HOROLOGICAL™ TIMES

August 2002

American Watchmakers-Clockmakers Institute

"The Spring"

RING SIZER

YGF & WGF Ring Sizers
2.0mm, 2.5mm, 3.0mm, 3.5mm, & 4.0mm

Remember the **XACT Fit®**?

You used the self adjusting ring guard successfully for many years and then it vanished. ***"The Spring"*** ring guard is now available to do the same job for you. The hidden leaf spring assures a firm even tension when fitting over knuckles – works smoothly and has a comfortable "feel", adjusts up to 3 ring sizes. We now have these ring sizers in stock assortments or individual sizes. ***Coming soon!*** Spring sizers for class rings.

Available Again
New Manufacturer

Adjusts up to 3 ring sizes just like Xact-Fit®.
No unsightly wires or springs to look at.

Special Introductory Kit

18-pieces; Assorted sizes in yellow and white in a sturdy compartment box.

#32-0012 Only $49.00 ***(Reg. Price $54.95)***

INDIVIDUAL REFILLS AVAILABLE

Esslinger & Co.
79 Years Young – And Growing

1165 Medallion Dr. • St. Paul, MN 55120
Toll Free Phone Orders
1-800-328-0205
Toll Free Fax Orders (24 Hrs)
Fax: 1-800-548-9304

HOROLOGICAL™ TIMES

An Official Publication of the American Watchmakers-Clockmakers Institute

EDITORIAL & EXECUTIVE OFFICES
AWI, 701 Enterprise Drive, Harrison, OH 45030
Phone: Toll Free 1-866-367-2924 or (513) 367-9800
Fax: (513) 367-1414
E-mail: awi@awi-net.org Web Site: www.awi-net.org
Office Hours: Monday-Friday 8:00 AM to 5:00 PM (EST)
Closed National Holidays

Donna K. Baas: Managing Editor, Advertising Manager
Katherine J. Ortt: Associate Editor, Layout/Design Associate

James E. Lubic, CMW: Executive Director & Education & Technical Director
Lucy Fuleki: Assistant Executive Director
Thomas J. Pack, CPA: Finance Director
Laurie Penman: Clock Instructor
Nancy L. Wellmann: Education Coordinator
Sharon McManus: Membership Coordinator
Mary Huff: Shipping Coordinator
Melanie Frye: Receptionist/Secretary
Steve Jones: Audiovisual Manager

HOROLOGICAL TIMES (ISSN0 145-9546) is published monthly and copyrighted by the American Watchmakers Institute, 701 Enterprise Drive, Harrison, OH 45030-1696. Subscription price for the public is $70.00 per year ($6.50 per copy). Members subscription is $25.00 which is included with annual dues of $70.00. Periodicals postage paid at Harrison, OH 45030 and additional entries. POSTMASTER: Send address changes to *HOROLOGICAL TIMES*, 701 Enterprise Drive, Harrison, OH 45030-1696.

CONTENTS

VOLUME 26
NUMBER 8
AUGUST 2002

FEATURE ARTICLES

COLUMNS

DEPARTMENTS

EDUCATION

SPECIAL INTEREST

COVER

This month's cover features the Timexpo Museum in Waterbury, Connecticut.
Photo by Chip Lim, CMW, CMC, CMEW.

President's Message

Robert D. Porter, CMW

This message is being written in July for the August issue of the *Horological Times*. Perhaps it would be more appropriate to call it a past president's message as I have decided not to accept another term as president. I will continue to serve as a director.

Being president of AWI is a full-time job, and I have done my best to move AWI ahead this year with mixed results. I had hoped we would see the reopening of the AWI Academy of Watchmaking as the Board of Directors had unanimously agreed to do at last year's annual meeting, but this was not to be, for reasons I still don't fully understand. More of my time will be devoted to the "Beginning Lathe Program," writing, and the ELM Trust. I wish the new president all the best.

Many thanks to each and every one of our members who have supported AWI over the years, and for all the work our Committees, Affiliate Chapters, Industry people, and many others have done to benefit all the members of AWI.

Mr. Laurie Penman is back on board helping us to address the needs of our clockmaker members. Laurie and his students have been busy restoring a Riefler and other precision clocks for the Cincinnati Observatory. He is also working on an AWI home study course in clockmaking. As the budget permits, AWI will make greater use of videos and the Internet to provide continuing education opportunities to our members across the nation and around the world. Bench courses will continue to be provided where there is sufficient interest—let us know what your needs are. The *Horological Times* continues to be our best source of technical information for every member of AWI.

Our Finance Committee will present a balanced budget to the Board at the annual meeting this month. During the mid-year meeting in February our financial advisor, Mr. Rob Clarke, informed the Executive Committee and the AWI staff that our finances are in the best shape he has seen. Mr. Clarke pointed out that this would be a good time to improve many of our programs, and to enhance much of the infrastructure such as the website and online technical and business capabilities.

Despite the accelerating retirement of AWI members, our membership has held steady and has even increased slightly since the beginning of the year to four-thousand-plus members.

"A single reason why you can may beat a thousand reasons why you can't."—Marvin Small

Executive Director's Message

James E. Lubic, CMW

You will be reading this about the same time as the Annual Convention is taking place August 1 – 4th. I am looking forward to this year's meeting as the Board of Directors will be making several very important decisions regarding the future of AWI.

Strategic planning is one of the important issues. In order for AWI to be successful in the future members of the Board must adopt a Strategic Plan that **everyone** on the Board supports. Following are two of the issues that will be discussed and decisions made as to how the Institute should proceed in the future.

Academy of Watchmaking - Do we continue to pursue full-time training in AWI's facility? If so, how do we pay for it? If not, then what do we do with the two existing class rooms.

Website – Do we spend the needed AWI assets to develop a member-protected area with several educational/member benefits that would also help to increase membership? Do we leave our website as is? It is basically an informative site.

These two issues are the key to whether or not AWI thrives in the future.

I would like to congratulate Marshall Richmond, Milan, Indiana; Manuel Yazijian, Montreal, Canada; and Dennis Warner, Austin, Texas on becoming the newest elected members of the AWI Board of Directors. I look forward to working with each of you and the rest of the Board to move AWI into a successful and bright future for our members.

REC Director Ken Pell, Orlando, Florida will be retiring as a director this year. Ken has been a real advocate for the schools in the past and I hope to see Ken run for the Board in the future.

Director and Past President David Christianson, Kendallville, Indiana will be going off the Board this year after serving two consecutive 3-year terms. David will still be a member of the ELM-Trust, which is also very active. David has been a big help to me personally as well as an asset to AWI, and I will miss having him on the Board. I hope he will run again in two years when he is eligible.

The other two directors going off the Board are Ewell Hartman, Richmond, Virginia and Jerry Jaeger, Sheboygen, Wisconsin. Both have been very valuable assets to AWI and should be credited with many of the educational benefits that AWI members now enjoy. I should go back and research everything that the two have done for AWI as they have dedicated many, many years to serving AWI and its members, but I'd be afraid to leave something out.

Jerry Jaeger was elected to AWI's Board of Directors for the first time in 1962, and Ewell Hartman was first elected in 1968. If either of these AWI icons would want to run for the Board again I'm sure they would be elected. They both tell me that they are retiring from the Board, which I guess they should be allowed to do, but I would like to thank them both for their service to AWI and for supporting me personally. They will be missed as members of the Board; however, both will still be active in AWI. Jerry will continue to serve on the Certification Committee, and Ewell will continue to work with the Chronometer Club. Thank you again for your dedication to making AWI better!

When Was the Last Time You Changed Your Oil?

Trust McCaw's and Moebius for all of your lubrication needs!

Fixodrop "makes oil stay put"
reg. $69.95 **NOW $59.95**

#8200 Spec Lube for Springs
reg. $9.95 **NOW $8.49**

#8201 8200 with Molybdenumdisulphide
reg. $14.95 **NOW $12.95**

#8030 Clocks and Music Boxes
reg. $10.20 **NOW $8.95**

#8031 8030 for Low Temperatures
reg. $12.75 **NOW $10.95**

#D-5 Microglis "A combination of 5 oils with Moly"
reg. $21.95 **NOW $18.95**

#8032 Regular and Automatic Mainsprings
reg. $14.95 **NOW $12.95**

Laperle Clock Oil pint
reg. $51.25 **NOW $46.95**
30cc
reg. $5.75 **NOW $4.99**

#9000 Quartz Oil
reg. $24.75 **NOW $21.95**

KT-22 Stem and Winding Lube
$3.35

Don't forget to order your Capillary and Dip Oilers too!

ORDER TODAY! IN STOCK AND READY TO SHIP!

Now order via e-mail at mccawco@worldnet.att.net

The Wm. S. McCaw Company
WHOLESALE JEWELRY
Since 1913

1722 Madison Avenue
Toledo, Ohio 43624
Phone: 419-243-3720
800-472-0200
800-537-0343
Fax: 419-243-0321
800-245-6481

AWI
JIDA

VISA
MasterCard

Wholesale Watch Materials • Tools and Findings • Jewelry • Boxes

Questions & Answers

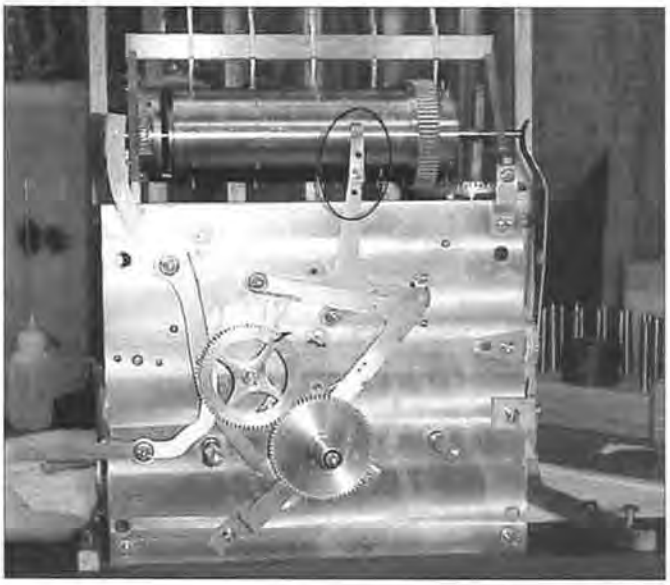
Question

Recently I took into my shop a grandfather clock that has me baffled. The movement came out of a decently old colonial clock. The movement looks very much like a Herschede but I've never seen anything quite like it. It is a two-train chiming movement with tubes and it seems to me that it should chime at the quarters then the chime roll should shift after the 4th quarter and it would strike the hour. Unfortunately it doesn't shift and there is no way of telling why. It seems to me that the piece that should shut off the chiming was broken and a homemade piece was made and it doesn't work. I have had the quarters shutting off at times, but it has never struck the hour.

I am sending pictures in the hope that you could help me in some way, I'd really like to make it work. On the back of the movement are some numbers 2047 Pat. Jan 12, 09. From the Colonial Mfg. Co.

I have circled the piece that I suspect on the front views.

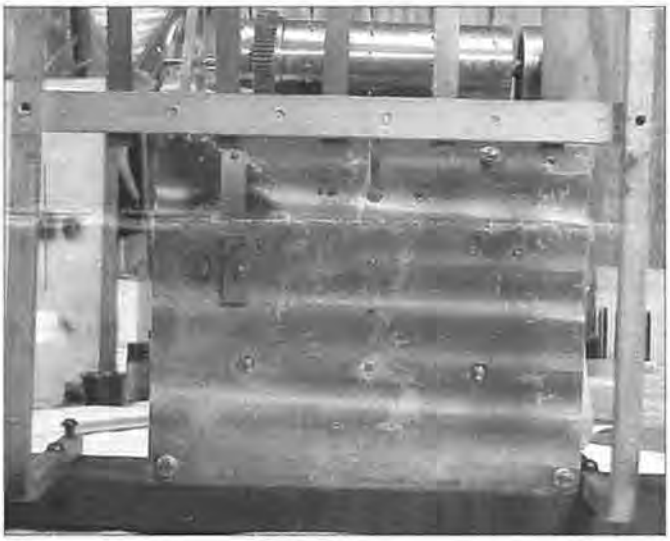
Lew Bowen
Lawrence, MI

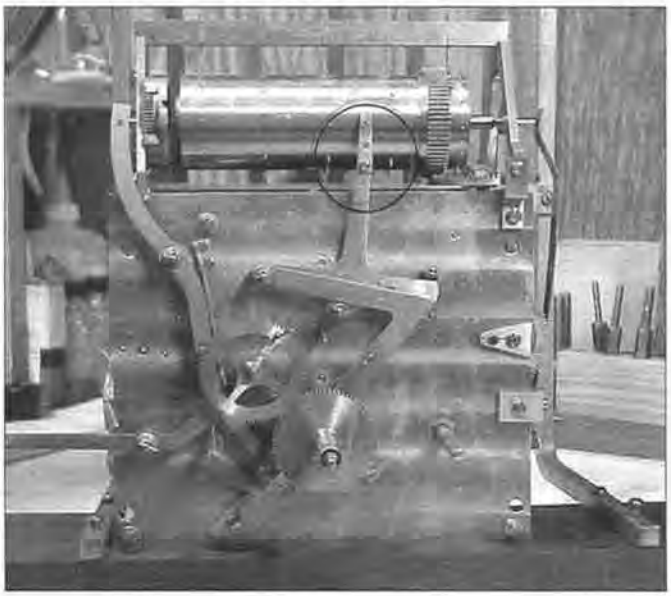


Answer

Your movement is a two-weight/five-tube Westminster chime movement by the Herschede Hall Clock Company of Cincinnati (at the time). It was such a unique movement that it was awarded the Grand Prize at the

(Continued on page 26.)





Borel

For the Latest in Watchmaker's Tools & Parts

visit @www.JulesBorel.com, click on products

Borel

16mm Trifold Buckle with Extender

Top View shown with extender extended

16mm trifold buckle with optional adjustable extender. Designed to fit certain Citizen type watch bracelets. Makes the bracelet a little longer. Stainless Steel.

Stock # 185-273

$ 2.60 each, 3@ 2.40 ea., 12 @ 2.10 ea.

Tri-fold Buckle Expanders

Attaches to a metal watchband tri-fold buckle and allows it to open up larger. Helpful when taking off the watch if you have large hands. Assortment contains 1 each in yellow & white of sizes 12, 14, 16, 18, & 20mm.

18A-290 10 pc assortment **$ 14.00**

Push Button Trifold Clasps

These nicely made stainless steel clasps are easily opened by pushing in the side buttons. Fastens securely when buttons are released when closing. Assortment contains 1 each - 12, 14, 16, 18mm sizes.

18A-280 4 pc assortment **$ 12.50**

Individual Clasps:	**185-241**	12mm
$ 3.30 each,	**185-242**	14mm
3@ 3.10 ea.	**185-243**	16mm
12 @ 2.75 ea.	**185-244**	18mm

Size Width	St. Steel Stock #	Yellow* Stock #
12mm	185-251	
14mm	185-252	
16mm	185-253	
18mm	185-254	
10mm	185-260	186-260
12mm	185-261	186-261
14mm	185-262	186-262
16mm	185-263	186-263
18mm	185-264	186-264
20mm	185-265	186-265

Tri-fold

Tri-fold w/security lock

Width Outside	Width Inside	Length Closed	St. Steel Stock #
8.7	5.0	35.3	185-BBL
10.9	6.0	38.6	185-BBM

Butterfly, center opening

Tri-fold, Tri-fold with lock, & 'Butterfly' Buckle Assortment

 # 18A-270

$ 27.50

Contains 1 each of the 12 stainless steel buckles on the left (*no yel.) in handy 12 compartment plastic box. Also available individually.

Borel

Jules Borel & Co.
1110 Grand Boulevard
Kansas City, MO 64106-2348

Order Desk **800-776-6858**
Order FAX **800-776-6862**
Local **816-421-6110**

Borel

Ask Huck

J.M. Huckabee,
CMC, FAWI, FBHI

Cutting Tools Used with the Watchmaker's Lathe

Question

How many cutting tools are needed for the watchmaker's lathe for servicing mid-sized clocks?

Answer

It seems that the answer to your question is: "More than anyone owns!" It seems that we always need one of a little different shape from those at hand.

The situation is not real bad news. I must have more than thirty items. However, I'm noted for wanting to extend and improve my tools, many of which have been a foolish investment.

I use about 20 cutting tools frequently. These are various shapes of turning, cut-off, and boring tools. I sharpen what I will need before a job so that I do not stop to sharpen tools. Almost all of my hand-held cutting tools are shop built.

My turning tools are made from pieces of annealed spring steel stock about one tenth-inch square, fitted into half-inch diameter wood dowels about four inches long. The tool bit overhangs the handle by a little over an inch. When annealed, the material can be shaped roughly with a big file. I then heat about a quarter-inch of the end to bright red, and quickly dip it in a cup of water. It is then ground on a soft-backed disc faced with aluminum oxide paper of about 200 grit. The 3M and Norton papers are excellent. Until the hardened tip is worn away, they can be resharpened in a matter of seconds.

I suggest you get in touch with AWI for a loan of one of my tutorials. The one called *The Idea Book* is totally dedicated to clock work on the watchmaker's lathe.

Sharpening Lathe Turning Gravers

Question

How do you sharpen your lathe gravers? What stone do you use, and how do you hold the tool?

Answer

I'm too impatient to sharpen them on a bench stone. A little touch-up on an oil stone, OK. I grind my tool bits with a hand-held motor tool and a soft-back disc faced with fine grit abrasive paper. I keep the motor tool by the lathe, and a bit can be touched up in less than five seconds. If I get overly zealous and grinding anneals the edge, I turn a propane torch on the tip, and then dip it in a cup of water.

As a teenage apprentice machinist, Mr. Manberg's words were: "Boy, if the chips are not blue, increase the feed and speed. If the chips are blue, increase the coolant flow." Now our lathe work cannot be gauged by those instructions. However, those words still ring in my ears. They now say: "Make every minute productive. Our trade is paid for the results we render."

I suggest you take a look in the AWI book, *The Top 300 Trade Secrets of a Master Clockmaker*. That book has lots of clock related lathe jobs that use unique accessories to greatly improve worker productivity. It is illustrated with over 300 close-up photographs. It contains many ideas and methods that are never found in available material on the watchmaker's lathe.

Please reserve judgment on "Old Huck's" lathe practices until you see the end result.

Screwdriver Sets

Good:

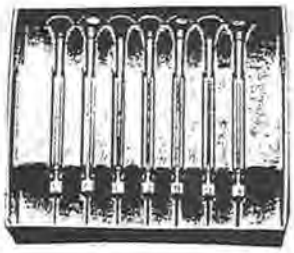
#WT800.742 $9.00/Set

9 piece solid blade nickel-plated screwdriver set with swivel heads. Sizes range from 0.60 to 2.30 mm.

Replacement Screwdrivers $ 1.55/ea

Better:

#WT800.725 $12.95/Set



7 piece reversible blade nickel-plated screwdriver set with color-coded swivel heads. Sizes range from 0.60 to 1.60 mm.

Better Yet:

#WT800.730 $19.95

7 piece reversible blade nickel-plated screwdriver set with color-coded swivel heads. Sizes range from 0.60 to 1.60 mm. Replacements and extra blades available.

Replacement screwdrivers: $ 3.60/ea
Extra Blades: $12.00/dz

Best Available:

#WT800.201 $139.95/Set

12 piece Swiss-made ball-bearing screwdriver set on a metal rotating stand. Color-coded sizes range from 0.50 to 3.00 mm. Blades are held in place with set screws.

Replacement screwdrivers: $ 9.50/ea
Replacement blades: $ 9.75/dz

Gaber & Company - Pittsburgh, PA

800-792-2820 Phone
800-322-8331 Fax
gabertools@AOL.com E-Mail

Fred S. Burckhardt, FAWI

Our American Legacy

One name that bears mentioning, even though he was never connected with an American company, is that of Albert H. Potter. He was born in Saratoga County, New York, in 1836. In 1852, he started to apprentice with Wood & Foley in Albany, New York. Three years later he opened a repair shop in New York City and turned to making watches. While there, he made thirty-five watches in gold cases. After five years he went to Cuba. Later he returned to New York City and later to Chicago where he and his brother established the Potter Brother's Business. In 1875 he went to Switzerland and made the Potter watch, about 600 of them. A.H. Potter was considered by many to be the finest American watchmaker. He made many complicated watches including quarter repeaters, chronometers, perpetual calendars and others.

Aaron L. Dennison comes to the foreground once again when in 1864, he and A.O. Bigelow of Boston decided to start up a watch company. Their idea was to have some parts made in Switzerland and the rest of the parts, plus assembly, to be done in America. This way they could still call it an American watch. Dennison went to Switzerland to run things there.

The name of the company was the Tremont Watch Company. Things started out as planned and the first movements were ready in about twelve months. Business was very encouraging and in 1866, it was decided to move to Melrose, a suburb of Boston, and make the entire watch. The name was changed to the Melrose Watch Company. Dennison was unhappy with their decisions and withdrew from the company.

