

"The courses added tremendously to my confidence in clock repair. You may ask but am I ready to take the course?...With Roy's excellent approach to the course material, I was making tools I could use within days. ...I was never made to feel 'stupid' because of my lack of knowledge. ...I came with no knowledge and no confidence and left after a few days with tools and skills I could use for a lifetime. ...The courses are well designed and successful in imparting the knowledge and skills. Roy has an excellent grasp of all course material and an exceptional ability to impart it to students at any level. It is time and money well spent and it will reap dividends throughout your career."

Another member Carroll Bell comments about Austin's local guild:

"We have an active guild...do not sit around resting on our laurels...constantly recruiting new members. ...Interest in continuing education is because of the enthusiasm of the guild members...offer repair tips, how to do something, where to find something, or horological history...between meetings, we are in constant communication with one another for assistance...everyone wants to pass on everything they know to the younger or less experienced. ...In conclusion we (the Guild) are successful because we are ACTIVE, ENTHUSIASTIC, AND WILLING TO SHARE."

Executive Director's Message

(Continued from page 2)

The AWI Constitution provides for this Board to have a non-voting Board delegate with the same rights and privileges as the Research and Education Council and the Affiliate Chapters. AWI should actively seek out advice, consultation and involvement of the distributors and manufacturers who play such an important role in each individual member's livelihood. Has it occurred to anyone that instead of always worrying about their influence on us, why shouldn't we be working on influencing them?

It is time for AWI to decide the future of the Academy. In partnership with our colleagues at WOSTEP, AWI should develop and implement the highest standards for the entry-level training of watchmakers and clockmakers. This will require a major shift in policy and new sources of revenue to become a reality.

Finally, we need to take a long hard look internally at our member services program. Individually, our headquarters staff is a bright, cheerful, hard-working, and very caring group. As an institution, we too often drop the ball when it comes to being responsive and just plain useful to our members when they have an inquiry. We're going to spend a lot of time in the coming year sorting out our own way of doing business.

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George Graham Bracket Clock, Part 33

Leo A. Jarsolaw

Introduction
In Part 32 we got as far as assembling the chime controls, less the chime/silent lever. We will now continue the front plate assembly.

16. Install chime/silent lever (12) (Figure 33.1).

16.1. Oil chime/silent post.

16.2. Install chime/silent lever.

16.2.1. Check engagement of the hook on the lower extension (14) with the lock pin (13) on the quarter rack (15).

Note: If hook does not engage, it may be necessary to bend the lock pin.

17. Installation of the strike controls (Figures 33.2 and 33.3).

17.1. Install the hour strike warning lever (76) and tail assembly (68).

17.2. Install the hour warning spring (79).

CAUTION: THE STRIKE WARNING LEVER TAIL (68) MUST BE ON THE RIGHT SIDE OF THE WARNING ACTUATING PIN WHICH IS ALSO THE QUARTER GATHERING PALLET STOP (72).

THIS PIN IS ON THE LEFT END OF THE QUARTER STRIKE RACK (64). CHECK THAT WHEN THE RACK IS FULLY GATHERED, THE ACTUATING OR STOP PIN PULLS ON THE WARNING TAIL (68), ROTATING THE WARNING LEVER/TAIL ASSEMBLY COUNTERCLOCKWISE (CCW).

18. Install hour strike controls (Figure 33.3).

18.1. Oil strike rack post.

18.2. Install hour strike rack (19).

18.2.1. Install hour strike rack spring (Not shown or numbered).

18.3. Rotate hour snail (39) to the twelve o'clock position (Figure 33.3).

18.3.1. Check rack (17) and its spring for free movement.

18.3.2. Adjust spring as necessary.

18.3.3. Check rack tail for a positive seat on the 12 o'clock step.

Note: Photo (33.3.) shows the tail on the 1 o'clock step.

18.4. Install hour strike rack hook (75) after a drop of oil on the post.

CAUTION: MAKE CERTAIN THAT THE RACK HOOK TAIL (67) RESTS BETWEEN THE QUARTER STRIKE SNAIL (36) AND THE MINUTE WHEEL (35) (FIGURE 33.4).

19. Strike timing checks (Figure 33.3).

19.1. Position rack/rack hook in the stop mode with the gathering pallet (73) stopped against the pallet stop (74).

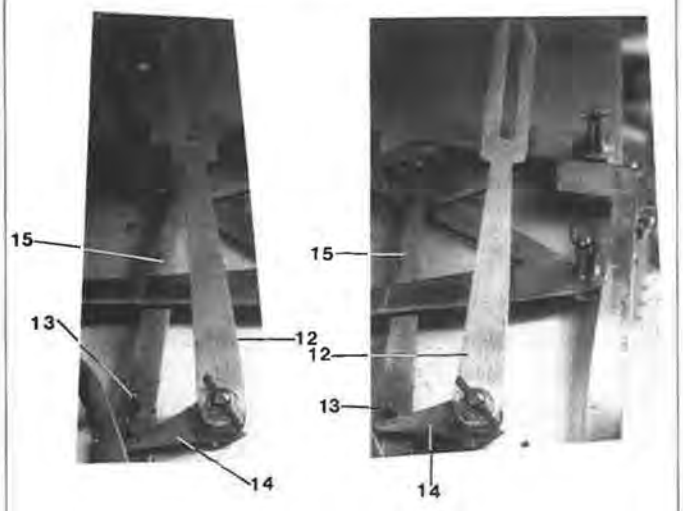
19.1.1. Check warning wheel pin location.

