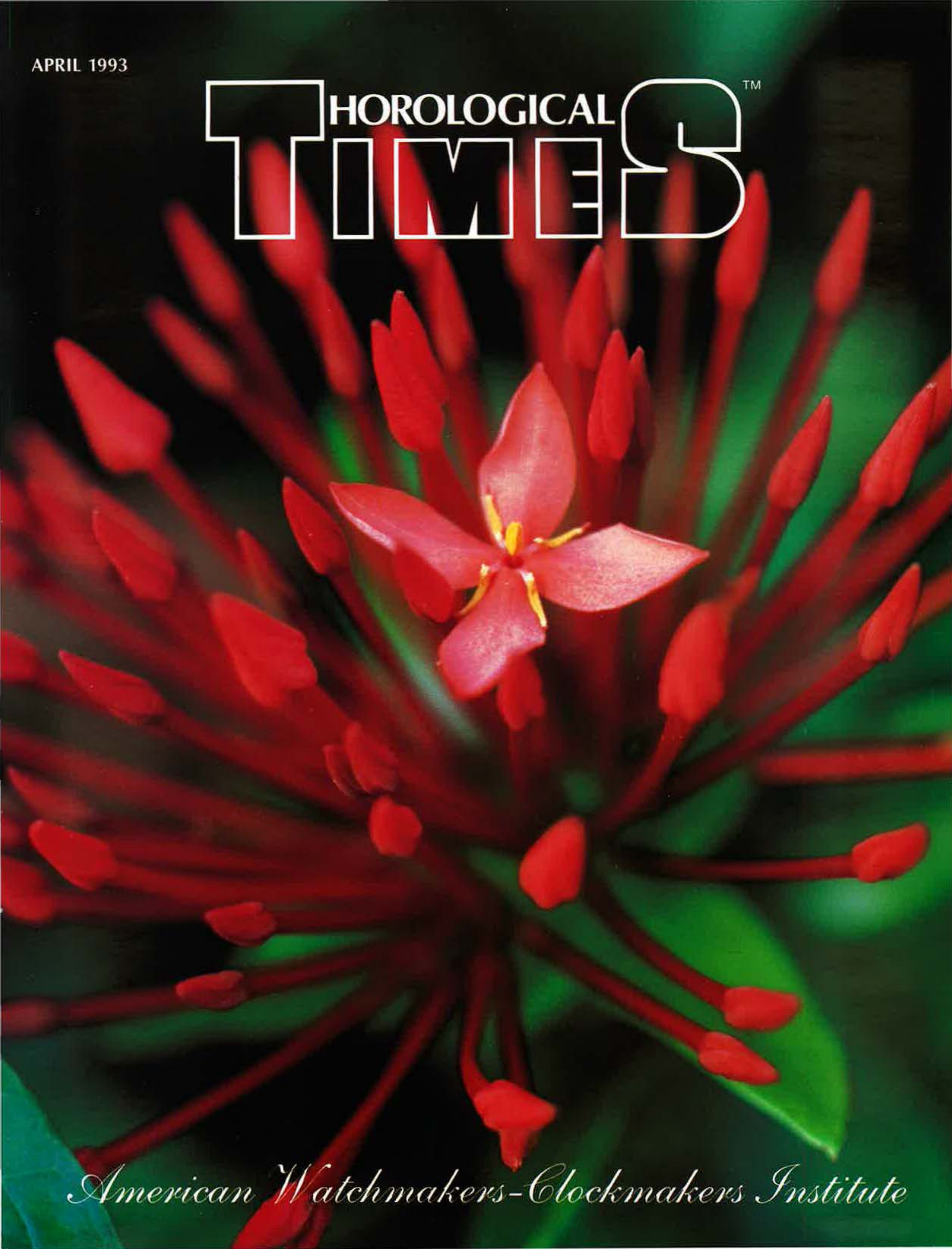
APRIL 1993

HOROLOGICAL TIMES™



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HOROLOGICAL TIMES™

EXECUTIVE AND EDITORIAL OFFICES

AWI Central
P.O. Box 11011
3700 Harrison Avenue
Cincinnati, OH 45211
Telephone: (513) 661-3838
Fax: (513) 661-3131