After a short time, seeing their cost was greater than anticipated, the company failed. Dennison, who was still in Switzerland, was asked to see if he could sell the plant but he had no luck. He returned to Boston and tried to revive the old Tremont company but met no success. He then tried to start a new company but once again couldn't get the necessary funds. After about five months, he went to England where he was instrumental in selling the remains of the Melrose company. A new company was formed called the Anglo-American Watch Company, later changed to the English Watch Company.

Another short-lived company was the Mozart Watch Company. Don J. Mozart was born in Italy and his family moved to America when he was three years old. He turned out to be a mechanical genius, inventing machines of all types. He became especially interested in horological endeavors and in 1863 went to Bristol, Connecticut where he hoped to manufacture a clock he had invented. It proved to be a failure and he turned his thoughts to the manufacture of a three-wheeled watch.

In 1864, the Mozart Watch Company was formed in Providence, Rhode Island. Mozart designed and began the manufacture of the machinery and then started the production of his watch. Everything was fine until it came time for the escapement, which proved to be unsatisfactory for the movement. Mozart left the company which was later reorganized as the New York Watch Company. In 1867 the plant moved to Springfield, Massachusetts and in April of 1870, there was a fire, destroying the factory building. Most of the machinery and watches were saved. Then in 1875, during a period of financial difficulty, it was decided to close the plant. The stockholders took over and reorganized as the New York Manufacturing Company. What it amounted to was the old company with a new name. It lasted about eight months and closed in the summer

of 1876. A new company was formed by the old stockholders called the Hampden Watch Company.

In 1886, the Hampden Watch Company merged with the Deuber Watch Case Company of Cincinnati in Newport, Kentucky, and became The Deuber-Hampden Watch Company and moved to Canton, Ohio. Mr. John C. Deuber purchased controlling interest in the Hampden company and decided to build new factories for both companies. The people of Canton offered $100,000 and twenty acres of land for the factories. In the spring of 1888, the new buildings were ready and the machinery was moved from Springfield. At the time, this was the largest and most magnificent watch plant in the world.

Albert L. Deuber took over in 1907. Then it was sold to Walter Vretmann in 1925. The company went into receivership in 1927 and then sold to the Russians in 1930. The equipment and some of the employees moved to Russia to help establish their watch industry.

Now to return to Don J. Mozart. In 1866, after leaving the company, Mozart went to Ann Arbor, Michigan, where he got a group of locals together and started the Mozart Watch Company of Ann Arbor, Michigan. After three years, with hardly anything to show for their time and money, the funds began to become a critical factor. In the winter of 1870, it was decided to sell the company. About thirty watches were finished and these went to the stockholders and friends.

In 1871, a new company was formed in Rock Island, Illinois. They purchased the entire stock and machinery of the Mozart company. A factory was built in Milan, Illinois. After the machinery was moved and put into the new building, the stockholders decided it wasn't what they wanted, because of the poor condition of the machinery, and wouldn't pay the notes for $15,000. The machinery was returned to the Mozart company. Due to unfortunate circumstances, no watches or movements were ever manufactured by the company.

The Freeport Watch Manufacturing Company was formed in 1874, at Freeport, Illinois. Part of the Mozart plant was purchased and moved to Freeport. On the night of October 21, 1875, the factory burned down. It was a total loss. No watches were ever produced by this company. An interesting note is that three officers of the company were indicted for starting the fire. All three were exonerated.

Our old friend, J. C. Adams, helped organize the Illinois-Springfield Watch Company in January, 1869. It was said that Adams stole away about half of the old Waltham employees from Elgin, that Elgin took from Waltham. In the fall of 1870, the new building was finished. By early 1872, the first watch was ready. Offices were opened in New York and Chicago, but hard times fell upon them. With a large inventory of finished movements, but with little demand for them. The funds began to run low. In 1875, a new company was formed and assumed the liabilities of the old company. They did no better even though the inventory increased and the company was enlarged. In 1879, the company was again reorganized and the name changed to the Springfield-Illinois Watch Company. In 1886, the company marketed a four size ladies watch, which was the smallest watch made in America at the time.

In 1885, the name changed once again to the Illinois Watch Company. Business continued until 1927 when it was sold to the Hamilton Watch Company. Hamilton continued the factory until 1933 when they sold half of the equipment and moved the rest to Hamilton. Movements were finished at Hamilton until 1939. All told, the company produced 5,600,000 movements.

Timexpo Museum

Text and photos by Chip Lim, CMW, CMC, CMEW

Semper Paratus! The trip started out innocently enough: a visit to the U.S. Coast Guard Academy in New London, Connecticut (CT) followed by a trek northwest to radio station W1AW at the American Radio Relay League (ARRL) headquarters in Newington. But then one never knows what awaits down the road...

Almost within line-of-sight of the W1AW antenna tower is Pieces of Time LLC, owned and operated by AWI Academy of Watchmaking graduate Rick Littlefield, CW, CEWT. From his humble beginnings at a home bench some ten years ago, Rick has become one of Newington's premier horologists, specializing in the service and restoration of vintage American timepieces. During the course of conversation in the bright and airy street level storefront location on bustling route 175 that he moved into a year ago, an inquiry was made about the exhibits at the nearby Timexpo Museum. Not yet having been there himself, mere moments after closing time we found ourselves motoring westward to Waterbury to check them out.

Unlike the American Clock and Watch Museum in Bristol (CT) whose focus is American horology (HT, July 2000), the Timexpo Museum raison d'etre is multifaceted. In addition to chronicling the evolution of the fledgling Waterbury Clock Company into the present day Timex Corporation, it challenges viewers with interactive anthropological exhibits from the Pacific Rim and explores the mound builders of North America. Turning off route I-84 at exit 22, visitors are greeted by "Big Moe," a 40-foot-tall stone-finished polymer replica of an iconic Easter Island moai seated serenely next to the museum which occupies the three story red brick headquarters of the former Scovill Brass Works.

In the mid-1990s the factory complex which gave Waterbury its nickname 'Brass City' was redeveloped into a shopping center; only the stately 19th century headquarters building and a solitary smoke stack were spared. Enter the Timexpo Foundation Incorporated, an offshoot of the Timex Corporation, which had been looking for a home. In conjunction with the Naugatuck Valley Development Corporation (NVDC) and the Connecticut Department of Economic and Community Development, a budget of nearly $5,000,000 was secured to renovate the building and underwrite exhibit installation. Construction commenced in July of 1998, and the museum welcomed its first visitors on the 4th of May 2001.

What would a horological museum be without a clock tower? Not having had one originally, a four dial clock, sans bell, and backlit in Timex's trademark Indiglo®

A view of the clock and watch gallery

Ingersoll Yankee: "The watch that made the dollar famous."

Origins of the Waterbury Clock Company

Post World War 2 products

teal blue (but what else?) was added on the roof. The top of the tower is capped with a ziggurat, or stepped pyramid shape, which symbolizes the museum's archaeological exhibits.

At first glance the thematic connection between the moai and Timex leaves some baffled. Carl Rosa, Museum Director/Curator, provided this insight: the Fred Olsen family, which owns the Timex Corp. have an avid interest in history. While very much devoted to the study of the lineage and legacy of the Waterbury Clock Co., archaeology of ancient civilizations and research into ocean navigation are also passions. The work of the late Dr. Thor Heyerdahl, a family friend and fellow Norwegian, was the inspiration for the latter exhibits. Perhaps best known for his epic voyage from Peru to Polynesia on a balsa wood raft named Kon-Tiki, in 1992 the renowned anthropologist and explorer joined with the Olsens to establish the Foundation for Exploration and Research on Cultural Origins (FERCO).

The popular Ingersoll Mickey Mouse watch display

John Cameron Swayze and the famous outboard motor torture test

The clock shop and restoration area

Experiment with Pacific Ocean currents

Prior to joining the Timexpo staff as the Director/ Curator of Archaeology, Madeleine Lynn worked on a number of projects for the Olsen family and FERCO. During the last six years, among other activities, she was instrumental in bringing the Cultural Origins and North American Mound Builders exhibits to fruition. With the completion of these programs, an arduous decision was made to leave the museum in October 2001 to pursue her interests in China and its culture (she has a master's degree in Asian studies). As of this writing her position remains unfilled.

Carl Rosa has been involved with Timexpo since 1993 when he was hired to grow the Corporate Time Collection, develop plans and programs for the museum and establish a repository for the Timex archives. A native Nutmegger with a background in political science and contracts administration, his favorite piece in the collection due to its rarity is a 104 inch high Waterbury tall case

clock with grid iron pendulum—it was only in production for one year. Anyone care to guess which year?

The approximately 8,000 square feet of Timexpo exhibit space is distributed over three floors, and consistent with the current practice was laid out in a "top down" arrangement by the Boston design firm of Krent/Paffett Associates Inc. Interactive exhibits, both traditional "turn-the-crank" and electronic versions are located throughout the galleries. Well-traveled *HT* readers may have visited another of their commissions, the Binney & Smith Company's *Crayola Visitor's Center*, a crayon factory museum in Easton, PA.

Upon arrival on the third floor, visitors are introduced to 1850s Waterbury when brass manufacturers such as Gordon Burnham and Aaron Benedict expanded their product line to include mass-produced brass movement clocks; the Waterbury Clock Co. was incorporated in 1857. Followed in 1880 by the Waterbury Watch Co., Daniel A. A. Buck's *Long Wind* pocket watch pioneered manufacturing methods that made reliable timepieces affordable for ordinary people. A display reminds one just how l-o-n-g the *Long Wind* mainspring is (nine feet/274 cm) and of its 158 half-turns of winding to obtain 30 hours running time. Robert H. Ingersoll and the Yankee dollar watch continue the story. On view are copies of the orders from 'both' Mark Twain and Samuel Clemens for watches.

A former vault area contains a re-creation of a clock repair shop, with a difference. Throughout the month, usually on Thursdays, volunteer watch/clockmakers, some from the Timex Corp., may be found performing restoration work on items from the 1300+ piece Timex Corporate Time Collection. Some of the completed clocks can be seen in an adjacent gallery as well throughout the building. Questions are always cheerfully entertained (as are new volunteers!)...

It is common knowledge that Mickey Mouse literally saved the financially ailing Waterbury Clock in 1933 with the introduction of watches bearing his likeness at the Chicago World's Fair. Crowds of both the young and the young at heart that perpetually crowd around this exhibit seem to attest to Mickey's continuing popularity. A side note: Mickey's dad Walt Disney can also take credit for rescuing an up-and-coming firm in 1938 after their $538 in operating funds was nearly exhausted. Walt's purchase: eight model 200-B audio oscillators to calibrate the recording equipment for the film Fantasia. The company: Hewlett-Packard.

The second floor continues with the soon to be re-christened U.S. Time Company and its contributions to World War II, among them products such as gyroscopes and anti-aircraft fuses. First aired in March 1958, one of the best-remembered moments in television history is re-created for museum goers to try for themselves: the outboard motor torture test. Although it isn't possible to strap your own watch to the propeller for the trial, an ever vigilant trench coat-clad cutout John Cameron Swayze with microphone in hand is present to report the results. "It takes a lickin' ..."

Renamed the Timex Corporation in the 1970s, digital developments like the Indiglo®, Data Link and the Internet Messenger product lines round out the time exhibits.

The second floor is shared with the Cultural Origins Exhibits. An interactive watertable permits experimentation with Pacific Ocean currents to see how ancient civilizations such as the Polynesians could have spanned great distances, as demonstrated by Thor Heyerdahl. Models and other artifacts show how they may have prepared for those voyages and the equipment used.

The ground level brings the visitor back to North America to explore how Mound Builders constructed massive earthen mounds which were oriented in such a manner as to be used to keep celestial time. Again, there is a possible connection to navigation and trade.

The remainder of area comprises a small resource center that has a number of related publications and electronic media, a multipurpose room for community events and/or private functions (contact Cathy Conti, Program Development Specialist) and the Timex store. Here's an interesting discovery: out of all of the high-tech electronic watches available, a consistent best seller continues to be the classic analog day-date models!

In some ways museums are like airports—they might be considered as continuous works in progress. After a year of operation, the Timexpo Museum has yet to reach its full potential, both in terms of exhibits and attendance. The establishment of a full library/archives, installation of additional exhibits and getting more of the collection out on display are among the future plans. We wish Carl and staff continued success with all of their projects. It is apparent that the Timexpo Museum is well on its way to living up to its motto: "It's about TIME for family fun."

Timexpo Museum
175 Union Street
Brass Mills Commons
Waterbury, CT 06706
http://www.timexpo.com
tel: (203) 755-8463
hours: Tuesday-Saturday 10:00-17:00,
Sunday Noon-17:00

Foundation for Exploration and Research
on Cultural Origins (FERCO)
http://www.ferco.org

The Modern German Clock Movement

Part 27

We Get Letters

Mark Butterworth

Readers and clock repair persons often provide ideas and ask questions that over time build up and are far more important to write about than whatever I had on my mind. This is one of those times. In addition, it had always been my idea to give an update on news in the movement manufacturing business that would be of interest or to have an impact on the repair person. One final goal is to help in the communication between the clock shop and the material supply house.

I think the best summation of a number of e-mails, letters, etc., is from a fellow AWI member and friend in Arizona. He e-mailed me expressing frustration over the fact that there is not always information in the catalogues detailing design changes that have been made in some replacement movements which require alteration before installing them in the clock case, or possibly alterations required in the clock case itself. We will discuss at least the major issues in this article.

Most of the German movements still manufactured today, Hermle, H. Herr, Kieninger, Regula, and Urgos have been produced in their same basic form for the past fifty years. They have been manufactured for thousands of clock companies in hundreds of countries. The fact that these changes are actually few is remarkable in itself. Witness the Asian movements made just within the past ten years for which it is impossible to get an exact replacement. These changes came about for several reasons:

1. Modifications were made at the request of the clock company purchasing the movements. An example of this is a different suspension post length on a grandfather clock for different pendulum bob diameters and also different case depth. Unfortunately for both the repair person and the supply house, the movement manufacturer has been all too accommodating. Of course it was also this flexibility which allowed those movement manufacturers to survive.

2. Modifications have been made to improve the movement. An example would be the "A" frame suspension that Hermle now uses on its grandfather clocks to provide a stronger support for the large pendulum bobs which now comprise a large part of sales.

3. Modifications have been made to save money. The great majority of these do not actually affect the ability to replace the movement without alteration. An example would be changing the chime roll in the Kieninger KSU models to a solid cast drum.

4. Modifications have been made because the original subcontractor for a part or assembly either went out of business or no longer makes that part and no other reasonable avenue is available.

5. It was never envisioned that there would be a major market for replacement movements themselves. The movement manufacturers thought only in terms of making movements for finished clocks. In that respect alterations were not a problem. This has now changed dramatically and the German makers will be more aware of the effect of design changes on future sales.

Having said that, what are some of the changes which have occurred over the years and what is some of the news of the industry that affects the repair person? What can be done to minimize these surprises?

To answer the second question first, obviously those of us in the material business need to do a better job at informing the customer in our catalogues. Second, in my experience, many repair persons do not read the information already in the catalogue. Easily 90% of the questions I am asked on the telephone each day have the answer in a supply house catalogue. Third, when ordering a movement, if one is not familiar with it, ask the question "have there been any variations or design changes on this model that would affect installation?" Fourth, make certain when ordering either a movement or a part for it that the execution number on the rear plate of the original movement is specified exactly as it is on the movement. Each number and letter has meaning. Sometimes, in the case of Kieninger especially, the information is scattered in different places on the plate. Often the information is guessed, looked at upside down and backwards through a mirror. Keep in mind that although the movements themselves generally interchange, the internal parts may not, depending on when the movement was manufactured.

When the replacement movement is received, it is suggested that it be compared side by side with the original. That way any adaptations that need to be made are done before installing in the case or driving 50 miles and then finding that something needs done.

Now, the original question—what material changes have occurred that would require alteration. This list certainly is not complete, but it is a start. Hermle changes:

1. The units made for Seth Thomas with the S.T. number A205-000 had what we call "outrigger" hammers and the hammers need to be transferred from the old unit to the new one or the chime block reversed with the order of the rods reversed in the block in the new replacement series 150-010 or 141-010/11cm. On the pendulum model the bob must be replaced also.

2. The S.T. models which are Westminster chime with 120 mm square plates require the chime block to be reversed and the order of the rods reversed. The pendulum model also requires that the bob be replaced.

3. The side hammer models 351-030 and 351-031 have the hammer assembly modified and the letter "A" follows the last digit (351-030A). As a result, the chime block will need to be raised 1" in the clock case.

4. The old S.T. A207-000 ship strike made by Hermle on some models had the "On-Off" reversed from the new ones. No modifications necessary, but customer should be informed.

5. Some of the cable wind grandfather units made around 1980 had an offset time winding arbor. This was in production only a few years. The models before and after had direct wind on that arbor as well as the others and to replace this model requires either drilling a new time winding hole in the dial or replacing the dial.

6. All of the bell strike units came with either one or two bells. Suppliers usually carry them with two bells only and if one bell is needed the other can be removed.

7. The grandfather units were generally made with the low suspension post until around 1980. The new models have a new "A" frame assembly. In changing from the low post to the high one, the pendulum needs to be shortened 1" as the new leader is longer than the old one, but the leaders do not interchange.

8. Suspension posts on the grandfather units were made in four different lengths. Suppliers carry as stock items what will cover 90% of the cases. Only two will solve all the problems. To be certain, specify whether the pendulum is lyre or wood stick. Wood stick uses a shorter post and lyre the longer one. To be absolutely certain measure from the rear plate to the end of the post.

9. There were several changes in the cable wound grandfather units in which the individual parts from new units do not interchange. Examples are cable, cable drums, and second wheels.

Urgos (purchased by Hermle 1998) changes:

1. Urgos now uses the same handshaft diameters as Hermle. As a result the old hands do not fit without alteration. Usually new hands are supplied but it is helpful to tell the supplier the length of the minute hand. The Urgos uw32 and uw66 series uses the same hands as all Hermle except the Hermle Flagship series (471, 1171, 2071). The UW03 series now has the same hands as the Hermle Flagship. The moon gears for the Urgos need reamed out to fit as well.

2. Some of the very old uw32 series had a T-style bottom to the pendulum leader or hanger. If so, the pendulum top must be replaced or part of the old leader soldered on to the new one.

3. A few of the older uw32 and uw66 units had a beat of 4080/hr while their replacements have a beat rate of 4050/hr. This requires lengthening the pendulum 0.5"-1" Those models are listed in the supply catalogue.

4. Suspension post lengths were also varied. Same instructions as for the Hermle apply.

5. The escapement system is now being converted to the standard Hermle escape wheel and verge (great improvement). The chain wheels on the uw32 series also have changed to use Hermle chain. As a result those and other internal parts are no longer interchangeable.

Kieninger changes:

1. In 1980 a new leader was put into use. To replace units before that time, a square needs to be filed out in the new one where the pendulum hangs.

2. For a short time in 1978-1979 a 14-day unit was produced. The chime weight was about 16 lbs. To replace this the weight must be cut down. In addition the bottom plate on which the weights hang must be replaced. They come with the new unit.

3. The RK and RU units were drilled in different places for the dial over time. There are a few instances in which the dial feet do not mesh with the new unit. The dial must then be attached to the clock case.

4. The J series as well as the KSU had some internal changes over time and as a result the new parts are not always interchangeable.

Hopefully this listing will not lead one to believe that all has changed over the years. In fact, the opposite is true. Very little has changed that affects the repair person. It should alert one to the fact that there are some variations among the roughly ten million German mechanical clock movements that need to be taken into consideration.

Final thought: *"Society is always taken by surprise at any new example of common sense."*—Ralph Waldo Emerson.

New Members

Arizona
Yelverton, Duke—Tucson, AZ

California
Simmons, Brian—Woodland Hills, CA

Florida
Goss, Kenneth—Orlando, FL*

Indiana
Stokes, Robert—Indianapolis, IN
Voegerl, John F.—Bloomington, IN
Sponsor: Gary L. Neff—Bloomington, IN

Maine
Frkonja, Sally—Sanford, ME

Maryland
Tunstall, Marvin—Baltimore, MD

Nevada
Cashton, Rich—North Las Vegas, NV

New Hampshire
Menez, Frank J.—Dover, NH

Ohio
Shishlo, Eduard—Columbus, OH

Pennsylvania
Guerriero, Gregg B.—Williamsport, PA
Murat, Gary—Feasterville Trevose, PA
Rebel, William—Beaver Falls, PA

Puerto Rico
Lopez, Jose J.—Umado, PR*

Rhode Island
Sacco, Michael—Westerly, RI

South Carolina
Gin, Etienne—Easley, SC

Texas
Oliver, Kevin—Dallas, TX

Washington
Sharkey, Michael—Friday Harbor, WA

International
Fong Fu Sin—Labuan F.T., Malaysia
Koolen, Leo M.—Delft, Netherlands
Lodhia, Jaychand—Gujrat, India
Lonergan, Alphie C.—Co. Armagh, Ireland

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

Explanation of Watch Water-Resistancy Ratings

Steve Wells

Steve Wells works for Capital Watch Services in Wellington, New Zealand. He handles the clock work and over-the-counter jobs such as batteries, straps and the like. Capital Watch Services employes four full-time semi-apprentice watchmakers, two seasoned watchmakers, and four to five shop staff.