Note: It should be approximately 90°-180° away from the warning lever tab (78). If not, reposition the gathering pallet and check through all four positions if necessary.

19.2. Remove gathering pallet.

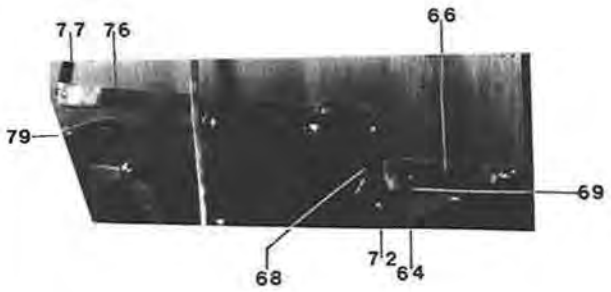
20. Install strike/silent lock lever (Figure 33.5).

20.1. Drop of oil on the post.



12 Chime/Silent Lock Lever
13 Quarter Rack Lock Pin
14 Chime Lock Lever Ext.
15 Quarter Rack

Figure 33.1. Chime/Silent Lock Lever



64 Quarter Rack
66 Qtr. Rack Hook
68 Hour Warning Lever Tail
69 Qtr. Gathering Pallet
72 Qtr. Gathering Pallet Stop
76 Hour Warning Lever
77 Hour Warning Slot
79 Hour Warning Spring

Figure 33.2. Hour Warning Control

20.1.1. Mount lock lever (16) on its post.

20.2. Check that hook on lock lever extension (18) engages with the lock pin (17) in the silent position.

Note: If the hook does not engage, it may be necessary to bend the lock pin.

20.3. Pin all controls installed.

21. Setting up the fusees (Figure 33.6).

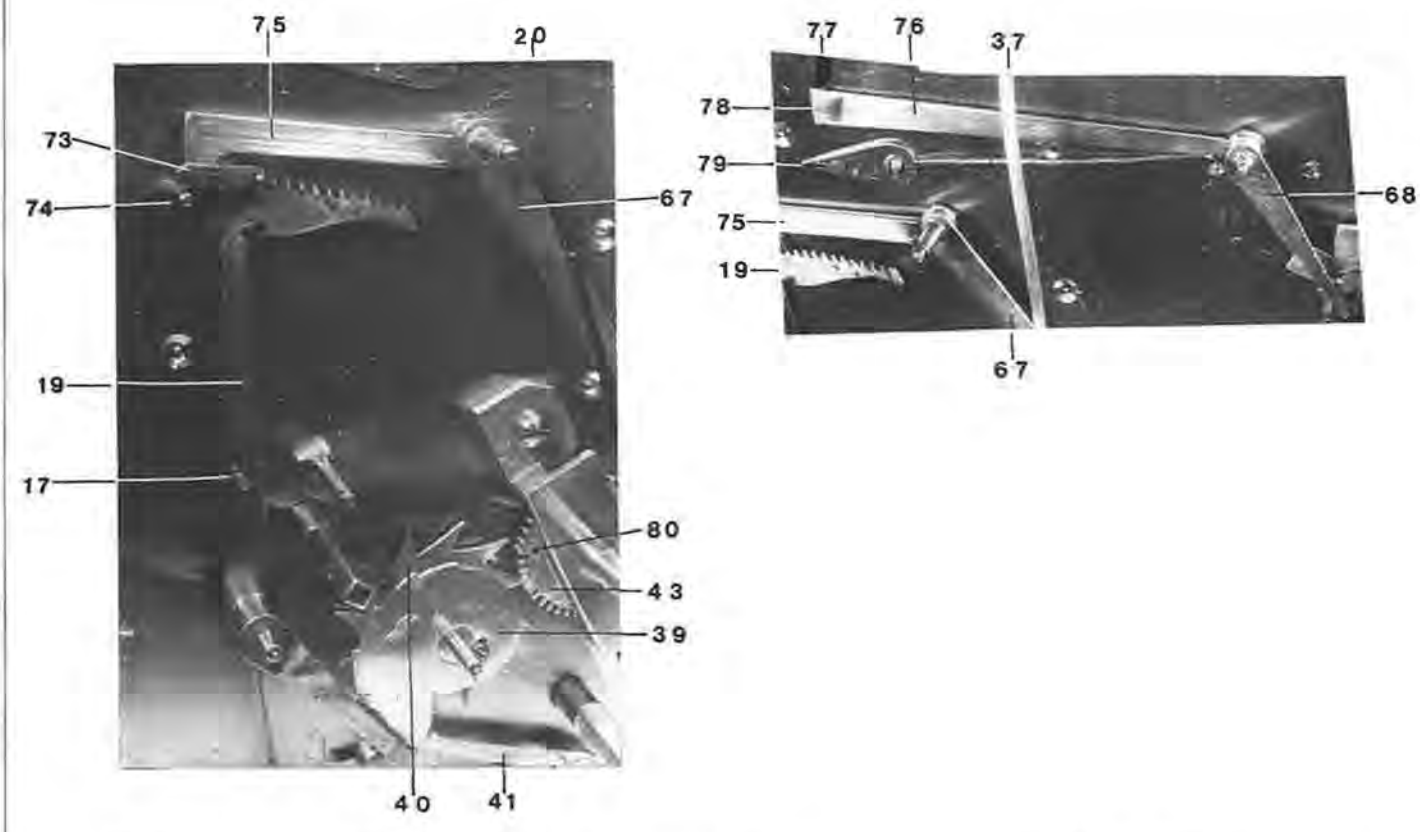
Note: Let me digress for a little background. There is much coverage of the fusee system in some of the clock repair books. However, practically nothing is mentioned about getting the line/cable/cord or chain properly installed. Sometimes a reference is made to winding the line or attaching the chain. One book, Donald DeCarle's **Practical Clock Repairing,** ***does give a procedure. I have used this procedure many times. Recently in the November '90 issue of the*** **Clockmakers Newsletter,** ***(S. G. Conover, Editor and Publisher, 203 John Glenn Ave., Reading, PA 19607), there was an excellent article on the fusee by Laurie Penman. Mr. Penman suggests a different method of winding the line. This method assures that the line is wound in position on the spring barrel to accurately line up with the grooves on the fusee. I tried his method on this clock. It worked well on the two outside trains. However, since this is a 3-train movement, I had trouble applying his procedure to the center (time) train. This was due to lack of space. I'll describe both methods later. Mr. Penman does mention a problem with the time train on a 3-train movement with chain driven fusees. He advises hooking up the chain on the center fusee before assembly. Nothing is mentioned on a problem with cable/cord in this type of clock. It could possibly be the layout of this particular clock we are now working on.***