★ FELLOWS ★
OF THE AMERICAN WATCHMAKERS INSTITUTE

James H. Broughton
George Daniels
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*** Orville R. Hagans**
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Robert A. Nelson
*** Hamilton E. Pease**
Milton C. Stevens
Marvin E. Whitney

* Deceased

President's Message

Did you know that AWI members vary a lot in their interests? Some specialize in clock repair, some in watch repair, some in both, and others in one or more these plus other allied crafts. You probably guessed that I am leading up to a point, and you are right. In fact, I am leading up to several points.

First, we hear from time to time that we do not have a balance of articles in the *Horological Times* to represent both the clockmakers and the watchmakers. Of course, this is not really true; well, maybe it is partially true. It is not our intent to have any unbalance of articles which will favor one over the other. It does automatically happen that way just because we do try to publish all articles that are original, technically correct, and of general interest without making a tally to determine if more of one has been printed than the other.

Another subject that comes up for discussion is the possibility of some discrimination in our name AWI. Originally, AWI meant American Watchmakers Institute. Our name was to include all craftsmen but it did not appear to do this. This has been discussed at each board meeting for several years. The consensus was that the name change (which would take a constitutional amendment) was not the way to go, and yet we needed a way to please everyone. By golly we did it! The acronym AWI is still correct; however, it means American Watchmakers-Clockmakers Institute.

You will notice this change as new stationery is printed. I'm sure you have noticed the bottom line on the front cover of the *Horological Times* already indicates this change. As we said, it now includes all of us.

So, if you feel there is any unbalance, you can do something about it. Just write an article of interest to either watchmakers or clockmakers, and it will be considered for publication. Or, maybe you have an idea that relates to the other allied craftsmen.

Actually, if we want to get technical, we are not just American anymore. We are international, as we have some members around the world. The most recent guild to join us is from Australia. We also have guilds from other parts of the world. Hopefully it's not our desire to change our name from American to International.

Who knows what's next in our trade which may entice us to consider another name change. We service members who are gemologists also. I know, I number among them. However, I would not suggest a name change to indicate this within the letters of our original and well-known AWI logo.

Wes Door

ON THE FRONT: This month's stunning front cover is by Alex Bahtiarian, a resident of Englewood, New Jersey.


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Bench Tips

BY JOE CROOKS

Straightening mangled escape wheel teeth on lathes

This clock tip is from Richard Zielike of Edina, MN.

Here's an idea that can help straighten escape wheel teeth if you have a lathe with an adjustable tool rest. A tailstock that will hold a center will be helpful.

You will need to taper one end of a 2-3" piece of 1/4" brass or aluminum bar stock and mount it in your tool holder (see Figure 1).

If you have a tailstock, you can chuck up some brass stock and drill a center hole in it so that you can turn your work between centers. Make sure that your center hole is supporting your arbor and not your pivot (Figure 2).

When you get an escape wheel with a lot of bent teeth, mark a good tooth, and chuck up your wheel. I like the stability I get from doing it between centers, but it's not always necessary.

Move your cross-slide so that the tapered end of the 1/4" stock is under the good tooth, and adjust the angle of the stock so that it matches the back of your good tooth (Figure 3).

Move your slide rest and advance to the next tooth. When you have a bent tooth, you can apply pressure with a dowel or other firm object to straighten it out.