The basic figures for the water resistancy ratings of watches are derived from the ISO (International Standards Organization) 2281 document. (The particular revision being referenced here is ISO 2281:1990(E), 3rd Edition).

Most watches will have some form of water resistancy rating printed on their dial (the watch face) or on the back of the case. Usually in the form of "Water Resistant X meters" where X is usually 30, 50, 100, 150 or 200. Additionally the word "Divers" may be seen - this represents a higher level of water resistancy which requires different tests as outlined in the ISO-6425 specification for Divers grade watches. Where no rating is given it is assumed that the watch is not suitable for immersion in water and no guarantee should be given as to the water resistance of the watch. Unless specified as a "Divers" grade watch, the watch should not be used as such.

With regards to the phrase "Water proof"—This is an outdated expression which is no longer in use in the industry as it implies that a watch is completely impervious to any form of leakage regardless of conditions, this is not the case, as given extreme enough conditions (e.g. extreme ocean depths) there is virtually no way of making what is essentially a container such as a watch case completely watertight. The expression "Water resistant" (or just "Water resist," "Etanche" in French or "Wasserdicht" in German) is now used instead which can be taken to mean that it only resists water and given appropriate conditions this resistance may be overcome and the watch may leak.

The words "Water resistant" and the "depth" rating do not directly rate to each other. To be eligible to be certified as "Water resistant" a watch must pass a combination of 5 of 6 tests. These tests are as follows:

(Unless specified the watch should be at 18°C to 25°C of temperature during all tests.)

1) Resistance to air overpressure - A watch should not leak when subjected to a pressure of 2 bar at a rate of more than 50 micrograms of air per minute when put into a pressurized dry chamber.

Note: 1 bar is a pressure level equivalent to the watch being held motionless at a depth of 10 meters of fresh water. Movement of the watch and different water densities (such as those found in sea water) can affect the pressure on the watch possibly causing the pressure level to exceed this amount. Hence 2 bar is equivalent to 20 meters below water (or 2 atmospheres). 1 bar is equivalent to 10 Kilopascals of pressure.

2) Condensation Test - The watch is heated to a temperature of 40°C to 45°C then a drop of water of 18°C to 25°C is placed on the glass. After approximately 1 minute no condensation should have formed on the inside of the watch glass.

3) Resistance when immersed in water at a depth of 10 cm - The watch should show no signs of leakage when left in 10 cm of water for 1 hour.

4) Resistance of operative parts - The watch should not leak when a force of 5 Newtons is applied to the crown or other operating buttons at an angle perpendicular to the casing while the watch is immersed in 10 to 10 cm of water for 5 minutes.

5) Resistance to different temperatures - At a depth of 10 cm in water the watch should be heated successively to 40°C for 5 minutes, then 20°C for 5 minutes, and then again to 40°C for 5 minutes. The watch should show no signs of leakage at any stage during this test.

6) Resistance to water overpressure - The watch must be immersed in water, at a pressure of 2 bar for 10 minutes and then brought back to the ambient pressure level within 1 minute. The watch should show no signs of leakage after this time.

If the watch passes tests 1, 2, 3 and 6 or 2, 3, 5 and 6 (or indeed, all 6 tests), then it is deemed to be "Water resistant" to 2 bar (possibly also given as 20 meters, 2 atmospheres).

The depth rating is obtained if the watch passes test #6 as the higher pressure levels, e.g., if it can stay immersed for 10 minutes at a pressure of 10 bar as well as passing the other required "Water resistancy" tests then it is eligible for a rating of 10 bar (100M, 10atm or 300 feet).

Any watch claiming to be "Water resistant" or specifying a depth rating without a representative sample of the watch being subjected to these tests should not be claimed as being "Water resistant" as specified by the ISO2281 rating.

Maintaining Water Resistancy

It is recommended that the water resistancy of a watch is checked every 6 months or so (or maybe less frequently if rarely used in water) by a qualified watchmaker (not jeweler), or at least when the watch is opened for servicing or replacement of a battery/power cell. While the testing itself will not make any difference to the resistancy of a watch, it may expose possible wear in the casing or sealing parts which may cause the watch to leak when immersed in the future. The process of opening the watch in most cases will not "break" the seal and if resealed correctly afterwards the water resistancy of the watch should be at least as good as it was before opening, in general some form of sealant grease should be used to preserve the rubber seals and assist in sealing. In cases where the seals are obviously worn or damaged due to exposure to chemicals, poor workmanship when the watch

was previously opened, or merely perished from age, they should be replaced and the watch resealed and tested.

The testing procedure used will generally be similar to the air over-pressure test for the ISO2281 rating where the watch is placed in a pressurized chamber and is checked to see that it does not leak at a level greater than 50 micrograms per minute. If it fails this test then it may need some or all of its sealing parts replaced and another test performed. The exact steps required will be able to be determined by the service person.

If the watch has a screw-down crown, it must be in the screwed-down position before any immersion if the watch is to be water resistant. Failure to have the crown screwed in will almost certainly cause the watch to leak if immersed.

Showering

It is by no means recommended that a watch be showered in regardless of its water resistancy and depth rating. The chemicals found in soaps, shampoos and such, are quite effective at turning the rubber seals used in watches brittle or dissolving them outright depending on the materials used in the production of the seals. The heat of the water may also cause the various different materials the watch is produced from to expand at different rates, and when the watch cools the air inside it will contract which will cause it to try to suck water into the casing resulting in anything ranging from minor condensation to water damage to the electrical and/or mechanical components of the watch.

Sudden temperature changes (particularly from hot to cold, such as laying in the sun and then jumping into water) can cause the natural moisture in the air inside the watch to condense on the glass. Left alone this will generally clear as the water evaporates, but if it remains foggy it is suggested that the watch is checked by a qualified professional as soon as possible to prevent damage.

Depth Ratings

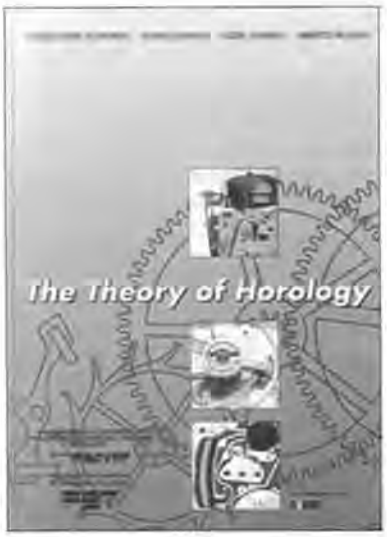
The water over-pressure rating specified enables the watch to be used as following:

30M/100Ft/3ATM/3Bar	Suitable only for general use, resistant against light splashes, rain and similar. Not suitable for immersion.
50M/160Ft/5ATM/5Bar	Suitable for surface swimming. Unsuitable for water sports such as surfing or waterskiing.
100M/300Ft/10ATM/10Bar	Suitable for surface swimming, snorkeling and water sports.
150M/500Ft/15ATM/15Bar	
200M/660Ft/20ATM/20Bar	
Beyond 200M	Watches with an over-pressure depth rating beyond this level should be Diver certified and suitable for professional Scuba diving. If the watch does not display the "Diver" marking on the dial or caseback, then this may not be the case.

Seiko S-860 Multi-tester Addendum

Since the publication of the Seiko S-860 Multi-tester review (*Horological Times*, January 2002) a design anomaly with the 4 uA range of the *Supply Voltage and Gate Time* function has been identified. Under certain circumstances while testing ***a complete*** step motor quartz movement, a false blocked train indication may be observed. A function of the magnetic and electrical efficiency of the motor in the watch under test, its voltage drop may be greater than the S-860 4 uA range amplifier can handle, and an erroneous reading/indication will occur. The 40 and 400 uA ranges have better regulation and operate normally. This appears to be a price/performance consideration, and is annotated in the unit's operating instructions. Due to the fact that circuit board resistance characteristics more closely match those of the amplifier, reliable current values can be obtained when testing them separately using the 4 uA range. To reduce the possibility of unnecessary maintenance and to be consistent with standard measurement practices, all tests should be started using the highest range, then decreased to improve resolution.

Book Review



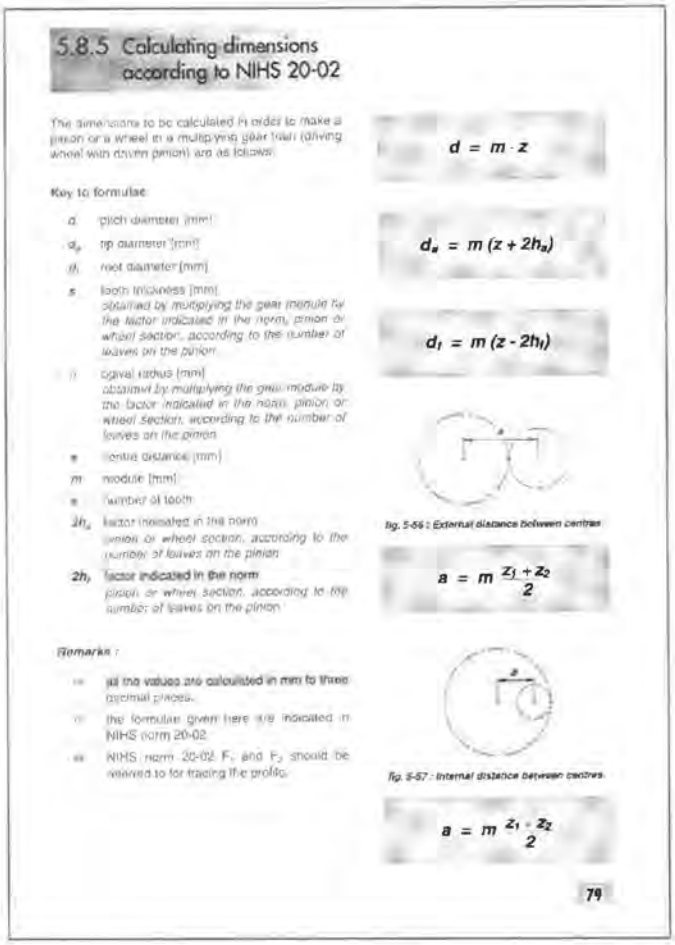
Theory of Horology, contributing authors: Charles-André Reymondin, Georges Monnier, Didier Jeanneret, Umberto Pelaratti. Published by The Swiss Federation of Technical Colleges and Watchmakers of Switzerland Training and Educational Program (WOSTEP). In Collaboration with GREME (The French-Speaking Swiss Group of Specialists in Teaching Media). Translated to English by Mrs. Rosamund Bandi-Tebbutt and Mr. Derek Pratt on the technical aspect.

The following book is indeed a breath of fresh air in the world of horology. Upon receiving it, I immediately leafed through the pages, and I saw one colorful picture after another. Pictures and diagrams were clear, concise, and drawn in several colors, something which is a rarity in books on horology. This hardcover book of about 360 large semi-glossy pages of 8"x 11.5" is printed in full color, and every page has anywhere from one to five or more pictures and diagrams.

Who is this book for? Everyone who is involved one way or another in horology, simple enough to be understood by the discerning amateur, yet detailed enough to be used as a reference book by the practicing professional.

Since it is titled *Theory of Horology* it is just that, theory on horology pertaining to watches and clocks. This book is not a detailed guide of how to repair a watch or clock, but from the descriptions given and from the detailed line drawings of all types of timepieces, one can easily deduce methods of repair and re-assembly.

The book commences with the beginnings of time measurement from the Stonehenge era, the use of stars and planets as reference points all the way to our present day horological complications. *Theory of Horology* contains examples and line drawings of simple mechanical wristwatches to self-winding, tourbillions, perpetual calendars, moon phases, and repeaters, to French, German, Swiss striking and Atmos clocks. It also explains in detail most of the well-known types of escapements for watches



5.8.5 Calculating dimensions according to NIHS 20-02

The dimensions to be calculated in order to make a pinion or a wheel in a multiplying gear train (driving wheel with driven pinion) are as follows:

Key to formulae:

- d pitch diameter [mm]
- d_a tip diameter [mm]
- d_f root diameter [mm]
- s tooth thickness [mm] obtained by multiplying the gear module by the factor indicated in the norm, pinion or wheel section, according to the number of leaves on the pinion
- r rayal radius [mm] obtained by multiplying the gear module by the factor indicated in the norm, pinion or wheel section, according to the number of leaves on the pinion
- a centre distance [mm]
- m module [mm]
- z number of teeth
- $2h_a$ factor indicated in the norm pinion or wheel section, according to the number of leaves on the pinion
- $2h_f$ factor indicated in the norm pinion or wheel section, according to the number of leaves on the pinion

$$d = m \cdot z$$

$$d_a = m\,(z + 2h_a)$$

$$d_f = m\,(z - 2h_f)$$

fig. 5-56 : External distance between centres

$$a = m\,\frac{z_1 + z_2}{2}$$

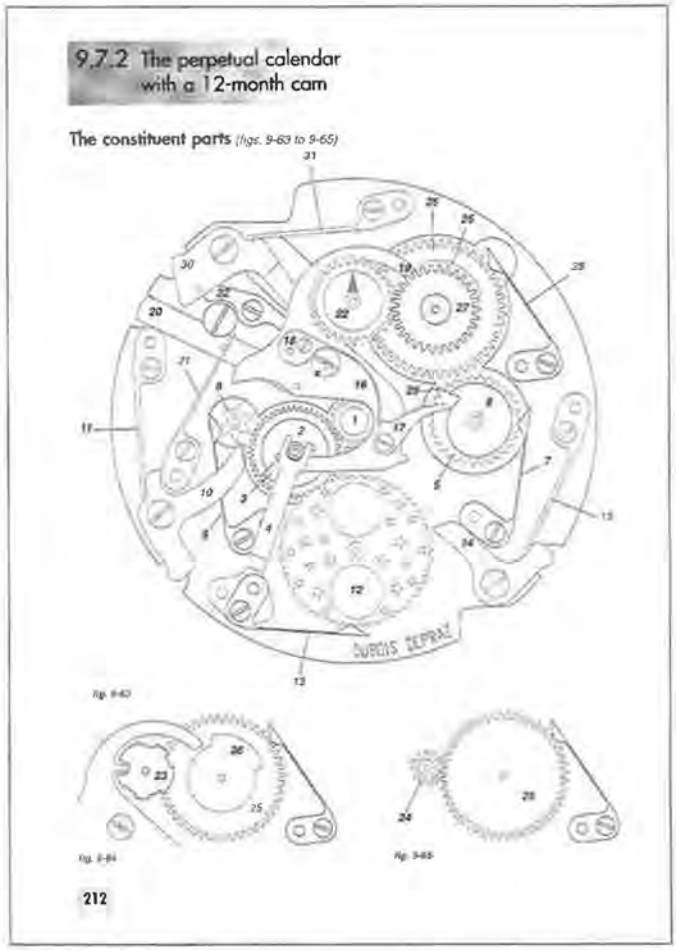
fig. 5-57 : Internal distance between centres

$$a = m\,\frac{z_1 - z_2}{2}$$

Remarks :

- all the values are calculated in mm to three decimal places.
- the formulae given here are indicated in NIHS norm 20-02.
- NIHS norm 20-02. F_1 and F_2 should be observed to for tracing the profile.

79



9.7.2 The perpetual calendar with a 12-month cam

The constituent parts (figs. 9-63 to 9-65)

fig. 9-63

fig. 9-64

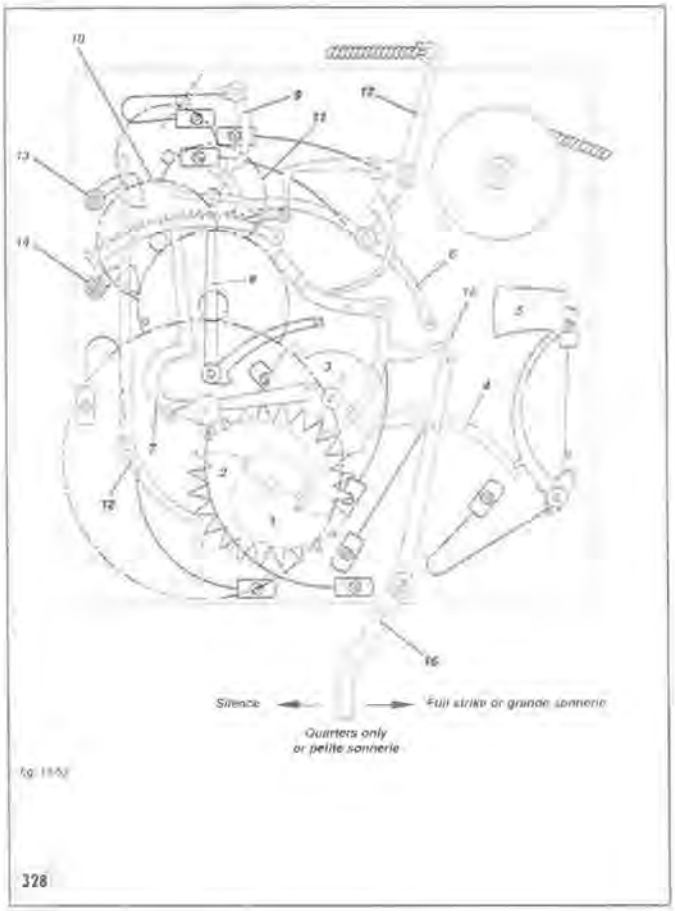
fig. 9-65

212

1	12-hour wheel	17	Main pawl
2	24-hour wheel	18	Main-pawl spring
3	24-hour wheel finger	19	Main-lever beak
4	24-hour wheel bridge	20	Date and day-star corrector
5	Date star, 31 teeth (date indicator)	21	Main-lever spring
6	Date cam	22	Leap-year wheel
7	Date-star jumper	23	12-month cam
8	Day star, 7 teeth (day indicator)	24	12-month cam pinion
9	Day-star jumper	25	48-month wheel
10	Day-star corrector	26	Leap-year cam
11	Day-star corrector spring	27	Intermediate wheel
12	Moon star (moon indicator)	28	48-month wheel jumper
13	Moon-star jumper	29	48-month wheel finger
14	Moon-star corrector	30	Month corrector
15	Moon-star corrector spring	31	Month-corrector spring
16	Main lever (multiple lever)	32	Month-corrector lever

Fig. 9-66. Perpetual calendar mechanism with 48-month cam in a Standplain watch.

213



and clocks. It describes among many others, watch jewel manufacturing, electroplating of movement parts, different types of watchcases, and the effects of bodily salts on bracelet rivets. It reminded me of our science books from my school days in 1980s with all the colorful diagrams, using clear wording.

One more thing I like about *Theory of Horology* in that it has all the appropriate formulas in most of the chapters set in large yellow boxes, which I believe are, in order to help us better retain them in our photographic memory. Not surprisingly, since it is written with the sanction and support of several high ranking and well-known figures in the horological industry. It is definitely the culmination of some of the greatest minds in our field.

Theory of Horology is currently the "bible" of every novice and even the well seasoned watchmaker, clockmaker, and student.

It ends with an eight (8) page section on exercises (with answers given of course) which I also found to be quite interesting as this will surely challenge some of the best of us.

Definitely a must for our ever-expanding book shelves but I assure you, it will not serve as a mere decoration.

Manuel Yazijian

Huckabee Tutorials for Individual Study

The Henry B. Fried Library has three volumes of self-study material written by J.M. Huckabee and edited and adapted by Charles E. Baldwin. The volumes are produced in color to insure the clarity of the demonstrations. Each volume is limited to 3 copies. Copies may be borrowed from the library for a two-week period.

Other Huckabee tutorials available in black and white include:

- *Turning Between Centers*
- *A Tutorial Guide for the Clockmaker*
- *Clockmaking Illustrated: The Lathe, Steady Rest and Pivot Repair*

Requests should be sent to: AWI Library Requests, 701 Enterprise Drive, Harrison, OH 45030-1696, Phone toll free 1-866-367-2924 ext. 305, or (513) 367-9800, Fax (513) 367-1414, e-mail: mhuff@awi-net.org

The Idea Book of the Watchmakers Lathe
89 pages, 223 color photos

In this book Huck shares his fine collection of watchmakers lathes, accessories, tools and creative techniques. It is excellent information and training material designed to sharpen the lathe skills of the improving clockmaker. The lathes and tools illustrated range in age from 25 to 80 years. Well-maintained tools of this type can have a useful life of several generations.

Lathe Exercises for the Clockmaker
95 pages, 232 color photos

This book is a companion volume to Huckabee's *The Idea Book of the Watchmakers Lathe*. In this volume Huck shows practical examples of how to use the lathe in clock repair. He moves from making simple parts, to tools, and on to the more difficult task of wheel, hub and arbor work.