Before starting, make certain that all trains are free, no gathering pallets or verge. We will be winding the cable onto the fusee. We will start by winding/threading the cable onto the left (strike) train.

At this time all three cables are attached at one end of the fusee and the other end to the spring barrel. The free cables are hanging outside the movement.

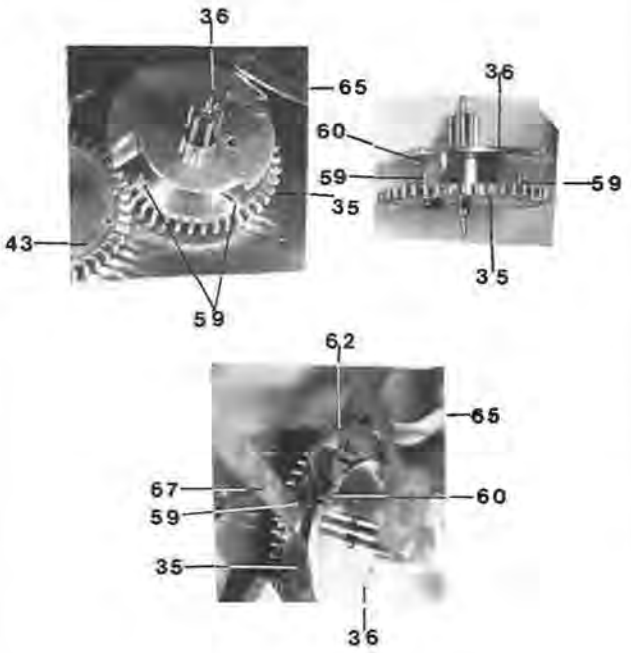
21.1. Loosen all three click screws (84) one or two turns.

21.2. Place the movement on your bench on the quarter strike side. The strike side will be on top.



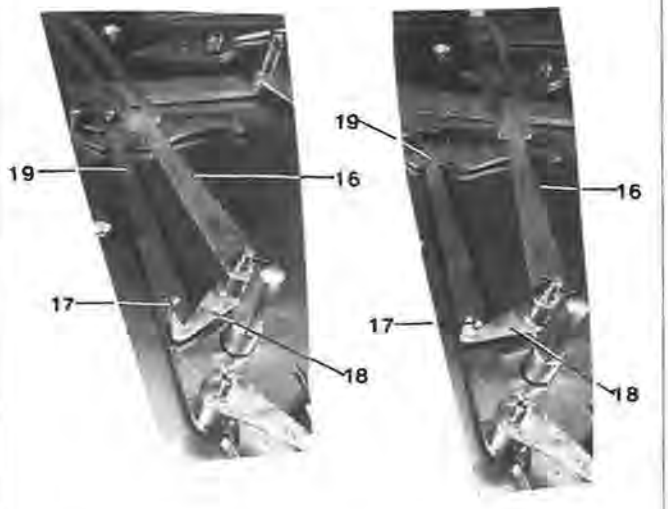
17 Hour Rack Hook Pin	41 Jumper	75 Rack Hook
19 Hour Rack	43 Cannon Pinion	76 Hour Warning Lever
20 Front Plate	67 Hour Rack Hook Tail	77 Hour Warning Slot
37 False Pendulum	68 Strike Warning Lever Tail	78 Hour Warning Tab
39 Hour Snail	73 Hour Gathering Pallet	79 Hour Warning Spring
40 Starwheel	74 Gathering Pallet Stop	80 Starwheel Actuator Pin