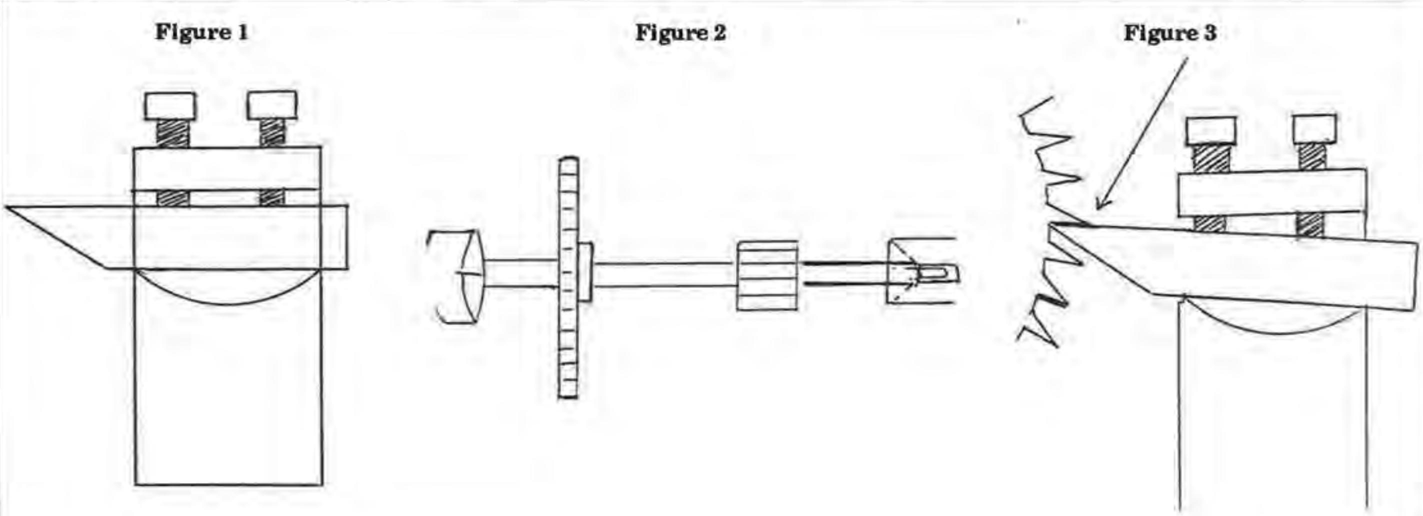
After you have checked all of the teeth in your escape wheel, you will need to make sure that it runs true. Run your lathe at a slow speed, and gently touch the teeth with a stone until all of the teeth are the same length. Use a fine file to dress up the back of each tooth.

Once you have your tapered bar stock and your tailstock center, and you understand how this works, it's very fast. I use it on a Sherline, but I believe that it would work on any small lathe with an adjustable tool rest and a tailstock. I think it keeps the tooth angle better than the commercial ones on the market, and it's a whole lot cheaper.

Hi, Richard. This is a good tip for truing escape wheel teeth. It's more precise than my method of eyeballing the wheel in the lathe and stroking it with a smooth-jawed pair of duck nose pliers. Then I steady an Arkansas stone on the slide rest to top off the long teeth, then dress down the back side of the teeth with a fine file as you do.

❑

Send your tips to: **Jingle Joe**
c/o "Horological Times"
3700 Harrison Avenue
Cincinnati, Ohio 45211



Questions & Answers

Three Timepieces:

- ***A Landeron Watch***
- ***The Hamilton 4992B***
- ***New Escapement Platform***

HENRY B. FRIED
CMW, CMC, FAWI, FBHI, ★FNAWCC

Q I am enclosing an enlarged photocopy of a 12s watch marked "The Grenwich" and "Canada" on the dial and main plate, in the hope that they will allow you to identify the manufacture of this watch. Please allow me to raise several questions:

I have in my possession a Hamilton 16s, 4992B, 22-jewel navigational pocket watch. When I obtained it it had a 12-hour metal dial, and a seconds bit in the 6 position. The main plates do not appear to have ever had a sweep second mechanism. After restoring the watch, I noticed that the hour and minute wheels were the normal 24 hours for this movement. My understanding was that Hamilton had a surplus of these watches and sold them as railroad watches. If this is true, I am surprised that they did not change over to a 12-hour display. A minute wheel from a 992 will not fit the post on the 4992B plate.

Did Hamilton make a special minute wheel for those 4992B movements used in railroad service? Or did Hamilton use a 24-hour railroad dial? As I don't believe I will find a sweep second mechanism to reconvert the movement to a 4992B, I am at a loss to know how to finish this watch. Any advice?