These techniques have been developed over more than a half century of experience with lathes in a wide range of sizes. The practical illustrations are adapted to the typical watchmakers lathe.

Repairing the American Clock Movement
111 pages, 232 color photos

The repair of the American antique clock is both an adventure and a challenge. The material in this book has been prepared to provide instruction and guidance in the basics of clock movement repair. It was designed mainly for the AWI educational program for students involved in clockmaking. It may also serve as a self-study guide for those familiar with clock repair.

The work in this book is centered around a simple time-only clock movement of the "box regulator type" manufactured in the first part of this century. Many of the repair techniques may be adapted to movements of similar size and type, even though not identical to the example.

AWI Movement Bank/Material Search Network

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.

1 Z4 CH Meylan pocket watch, serial #40542, 18 L, *mainspring 000 x 3 x 24 inches*

1A2 Longines 350 or 352 *movement complete*

1A4 Trenton 0 size, 3 finger bridge, *movement complete* or *main plate with all settings and winding parts attached*

1A7 Gruen 18 size *ratchet wheel screw*, #5415/?

1A8 Howard 18 size *balance cock - series III*

1A9 Omega 17 J, automatic, case #KM6068, #62862 Sea Master Diville, #20273127, *case - gold-filled or steel in good condition*

If you can supply any of these items please contact: AWI Material Search Network, American Watchmakers-Clockmakers Institute, 701 Enterprise Drive, Harrison, OH 45030-1696. Toll Free: 1-866-367-2924, ext. 305; Phone: (513) 367-9800, Fax: (513) 367-1414 or E-mail: mhuff@awi-net.org.

The AWI-ELM Trust, in cooperation with the American Watchmakers-Clockmakers Institute, maintains this unique member service to assist professionals in replacing hard-to-find parts for vintage timepieces. When a member cannot locate a replacement part through normal sources, the Movement Bank/Material Search Network (which consists of movements, timepieces and materials donated to the Trust) is often able to help. There is a fee of $10.00 for each search. The fee will be waived if a part or movement of equivalent value is donated to the Movement Bank.

The AWI Material Search Network first contacts several dozen material houses and outlets on behalf of the member to determine if the missing part is available from any commercial source in the United States or Canada. If no other source is available, the Movement Bank is searched for a usable spare part. If found, the fair market value of the part will be assessed and the part made available for sale to the member. If the part cannot be found in the Movement Bank, the search will be listed in the *Horological Times*.

Questions & Answers

(Continued from page 4.)

Panama Pacific International Exposition in 1915.

As unique as it was, it is a difficult movement to adjust. In fact I've heard that Herschede fielded specially trained technicians to adjust and service these movements sometime after they came out in 1909.

Yours is the 3rd variation of the same movement that we've seen in our shop. All are basically the same but have some components placed in different locations. One even has thinner plates than the other two.

Your chime roll shifting problem can be due to several things. First of all the large spring on the right side of the movement (looking from the front): if too weak, it will not push the chime roll fully to the left allowing the strike pins to line up with the strike hammer tails. If too strong it won't shift out of striking position. The articulated pin on the left end of the chime roll must insert into the hole in the spiral cam at the end of the 4th quarter chime sequence. Wear is the critical factor in the repair of this movement. Any kind of wear on the spiral cam track, the articulated pin or, the bearings of the chime roll, even the hammer tail ends and chime/strike pins on the chime roll can prevent the chime roll from shifting or shifting smoothly and stopping the clock. Lubrication in the spiral cam track that the articulated pin traces and on the chime roll arbor bearings is necessary, as well as at the point where the large spring pushes against the chime roll arbor. Use a high pressure grease that will stay in place.

The "shut off piece" that you describe and show on the photo is correct... it is not a replacement. It is actually a trip lever that lifts the warning lever off the holding cam. This piece acts as a sensor or feeler arm that tells the clock that the chime sequence has ended. This arm is angled on its end to ride over any pin that might get in the way during the shifting of the chime roll.

One of our members, Mr. Edwin Sowers, III, wrote an excellent article on this movement in the June 2001 issue of the *Horological Times* magazine. Study his article with your movement in front of you. And then very carefully study the operation of each segment of the chime/strike sequence until you understand what is actually happening and where. This movement needs very little adjustment... mainly the end of the chime feeler arm, the shift spring, and the relationship of the hammer tails to the chime roll pins.

David A. Christianson,
Technical Editor, CMW, CMEW

Question

Acustomer brought me a Universal Geneve Unisonic-sub to repair. After giving a brief lecture on the quality of the older Swiss electrics, I removed the case back. Lo and behold, the movement was a 218 Accutron with the dial repositioned so the date was at 3:00. The movement was engraved Universal Geneve T 1-52.

I have worked on a lot of Bulova Accutrons and many of the Swiss versions, but I had always believed the Swiss (Omega, Eterna-Sonic, etc.) used only the Swiss version after purchasing the patent rights from Bulova, I did not know Universal Geneve used the original 218 Accutron movement.

I like to be able to tell my customers as much as I can about their watches but I checked the Internet and could find no information on this. We repaired the Swiss Accutrons in 1973 as I remember so I would guess these Universal Geneves were available in the early '70s for a year or two. Know anything about them?

Richard A. Schauer
Redmond, WA

Answer

Bulova made the Accutron 214 and 218 in their New York factory for the U.S. market and they are marked USA. Bulova also owned the Universal Geneve factory from 1967 to 1977 and manufactured the 214 and 218 movements for the European market, which were marked Swiss. These were marketed as the "Unisonic Tuning Fork" watch.

According to Henry Frystak, our Mr. Accutron, the Swiss 218 Accutrons were marked as caliber "218F" to distinguish them from the "218G" which were manufactured by Citizen Watch Co. for the Asian market. The Swiss and Japanese 218 movements were rotated in their cases so the stem appeared at the 3 o'clock position (i.e., the dials were printed about 30° off center from the U.S. models.

Also, according to Henry, the 218F movement used a 2-step stem and the 218G used a 3-step stem with each having a different yoke and set lever than the American version, because the 218F & 218G models had a current disconnect switch on the component coil side of the circuit.

Bulova licensed the tuning fork technology to Ebauches SA in about 1973. They balanced the tuning fork to eliminate the Accutron's original position and then put it into their own movement design, which they patented themselves. These movements were marketed as the "Eterna-Sonic" watch and showed up in the U.S. market in the cases of Wyler, Longines, Omega and Zenith.

I'd like to thank Henry Frystak for the information that he was able to add to this important aspect of American watch manufacturing.

David A. Christianson,
Technical Editor, CMW, CMEW

Horological Times Seeking Articles

Linda Chrysler
Chairperson, *HT* Advisory Committee

The *Horological Times* (*HT*) magazine is a unique publication. It is written entirely by the members, for the members, and distributed only to members. For many, this is the only regular contact they have with the American Watchmakers-Clockmakers Institute (AWI). As a result, the magazine strives to provide technical and horological related information in a format which can be used on a daily basis by the watch or clock repairman. This may include technical repair information, historical data, bench tips, etc.

The *HT* staff consists of two employees. Donna Baas, a 19-year employee, who is Managing Editor and Advertising Manager and Katherine Ortt, Associate Editor and Layout/Design Associate, who assists with the editorial, layout and design of the magazine on a freelance basis.

The *HT* Committee is the most active committee at AWI, continually reviewing articles submitted for publication to ensure they meet the technical and editorial specifications of the magazine. The six individuals on this committee are active AWI members, are employed in the field of horology, and have extensive knowledge in watch repair, clock repair and related fields.

With the diverse and technical background of our membership, we continually solicit, accept and publish technical articles for the benefit and education of our members. Articles which are technical in nature, i.e. detailed repair specs, etc., for watches and/or clocks are more likely to be approved. Historical articles can be submitted and with detailed technical repair information, may be approved for publication. Remember, the *HT* strives to be a technical publication. With the large number of antique clocks and watches still in use, technical information on these historical pieces would benefit the membership. In addition to a one-time article, we accept a series of articles. For a series of articles, submit the first full article, as well as an outline of subsequent articles for approval. Compensation is given for all material approved by the *HT* Committee for publication.

Occasionally articles are submitted which do not merit publication. In those cases, we acknowledge receipt and give the writer specific reasons for declining the article. We hope that the writer takes our comments and revises the article to meet the technical specifications of the magazine.

Articles can be submitted via e-mail or first class mail. E-mail submissions can be via most software, but Microsoft Word, PageMaker and Photoshop software are preferred. Special arrangements should be made with the *HT* staff for other formats. Artwork submissions can be via e-mail; high resolution images are necessary for quality purposes. The original artwork, whether it is drawings, photographs or slides, is always preferred. Photographs/slides can be color or black and white. Articles submitted via first class mail should be typewritten and double spaced.

In addition to articles, the *HT* is always seeking cover material. Cover material should be horology related and should be submitted along with an article about the item featured. Cover artwork must be submitted via color slide. Any other media will not be accepted.

Jack Kurdzionak, CW

A Field Trip to Switzerland

The Kurdzionak family has been visiting Switzerland and the Basel Fair almost every year since 1994. At that time, Henry B. Fried introduced us to Europe when I went with him as part of his annual horological tour. On the 1994 trip we spent one day at Basel. I had never seen so many watches and clocks in one place and in one day in my entire life. The quality of the products displayed in the watch pavilion ranged from Patek Philippe to Pulsar with everything in between. There was a machinery building with horological tools from every major European supplier on display. Manufacturers of watch accessories such as bracelets, straps, watchcases, and even watch cells were all represented there. Another building featured jewelry from the finest manufacturers in all Europe. One entire building was filled with Asian suppliers of watches, clocks, tools, jewelry, and packaging. There was so much to be seen, that one day could not and did not do justice to the exhibition. I wanted to visit the Fair for another day or two but that was not possible. The tour group had a schedule to follow and was leaving the area. As I left the Fair, I privately vowed to return again.

Last year, I represented AWI at several Affiliate Chapter conventions and spoke to each group about visiting the Fair. Many members asked, "Would you be willing to take some of us along with you?" The answer was, "Yes, I'll look into that and maybe we can combine it with a class in basic watch repair at ETA's training center, which is not too far from Basel." I called ETA and found them very receptive to helping some American watchmakers, but unfortunately their schedule was full. They had a class scheduled for German watchmakers the week before the Basel Fair. Then, a few days later, they called and told me they had asked the Germans for permission to reschedule their class for a later date to accommodate our group. The Germans graciously agreed and the trip was now a go. An AWI member, travel specialist Nick Lerescu of Advantage Tours International, was enlisted

Our group enjoying a Rhine River dinner cruise as guests of Frederic Constant Watch Company.

to find a hotel, obtain rail passes, and make airline arrangements. *Professional Jeweler Magazine* agreed to provide complimentary passes for us to attend the Basel Fair. The training at the ETA Center is free so the only expenses involved were to be transportation, lodging and meals. Then, came the September attacks on NYC and Washington with their devastating results, which caused many to reconsider their travel plans. Several people who had planned to make the trip decided that air travel was not for them at this time. Our group shrunk a bit, but we still had nine signed up and ready to go.

We left for Switzerland on March 30 and arrived on Easter Sunday. We settled into our hotel in the watchmaking city of Bienne, just a few blocks away from the Omega and Rolex factories. The next day, Easter Monday, a legal holiday in Europe was a day of leisure for us. It gave everyone an opportunity to get to know one another and acclimate to the seven-hour time change from home. After breakfast, we walked to the railroad station and boarded a train for Geneva. The 1½-hour trip through some beautiful Swiss countryside was made even prettier by the lovely weather. In Geneva, we visited the Museum of Enamel and Horology after which we enjoyed an American style lunch at a Pizza Hut before we returned to Bienne. On Tuesday morning we had to get down to business. A ten-minute train ride from Bienne brought us to Grenchen and the ETA Training Center to begin our class in basic mechanical watch repair. We were warmly welcomed by our instructor, Alessandro Betti.

The city of Grenchen was, and still is, a watchmaking center. In the past it was the home of A. Schild, Nivada, Ebosa, A Michel, and Kurth watch companies just to name a few. Today, ETA, Eterna, Fortis, Breitling, and several others still operate factories in that city and are a major contributor to the local economy.

Mack Shuping hard at work in ETA's watch repair class.

Hans Weber receiving his certificate from Allesandro Betti.

A Swiss welcome to ETA's factory tour for our group.

Jack and David Kurdzionak with Glycine Watch Company's owners at the Basel Fair.

Watchmaking has been and still remains so important to Grenchen that the post office has a large, bas-relief model of a watch movement cast in concrete on its front wall. The model is complete with Incabloc shock absorbers on the balance jewels.

We studied at the training center for four days as Alessandro taught us the basics of repairing modern ETA mechanical movements, both manual wind and automatic. Although this four-day class was titled "Basic Watch Repair," its content was by no means simple. We studied proper lubrication procedures using Moebius oils, mainspring care, movement assembly, cleaning techniques, Etachron regulation, and the use of diagnostic equipment. Regardless of the experience level of the students, we all had plenty to learn. The Training Center, with its well-equipped classroom and workshop, has all of the educational tools required to teach the repair of ETA movements. Everything required for the class was provided including practice movements, spare parts, hand tools, and lubricants. The value of this Swiss training is priceless.

Each day, we left the classroom at noontime and walked a few blocks to the nearby ETA factory cafeteria where a delicious lunch, complete with coffee and dessert, was provided for us. On our third day of classes, Alessandro arranged for us to tour a nearby ETA manufacturing facility. That was a real treat to be able to watch as automatic machinery was cutting arbors and pinions for mechanical and quartz watches. The highlight of the factory tour was watching the actual manufacture of quartz crystal oscillators in ETA's climate-controlled facility. Although we could not enter those rooms, we were able to view the manufacturing operations through special panes of tinted glass, designed to prevent damage to the quartz crystals from outside sources of light.

On Friday, the final day of class, all participants received Training Center certificates, suitable for

framing, from Allesandro. After graduation we immediately boarded a train to Basel to attend the World Watch and Clock Fair, which had just opened one day prior. Our free passes to the Fair (Europeans pay about $100 to attend) were waiting for us at the admission desk. Immediately we began the business of checking out new watches, clocks, and watchmaking tools. We spent the next three days until Monday evening looking at timepieces and watch tools. There was so much to see in the watch and clock buildings that we never entered the jewelry display areas.

Most of our evenings were spent dining out at various restaurants. A special treat was a delightful Saturday evening cruise on the Rhine River as guests of the Frederic Constant Watch Company. All of our travel was done on our Swiss rail pass that was honored on all Swiss trains, busses, and trams. The train system in Switzerland is one of Europe's finest. Trains to almost everywhere leave at least one an hour and very often more frequently. When a train is scheduled to leave at 10:05, it leaves at that time, no sooner or later. Busses or trams, which go to every location in the city, serve every major train station and they run about every 10 minutes. You really don't need a car when traveling in Switzerland with its fantastic public transport system.

On Tuesday, our last full day in Switzerland we traveled to Zurich, Switzerland's largest city, where we visited the Beyer Museum and the Turler Clock display. Both are located on Zurich's famous Bahnhofstrasse, a very upscale shopping district. The Beyer Museum has one of the world's finest private watch and clock collection including many pieces by Breguet, Daniels, Graham, LeRoy, etc. The Clock in the Turler watch store is an astounding multifunction clock displaying astronomical motions in addition to the usual timekeeping functions. This clock took nine years to design and construct, and required 2400 pounds of brass to make its plates and 251 wheels that are mated with 155 pinions. This nearly 7 foot tall clock is solar powered from roof panels and radio synchronized to Coordinated Universal Time. It is truly a mechanical marvel and well worth a visit by anyone who appreciates horology.

Finally, we arrived home on Wednesday, April 10 to rest a bit before returning to work. All enjoyed the Swiss field trip and agreed that we should plan a return visit. The participants were Dick and Pat Vanaria, John Buerger, David and Jack Kurdzionak from Massachusetts, Mack and Jennifer Shuping and Rick Dunnuck from North Carolina, and Hans Weber from New Jersey.

Technically Watches

Pocket Watches and Their Maintenance
Part 51
The Elgin Timer (Continued)

Archie B. Perkins,
CMW, FAWI,
FNAWCC, FBHI

The Disassembly Procedure of the Timer Mechanism

When disassembling the timing mechanism, it is usually done in steps that allow the highest parts to be removed first and the lowest parts to be removed last. The following steps can be used to disassemble the mechanism.

Figure 1 shows the timer mechanism with all of its parts in position on the lower plate of the movement.

Figure 2 shows the parts numbered in the order in which they are removed.

Step 1. Remove the minute register pawl and its spacer. These are held down with a screw. The spacer fits between the base of the pawl and the watch plate. The base of the pawl can be moved back and forth on the spacer to increase or decrease the active length of the pawl for adjustment purposes. Figure 3 shows the watch movement and the minute register pawl and its spacer after their removal.

Step 2. Remove the connecting lever spring. This spring is held down by a screw. A steady pin in the base of the spring fits a hole in the plate to align the spring in the proper position. Figure 4 shows the movement with the spring removed.

Step 3. Remove the connecting lever and its connecting pinion by first removing the screw going through the lever. A bearing in the base end of this lever pivots on a post that is frictioned into the watch plate. The shouldered screw that goes through a hole in the lever allows the lever to swing back and forth so the connecting pinion can connect and disconnect from the seconds wheel. The shoulder on the screw is long enough to allow the proper freedom between the head of the screw and the top of the lever. The head of the screw prevents the lever from rising up on its stud. Figure 5 shows the lever and pinion after their removal.

Step 4. Remove the seconds wheel and minute recording wheel cock by first removing the cock screw. Figure 6 shows the cock after its removal.

Step 5. Remove the flyback lever

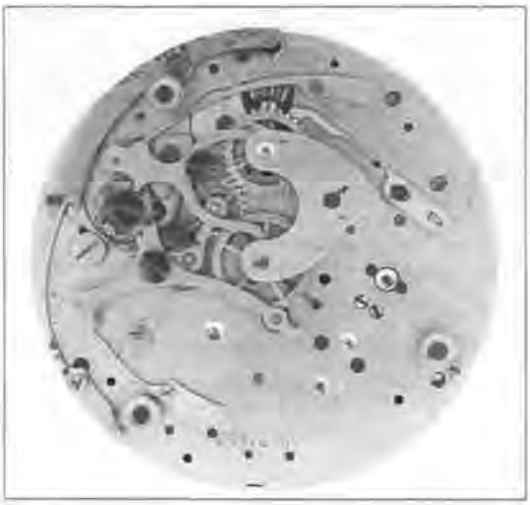


Figure 1

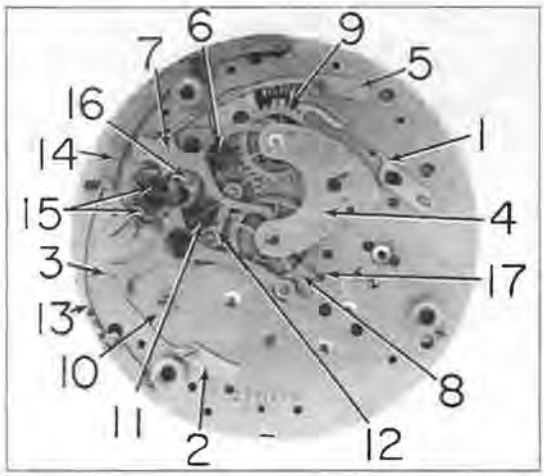


Figure 2

spring and its screw. *Note: When disassembling a timer or chronograph, it is best to remove the spring that holds tension against a lever before removing the lever.* It is also best to replace the lever first before the spring. When assembling the mechanism, as the mechanism is reassembled, the lever should be checked for freedom on the stud before the spring tension is applied. Figure 7 shows the spring after its removal.

Step 6. Remove the flyback lever screw. This screw is used to hold the lever down on its stud. A shoulder on the screw allows the lever to operate freely under the head of the screw when the screw is tight in the plate.