Figure 33.3. Strike Control Components



35 Minute Wheel
36 Quarter Snail
43 Cannon Pinion
59 Quarter Lift Pins
60 Hour Lift Pin
62 Lift Lever
65 Quarter Rack Tail
67 Hour Rack Hook Tail

Figure 33.4. Minute Wheel/Quarter Snail Assembly



Strike **Silent**

16 Strike/Silent Lock Lever
17 Hour Rack Lock Pin
18 Strike Lock Lever Ext.
19 Hour Rack

Figure 33.5. Strike/Silent Lock Lever

Note: You may have noticed that the clicks on these spring barrel arbors are not spring loaded. Loosening the screws should allow them free movement. A drop of oil is recommended. Notice, the clicks are designed with the screw pivot off center. The heavier end is the part that engages the tooth of the ratchet wheel. With the movement on its side, if the click is free enough, gravity alone will cause it to ride the ratchet wheel. Sometimes however, in winding you may have to assist gravity with your finger to keep the click engaged with the ratchet wheel.

CAUTION: SINCE WE ARE STARTING WITH THE STRIKE TRAIN, THE CHIME PIN BARREL MUST NOT BE INSTALLED AT THIS TIME. WHEN PLACING THE MOVEMENT ON THE QUARTER STRIKE SIDE, THE PINS ON THE PIN BARREL COULD BE DAMAGED. THIS MAY HAVE BEEN THE PURPOSE OF THE DESIGN OF THE HAMMER BLOCK AND PIN BARREL SO THAT THEY MAY BE INSTALLED AFTER THE MOVEMENT ASSEMBLY IS OTHERWISE COMPLETED.

21.3. Pull on, and guide the cable into the grooves of the fusee, while winding it with its key. Continue until the fusee is full.

Note: The cable should be up against the stop lever. At this time there might not be enough pressure to overcome the spring and therefore not lock.

21.3.1. While still keeping tension on the line, wind the spring arbor in the normal direction to provide wraps of the cable around the barrel. Continue winding the spring arbor until all the slack cable is taken up and some tension is applied. Since the gathering pallet is not installed at this time, while threading the cable, the train is free to run. Let it!

Note: With the extra length of cable allowed in Part 31, steps 10.4.1.1 and 10.4.1.2, you should end up with about two wraps around the spring barrel. The exact number isn't important but should be at least one full wrap. You may have to uncross some of the cable as it wraps around the barrel. Specifically the first two or three turns. Also work the wraps over to the right side so that the cable positively engages the stop iron.

The tricky point in this procedure when the fusee is fully wound, the cable from the fusee to the barrel is too short to hold while unwinding onto the barrel. I placed my left finger on the cable in the last groove of the fusee to prevent the cable from unraveling off the fusee.

21.4. Wind cable from the fusee onto the spring barrel, using key, let-down key, wrench or hand vise.

21.4.1. When cable is completely on the spring barrel, wind spring about 1/2 turn further, engaging the click in the ratchet wheel.

Note: The strike train will now run. The spring will rotate the barrel pulling the cable off the fusee. Notice that the cable is laid on the barrel evenly. Since the strike train is governed by the fan, this will take about an hour.

21.4.1.1. When the spring is about run down, continue in short steps until the line is off the fusee, except the last 1/2 turn.

21.4.2. With another 1/2 turn of the spring arbor, check, observing strike hammer action.

21.4.2.1. Continue run of strike train until all line is off the fusee.

21.5. Set up the fusee system (Figure 33.6).

21.5.1. Using your key or other tool, wind the spring arbor approximately another 3/4 turn.

21.5.1.1. Set the click (83) into a tooth off the ratchet wheel (82).

21.5.1.2. Lock the click in this position by tightening its screw (84).

Note: This action is referred to as "Set-up." Its purpose is to prevent the spring from completely unwinding. Since the 3/4 turn is applied with the fusee unwound, anytime the train runs down there will always be the 3/4 turn tension on the spring.

21.6. Re-check strike train timing (Figure 33.3).

21.6.1. Place the hour strike gathering pallet (73) on its arbor in the stop position against the pallet stop (74).

Note: The pallet fits on a tapered square arbor. Tap it onto its seat. Pinning isn't required.