I am also attempting to repair a U.S. Navy ship's clock. The entire platform should be replaced. The only markings are "M. Low" on the upper portion of the dial, and "U.S. Government" on the lower portion of the dial. A similar marking and the words "New York" are on the main barrel. I have an exact size photocopy of the underside of the platform:

The words "Swiss-made" are clear, but I do not recognize the manufacturer's mark. Can you tell me where I am likely to find a new escapement platform?

John B. Lyons
Mt. Airy, MD

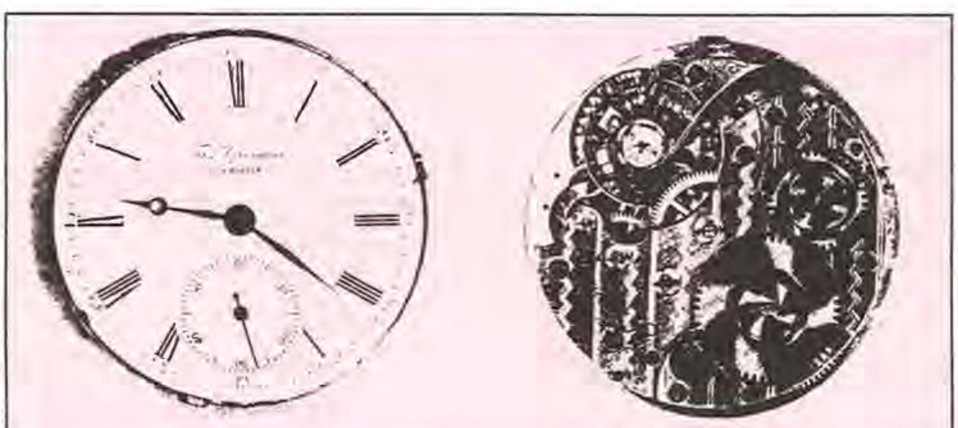
A *I have spent some time searching through old U.S. and foreign catalogues in an effort to identify the "Greenwich" watch. I could not come up with any positive identification. From what I have seen, it appears that this might have been made by the Landeron Watch Company in Switzerland in the first quarter of this century. It might have been possible to do better had I viewed the setting parts which do reveal similarities of one factory from another. As it is such a watch, it is long out of existence and of course parts are unavailable. It is a fairly well-made watch movement. The patent number might reveal who the patentee was, but this would require an involved search--whether it was a U.S. patent (unlikely), Canadian (almost unlikely), or Swiss (most likely). If you wish, we can pursue that, but you will have to let us know and be very patient about the time it would take to obtain the information, if at all.*

As for your 4992B Hamilton military watch, Marvin Whitney's "Military Watches," pages 334-335, refer to a watch similar to your description. Yours may be somewhat different. On page 334 of this fine book, Whitney states: "The model 3992B master navigation watch was made especially for the Canadian Government. The movement was identical to that of their 4992B model, the only difference being the dial configuration. The 3992B was fitted with a 12-hour dial, with a secondary row of numerals running from 13 to 24, so that it could be used with the 24-hour military time system. Thus, since both watches were nearly identical, to avoid confusion, Hamilton identified the Canadian watch as their model 3992B master navigation watch."

At the end of the war, the U.S. 4992B became surplus, and I was able to buy a number of them, but the buyers preferred a Civilian 12-hour. So I obtained different minute wheels which brought the time to a 12-hour reading and had the dials refinished to suit. The minute wheels came from Switzerland since there was a great call for similar conversions of this watch from others who had the same idea. My suggestion is that if it looks anything like the 4992B, leave it alone, as you have a rare item.

As for the platform escapement, the little trademark of the incabloc spring is that of the maker of this escapement. It is the Portescap Company of La Chaux de Fonds, Switzerland. Perhaps their U.S. representative (who markets the Vibrograf) may help. They are: ***Vibrograf USA, 504 Cherry Lane, Floral Park, NY 11001; (516) 437-8700.***

Henry B. Fried



Candidates for AWI's 1993 Election

This year there are eleven candidates selected by the nominating committee from which five directors will be elected to a three-year term. The candidates are shown here. The five who receive the most votes will join the current board members during the Annual Board Meeting, June 26-27, 1993.