Figure 3

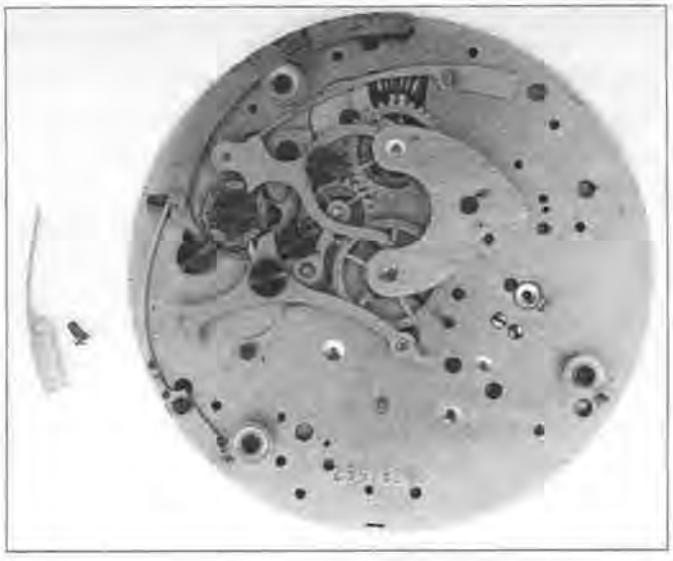


Figure 4

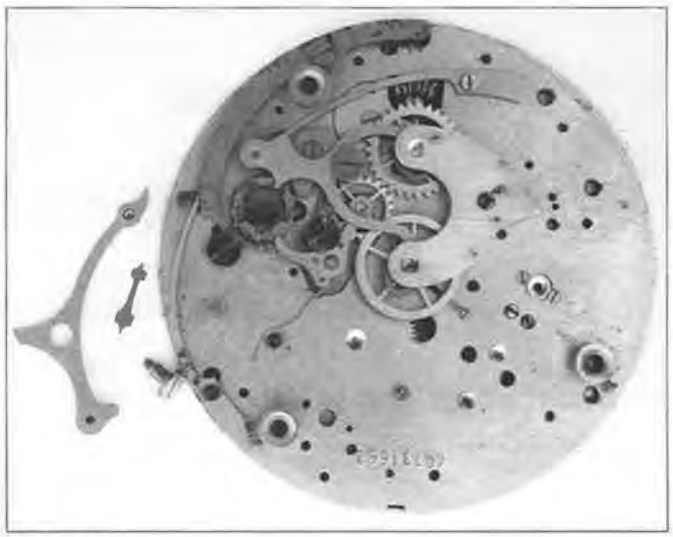


Figure 5

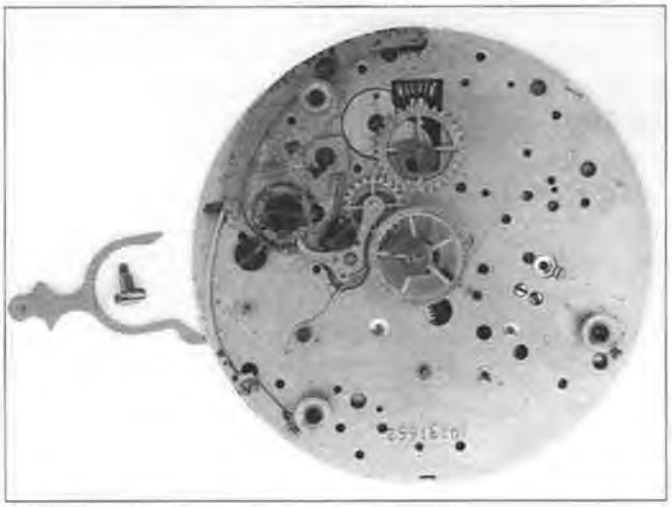


Figure 8

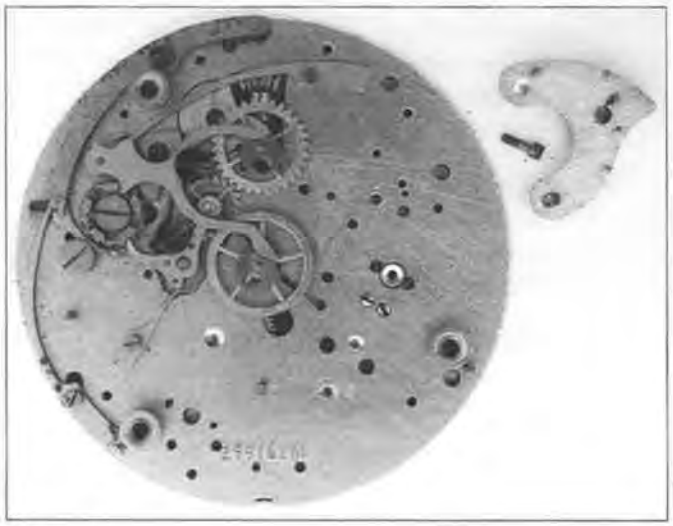


Figure 6

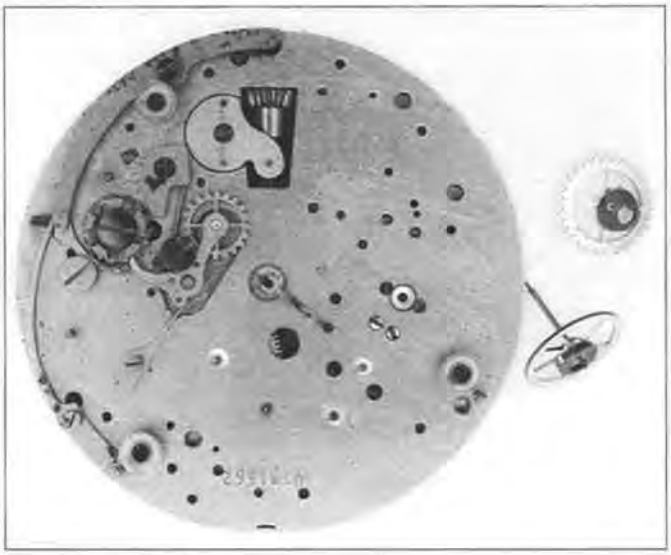


Figure 9

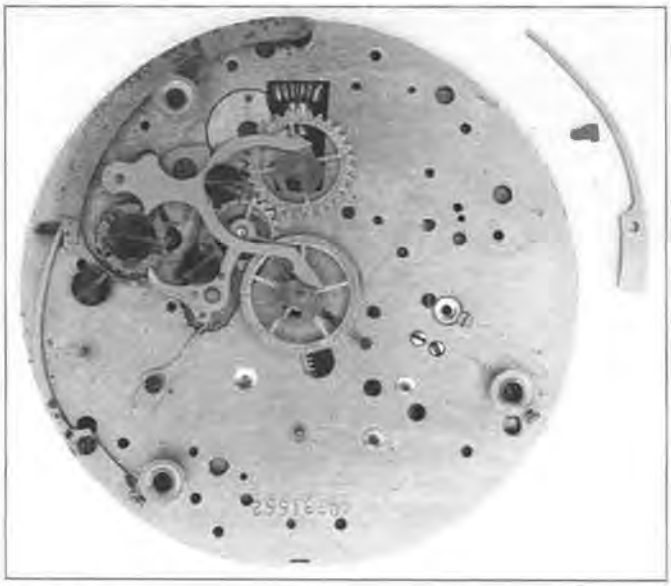


Figure 7

Step 7. Remove the flyback lever. When a lever such as this fits on a stud, the condition of the stud and the bearing in the lever should always be checked as the lever is removed. Figure 8 shows the screw and lever after their removal.

Step 8. Remove the seconds wheel. This wheel has very delicate teeth and it should be handled with care. This wheel should be lifted out of position with the jaws of the tweezers on a spoke of the wheel, *not on the rim of the wheel.*

Step 9. Remove the minute register wheel. This wheel should also be lifted out of position by one of the wheel spokes. Always check the condition of the pivots when a wheel is removed. The pivot holes should also be checked for wear. Figure 9 shows the seconds wheel and intermediate minute wheels after their removal.

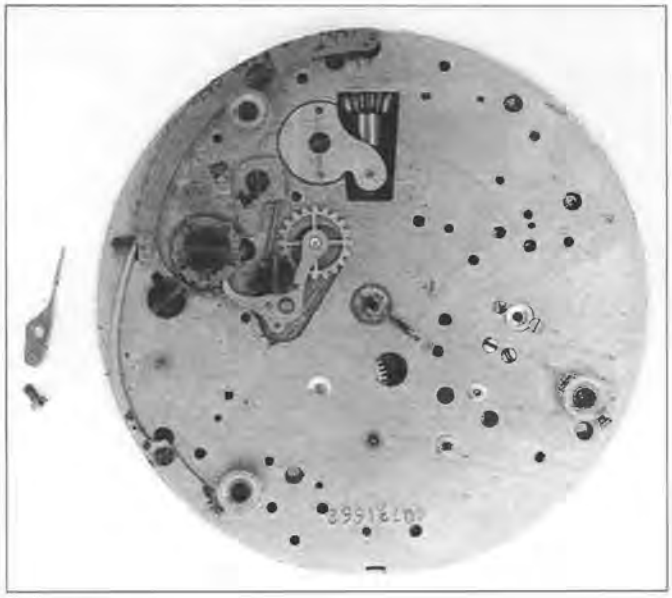


Figure 10

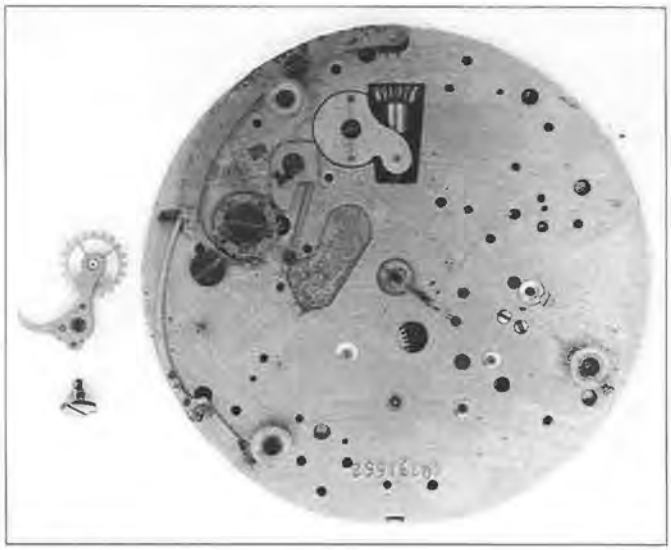


Figure 11

Step 10. Remove the intermediate lever spring and its screw. These are shown after their removal in Figure 10.

Step 11. Remove the intermediate lever screw. This screw is used to prevent the lever assembly from rising on its stud. The shoulder on the screw allows the lever to move freely underneath the head of the screw.

Step 12. Remove the intermediate lever assem-

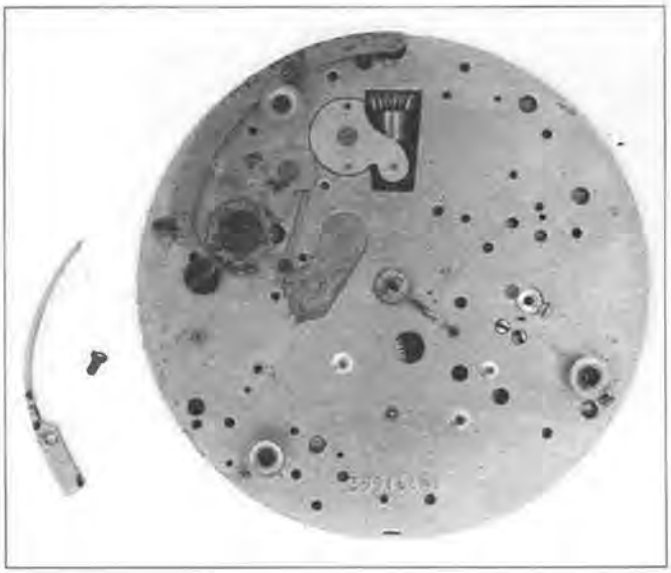


Figure 12

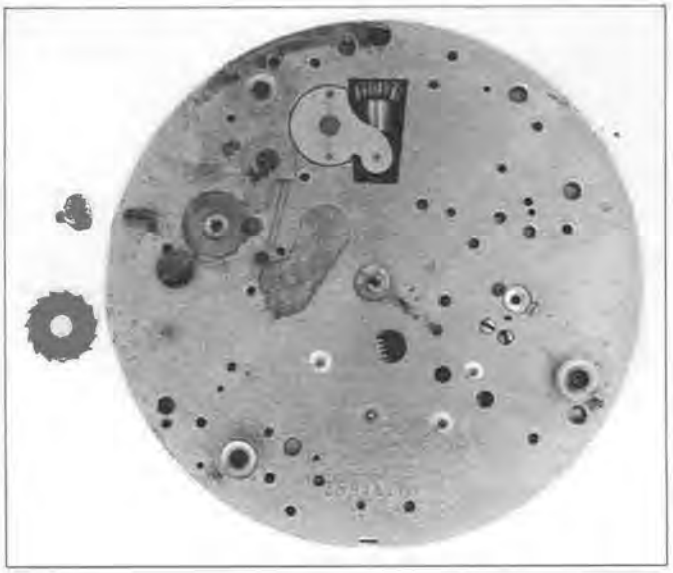


Figure 14

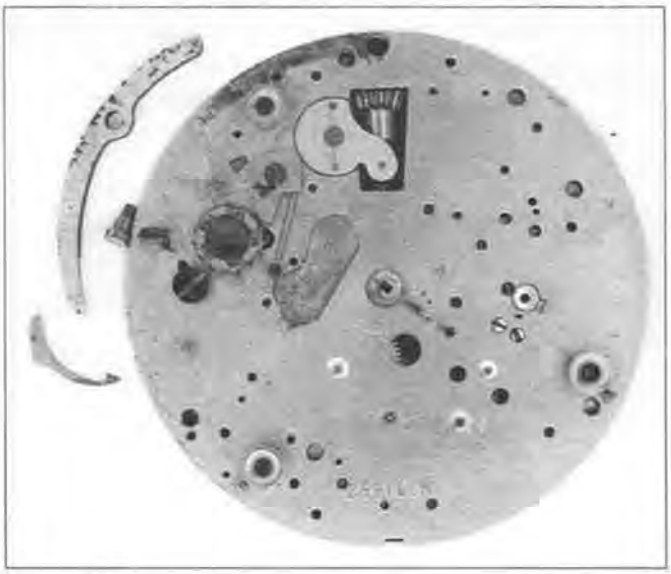


Figure 13

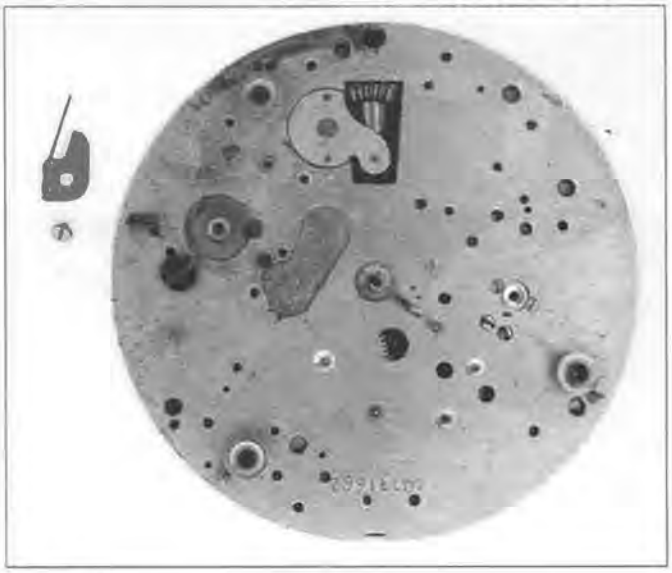


Figure 15

bly. This assembly is made up with the following parts: The intermediate minute wheel, upper and lower plates, two spacers, one bushing, one screw, two steady pins, and two pivot bushings. The lever and its screw are shown removed in Figure 11.

Step 13. Remove the actuating lever spring. Figure 12 shows the spring after its removal.

Step 14. Remove the actuating lever and its cam hook. The cam hook fits onto a pin on the tail of the actuating lever. The hook turns the actuating cam each time the crown is pressed to operate the actuating lever and cam hook. The hook is held down in its operating position by the cam hook screw. The cam hook will slide out from under the head of the screw making it unnecessary to remove this screw. Figure 13 shows the lever and its hook and screw after removal.

Step 15. Remove the cam screw and actuating cam. The cam screw has a shoulder that furnishes a bearing for the actuating cam. Figure 14 shows the cam and screw after their removal.

Step 16. Remove the actuating cam pawl and its screw. The pawl fits on a post fastened to the watch plate. The post has a threaded hole in its center for the screw. The pawl has its tension spring riveted into a hole in the edge of the pawl. The tension spring rests against the shoulder of the intermediate lever assembly screw. The

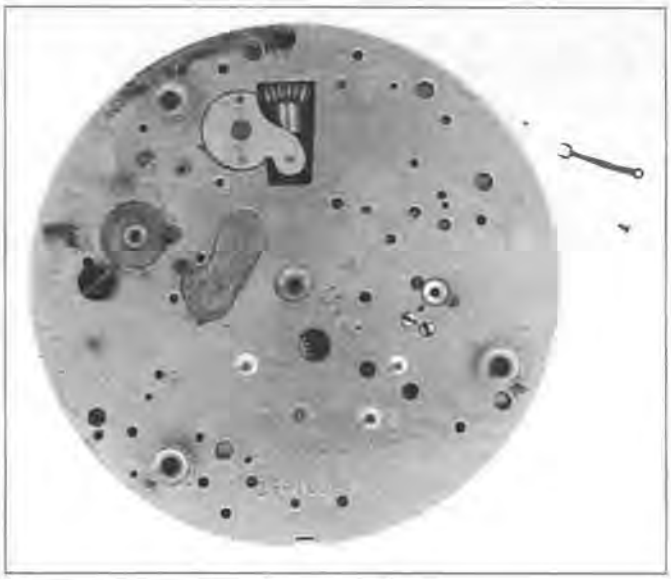


Figure 16

Figure 17

actuating cam pawl works in the ratchet teeth of the actuating cam. Figure 15 shows the pawl and its screw after removal.

Step 17. Remove the seconds wheel friction spring and screw. Figure 16 shows the spring and its screw after removal.

Managing the Screws after Removal

When removing the screws during the disassembly of the levers, it is very important to manage the screws to prevent them from being mixed up. The shoulders on the screws are sized for each individual lever or spring. Usually the screws used for the levers on timers and more complicated mechanisms are not interchangeable.

One method of managing the screws is to replace the screw in its screw hole as soon as the lever or spring is removed.

Another method of managing the screws is to use a screw holder block made up for this purpose such as the one shown in Figure 17. This block is from Universal Geneve in Switzerland. The screws could be placed in the order of their removal in a block of pithwood.

Managing the Springs and Levers

To keep the springs and levers together and in order, they can be strung on a small wire loop in order as they are removed from the watch movement. The wire loop can be made from fine music wire. The strung parts can be placed in the cleaning basket for cleaning, rinsing, and drying, or they can be cleaned by hand.

If a cleaning basket with many compartments is available, then the levers and matching springs can be kept together in the individual compartments.

"Timers" will continue.

Jack Kurdzionak, CW

From the Workshop

You Are Invited

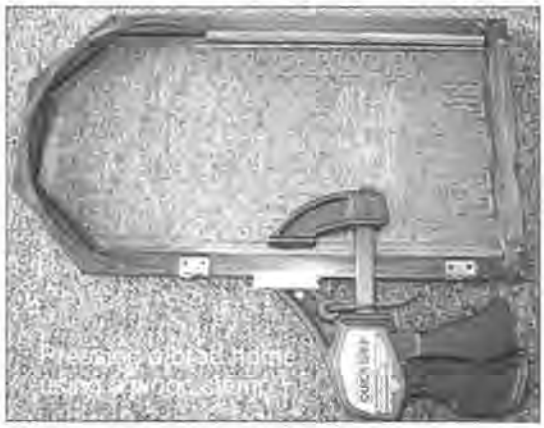
Do you have a solution to a watch or clock repair problem that you want to share with our membership? Do you have a question about a repair problem you would like to ask? I invite you to participate in this column with your suggestions, questions, and comments. It's easy. Just e-mail me at AWI <magazine@awi-net.org>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

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

Good Uses for a Common Tool

Our member Mike Carpenter, CC, suggests a new approach for installing wood strips used to retain glass panes in clock doors. These strips are fastened with small brads to the inside of the clock door. Attempts to drive these brads in with a small hammer or press them in with a screwdriver can lead to chipped or broken glass or, even worse, a personal injury. Mike recognized the value of pressing these brads home with a wood clamp while he was gluing the mitered joints on a clock door. A wood clamp provides a controlled and gradually applied force to whatever is in its jaws and that includes inserting a brad into wood without risk of damage to the glass caused by a misguided hammer.

When installing new wood strips, he drills pilot holes in the strips using a drill bit



in a pinvise to give the brad a path through the wood. After positioning the glass, the wood strips are placed along the edge of the door. One by one, the brads are gently pressed into the wood as the clamp is closed as shown in the photo. Mike installed a soft pad on one of the clamp's jaws to protect the finished wood surface on the door's exterior.

Sticky Situations

There are those watches you wish you never opened. The case back gasket, usually an o-ring, has deteriorated and flowed all over the movement, the case back, and the case itself. No longer resembling a gasket, its appearance is that of sticky, black tar. Even the o-rings used in water resistant crowns for these watches can turn into this ooze. Servicing these watches involves more than just the usual cleaning of the case and movement. This black stuff must be thoroughly cleaned from only the case, if you are fortunate, and from the movement if you are not so fortunate.