21.6.2. Check position of the hammer tail in relation to the lift pins.

21.6.2.1. Check position of the warning wheel pin in relation to the hour warning tab (78). Correct if necessary.

21.6.3. Install hammer spring.

21.6.4. Wind fusee 1/2 turn.

21.6.4.1. Position quarter rack in fully locked (retracted) position.

21.6.4.2. Lift hour strike rack hook (75) allowing the train to cycle one revolution of the gathering pallet.

21.6.4.3. Re-check positions of the hammer tail and warning wheel pin.

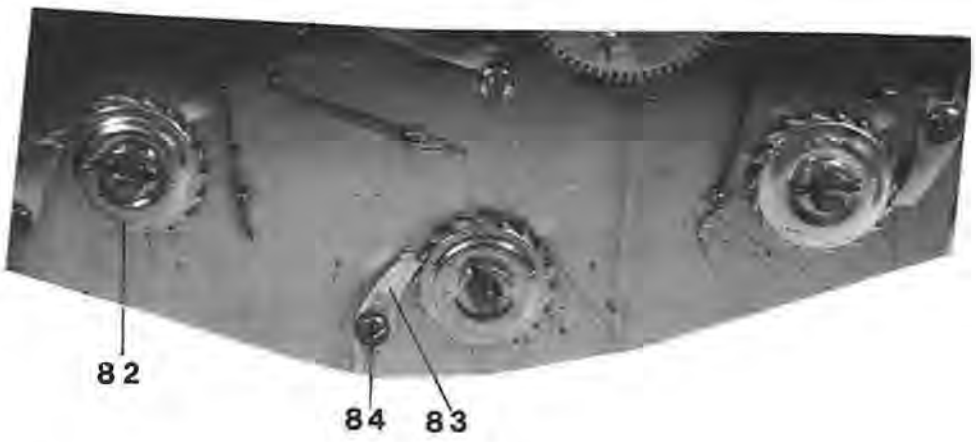
Note: When the hammer is drawn back manually by a finger, the tail should clear the let-off pin. It also should have some run room to the next lift pin. The warning wheel pin should be approximately 90°-180° from the warning stop tab. If okay, proceed. If not, readjust.

21.6.5. Fully wind hour strike fusee until it stops.

21.6.5.1. Check strike stop iron (lever) for operation (Figure 33.7).

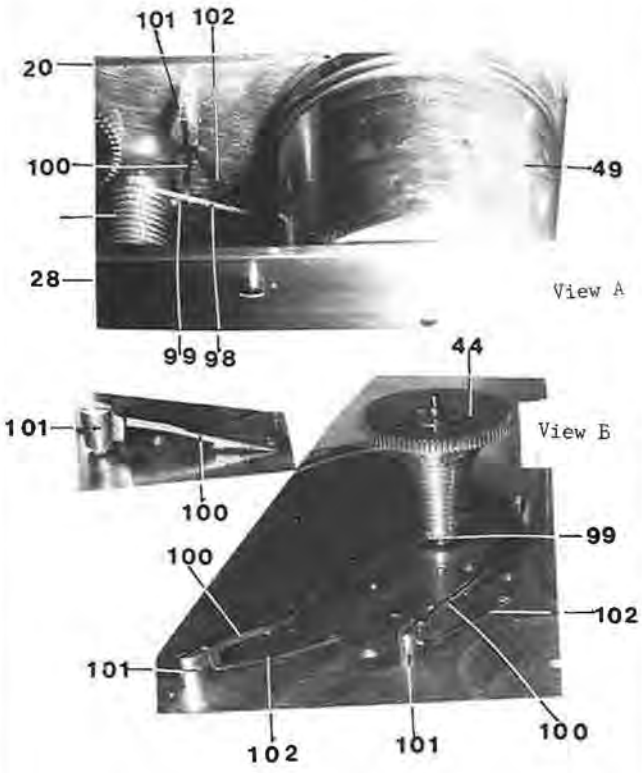
Note: The cable should have shifted the stop iron (100) into position to control and lock on the fusee horn (99), thereby stopping the winding with the fusee cable in all the fusee grooves.

This completes Part 33. In Part 34 we will start with the center/time train fusee.



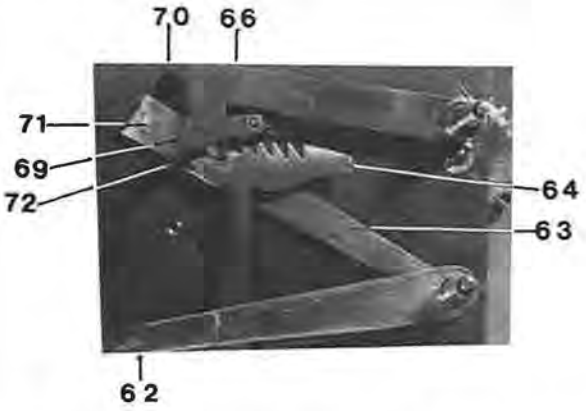
82 Fusee Set Ratchet Wheel 83 Fusee Set Click 84 Fusee Click Holding Screw

Figure 33.6. Fusee Set Let Down



20 Front Plate
28 Rear Plate
44 Fusee
49 Spring Barrel
98 Fusee Cable
99 Fusee Horn
100 Stop (Iron) Lever
101 Stop Lever Post
102 Stop Lever Spring

Figure 33.7. Fusee Components



62 Lift Lever
63 Warning Lever
64 Quarter Rack
66 Quarter Rack Hook
69 Quarter Gathering Pallet
70 Warning Slot
71 Warning Tab
72 Gathering Pallet Stop

Figure 33.8. Chime Control Details

BULLETIN BOARD

NEW REQUESTS

C & E Marshall Material Cabinet Charts
Michael Okagaki, San Francisco, CA, is looking for two material charts for a C & E Marshall Material Cabinet. The wooden cabinet has 10 drawers, circa 1920s. The Marco System Number is not known, but the rest of the system covers older Swiss material, 4 to 10½ ligne.

He needs a material chart for Setting Levers and Screws, Drawer #4, 160 clear top boxes in a wooden drawer. This drawer appears to contain an assortment of 160 types of setting levers and screws for Swiss watches, roughly 4 to 10½ ligne.