During the month of April, the ballots and a background sketch of each candidate will be mailed to all AWI members eligible to vote. The election mailing will also contain the position of each candidate regarding this statement (candidates will respond in 300 words or less):

> ***Service and education are the main thrusts of AWI. As a director I would propose the following recommendation.***

A ballot return envelope will also be included in the mailing. The envelope will be addressed to the certified public accountant who is responsible for counting the votes and certifying the outcome of the election.

All ballots returned must be in the ballot return envelope and postmarked on or before the deadline date which will appear in the voting instructions. Only marked ballots should be sent to the certified public accountant. Please do not include any notes or requests for information. The CPA must hold all ballots received until sometime after July 1. AWI will be unable to answer any messages you might enclose until that time.

The future of AWI depends on the quality of the people the members select to serve as directors. Please take time to study the qualifications and positions of each candidate carefully when you receive the election mailing. ❑

James H. Broughton
Columbus, OH

Alice B. Carpenter
Tarboro, NC

Joseph L. Cerullo
Cranford, NJ

Ron DeCorte
Toledo, OH

Wes Door
Kennewick, WA

Jerry Fugich
Yelm, WA

John Kurdzionak
Stoneham, MA

Henry Loeser
Teaneck, NJ

Robert D. Porter
Florissant, MO

Bill Walking
Tucson, AZ

Marvin E. Whitney
Alexandria, VA

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SPRING BAR

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Otto Frei - Jules Borel Spring Bar Assortment # 2A Gives you 5 100% Stainless Steel and 1 Stainless Inner Spring Assortments in one single 8 1/4" x 14 1/2" x 1 1/4" Leatherette Box

Assortment # 1 is the World's Famous JBorel Spring Bar Assortment # 267/40

DOUBLE SHOULDER: 1/4, 5/16, 3/8, 7/16, 1/2, 9/16, 5/8, 11/16, 3/4, 13/16, 7/8

DOUBLE FLANGE: 5/8, 11/16, 3/4, 13/16, 7/8

THIN 1.5mm: 1/2, 9/16, 5/8, 11/16, 3/4, 13/16, 7/8

Special Buckle No. 20: 5/8

Special Buckle No. 27: 12 MM

Asst. #267/40 $55.00
267 Stainless Steel Spring Bars in a 8 1/4" x 9 1/2" case.
Refills
One Dozen per size $1.44
100 per size $7.00
352 pieces of these spring bars in the # 2a assortment.
100% STAINLESS STEEL

Asst. # 2 MK800 1.3mm dbl. flange
100% STAINLESS STEEL

1/4, 5/16, 3/8, 7/16, 1/2, 7/8, 220-B 5/8, 9/16, 222-B 11/16, 224-B 3/4, 13/16

MK800/72
72 pieces in a 12 bottle plastic box
$12.95
MK/300
300 pieces in a plastic box $ 30.00

Refills 12 for $2.04
50 for $5.00

80 pieces in the #2a assortment
1/4 " size not double flange style.

Asst. # 3 JBorel Curved Stainless Steel
Refills $1.44 /dozen per size, 100 per size $7.00 Asst. SB-5 $7.95 in plastic box
50 pieces in the # 2a Assortment

Borel	750 SERIES CURVED
750-B	5/8 — 16.00 MM
752-B	11/16 — 17.50 MM
754-B	3/4 — 19.00 MM
756-B	13/16 — 20.50 MM

Asst. # 4 Seiko Style 1.3mm Thin
single shoulder by 1/2 mm increments. 39 Sizes from 5.0mm to 25mm, 234 pieces of these 100% Stainless Steel Bars are in the # 2a Assortment.

Also available Asst. # SB -84A
24 sizes 96 pieces $26.95
Refills $3.80 per doz. per size
$25.00 per 100 pcs. per size.