This black stuff does not yield to the usual array of cleaners we use to wash cases and bracelets, but your local hardware store has

a product, acetone, that will remove this stuff very quickly. In a small glass bowl, immerse the case and movement parts in acetone and watch the black material dissolve. For speedier action, float the glass bowl in your ultrasonic tank and vibrate it for a few seconds. Wash the parts thoroughly in soap and water and then clean the parts as you normally would.

When using acetone, exercise caution and read the label on the acetone container carefully. It is extremely volatile and flammable. If you spill it on plastics or synthetic material it can damage them. It can also damage a painted watch dial so it is not to be used to clean the black stuff from a dial.

We have repaired some Rado watches where the gasket material has flowed over the lower side of the Rado's sapphire crystal. We were reluctant to soak these Rado sapphire crystals in any solvent because their underside is painted and plated. We experimented a bit with some broken Rado crystals and left them in acetone for a few hours and also in the ultrasonic tank's clock cleaning solution for a full day. To our surprise, the crystal's coating remained pristine. We now clean these crystals in acetone as needed to remove the tarry stuff and then just wash them with soap and water before re-installing, of course with a new gasket.

Jack Kurdzionak

Keeping It Simple

Pennsylvania's Joseph Verruni, CW, has two very simple and very helpful suggestions for those of us who install quartz movements in clocks. The first is to use double face mounting tape, available in your local hardware store, to hold these movements securely to the backside of the dial thus preventing the movement from rotating. This tape, about 2 mm thick, does a much better job than the large rubber washer originally supplied with these movements.

Joseph's second suggestion is to use balsa wood shims to adjust the depth of a replacement quartz clock movement when the hand shaft is a bit too long for the application. Balsa wood strips, available at the local hobby shop in various widths and thickness, can be easily trimmed to size and work well with the double-faced tape mentioned above.

A Good Set of Keys for the Clockmaker

Stephen J. Boynton suggests that clockmakers keep a set of pocket watch keys handy when regulating French mantle clocks. Double ended, clock keys cannot be used to turn the regulator of a French clock because the squared end of the arbor is far too small to be engaged by an American clock key. Stephen has found that a pocket watch key, designed for winding antique key wind watches, can always be used to turn the regulator. He keeps a complete set of these 13 keys (as shown in the photo) on a key ring so that the right size is always at hand and available for sale to the clock's owner.

Pocket Watch Keys

Beautifully made from steel with brass handles. Top *quality winding and setting action for the hands of* pocket watches.

3C-979	00	*3C-986*	6
3C-980	0	*3C-987*	7
3C-981	1	*3C-988*	8
3C-982	2	*3C-989*	9
3C-983	3	*3C-990*	10
3C-984	4	*3C-991*	11
3C-985	5	3C-992	12

Pocket watch keys, as shown in the Newell Mfg. catalog.

All Batteries Are Alike, Aren't They?

A battery customer recently bought several hundred #364 watch cells from his supplier. No others, just #364. The supplier asked if he needed any others and he said "Why no, I just use 364 in almost all watches. They fit just about everything." Most would agree that this attempt to reduce the number of cells in inventory is extreme, but it is not a solitary example. Others stock only high drain watch cells and fit them for both high and low drain applications. Contrary to what the persons mentioned above might believe, there is a reason for the variety of watch cells one must stock. They are made in varying heights and widths as well as differing chemical content which changes the voltage and output characteristics of each cell.

When replacing a cell, the replacement must fit properly. Its diameter must match the opening in the movement. Its height must be such that the case back does not strike the cell nor should it be so thin that the cell falls out of place. Should the cell bear the same number as the dead one being removed? Yes, if the old one was correct to begin with and no, if the old one is incorrect. Why not just use high drain cells for all watches? The watch manufacturers don't think much of this idea. There is a difference in high drain and low drain cells. They may appear to be similar but they have different numbers and are designed to do different jobs. Low drain cells are used in analog watches without any alarm or sound producing function. Alarm watches and those with battery powered dial illumination require high drain cells. A low drain cell cannot discharge current fast enough to satisfy these power hungry watches. For maximum shelf life, maximum run time for an analog watch, and high leakage resistance, a low drain cell must be used. If a high drain cell is substituted for a low drain application, there is a somewhat higher risk of cell leakage, a shorter useful life, and a shorter shelf life due to a different internal chemical system in the cell itself. All who change cells should be equipped with cell replacement data provided by each watch manufacturer. This data will specify the proper cell size and battery number for each product produced by that manufacturer. In addition, AWI's *Battery Number System* booklet is an invaluable source of cross reference data to assist in choosing the proper cell.

Jack Kurdzionak

BULLETIN BOARD

ITEMS STILL NEEDED

Movement for a Clock Made from an Emperor Kit
Jim Campbell, Lowell, NC, is searching for a movement for a customer's clock. His customer made the clock approximately 20 years ago from a Emperor kit. It has a wooden pendulum and is 36 inches from tip to tip. The clock has a battery movement; the motor winds the clock about every ½ hour. "Rhythm Watch Co. Ltd. Japan" is on the old battery movement. In the battery well it has "Japan 1.5V UM2" and on the metal plate in the front of the movement it has "A4024 and 2027 and 20".

Mr. Campbell has talked with Rhythm USA, Inc. in Atlanta, GA. They do not sell any parts. He also contacted Emperor and they had no suggestions.

Revere Electric Grandfather Clock Chime Hammer Springs
Jim Campbell, Lowell, NC, is looking for a source to buy chime hammer springs for a Revere Electric Grandfather Clock (five tubular bell). The chime hammer springs are the kind that are split and when the hammers are pulled back the part that is split and the string tied onto it can come back, lessening the tension on the spring.

L&R Model 728B Clock Movement Cleaner
Greg Bourne, Omaha, NE, is looking for a repair manual for a L&R Model 728B solid state clock movement cleaner (11-quart).

New Hermes Engravograph CA300 Calligragraph Attachment
Joseph Verruni, Plymouth Meeting, PA, is seeking information and operating instructions for a Calligragraph attachment for his New Hermes Engravograph. The Engravograph was made by Richardson's, Berkley Heights, NJ.

Hanhard 560 Timer
Willard Kiser, Ironton, OH, is searching for a parts list and technical information for a Hanhard 560 Timer.

Truing & Poising Calipers
Del Faulds, Yachats, OR, is seeking a source for a complete set of truing and poising calipers used on old Navy clock balance wheels.

Dixie Milling Machine Instruction Manual
Odell Frank, Sacred Heart, MN, is seeking an instruction manual for a Dixie Milling Machine, Swiss made. The machine is the same as used in the Bulova Watch Company.

Do you have information regarding this month's requests? Do you need information about one of this month's responses? If so, send your information or requests to:

Horological Times **Bulletin Board**
701 Enterprise Drive
Harrison, OH 45030-1696
Toll-Free: 1-866-367-2924, ext. 307
Phone: (513) 367-9800
Fax: (513) 367-1414
E-mail: dbaas@awi-net.org

John F. Kurdzionak

Affiliate Chapter Report

This shall be my last column in the *Horological Times* as Affiliate Chapter Chairman for the 2001-2002 year. It has been my pleasure to serve in this position on behalf of all of you, and I thank all those who supported me and voted for me for this post a year ago at the Annual Meeting. I would like to close my term in the *Horological Times* with some announcements, and then a story.

On September 13-15th, please take the opportunity to attend the Mid-Atlantic Horological Symposium in Maryland. Details and contact information are published in the *Horological Times*, but you may contact George Painter at gpainter@adelphia.net for questions. This is a superb opportunity for anyone to attend what I will call a "Chapter Meeting," but that is really so much more. There will be a vendor table, and speakers and instructors in attendance will include Dan Fenwick, Technical Services Manager, Swatch Group USA; Dennis Warner, former Affiliate Chapter Chairman; Stan Palen; Jerry Faier, CMC; John Kurdzionak, current Affiliate Chapter Chairman; Jack Kurdzionak, AWI 2nd Vice President; and Jim Lubic, AWI Executive Director. This opportunity to attend and meet the vendors and the guest presenters should not be missed. Over the last year I have written month after month why meetings such as this should be attended. Now please attend, if you are able to and are of the mind. It is why AWI is here...for you!

Also, at 6:30 PM on the 4th Tuesday of September, which is the 24th (changed from the 3rd Tuesday), The Massachusetts Watchmakers-Clockmakers Association will host Ed Ueberall, Author of the NAWCC's "The Railroader's Corner" Column at its meeting in Stoneham, MA. Ed will be speaking to the Massachusetts Chapter about Railroad Pocket Watches. Anyone interested is welcome to attend, and you may contact me at jfkclock@juno.com or at 781-438-1037 for details. Please mark your calendars.

I would like to finish with a story.....

A few years ago, Richard (Dick) Vanaria wanted to learn watch repairing, but started in the business by studying basic clock repair at a watch and clock repair school. He is now good enough at it that he repairs clocks part-time, but nevertheless, he still wants to try his hand at the repair of watches.

Dick will probably attend a local watch repair school in the coming months, but he recently attended the watchmaking school at the ETA Training Center in Switzerland this past spring with a group of other Americans, where they all received week-long training in the repair of ETA's basic mechanical calibers.

The transition from clocks to watches was not an easy one for Dick. He joked that he did so poorly in Switzerland that ETA had to discard the movements he had worked on. Joking aside, from all reports I have received, Dick did just fine for a first-time watch repair student. And on that same trip, Dick even went to the Basel 2002 watch show.

Dick is also a member of AWI and one of its local Chapters. In fact he holds a seat on the Board of Directors of his AWI Affiliate Chapter.

There is an interested, enthusiastic, dues-paying, "aspiring watchmaker" in Dick Vanaria. He's good at fixing clocks, but he is NOT a watchmaker. But soliciting him, and those like him, to join AWI and its Chapters is something that must be done as long as the continual complaint is that "we can't find new members." There ARE new members, but you

have to recognize them, ask them to join, and encourage them. Recognizing the potential members is part of the problem I think many of us have today. But why wouldn't someone recognize Dick? He's a clock repairer and a watch repair student and a member of a Chapter. He's also at all the NAWCC Marts. He is easy to spot.

Actually NO, he is NOT...to any of the above, as far as this discussion is concerned....Dick installs doors and windows, remodels kitchens, and repairs roofs. Dick is a carpenter. Recall from the June column that I stated our local Chapter had a jeweler, a furniture mover, and carpenter as members. You have just met the carpenter. You never thought a carpenter would travel to ETA in Grenchen, Switzerland, to start learning how to repair mechanical watches, or go to Basel to buy a pocket watch, did you?

Two columns ago I intentionally touted Dick both as a "carpenter" and a "collector" in our local Chapter, so as to see the reaction from some of the old-school thinkers. Some of you felt that having a carpenter in a Chapter and AWI was somehow "bending the rules" simply to increase membership and revenue during tough times, others thought that "collectors" was a "bad word" and they belonged in another organization. Again, look at Dick's credentials and his efforts, and consider whether AWI is wrong to have the likes of him on the roster. He is an asset. But when he was labeled a "carpenter-collector," my promotion of his membership was attacked, and he was anything but an asset. If we can get past the recognition problem, we see not a carpenter next door, but a man with dues money in his wallet who recently went to Switzerland to study watch repair.

The prospect of having non-watchmakers like Dick Vanaria "infiltrate" the local and national membership may horrify some readers, but the repair business has changed. High schools no longer graduate "watchmakers" as they did in prior generations. We may all want the old days back where the likes of Henry B. Fried would teach countless teenage students watchmaking, who all had jobs awaiting them in factories and trade shops at graduation, but those days are gone. We cannot get new blood into our membership from a pool of imaginary watchmakers.

"Imaginary watchmakers" means sometimes it appears as if some people are waiting for the membership problem to go away by itself...ride out the storm and everything will be OK.....as if high schools will start graduating entire classes of watchmakers again, hundreds per year, all of whom will be able to turn balance staffs on a foot-treadle lathe and file a detent by hand out of a 1" by 1" by 1" block of steel and they will all join AWI and make the Institute mighty again. Those are impressive achievements, and these skilled people should certainly be AWI and Chapter members, but once those parts have been made, try getting them into a quartz watch or getting someone to PAY for those parts. I don't know which would be more difficult. Regardless, the people who can do those things are few, and to think there will again be thousands of them fixing 40-year-old watches is imaginary. Watchmaking of the past is not coming back as it "was." Watchmaking of TODAY needs our attention right now, and watchmaking of TOMORROW should be on our agendas for next year.

The fact remains that what few schools remain, only a relative handful of skilled watch repairers graduate, not thousands. We will not change that fact; we have to work with that fact to our advantage. The market for traditional "watchmakers" has changed and our Chapters must acknowledge that change in order to survive. There are no longer a dozen watchmakers in every town. There are no longer hundreds of material houses across the land. And there are no longer thousands of traditional watchmakers in each state to provide AWI and its chapters with its core support. Chapters need to seek for new members those available in "the pool" today, not stand around and hope that "the pool" from the 1960s is going to come back. Watchmaking of the past is just not a good source for new

members. Watchmaking of "today" is here, and has a "pool" of people of all ages and skill levels available to fill the ranks. But you must recognize them....they might be carpenters!

In addition to the handful of students studying watchmaking professionally, there are a lot of Dick Vanarias out there in 2002 who need Chapters and AWI to bond them. Do not alienate this excellent source of support. Dick Vanaria is what I would call the "perfect" member, yet when he was called a carpenter in this column I received criticism. This way of thinking only prevents future support.

Any Chapter, and AWI, ought to have several Dick Vanarias on their rosters. You can seek them out and welcome them into your chapter, as they may very well make up a good portion of the next generation of watch and clock repairers who provide your Chapter and AWI with years of support. There are more "Dick Vanarias" available out there to join your Chapter than there are "watchmakers." By this I mean there are more people with "normal" careers (carpentry, for example) who wish to someday change careers to watchmaking, than there are teenagers who "want to be watchmakers when they grow up."

Ironically, John Harrison was a carpenter, and he ran circles around the best and the brightest horological "professionals" of his day. How many of you would turn away Mr. Harrison if he filled out an application to your watchmaking chapter? Not many, I'll bet. But he wasn't a watchmaker, and on the logic used to discourage or deny the Dick Vanarias their memberships, John Harrison would have to be discouraged or denied as well.

Thanks for listening all year. I do hope you have all enjoyed reading my words in these pages. If I have signed up just one new member into AWI, or if I have encouraged a new Chapter to form, or helped your own Chapter to improve, or have given you a new outlook on the state of the repair business these days, then I feel I have done my job well. It has been a pleasure to serve. I do hope to see you all in Maryland and Massachusetts this September.

Incidentally, anyone attending the Massachusetts Meeting will get to meet Dick Vanaria in person, and who knows, he may be as good as John Harrison by then. I hope to see you there, and I thank you all for your support this past year.

Massachusetts Watchmakers-Clockmakers Association Program

Ron DeCorte gave a wonderful slide presentation featuring AWI's Packard Watch collection to the Massachusetts Watchmakers-Clockmakers Association in May. We had nearly fifty members and guests in attendance to make this one of our largest meetings in the past five years. The slides were of excellent quality and the presentation was one of the best we have ever had. Ron's knowledge of the Packard Watch collection was immediately apparent as he explained the significance of each slide. Ron also showed slides of several watches he made in his own workshop. The audience was exceptionally attentive to the presentation and Ron continued the program beyond the usual closing time so that he could answer questions.

President John F. Kurdzionak has invited all AWI members in Massachusetts and New Hampshire to our past four meetings as part of an effort to introduce AWI members to our local chapter. Every AWI member in our geographic area has received a written invitation to attend each of our meetings this past business year. We have had many guests and several have joined resulting in a 10% increase in our membership.

Jack Kurdzionak

The New York State Watchmakers Association 2001 Convention

Dale LaDue, CMW

The New York State Watchmakers Association held their 63rd annual convention on Friday, September 21 and Saturday, September 22, 2001. The Friday AWI Bench Course and the Saturday programs were held at the Holiday Inn Conference Center in Gang Mills/Painted Post, New York.

Jim Lubic instructing the mechanical watch course.

Our convention was held in the shadow of the September 11, 2001 terrorist attack on the World Trade Center Twin Towers. We certainly felt compelled to postpone our convention. Taking the advice of President Bush, New York State Governor George Pataki, and Mayor Rudy Giuliani of New York City, we did not give in to the fear of terrorism and went back to work. Our convention went on as scheduled.

The Friday bench course sponsored by AWI and presented by Jim Lubic, CMW, was the "Mechanical Watch Repair" course. The participants included absolute novices to CMWs. Jim's ability as an instructor was evident as he guided two members through their first disassembly of a watch and the theory of the different components as well as teaching to the more experienced among us.

Jim is demonstrating disassembly/assembly of AWI's "teaching" pocket watches to Ric Donk, John McElhenny, and Steven Sweeney.

Our convention program started Saturday morning with Steve Conover presenting his seminar on clock repair. Steve, who is an author of a number of books on clock repair as well as producing a first-class newsletter, gave us a first hand look at a few models of the Poole Electric Clocks. The history of Mr. Poole and his clock was informative and interesting as presented by Steve.

After lunch we gathered for the afternoon session put on by Scott Heisler of Orlando Watch Co. Scott's program was on repair of Rolex watches. His understanding and techniques were artfully conveyed to us as he disassembled and reassembled a modern Rolex. Answering questions and offering tips on the nuances of the modern Rolex watches was especially informative.

After a break we had our annual meeting which ended our formal convention.

Our banquet was very nice. Jim Lubic spoke to us about AWI to keep us abreast of what is happening within the organization. We want to thank AWI for providing Jim as our speaker and instructor for the bench course.

Thanks also to the Holiday Inn in Gang Mills/ Painted Post, New York, for their hospitality.

Tracy Petrocy disassembling his watch.

Scott Heisler instructing his Rolex Repair Program as Tracy Petrocy looks on.

Cameron C. Spicknall working on his watch.

The rest of our group around Scott.

Closely watching Scott's techniques.

Steve Conover presenting his course on clock repair.

Tony Voight's display of Witschi repair and test equipment being shown to Scott Heisler.

Jim Lubic speaking at our banquet with Scott Heisler.

Our banquet.

New York State Watchmakers Association 2002 Convention

September 20-21

Holiday Inn - Gang Mills/Painted Post, NY

Mid-Atlantic Horological Symposium, Inc.

The Mid-Atlantic Horological Symposium, Inc. (MAHSI) is pleased to announce the 2002 Horological Symposium, September 13-15, at the Maritime Institute of Technology and Graduate Studies (MITAGS) in Linthicum, Maryland. The three days of watch and clock courses and symposium presentations will be an exciting opportunity for anyone, including AWI or NAWCC members. On Saturday attendees will include horological vendors, material houses, watch and clock company representatives, and other related activities. This AWI-supported Symposium is sponsored by the three MAHSI member AWI state associations: Maryland, Pennsylvania, and Virginia. Well-known expert instructors will be presenting the courses and skill presentations. Scheduled to appear are:

Jerry Faier, CMC	Retail clock repair/restoration businessman and experienced teacher
Dan Fenwick	Manager Technical Services, Swatch Group U.S.
Jack Kurdzionak, CW	AWI *Horological Times*, Author of "From the Workshop"
John Kurdzionak	AWI Affiliate Chapter Director
James E. Lubic, CMW	AWI Executive Director and Education & Technical Director
Stan Palen	Mechanical engineer and owner/operator of watch and clock shop and author of many computer technical articles
Dennis J. Warner	Former AWI Affiliate Chapter Director; member of Industry Advisory Board at Oklahoma State School of Watchmaking, Okmulgee, OK; current president of the Capitol Area Watch and Clockmakers Guild, Texas

Application for MAHSI Symposium - September 13-15, 2002

Please check the courses/activities you wish to attend. For courses, please indicate your first, second, third choices. All courses will be filled on a first come basis.

❑	Friday, September 13	Build Your Own Quartz Chronograph	Instructor: Dan Fenwick	$ 75.00*
❑	Friday, September 13	Clock Repair	Instructor: Jack and John Kurdzionak	$ 75.00
❑	Saturday, September 14	Swiss 17L Pocket Watch Repair	Instructor: Dennis Warner	$100.00
❑	Saturday, September 14	Clock Repair	Instructor: Jerry Faier	$100.00
❑	Saturday, September 14	Buffet Dinner & Program, 7:00 p.m.	Speakers: Dan Fenwick & Jim Lubic	No Charge**
❑	Sunday, September 15	Breakfast Buffet, 8:00 a.m.		No Charge**
❑	Sunday, September 15	Program only	Speakers: Dan Fenwick & Stan Palen	$ 15.00***

*$75.00 includes student keeping the watch movement, with additional charge for a case if available.
**Those residing at MITAGS - meals are included. Others must purchase meal tickets at registration desk.
***This $15.00 charge is for attendees who have not participated in the previous two days of courses.

Checks and Money Orders only, made payable to Mid-Atlantic Horological Symposium, Inc.