The other chart is for the Setting Bridges, Drawer #7, 160 clear top boxes in a wooden drawer. This drawer appears to contain an assortment of 160 types of setting bridges for Swiss watches, roughly 4 to 10½ ligne.

Marshall Stock Numbers
Martin Norman, Prescott Valley, AZ, has a lot of material (staffs and stems) with Marshall stock numbers. He needs help in identifying this material.

Andre Pailet Watch
Otis Loebbaka, San Antonio, TX, is seeking information on how to open the case of an Andre Pailet watch. It has a solid gold one-piece case, vacuum sealed. AWI has no information on the watch. If anyone can identify the maker/distributor or help Mr. Loebbaka with this problem, please contact AWI.

Vigor TC2000A Timing Machine
Sergio Lotenschtein, Honolulu, HI, is seeking an owner's manual for a Vigor TC2000A mechanical and quartz timing machine.

RESPONSES

Eloga Watch
Kathleen Pritchard, Bethesda, MD, replies:
Eloga S.A., Fabrique d'Horlogerie, was a Swiss maker located in Lengnau, Switzerland, from at least 1949 until at least 1973. They produced watches with day date, month, and moon phase designations. They also produced chronographs, and watches that were water resistant and antimagnetic. Brand names were "Desky Watch," "Flying Horse," and "Vadux." Their address was listed in 1973 as simply Lengnau, Switzerland. They were still maintaining these trade names in 1986.

19-Ligne Timer
Kathleen Pritchard, Bethesda, MD, replies:
The mark shown is a Swiss patent mark and refers to Patent No. 3823, granted July 27, 1891 to Leon Breitling, La Chaux de Fonds, Switzerland, for a chronograph timer. Breitling is still very much in business and their U.S. trade representative can be contacted. (There is also a book on Breitling by Benno Richter, published by Schiffer, and available from all horological book dealers.)

"Centennial" Watch
Kathleen Pritchard, Bethesda, MD, replies:
The Patent No. 3364 stamped on the movement is for a patent granted to Albert Jeanneret & Freres, St. Imier, Switzerland, 21 March, 1891, for a chronograph timer. (Does that fit the description of a pin-lever watch?) Jeanneret became Jeanneret-Brehm, makers of the Park Watch, Excelsior Park, etc. "Centennial" was a name owned and used extensively by Cross & Beguelin, importers, in New York, and the "Centennial" watch was made for them by Jeanneret-Brehm. Cross & Beguelin advertised the "Centennial" chronograph watch from 1889 on. The 1915 issue of *Trade Marks of the Jewelry and Kindred Trades* still listed "Centennial" as a brand of Cross & Beguelin. I believe (Gallet S.A. in La Chaux-de-Fonds (rue de Parc, 69 bis) now produces the Jeanneret-Brehm brands.

ITEMS STILL NEEDED

Tommy Hilfiger Watch Company
Jim Stanley, Fort Wayne, IN, is looking for the address of the Tommy Hilfiger Watch Company. If anyone knows the address please send it to AWI so that it can be forwarded to Mr. Stanley.

Tai-Tien QWA5 Quartz Watch/Clock Analyzer
Jim Broughton, Columbus, OH, needs a schematic for a Tai-Tien QWA5 Quartz Watch/Clock Analyzer. If anyone has a copy of this schematic, please send it to AWI and we will copy it and return it promptly.

Citizen CQT 101 Tester Manual
Thomas Mister, Virginia Beach, VA, is seeking an instruction manual for a Citizen CQT 101 Tester. If you have a copy, please forward to AWI and we will make a copy for Thomas Mister and our files.

Rolex 1000 Waterproof Tester Manual
Jeff Forslund, Delafield, WI, is looking for an owner's manual for a Rolex 1000 Waterproof Tester. If anyone has this manual, please send it to AWI and we will copy it and return it promptly.

19th Century Black Forest Clock
Rodney Jordan Renaud, Deep River, Ontario, Canada, has a clock in for an overhaul. He is seeking the make of the movement and is looking for a balance spring. The hairspring is "toast." The diameter of the balance wheel is approximately 1 inch, the plates are approximately 2½ x 3¾ inches. It is an alarm movement that drives a music movement from the train on the right (in the photo). It has a pin-pallet-type escapement. I suspect it is of the late nineteenth century Black Forest origin.

Portescap Ultrasonic Cleaner Rc-4
R.L. D'Avignon, Syracuse, NY, is seeking a schematic for a Portescap US Ultrasonic Cleaner, Model Rc-4. If anyone has this schematic, AWI will make a copy for Mr. D'Avignon, retain one for our technical files and return the original.

AWI Material Search

EDITOR'S NOTE: This column is designed to work in conjunction with the AWI Movement Bank. If you can supply any of the items listed here, please send details to the Material Search Network. **Do not send the items to AWI.** Members requesting these items will be advised of their availability and will contact you directly.