Asst. # 5 Buckle Asst. # SB 84a

One of our most popular Asst.
12 different Spring Bars 7 doz. total pieces for buckles and clasps
$ 12.95
72 pieces of these bars are in the #2a Assortment.
100% Stainless

Refills $ 2.04 per dozen
$10.00 per 100 per size

Asst. # 6 1.2mm Thin Seiko Style Single Shoulder. 14 Sizes. These Bars have a Stainless inner Spring, but are not made of 100% Stainless Steel. Swiss Made
Assortment SB-6A 12 sizes
72 pieces $ 19.95

56 pieces of these bars are in the # 2a assortment.
Refills $3.20 dozen
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Two Genuine Seiko Spring Bars Extra Thick 2.00 & 2.50 mm Diameter.
3 pcs each Top Off The # 2a Spring Bar Assortment. Gen. Seiko $1.00 each
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You could buy all the assortments that make up the #2a assortment and spend $141.75 for only 633 pieces, when you can buy the #2a for only $140.00 and get 850 Spring Bars in one single leatherette case !!

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with Stainless Steel innner spring.
10 Sizes 1000 pieces only $17.95
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Association News

ARIZONA

On February 18, 1993, four members of the Arizona Watchmakers, Clockmakers & Jewelers Guild conducted three seminars on Career Day at Cholla High School, Tucson, AZ. At the beginning of the seminars, they passed out the AWI pamphlet "Careers in Watch/Clock Repairing".

The teachers at the school and the guild members rated the seminars as being successful based on attendance and questions. An invitation was extended to all teachers and students to attend a guild meeting.

The guild was also invited by Tucson Unified School District to speak at a Career Day Seminar on March 17, 1993 at Palo Verde High School.

INDIANA

On April 25, 1993 the Horological Association of Indiana will present a hands-on bench course for the watchmaker on the ETA 255 Series Multifunction Quartz Watch. It will be presented by Dan Fenwick, Technical Director of the Swiss Watch Technical Center.

For the clockmaker, Mark Butterworth of Hermle will conduct a seminar on Repairing or Replacing Hermle Clock Movements. Also for the clockmaker, Gary Neff will conduct a seminar on changing the beat and gearing on clock movements in relation to pendulum lengths.

For more information, please contact: Barry Baker, President HAI, 643 So. 4th Ave., Louisville, KY 40205; (502) 583-3676 or Fax (502) 583-0024.

NORTH CAROLINA

The Costal Plains Guild of the North Carolina Watchmakers Association held a luncheon meeting in January. Members saw a video on the Kronoglass Crystal Cutting Machine, followed by Alfred Boswell demonstrating the process for cutting the crystals on the Kronoglass machine. Eric Parris then brought out his Schohl Crystal Cutting Machine for a demonstration. He brought two bezels and cut two crystals for us. A long discussion was held on the merits of both machines, charges for service, and how long it will take to recover the price on the machines.

At the February meeting a video of the Marvin Whitney Roast held last September in Virginia was viewed. The North Carolina Watchmakers Association presented Mr. Whitney a plaque with the following inscription: "Presented to: Marvin E. Whitney in recognition of, and in appreciation for his generous services and contributions to the field of horology. This honor is awarded on behalf of the officers, members, and directors of the North Carolina Watchmakers Association. Rick Dunnuck, President NCWA, Sept. 28, 1992."

On November 8, 1992, the Golden Triad Watchmakers Guild held its third annual watchmakers and jewelers auction in Asheboro, NC. Over 100 individuals registered. Clocks, tools, movements, cabinets, benches, lights, cleaning machines, watches, and small boxes with assorted items were put up for auction. ❑

Upcoming Conventions

April 23-25	**Horological Association of Virginia Convention,** Williamsburg Hilton, Williamsburg, VA. AWI Speaker: Joseph Cerullo.
April 23-25	**Wisconsin Horological Society Convention,** Radisson Inn Downtown, LaCrosse, WI. AWI Speakers: Charles Cleves and Wes Door.
May 21-23	**Texas Watchmakers Association Convention,** Green Oaks Inn, Ft. Worth, TX.
June 4-6	**North Carolina Watchmakers Association Convention,** Holiday Inn North, Raleigh, NC. AWI Speakers: James Broughton, Henry Fried, and Roy Hovey.
July 23-25	**Watchmakers Association of Ohio Convention,** Park Hotel, Columbus, OH. AWI Speaker: Joseph Cerullo.
October 1-3	**New York Watchmakers Association Convention,** Holiday Inn, Seneca Falls-Waterloo, NY. AWI Speaker: Fred Burckhardt.
October 8-10	**Illinois State Watchmakers Convention,** Clock Tower Inn, Rockford, IL. AWI Speakers: Alice Carpenter and Buddy Carpenter.
October 23-25	**Florida State Watchmakers Association Convention,** Ramada Hotel Resort, West Palm Beach, FL. AWI Speaker: Ewell Hartman.