Name _____ Address _____ City _____ State _____ Zip _____

Phone _____ E-mail _____ Other Horological Associations _____

Experience _____

Mail to: Stan Palen, Treasurer MAHSI, 8283 Oakwood Dr., King George, VA 22485
E-mail: spalen@crosslink.net Phone: 540-775-7027

Note: You must make your own lodging reservations. We recommend the Maritime Institute of Technology at the Symposium location. Phone: 410-859-5700, Fax: 410-859-0942 Additional information on local lodging available by request.

Rates: $129.00 single occupancy and $178.00 double occupancy. These rates include three meals plus a night lunch and full use of all facilities, which includes pool, workout room, racquetball courts, and recreation room. A limited number of suites are also available.

New York State Watchmakers Association

64th Annual Convention

September 20-21, 2002

Gang Mills - Painted Post, NY

Saturday, September 21

- Jonathan Rowe will demonstrate how he produces an excellent polish on screw heads and other flat metal parts of a watch.
- Robert Waters will talk about and demonstrate on a computer, the theory behind watch escapement testing. Using the computer, tests can be performed with no risk to the delicate parts of an escapement. See the effects that moving, twisting, and/or changing a pallet stone will have on the important escapement freedoms.
- Lou Stella will present "Chiming Clock Repair." Do you have trouble synchronizing all those levers and wheels of the modern German Chiming Clock? You may learn a new trick or two that will make your bench life less frustrating.
- Mark Mongillo will present his "Ultimate Watch Screwdriver." These screwdrivers are cheap to make and easy to use.
- John McElhenny will talk about using the Internet to buy and sell watches and clocks. You may find a new and exciting source of income on the Web.

Complete convention details will appear in future issues of *Horological Times*

Affiliate Chapter Calendar

September 13-15, 2002
Mid-Atlantic Horological Symposium
Maritime Institute, Linthicum Heights, MD
Contact: George Painter *Gpainter@adelphia.net*
Phone: (410) 781-6491

September 20-21, 2002
New York Watchmakers Association Convention
Holiday Inn-Corning-Painted Post, Painted Post, NY
Contact: Mark Mongillo (716) 945-3622

September 24, 2002
Massachusetts Watchmakers-Clockmakers Association Meeting - 6:30 p.m.
Program: RR Watches by Ed Ueberall
Contact: John Kurdzionak *jfkclock@juno.com*
Phone: (781) 438-1037

October 17-20, 2002
Minnesota Clockmakers Guild Annual Symposium
Hilton Garden Inn, Eagan, MN
Contact: Jeff Pomeroy *pomeroy@securecomputing.com*
Phone: (612) 623-7874

FREE WORKSHOPS!!

Sponsored by:
Watchmakers-Clockmakers Association of Ohio
Affiliate Chapter No. 4

Everyone Welcome!

Held Evenings — Monthly - Bimonthly

Whether you are a beginning horologist or an experienced horologist, these workshops are excellent opportunities to glean knowledge and repair tips for the common problems encountered in our trade. Bring your problem watch or clock to a workshop for a solution!

Typical Topics:
Hairspring Vibration, Mainspring Replacement, 400-Day Clock Repair, Repivoting, Cuckoo Clock Repair, Oils & Oiling, Gear Cutting, Electric Clock Motors

EMPHASIS IS ON SKILLS NECESSARY FOR PASSING AWI'S WATCH & CLOCK CERTIFICATION TESTS!

For Dates, Times & Locations of FREE WORKSHOPS
In NE Ohio, contact Mark Baker, CMW at (330) 537-3939
In SW Ohio, contact Kent Garber, CC at (937) 273-5677

Laurie Penman

Education Update

I know that nothing much seems to happen in the summer so far as education is concerned, but in fact what is happening is the planning of our timetables for courses at AWI in Harrison, Ohio, and organizing bench courses out of state. At the moment we have only been able to deal with the evening classes in clock repair. Jim Lubic is finalizing the details of price at the moment but we have three "terms" of 10 weeks each beginning in September – precise dates will be announced shortly.

However, what we do need is information and requests for classes that the membership and the groups would like to see offered in their areas. Clearly you need precise information about the contents of some of the "standards" that we already have constructed but since there is a huge variety of classes that we can put together, we really do need feedback from the membership. Please tell us what you would like to see in classes, whether one, two or five day. If these are needed in your area we need to know whether at least eight people will be able to attend, and it would save a lot of time if an approximate date for the class can be suggested. It takes longer for us to wait for individual responses to our suggestions for dates before making an offering, than if there is already local agreement on a month that is suitable.

As to those "standards" and their content, here are a few; those marked a) are one-day classes (one-day classes must be held in conjunction with a convention), those marked b) are two-day, and c) marks the five-day classes.

a) *General Clock Troubleshooting*. A gathering of clock problems. Bring along movement or clocks that have any problem that is causing, or has caused particular pain. Timekeeping, striking, chiming, in clocks from 400-day to tall case to cuckoo clocks, ancient and modern. This is a simple practical class. If there is sufficient need, two classes can be put back to back to cope with large numbers of movements and problems.

b) *Timekeeping, Escapements and Pendulums*. Another purely practical class to supply solutions for clocks that give timekeeping problems. Adjustments and repair for the recoil escapement, Brocot and Graham deadbeats. Some problems are caused by the suspension or the pendulum, some by the mainspring, all can be exasperating and very time consuming. Very little attention will be given to the making of these escapements or their replacement.

c) *Timekeeping, Escapements and Pendulums*. In addition to dealing with the same matters as the two-day class, this one will pay attention to the design of the escapements and the making of replacement anchors, Black Forest bent strip, (cuckoo clocks and postman's alarm), Brocot pallets and pallet bodies and Graham deadbeat pallets. There will not be time for each attendee to make all four but everybody has their own choice. You can always take a look over your neighbor's shoulder to see what they are doing.

b) *Center Lathe Turning*. The center lathe is particularly useful for clockmakers but it is used in a quite different fashion to the watchmaker's lathe. We will cover making, turning, facing and boring tools; setting up the machine; making bushes, plugs, pivots and repivoting arbors. Advice on choosing a lathe too.

c) *Center Lathe Turning*. In addition to the work done in the two-day class attendees will deal with making screws to match the originals and many other turning tasks such as: making a bush driver to seat bushes squarely; making a modified "priest" to mark the correct centers for bushes; make a "spot facer" for pivot holes; punches to remove broken pins from posts and extensions; making a simple fixture for manufacturing replacement lantern pinions. Using the lathe to face a flat surface with a fly cutter.

b) *Striking and Chiming Clocks*. The adjustment and repair of modern and antique striking, quarter striking and chiming clocks. This is definitely a class that you should try to bring movements to, the striking and chiming systems of modern and antique clocks differ considerably and the more examples of different systems that can be considered and handled, the better. The instructor will have examples of the round French movement, German strikers and chimers, the American Welch striker. These clocks have examples of both rack and snail, and count wheel or count plate striking. There is only time for simple repairs in this class.

c) *Striking and Chiming Clocks*. Adjustment and more complex repairs to modern and antique striking, quarter striking and chiming clocks. This is definitely a class that you should try to bring movements to, the striking and chiming systems of modern and antique clocks differ considerably and the more examples of different systems that can be considered and handled, the better. The instructor will have examples of the round French movement, German strikers and chimers, the American Welch striker. These clocks have examples of both rack and snail, and count wheel or count plate striking.

Repairs will include, the replacement of teeth in a rack, damaged or maltreated snails, racks and count plates, gathering pallets, gathering pallet extensions.

EDUCATION

Bench Courses

To schedule a Bench Course in your area please contact AWI for complete information. A list of available Bench Courses is printed here for your convenience. To register for Bench Courses, please mail, phone, fax or e-mail your registration and payment information to: **American Watchmakers-Clockmakers Institute, 701 Enterprise Drive, Harrison, OH 45030-1696; Toll Free 1-866-367-2924, Phone (513)367-9800, Fax (513) 367-1414, E-mail: educate@awi-net.org** PLEASE NOTE: Registrations are limited and will be selected by the earliest date received. Please include a check or charge card number (Visa, Mastercard, Discover or American Express), card expiration date, signature and phone number. All registration fee checks and charges are processed immediately upon receipt. ***DEADLINE FOR REGISTRATION IS 30 DAYS BEFORE THE SCHEDULED DATE OF THE COURSE.*** • Indicates Bench Courses held in conjunction with a convention or purchased by an AWI Affiliate Chapter. For more information on these specific courses, please refer to the contact information provided for each class.

DATE	CLASS	INSTRUCTOR	LOCATION	FEE
SEPTEMBER 2002				
28-29	Beginning Lathe	Robert Porter	Seattle, WA	$250.00
NOVEMBER 2002				
9-10	Beginning Lathe	Robert Porter	San Francisco, CA	$250.00

AWI BENCH COURSES

Advanced Clock Repair
Beginning Lathe
Clock Case Repair
Clock Escapements
Cuckoo Clock Repair
ETA Products
Filing & Flat Polishing
400-Day Clock Repair
Hairspring Vibrating
Introduction to American Pocket Watches
Introduction to Clock Repair
Introduction to Quartz Watch Repair
Lathe Program
Mechanical Watch Repair
Micro Lathe Operations
Mechanical Chronograph
Organize Your Work Habits for Success
Platform Escapements
Repair of the Atmos Clock
Repair of the Bulova Accutron
Seiko Kinetic Quartz Watch Repair
Sequential Chime
Servicing ETA Quartz Chronographs
Striking Clocks
A Study of the Deadbeat Escapement
Swiss Auto Quartz

For details on scheduling a Bench Course in your area, please contact Nancy Wellmann, AWI Education Coordinator at 1-866-367-2924 ext. 303 e-mail: educate@awi-net.org

Classified Advertising

Regulations & Rates

Ads are payable in advance 90¢ per word, $1.00 per word in **bold** type. Classified display ads are $40.00 per column inch, 2ø" wide. Ads are not commissionable or discountable. The publisher may, at the publisher's sole discretion and for any reason and without notice, decline to publish or republish any ad, in which case any fees submitted or paid for such ads shall be returned or rebated to the advertiser. The publisher reserves the right to edit all copy. Price lists of services will not be accepted. Confidential ads are $10.00 additional for postage and handling. The first of the month is issue date. Copy must be received 30 days in advance (October r issue closes for copy on September 1st).

HOROLOGICAL TIMES
701 Enterprise Drive
Harrison, OH 45030
Toll Free 1-866-367-2924, ext. 307
Phone (513) 367-9800
Fax (513) 367-1414
E-mail: dbaas@awi-net.org

TRADESMAN

ESCAPE PLATFORM REPAIR
All types. Dennis Kaye, 888-363-9510
http://clocks.dwk.org, e-mail clocks@dwk.org

ACCUTRON SERVICE
All tuning fork calibres. Prompt & reliable. Larry Blanchard, P.O. Box 47, 214 East Niles St., Blue Mound, IL 62513; Phone & fax (217) 692-2564.

DIAL REFINISHING

BEFORE AFTER

Quartz Conversions
Diamond Dial Conversions
Emblem & Name Personalization

Write for Brochures
INTERNATIONAL DIAL CO., INC.
58 W. SUGARTREE
P.O. BOX 970
WILMINGTON, OH 45177
(937) 382-4535

ATMOS
Service & Repair - Original Parts Only
2-year warranty on labor
Clockmaster, Inc.
2537 So. Brentwood St. Louis, MO 63144
(314) 968-1010

DIAL REFINISHING CO. FAST SERVICE, FINEST QUALITY, quantity works welcome. Specialize on changing dial feet positions to fit the quartz movement. Send your works to: **KIRK DIAL OF SEATTLE,** 4th & Pike Bldg., Suite 625, Seattle, WA 98101; (206) 623-2452.

CLOCK & WATCH WHEEL & PINION CUTTING, REPIVOTING & INDEX PLATES
Full service custom machine work.
Mark Cooper, Rt. 5, Box 420, Alvin, TX 77511
(281) 331-9234 quailm@aol.com

CRYSTAL CUTTING SERVICE
Flat Mineral Glass Crystals
Quality Work
1-Day Turnaround
R.A. Time Capsule
Montoursville, PA
You'll love our price.
For more information call
1-800-WATCH-50

CLOCK, MUSIC BOX MAINSPRINGS, GEAR PINION CUTTERS, MATERIAL & PARTS CUSTOM MADE. **TANI** ENGINEERING, 1852 St. Rt. 44, Atwater, OH 44201; (330) 325-0645. Catalog $3.00.

CLOCKS: Gear cutting, repivoting, rebushing, jeweling. REPAIRING: Aircraft clocks & pocket watches. Roy H. Niegel (CMC, CMW retired), 34036N Saint Joe Dr., Spirit Lake, ID 83869-8775; (208) 623-4330.

HAMILTON ELECTRIC WATCH REPAIR
Expert, experienced service on all Hamilton 500 and 505 Electric watches. Hamilton electric watches and parts always wanted. Ren Rondeau, P.O. Box 391, Corte Madera, CA 94976. Tel: (415) 924-6534. E-mail: rene@hamiltonwristwatch.com

VINTAGE POCKET WATCH RESTORATION. Twenty years experience, guarantee, free estimates. The Escapement, Box 606, Chenango Bridge, NY 13745; (607) 648-3777.

HOROLOGICAL MACHINING COMPANY
Pinions, wheels, gears, staffs, stems, barrels, levers, jeweling. Adams Watch Repair (417) 257-1345.

CLOCK PARTS MACHINING. Free price list. John F. Kurdzionak, 8A Central Street, Stoneham, MA 02180; Phone (781) 438-1037, Fax (781) 279-2923, www.JFKCLOCK.com

POCKET WATCH CASE REPAIR
Tick-Tock Specialties. Bezels, hinges, springs, dents, etc. HARRY MAZAR, 308 N. McLeansboro St., Benton, IL 62812; (618) 439-6995, call 9 a.m.-1 p.m.

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

PORCELAIN / ENAMEL
WATCH AND CLOCK DIAL RESTORATION
Perfect and invisible. Colors and art perfectly matched. Dennis Kaye, 888-363-9510
http://clocks.dwk.org, e-mail clocks@dwk.org

ALVIN KRUTOLOW FOR ROLEX SERVICE
Master Watchmaker, 47 years experience. Awarded technical certificate from Rolex in 1977. Service includes case & bracelet refinishing & waterproofing of case. All watch parts are genuine Rolex. We specialize in the repair of high-grade watches & clocks. Not affiliated with Rolex Watches, Inc. USA. Ask for Alvin or Marcus, (203) 792-4539.

ELECTRONIC INSTRUMENT SERVICE
We are Factory Authorized Service for:
• VIBROGRAF & PORTESCAP
• TICK-O-PRINT & L&R
We service all makes of ultrasonics, all makes of watch rate recorders, and related equipment. 25 years experience.
JACK PHILLIPS
757 Lincoln Ave., #26 San Rafael, CA 94901
Used Equipment Bought & Sold
VISA **For Information**
Call (415) 453-9266

CLEANING, RESTORATION & PART MANUFACTURING FOR ALL TYPES OF CLOCKS & WATCHES
We service and restore all types and grades of watches and clocks. Patek Philippe, Piguet, Vacheron & Constantin, Rolex, LeCoultre, Omega, Accutron, mechanical (all complications), tuning fork, electric, quartz, fusees, alarms, repeaters, chronographs, chronometers, wristwatches, pendant watches, and pocket watches. Antique or new. Also all styles of clocks: Atmos, cuckoo, 400-day, electronic, and quartz. Special repairs welcome. Staff manufacturing, repivoting, stem manufacturing (regular and oversize), gear cutting, etc. Free estimates. Fast turnaround time. 37 years experience in watch and clock restoration and parts manufacturing.

J.S. Park, CMW, CMEW
Member AWI & NAWCC
Satisfaction Guaranteed
TIME WORLD
Stone Crest Mall
2929 Turnerhill Road #1400
Lithonia, GA 30038
Phone: (770) 482-4750
Fax: (770) 482-4751
Mon-Sat 10-9 Sun 1-6

ARTICLES FOR SALE

STUCK FOR A MOVEMENT?
or a watch part? Call Don Kroker's Watch Movements. (559) 229-8423 or write 4325 No. 5th St., Fresno, CA 93726.

Rollimat Pivot Polisher Machine & Lathe Attachment. Exclusive American Distributor. Once Upon A Time, 25 West Beverley St., Staunton, VA 24401; Toll Free 1-866-877-8164, E-mail: onceuptime@lycos.com

L&R Automatic Ultrasonic Cleaning Machine, recently totally rebuilt, w/warranty. $780/obo (you pay shipping). (850) 723-4294 (cell phone).

MORGAN PIVOT POLISHER
USA MADE
Visit Web or call for info
(262) 539-4000
www.ClockBug.com
jim@ClockBug.com

Regula and H. Herr cuckoo movements. Complete selection. Great pricing. Examples: 1-day R25: $30, 8-day R34:$45. Also factory stopper new Hermle, Urgos, and Kieninger at 60% OFF our regular wholesale prices. Call Butterworth 1-800-258-5418.

FULLY WARRANTEED
Watch Timers & Cleaners

FACTORY REBUILT WATCH TESTING EQUIPMENT
Call or Write for details:
Tel: (516) 437-8700
Fax: (516) 437-8708
VIBROGRAF U.S.A. CORP.
504 Cherry Lane, Floral Park, NY 11001
www.vibrografusa.com

If You Repair Clocks . . .
you need our all new Catalog #28.

Timesavers
Box 12700
Scottsdale, AZ 85267• USA
480-483-3711 / 480-483-6116
info@timesavers.com / www.timesavers.com
Our 152 page Catalog #28 is $3 post paid

eckcells
Your battery connection and more . . .
379 Main Street Stoneham, MA 02180
NOW SUPPLYING MAINSPRINGS (NEWALL)
For American-made watches
$3.50 each, $10 for 3, $36 per dozen
COMPLETE LINE OF SEITZ JEWELS
EVEREADY, RENATA & MAXELL BATTERIES
Competitive pricing, monthly battery specials
MC/VISA
TOLL-FREE 800-435-4354 PHONE
TOLL-FREE 800-690-3303 FAX

20+ years accumulation of parts. Some hard to find, others more current. Will sell separately or as needed. Contact Richard Mazza (818) 645-6090, Fax (818) 501-7727, or e-mail qltywatch@aol.com

NEW FE268 **17J** MOVEMENTS, 10 per case. $49.95. (301) 729-6500.

SHERLINE PRODUCTS
10-25% OFF
Free catalogs upon request.
Starrett Collets Now Available
ANTIQUE CLOCKWORKS, LTD.
P.O. Box 201, Loretto, MN 55357
Toll Free 877-643-7698
E-mail: jgboothacw@aol.com
www.AntiqueClockworksLtd.com

Have you experienced the benefits of diamond tools?
Diamond abrasives for crystals, pivots, watch hands, pallets, gravers and much more!
www.eternaltools.com
Based in the UK. Tel/fax: (01144) 208 860 0974
Secure ordering online. Prompt worldwide service

NOW AVAILABLE
Discontinued SEIKO & LASSALE
Bands, Cases, Dials, Straps & Case Parts

This is an inventory of complete salesmen's samples. We have over 15,000 cases/bands in stock for immediate delivery. Crystals, dials, hands and crowns are available. Renew that old SEIKO or LASSALE customer's watch for a fraction of the cost of normal parts purchase. We have many parts that the major distributor can't supply. All parts are from U.S.A. authorized models.

Call RON CANDA
1-877-226-3259
This is a FREE call!!!

Have caseback, dial, or band numbers ready and I will let you know cost and availability.

E-mail: candajewel@aol.com
www.candowatches.com

TEC Specialties
Fine dials, decals and labels

Catalog with refund coupon $4.00 ppd
www.tecspecialties.com
Jim Zerfing **PO Box 5042**
South Williamsport, PA 17702-0842

maxell
Batteries
THOSE WHO PUT THEIR NAME ON THE OUTSIDE PREFER MAXELL'S NAME ON THE INSIDE
For all your alkaline, lithium and watch batteries, watch tools, watch movements, metal bands, leather bands, glasses (flat/domed), crystals, Swiss sapphire crystals, Citizen and Seiko crowns, springbars, o-rings and gaskets please contact:
Simren Canada
5730 Coopers Avenue, Unit #24
Mississauga, Ontario L4Z 2E9
Tel: 905-890-3618 • Fax: 905-507-6896
Toll: 1-800-381-3077 • Fax: 1-888-890-8878
E-mail: simren@idirect.com
Website: www.simrencanada.com

WATCH TIMING GRAPH MACHINE BY VIBROGRAF, Model 200, $200 +shipping. Ken Kazen, CMC, 608 S. Washington, Owosso, MI 48867; (989) 725-8340

Parting out small watch repair shop. Entire shop $3,450. (850) 723-4294 (cell phone).