1J1 Seth Thomas Military Clock aluminum sweep hand, 8½ inches

1J2 Chelsea (1943) silver reflector ring, 6 inches

1J3 Chelsea (1944) silver reflector ring, 8½ inches

1J5 LeCoultre Model 227, 19 ligne, 8-day small deck clock timing setting shaft with threaded end to match threaded setting knob

1J10 Omega top fold-over clasp, Part #1170-653, #1182-652 (numbers on band 5-73,311)

1F9 Patek Philippe 4th wheel and pinion, and cannon pinion, 18¾ ligne, 17 jewel, 32mm

1F10 Chinese #3955 vest/ pendant watch balance complete and balance bridge complete, 14½ ligne, 42mm, OF, KW-KS jewel, lever escapement, center sweep

If you can supply any of these items please contact: AWI Material Search Network, AWI Headquarters, 701 Enterprise Drive, Harrison, OH 45030; Phone (513) 367-9800; Fax (513) 367-1414.

1F9

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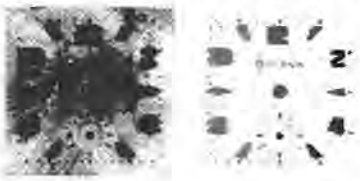

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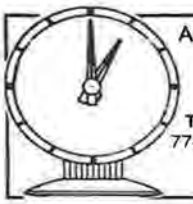

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THURSDAY, JUNE 18

3:00 P.M. - 6:30 P.M.	**Registration**
7:00 P.M. - 11:00 P.M.	**Affiliate Chapter Delegate Reception & Round Table** Alternate Delegates & Board Members Welcome

FRIDAY, JUNE 19

8:00 A.M. - 9:00 A.M.	**Registration**
10:00 A.M. - 4:00 P.M.	**Affiliate Chapter Meeting** Keynote Speaker - Dan Fenwick
7:00 P.M. - 8:30 P.M.	**AWI Headquarters Open House**

SATURDAY, JUNE 20

7:30 A.M. - 10:00 A.M.	**Vendor Display** Continental Breakfast Available
10:00 A.M. - 4:00 P.M.	**AWI Board of Directors Meeting**
4:30 P.M. - 7:30 P.M.	**Vendor Display & President's Reception**
7:30 P.M. - 10:00 P.M.	**Hawaiian Buffet & Awards Program** Fred Burckhardt, Emcee

SUNDAY, JUNE 21

9:00 A.M. - Noon	**AWI Board of Directors Meeting** (Conclusion)
Following Board Meeting	**NAWCC Chapter 102 Meeting**

FOR MORE INFORMATION CONTACT
AWI HEADQUARTERS AT (513) 367-9800

Advertisers' Index

Mid Atlantic Horological Symposium, Inc.

The Mid Atlantic Horological Symposium, Inc. (MAHSI) is pleased to announce a new and significant horological event scheduled for September 28 through October 4, 1998 at the Maritime Institute of Technology and Graduate Studies in Linthicum, Maryland. This 7-day intensive training in watch and clock courses, skill development, and symposium presentations promises to be an exciting opportunity for anyone interested in the horological sciences. The program includes: horological vendors, material houses, watch and clock company representatives, and other related activities. There will be a display area available in the hall for horological related schools, trade associations, and collectors' associations. Well-known expert instructors will be presenting many courses and skill presentations. **Just Announced** - Antoine Simonin, Director of the Watchmakers of Switzerland Training & Education Program (WOSTEP), Neuchatel, Switzerland, will also be an instructor during the symposium. Mr. Simonin will be teaching Lever Escapements. For a complete information package contact: Dewey Clark (410) 817-6780, e-mail: declark@mail.bcpl.lib.md.us or Stan Palen (540) 775-7027, e-mail: spalen@crosslink.net. Please mail requests for info to: Jerry Kincaid, 4113 Loch Lomond Dr., Baltimore, MD 21236 or e-mail: tictoctwo@aol.com. Vendors, material houses, and watch and clock company reps please contact Dan Fenwick 800-456-5354, ext. 3760. Sponsored by: Horological Association of Maryland, Watchmakers Association of Pennsylvania and Horological Association of Virginia.

Note: There is a full service cafeteria serving some of the best food in Anne Arundel County. Breakfast - $4.00, Lunch - $7.00, Dinner - $16 (served Steward style). You must make your own lodging reservations. We recommend the Maritime Institute of Technology where the Symposium is being held. Their room rates include all meals and facilities. Phone (410) 859-5700, Fax (410) 859-0942

Payment Info: Checks & Money Orders ONLY made payable to Mid-Atlantic Horological Symposium, Inc. (MAHSI)

Mail to: Stan Palen, Treasurer MAHSI, 8283 Oakwood Drive, King George, VA 22485

Select courses in the order of preference (1, 2, etc.). Symposium preregistration is $30.00, tickets purchased at the door will be $35.00. Space is limited; AWI members will be given preference. AWI membership fee of $45.00, made payable to AWI, can be included with your registration. You will receive course registration notification by September 5th.