New Members

ALDERTON, Lisa--St. Marys, PA
ANDERSON, Scott L.--Leucadia, CA
ARCHULETA, John Patrick--Tokyo, Japan
BAKER, Jeff--Atlanta, GA
Sponsor: Jeff Jacobus--Chamblee, GA
BARNETT, David--Arlington, TX
Sponsor: Steve Weatherly--Ft. Worth, TX
BEDI, G.S.--Doraville, GA
BELK, Joan E.--San Francisco, CA★
BENTON, Michael W.--Tulsa, OK
BIGLER, Hal E.--Champaign, IL★
BLANCHARD, William H.--Gainesville, FL
BOOTH, Kenneth N.--Houston, TX
BOLEK, Anthony--Harper Woods, MI
BURWINKEL, Louis--Cincinnati, OH
CAPRALOS, James--Poughkeepsie, NY
Sponsor: Leo A. Jaroslaw--Acton, MA
CARUSO, Charles D.--Eden, NC
CHILTON, Frank--Arvada, CO
COTTON, G.C.--Jackson, CA
Sponsor: Philip M. Fallis--Montebello, CA
COUCH, Thomas E., Sr.--New Kent, VA
DONLEY, Clark S.--Richmond, VA
DRISCOLL, Scott--Portland, OR
EDMISTON, Andy--Lakeland, FL
Sponsor: Richard Grose--Gastoria, NC
ELSAESSER, Moritz C.--Needham, MA
GARENS, Russ--Minneapolis, MN
Sponsor: David Eiman--Fresno, CA
GENDRON, Mark P.--W. Warwick, RI★
GLATFELTER, Neil--York, PA
GOLDEN, Robert--Arlington, VA
GONZALEZ, Oscar--Los Angeles, CA
Sponsor: Hugo Gonzalez--San Gabriel, CA
GRANDLIC, Rudy E.--Sheboygan, WI★
GRIFFIN, Joseph--Amherst, NH
GUNNELLS, Guy--Newtown, PA
Sponsor: Richard Grose--Gastonia, NC
HADEN, Darrell--Hattiesburg, MS
HAMILTON, Jeff--Tallahassee, FL
HANSON, Leighton J.--Beggs, OK★
HARDY, James E.--Clinton, MD
HARTWELL, J. Wylie--Orange Park, FL
HELLIGE, Charles B.--St. Louis, MO
HELSEL, Melvin C.--Irvona, PA
HILL, Charles F.--Leavenworth, KS
Sponsor: Jerry M. Faier--Overland Park, KS
HILTON, Jeff--Kent, WA
HUBER, Stephen J.--Miami, FL
IGLESIAS, Oscar--Miami, FL
JEAN, Arnold L.--Ignacio, CO
Sponsor: Harold Hein--Durango, CO
JOHNSON, Donald L.--Pardeeville, WI★
KALTER, Samuel--Philladelphia, PA
KLUGE, Roger W.--Atlanta, GA
Sponsor: Richard Roy--Stone Mountain, GA
KOINUMA, Kunimitsu--Tokyo, Japan
LIND, Rita E.--Sterling Heights, MI
LOAGUE, Lanny H., Jr.--Bowling Green, KY
MADDOX, Charles--Columbia, MO
MARCO, Lawrence E.--Bethesda, MD
MARSCH, Carsten--San Francisco, CA
McKEE, Roger S.--Perry, IA
McMILLEN, M.A.--Houston, TX
MELDRUM, Ronald--Moscow, ID
MOORE, Mike--Birmingham, AL★
MORGAN, Richard--Mahopac, NY
NAKAHARA, Nobuyuki--Flushing, NY
Sponsor: Jose A. Salgado--Brooklyn, NY
NEFF, Kenneth--New Athens, IL
NELSON, Jacqueline--Ocean Springs, MS
NGO, Ninh Khon--San Jose, CA
Sponsor: Bernie Mendoza--San Jose, CA
OVERMOEN, Scott--Arroyo Grande, CA
Sponsor: Virginia F. Rogers--Arrayo Grande, CA
PALMER, William E.--Charlotte, NC
PAUGH, Dwain--Overland Park, KS
Sponsor: Chuck Skoog--Kansas City, KS
PEARCE, Robert--Johnstown, PA
PIEPER, Norman L.--Overland Park, KS
Sponsor: Chuck Skoog--Kansas City, KS
QUAVE, Robert M.--Kensington, MD
REED, Paul L.--Georgetown, TX★
REYNARD, Alma Nola--Easton, PA
RHOADES, George F.--Cedar City, UT
RIVERA, Sergio A.--Miami, FL
ROBERTS, Dennis D.--Geneseo, IL
RODARTE, Martin A.--Palmdale, CA
SAULER, Ralph R.--Glassboro, NJ★
SCHMIDT, M. Douglas--Baltimore, MD
Sponsor: Gerald D. Kincaid--Baltimore, MD
SCHNEIDER, Adolph E.--Rapid City, SD★
SHIELDS, David T.--Long Valley, NJ
Sponsor: Daniel Nied--Newton, NJ
TANTISIRIRAT, Kittichai--Lawndale, CA★
TAYAG, Ernesto F.--Los Angeles, CA
TRIPP, Richard J.--Leslie, MI
TROPE, Graham--Toronto, Ontario, Canada
WALKER, Carolyn W.--Richmond, VA
WILHOYTE, Evans--W. Palm Beach, FL
WILLIAMS, John E.--Memphis, TN
Sponsor: W. Curtis Keech, Jr.--Memphis, TN
WIMER, David--Middlebury, CT
WITT, J. Don--Winchester, KY