CLOCK & WATCHMAKERS TOOLS
By J. Malcolm Wild, England

Depthing Tools, Milling Spindle, Jacot Tool, Division Plates, Mainspring Winder, Staking Tool
All tools craftsman-made.
Also Thornton Wheel & Pinion Cutters for both clocks and wat ches

Send $10.00 for 50-page catalog to:

JMW (Clocks)
Prop. J. Malcolm Wild, FBHI
12 Norton Green Close, Sheffield S8 8BP
England
Fax No. 01144 2740295
US Contact Call (570) 937-3301

DASHTO INC./TOM MISTER
http://www.dashto.com
Huge and everchanging selection
Used and new horological items
Sold by internet list only
TOOLS/EQUIPMENT
MATERIAL ASSTS/PARTS
POCKET/WRISTWATCHES
WATCH MOVEMENTS
WATCH CASES & DIALS
WATCH BRACELETS/BUCKLES
MUCH MORE
WE BUY & TRADE ALSO
tom@dashto.com
http://dashto.org

BUSINESS FOR SALE

Small Jewelry Store, includes jewelry and watch inventory (mostly vintage watches), located in Indiana. Good business, 10-year history. Selling due to illness. Reply to: Box BFS8902, c/o *Horological Times*, 701 Enterprise Drive, Harrison, OH 45030.

FOR SALE: Due to retirement, House of Clocks and Gifts - Since 1981 - Abilene, TX 79602. Draw from 150-mile radius. 3,100 sq. ft. freestanding building built in 1983. Interior remodeled in 1999. Sale of quality clocks and gifts. Clock repair and restoration for 40 years. Excellent customer base. Complete package: land, building, inventory, repair tools and 2000 Ford Van - $275,000. CAL SANFORD, The Clock Doc (915) 692-5605, www.sanfordclockdoc.aol.com

CLOCK SHOP FOR SALE
Well established and highly reputable. Family owned and operated for 38 years. Retail sales & repair. Located in Clearwater, FL. Commercial building has 2 occupied rental units. $350,000. 727-442-7782.

COMPLETE WATCH REPAIR SHOP FOR SALE IN ANKORAGE, ALASKA. For details call (907) 332-2500 or (907) 333-1870. Richard L. Clark

Beautiful Colorado Springs. Established 25 years. Watch & jewelry repair shop, loyal clientele, growth potential, owner motivated. (719) 597-6704 or (719) 632-3623.

SPECIALTY CLOCK SALES & SERVICE
EDMONTON, ALBERTA, CANADA

- Large inventory of Grandfather, wall, mantle, cuckoo & novelty clocks; watches & curio cabinets.
- Exceptional repair service.
- Provincial wide clients.
- 2,643 sq. ft.-long term lease.
- Vendor retiring after 33 years - will train qualified purchaser.
- LIST PRICE $450,000.

HAROLD SCHMIDT
Jayman Realty (Edm.) Inc.
1-877-428-2879 (Toll Free)
E-mail: haroldschmidt@shaw.ca

SOFTWARE

CompuWatch releases WMOSX (CompuWatch Office) Windows Shareware version for watch repair shops. For only $49.00 you get invoicing, job estimation, unlimited repair tracking, job envelope printing and many more features. Additional programs: general ledger, expense tracker, inventory control, comprehensive part ordering, trade work manager and password bank. Review the full package for 30 days free then register only the software you need. Get fast downloads at **www.compuwatch.net**.

HELP WANTED

WATCH TECHNICIANS

Due to our growth, we are seeking experienced **Watch Sales Service Technicians** and fully skilled **Watchmakers** for our newest locations in San Francisco, San Jose and Las Vegas.

We offer excellent benefits and opportunities for growth. Join the country's largest premium watch dealer and work on the finest timepieces available.

Send or fax your resumé to:
Tourneau, Att: National Service Director
488 Madison Avenue, New York, NY 10022
Fax: 212-421-2282 or call: 1-800-528-5871 x229

TOURNEAU
SINCE 1900

NEW YORK PALM BEACH BAL HARBOUR ATLANTA CHICAGO HOUSTON SOUTH COAST PLAZA LOS ANGELES SAN FRANCISCO SAN JOSE LAS VEGAS

Experienced Watchmaker Needed
Salary up to $100,000 + Benefits
Phone 248-723-5550
Fax 248-723-5401
Contact: Mr. Efim Khankin

SITUATIONS WANTED

WATCHMAKER
Experienced with Cartier and other high-end brands and Chelsea Clocks. Seeks challenging position and /or establish trade accounts in the United States. Please reply to: Box SW602, c/o *Horological Times*, 701 Enterprise Drive, Harrison, OH 45030.

WATCHMAKER
European experience, skilled in high quality watches and clocks, seeks position or partnership in the Chicago area. (773) 283-6690 danielsnowak@ameritech.net

WANTED TO BUY

ATTENTION RETIRED WATCHMAKERS
Call us before you sell your parts, tools, and watches. We have helped over 125 watchmakers in the last three years to dispose of their accumulations. When you're really ready to sell, we're ready to buy! Phone (727) 327-3306. Ask for Jeff or Nancy. E-mail: jeffnancy@watchfinder.com

ANYTHING ILLINOIS
Want to buy Illinois wristwatches, dials, movements and cases (complete or parts) in any condition. Please call 800-421-1968, x5520, Fax 949-725-9787 or mail to Fred Friedberg, c/o TAMS, P.O. Box 2068, Tustin, CA 92681-2068 or e-mail at ffriedberg@TAMS.com.

WATCH MATERIAL DISTRIBUTORS
Please call us if you are interested in selling your business.
All replies confidential.
Contact Pat Cassedy
Cas-Ker Co. (513) 674-7700

We also fit glass crystals to Openface, Hunting, and English chain drive watches. Complete watches, dials, movements, case springs for sale.

G F Specialties
1-800-351-6926
P.O. Box 170216
Milwaukee, WI 53217

We pay 97% of market for karat gold scrap (any amount)! Also, buy filings, gold fill, sweeps, silver, platinum! Immediate 24-hour payment return mail! Ship insured/registered mail to: AMERICAN METALS COMPANY, 253 King St., Dept. HT, Charleston, SC 29401. Established 1960. Phone (803) 722-2073.

CALL ME

When you are ready to sell your movements, cases, dials, parts, or complete watches. Prompt, fair settlement. Will travel or pay shipping. Mike Bailey, P.O. Box 1118, Elgin, IL 60121 or (847) 741-1289.

WANTED: Paying high prices for chronograph and high grade watches, movements, dials, cases, & parts. Dean Sarnelle, 25 W. Beverley St., Staunton, VA 24401, phone & fax (540) 885-6064.

Books from AWI

To order the following books please call toll free 1-866-367-2924, ext 301 or visit our website at www.awi-net.org

The History and Development of the Quartz Watch By Benjamin Matz, CMW, FAWI
First Edition, published 2001, ISBN 0-9653053-0-9, *Chronos* Magazine, Denver, CO. This 6" x 9", 57-page, soft cover book offers the reader a fascinating study of the history and development of the quartz watch. This interesting book is divided into an introduction, nine main chapters, a reference section, and an index.
RETAIL: $14.95 AWI MEMBERS: $13.46

How to Build a Regulator Clock By J.M. Huckabee, CMC, FAWI
Shop drawings with critical drawing notes, 82 fully illustrated pages.
RETAIL: $18.00 AWI MEMBERS: $16.20

Military Timepieces By Marvin E. Whitney, CMW, CMC, FAWI
Marvin Whitney began his extensive research for this book in the mid-eighties. He took advantage of archive records in Washington, D.C. and travelled extensively in New York, Pennsylvania, and New England searching out little-known facts. The book contains 32 chapters and hundreds of photographs, illustrations and diagrams. This book is probably the most complete compilation on military timepieces to date.
RETAIL: $75.00 AWI MEMBERS: $67.50

Quartz Watch Retrofitting By Wesley R. Door, CMW
When there's a reason to retrofit, this book shows methods to achieve this task. Chapters include replacing a quartz movement, or changing a mechanical to quartz including replacing dial feet. Chapters include how to make a Dial Soldering Box and how to use it. The last chapter provides an easy-to-use 75-page Quartz Interchangeability Chart. This 5" x 8" inch, spiral bound, 180-page book includes 132 photos and drawings.
RETAIL: $29.95 AWI MEMBERS: $26.96

Questions and Answers in Quartz Watch Repairing By Alice and Buddy Carpenter
A basic understanding of quartz technology.
RETAIL: $12.95 AWI MEMBERS: $11.66

Questions & Answers of and for the Clockmaker
This popular study guide for clockmakers has been updated by the AWI Certification Committee. This expanded version contains questions and answers and article reprints. Printed on 3-hole punch paper and shrink wrapped, this book is available with or without a binder. Each copy contains a cover to slip in the AWI binder or a binder of your own choice.
BOOK + BINDER - RETAIL: $27.95 AWI MEMBERS: $25.16
BOOK ONLY - RETAIL: $24.95 AWI MEMBERS: $22.46

Questions & Answers of and for the Watchmaker
This popular study guide for watchmakers has been updated by the AWI Certification Committee. This 250-page version contains questions and answers and article reprints. Printed on 3-hole punch paper and shrink wrapped, this book is available with or without a binder. Each copy contains a cover to slip in the AWI binder or a binder of your own choice.
BOOK + BINDER - RETAIL: $27.95 AWI MEMBERS: $25.16
BOOK ONLY - RETAIL: $24.95 AWI MEMBERS: $22.46

The Top 300 Trade Secrets of a Master Clockmaker By J.M. Huckabee, CMC, FAWI
The material in this 111-page book covers essentially all of the more difficult tasks encountered in the restoration of older American clocks. Each step is given in such detail that journeymen and students alike can enrich their skills as "with the master's touch". Most of this work can be readily adapted to other clocks encountered in the craft of clock restoration. Over 300 Photographs! Proceeds donated to the AWI-ELM Charitable Trust Student Loan Fund.
RETAIL: $26.95 AWI MEMBERS: $24.26

Twenty-First Century Watchmaking By William O. Smith, Jr., CMW, CMC, FAWI
Smith has developed a method that will enable the watchmaker to successfully make many of the replacement parts required to restore fine watches in the 21st century. Using this method and very few inexpensive tools, the watchmaker will become proficient at custom making most flat metal parts required to complete a restoration. The purpose of this book is to cover in detail the methods the author has developed during a lifetime at the bench, methods which are the quickest, easiest and least expensive way of making high-grade parts for obsolete mechanical watches. Those who become involved in the process will find it to be fascinating, enjoyable and financially rewarding. The author's skill as a craftsman, teacher and author, along with excellent photography and line drawings, combine to make the development of the skills required to make these parts from raw material a challenging yet realistic goal to attain. The reader will truly develop what the author refers to as "The Joy of Making Parts with Ease".
RETAIL: $45.00 AWI MEMBERS: $40.50

Watch & Clock Information, Please By W.H. Samelius
The writing of Samelius edited by O.R. Hagans.
RETAIL: $30.00 AWI MEMBERS: $27.00

The Watch Repairer's Manual By Henry B. Fried
This book is frequently used as the textbook for courses in watch and clock repair. It is ideal for individual study as well. Published in 1986, the 4th edition includes the six chapters on case setting and winding systems, motor barrels and jeweled main wheels, the verge fusee watch, repairing fusee chains, how to make a verge (staff), and the duplex escapement. A total of 26 chapters comprise this 456-page book, along with a glossary, appendices, many illustrations.
RETAIL: $35.00 AWI MEMBERS: $31.50

Advertisers' Index

AWI Employee Directory

James E. Lubic, CMW
Executive Director
Education & Technical Director
1-866-367-2924 ext. 310
jlubic@awi-net.org

Lucy Fuleki
Assistant Executive Director
1-866-367-2924 ext. 304
lfuleki@awi-net.org

Thomas J. Pack
Finance Director
1-866-367-2924 ext. 311
tpack@awi-net.org

Donna K. Baas
Managing Editor/Advertising Manager
1-866-367-2924 ext. 307
dbaas@awi-net.org

Nancy L. Wellmann
Education Coordinator
1-866-367-2924 ext. 303
nwellmann@awi-net.org

Sharon McManus
Membership Coordinator
1-866-367-2924 ext. 302
smcmanus@awi-net.org

Mary Huff
Shipping Coordinator
1-866-367-2924 ext. 305
mhuff@awi-net.org

Melanie Frye
Receptionist/Secretary
1-866-367-2924 ext. 301
mfrye@awi-net.org

Laurie Penman
Clock Instructor
1-866-367-2924 ext. 318
lpenman@awi-net.org

Steve Jones
Audiovisual Manager
1-866-367-2924 ext. 308
sjones@awi-net.org

American Watchmakers-Clockmakers Institute
701 Enterprise Drive, Harrison, OH 45030
Phone: Toll Free 1-866-367-2924 or (513) 367-9800 Fax: (513) 367-1414
E-mail: awi@awi-net.org
Web Site: www.awi-net.org
Office Hours: Mon-Fri 8:00 AM to 5:00 PM (EST)
Closed National Holidays

Our O-Ring gasket assortment provides you with 149 sizes at a great low price! $39.95

447 piece assortment contains three each of 149 sizes, including ultra-thin numbers

No.	Thick.	I.D.	O.D.
30.2000	.30	20.00	20.60
30.2200	.30	22.00	22.60
30.2600	.30	26.00	26.60
35.1580	.35	15.80	16.50
40.1100	.40	11.00	11.80
40.1250	.40	12.50	13.30
40.1400	.40	14.00	14.80
40.1500	.40	15.00	15.80
40.1600	.40	16.00	16.80
40.1700	.40	17.00	17.80
40.1800	.40	18.00	18.80
40.1900	.40	19.00	19.80
40.2000	.40	20.00	20.80
40.2100	.40	21.00	21.80
40.2200	.40	22.00	22.80
40.2300	.40	23.00	23.80
40.2400	.40	24.00	24.80
40.2500	.40	25.00	25.80
40.2600	.40	26.00	26.80
40.2700	.40	27.00	27.80
40.2780	.40	27.80	28.60
40.2800	.40	28.00	28.80
40.2900	.40	29.00	29.80
40.3000	.40	30.00	30.80
40.3070	.40	30.70	31.50
45.0810	.45	8.10	9.00
50.1500	.50	15.00	16.00
50.1600	.50	16.00	17.00
50.1650	.50	16.50	17.50
50.1750	.50	17.50	18.50
50.2020	.50	20.20	21.20
50.2070	.50	20.70	21.70
50.2200	.50	22.00	23.00
50.2300	.50	23.00	24.00
50.2400	.50	24.00	25.00
50.2500	.50	25.00	26.00
50.2600	.50	26.00	27.00
50.2700	.50	27.00	28.00
50.2800	.50	28.00	29.00
50.2850	.50	28.50	29.50
50.2900	.50	29.00	30.00
50.3000	.50	30.00	31.00
50.3100	.50	31.00	32.00
50.3200	.50	32.00	33.00
50.3300	.50	33.00	34.00
55.1790	.55	17.90	19.00
60.1000	.60	10.00	11.20
60.1750	.60	17.50	18.70
60.1900	.60	19.00	20.20
60.1980	.60	19.80	21.00
60.2100	.60	21.00	22.20
60.2165	.60	21.65	22.85
60.2450	.60	24.50	25.70
60.2500	.60	25.00	26.20
60.2600	.60	26.00	27.20
60.2700	.60	27.00	28.20
60.2800	.60	28.00	29.20
60.2890	.60	28.90	30.10
60.2950	.60	29.50	30.70
60.3000	.60	30.00	31.20
60.3080	.60	30.80	32.00
60.3185	.60	31.85	33.00
60.3220	.60	32.20	33.40
60.3380	.60	33.80	35.00
70.1740	.70	17.40	18.80
70.1850	.70	18.50	19.90
70.1890	.70	18.90	20.30
70.1925	.70	19.25	20.65
70.1960	.70	19.60	21.00
70.1980	.70	19.80	22.20
70.2080	.70	20.80	22.20
70.2130	.70	21.30	22.70
70.2300	.70	23.00	24.40
70.2460	.70	24.60	26.00
70.2510	.70	25.00	26.40
70.2660	.70	26.60	28.00
70.2700	.70	27.00	28.40
70.2750	.70	27.50	28.90
70.2780	.70	27.80	29.20
70.2850	.70	28.50	29.90
70.2900	.70	29.00	30.40
70.2940	.70	29.40	30.80
70.2980	.70	29.80	31.20
70.3000	.70	30.00	31.40
70.3020	.70	30.20	31.60
70.3060	.70	30.60	32.00
70.3140	.70	31.40	32.80
70.3180	.70	31.80	33.20
75.1660	.75	16.60	18.10
75.1885	.75	18.85	20.35
75.1920	.75	19.20	20.70
75.2300	.75	23.00	24.50
75.2600	.75	26.00	27.50
75.2740	.75	27.40	28.90
75.2790	.75	27.90	29.40
75.2880	.75	28.80	30.30
75.2910	.75	29.10	30.50
75.2930	.75	29.30	30.80
75.2970	.75	29.70	31.20
75.3000	.75	30.00	31.50
75.3065	.75	30.65	32.15
75.3100	.75	31.00	32.50
75.3130	.75	31.30	32.80
80.1650	.80	16.50	18.10
80.1870	.80	18.70	20.30
80.2030	.80	20.30	21.90
80.2100	.80	21.00	22.60
80.2760	.80	27.60	29.20
80.2840	.80	28.40	30.00
80.2900	.80	29.00	30.60
80.2915	.80	29.15	30.75
80.2930	.80	29.30	30.90
80.2960	.80	29.60	31.20
80.3000	.80	30.00	31.60
80.3060	.80	30.60	32.20
80.3070	.80	30.70	32.30
80.3130	.80	31.30	32.90
80.3160	.80	31.60	33.20
80.3240	.80	32.40	34.00
80.3300	.80	33.00	34.60
85.2940	.85	29.40	31.10
90.1850	.90	18.50	20.30
90.1860	.90	18.60	20.40
90.1900	.90	19.00	20.80
90.1920	.90	19.20	21.00
90.2060	.90	20.60	22.40
90.2130	.90	21.30	23.10
90.2220	.90	22.20	24.00
90.2510	.90	25.10	26.90
90.2840	.90	28.40	30.20
90.2860	.90	28.60	30.40
90.2890	.90	28.90	30.70
90.3000	.90	30.00	31.80
90.3020	.90	30.20	32.00
90.3060	.90	30.60	32.40
90.3100	.90	31.00	32.80
90.3180	.90	31.80	33.60
100.1900	1.00	19.00	21.00
100.2600	1.00	26.00	28.00
100.2750	1.00	27.50	29.50
100.2900	1.00	29.00	31.00
100.2950	1.00	29.50	31.50
100.2975	1.00	29.75	31.75
100.3000	1.00	30.00	32.00
100.3060	1.00	30.60	32.60
100.3075	1.00	30.75	32.75
100.3175	1.00	31.75	33.75
100.3200	1.00	32.00	34.00
100.3250	1.00	32.50	34.50

A complete selection for today's thin quartz watches as well as for most mechanical and diver's watches

One of the most comprehensive O-ring gasket assortments released in several years. It covers both thin gaskets for modern quartz watches as well as most older mechanical watches that use O-ring gaskets. Assortment contains 3 each of 149 sizes of Cas-Ker brand O-ring gaskets, 447 total. Comes in a convenient hinged lid box with a listing of thickness and inside and outside diameters of each.

900.133 O-Ring Gasket Assortment..... $39.95
Refills.....$1.50/3 $2.20/6 $3.50/dz

Assortment puts 170 Mini O-Rings for Crowns at your fingertips

Includes ten each of 17 sizes mini O-rings for crowns. Sizes: 0.5x0.3
0.5x0.4 0.5x0.45 0.5x0.5 0.64x0.31
0.6x0.35 0.6x0.4 0.6x0.45 0.6x0.5
0.6x0.55 0.6x0.6 0.6x0.65 0.7x0.4
0.7x0.45 0.7x0.5 0.7x0.55 0.7x0.6

900.610 Mini O-Rings $24.95
Refills..... 10/$7.50

Gasket Speed Lubricator©

Simply place gaskets between foam pads and twist cover a half turn to quickly lubricate "O" rings! Loaded with the finest quality silicone grease, will lubricate hundreds of gaskets up to 2½". Lubricated gaskets keep out dirt and moisture and help retain vacuum. Great for rubber, plastic and threaded watch backs. Tough, sticky, waterproof, tenacious lubricant resists wash-out. Rubber will NOT deteriorate!

420.104 Speed Lubricator $6.95

Cas-Ker Co.
2550 CIVIC CENTER DR PO BOX 31167
CINCINNATI OH 45231-0167

CALL 1-800-487-0408
FAX 1-800-487-5848
LOCAL PHONE 513/674-7700 FAX 513/674-0600
Shop our web site: www.casker.com

MasterCard VISA

THOSE WHO PUT

THEIR NAME

ON THE OUTSIDE,

PREFER OUR NAME

ON THE INSIDE.

QUALITY. INNOVATION. LONGEVITY.

maxell

THE WORLD LEADER IN MICRO BATTERY TECHNOLOGY