	DATE	COURSE	FEE
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☐	Sept. 29	Counter Persons	$ 50.00
☐	Sept. 29-Oct. 2	Lathe I ($260+$90 materials)	$350.00
☐	Sept. 30-Oct. 1	Making Small Parts	$130.00
☐	Oct. 1-2	Repair of the Atmos Clock	$130.00
☐	Oct. 1-2	Polishing & Finishing	$130.00
☐	Oct. 1-2	Pocket Watch Repair	$130.00
☐	Oct. 1-2	Mechanical Chronographs	$130.00
☐	Oct. 1-2	Business Management	$130.00
☐	Oct. 1-2	Clock Escapements	$130.00
☐	Oct. 1-2	Cuckoo Clocks	$130.00
☐	Oct. 2	Case Refinishing	$ 65.00
☐	Oct. 2	Lever Escapement	$ 65.00
☐	Oct. 2	Clock Striking Mechanisms	$ 65.00
☐	Oct. 2	Seiko Kinetic Watch Repair	$ 75.00
☐	Oct. 3-4	Symposium Only	$ 30.00

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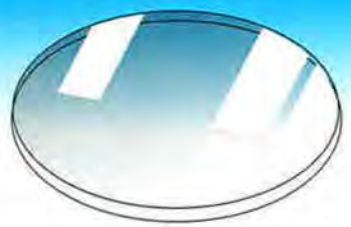

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DATE	CLASS	INSTRUCTOR	LOCATION	FEE
JULY 1998				
12	Seiko Kinetic Quartz Watch Repair	David Christianson	Lansing, MI	$75.00
25-26	Cuckoo Clock Repair	Jim Williams	Grand Rapids, MI	$130.00
• 26	Seiko Kinetic Quartz Watch Repair	David Christianson	Columbus, OH	$75.00
SEPTEMBER 1998				
19-20	400-Day Clock Repair	Ron Iverson	Austin, TX	$130.00
OCTOBER 1998				
17-18	Cuckoo Clock Repair	Jim Williams	Austin, TX	$130.00
24-25	Introduction to Watch/Clockmakers Lathe	Roy Hovey	St. Louis, MO	$142.00

AWI Project Extend

AWI's continuing Education Program offers one-week and two-week classes in various phases of watch & clock repair techniques. Work alongside recognized leaders in the field of horology. See how they handle the everyday situations we all encounter. All Project Extend classes are held in AWI's training rooms in Harrison, Ohio. Call or write for information and details for the classes that interest you! ***DEADLINE FOR REGISTRATION IS 30 DAYS BEFORE THE SCHEDULED DATE OF THE CLASS.*** To register for these courses, please mail, fax or e-mail your registration and payment information to: **AWI Central, 701 Enterprise Drive, Harrison, OH 45030. Phone (513) 367-9800, Fax (513) 367-1414, E-Mail: Educate@awi-net.org.** Please include a check or your Visa or Mastercard number, card expiration date, signature and phone number. Registrations cannot be taken by phone. All registration fee checks and charges are processed immediately upon receipt.

PROJECT EXTEND WATCH CLASSES

DATE	CLASS	INSTRUCTOR	FEE
JUNE 1998			
1-5	CEWT & CMEW Examinations	Jim Lubic	$250.00
8-12	CW & CMW Examinations	Jim Lubic	$250.00
JULY 1998			
13-17	Basic Horology	Jim Lubic	$250.00
27-31	Machine Shop Practices	Tim Schlotter	$250.00
AUGUST 1998			
3-5	Introduction to the Watchmakers Lathe	Jim Lubic	$150.00
6-8	Cross Slide Operations for Watchmakers	Roy Hovey	$150.00
10-22	Lathe Operations for Watch/Clockmakers (12-day)	Roy Hovey	$780.00
31-Sept. 4	American Pocket Watch Repair	Alice Carpenter	$250.00
SEPTEMBER 1998			
14-16	Watch Cases, Bands & Crystals	David Christianson	$150.00
17-18	Watch Case Repair	David Christianson	$100.00
21-25	Introduction to Watch Repair	Jim Lubic	$250.00
OCTOBER 1998			
5-9	Time Train, Dial Train & Friction Jeweling	Jim Lubic	$250.00
19-23	Drawing & Understanding the Lever Escapement	Jim Lubic	$250.00
26-30	Adjusting & Repairing the Lever Escapement	Jim Lubic	$250.00
NOVEMBER 1998			
3-6	Staffing, Trueing & Poising	Jim Lubic	$250.00
14-15	Watch Case Finishing	Dennis Warner	$100.00
DECEMBER 1998			
7-11	21st Century Watchmaking	Jim Lubic	$250.00
JANUARY 1999			
18-22	Hairspring Vibrating	Jim Lubic	$250.00
25-29	Automatic Mechanisms	Stanley McMahan	$250.00

PROJECT EXTEND CLOCK CLASSES

DATE	CLASS	INSTRUCTOR	FEE
AUGUST 1998			
31-Sept. 4	Introduction to Clocks	Jim LaChappel	$250.00
SEPTEMBER 1998			
21-25	Clock Case Restoration	Jim Williams	$250.00
28-Oct. 1	Clock Escapements	Jerry Faier	$250.00
OCTOBER 1998			
5-9	Organize Your Work Habits for Success	Robert Ockenden	$250.00
12-16	Clock Repair Operations	David Carlson	$250.00
NOVEMBER 1998			
2-6	French Clock Repair	Ron Iverson	$250.00

AWI JEWELRY SCHOOL

DATE	CLASS	INSTRUCTOR	FEE
AUGUST 1998			
24-28	Course II - Advanced Jewelry Repair	Tim Schlotter	$595.00
OCTOBER 1998			
19-23	Course I - Introduction to Jewelry Repair	David Christianson	$595.00