★ **AWI welcomes back these individuals who have been reinstated.** ❑

TELL A FRIEND ABOUT AWI AND WE'LL KEEP ON TICKING...

As a Clockmaker Turns

By J.M. Huckabee, CMC, FBHI

Lathe Tools, Fixtures, Problems, and Motive Power

Two previous articles dealt with fitting a tool slide rest to several makes of watchmaker lathes. This article will touch on the Levin tool slide as adapted to an alien lathe. Those of us who own Levin products are very proud of the excellence of the equipment, and frequently swell with pride when speaking with friends. Let's see how the Levin slide looks on a lesser known type of lathe. In Figure 1 we have that slide with some very nice additional features.

The tool post in Figure 1 is believed to be of Levin origin, though I'm not sure. It arrived in my hand with a socket-head tightening screw and an allen wrench, much like some of the Unimat tool holders. I consider this to be a very poor method of tool post control. Why? Every time you stick the wrench in place, the socket is full of chips. It is not time-efficient in use. A small point indeed, but why dig the chips out of that socket head several times per day? The tool post drawbolt was altered and a round rod slips through a cross hole as shown in Figure 1. The rod has a chamfered end, requires no orientation, and is a good tightening lever. I belabor the point to encourage you to ever seek better methods of increasing productivity. Does this make the tool better? Not really, it just makes it more pleasant to operate.

Looking closely at Figures 1 and 2, you will identify a round spacer under the tool post. The post was cut away on the underside and the spacer returns the space that was removed. Now, this same slide will slip onto another lathe which has a slightly lower spindle height. Does this make the tool better or worse? No, but it adds utility to other tools I own and ultimately extends the function of my shop.

Looking over Figure 2, we find a second lock between lower and center slides. Does this make the tool better? It sure does, because of the extra rigidity it provides. The Levin slide has ball bearings on the control cranks; that makes them turn as smooth as

Figure 1. A Levin 3-deck slide on a Moseley lathe. Note the dial gauge attachments which also accommodate micrometer stops.

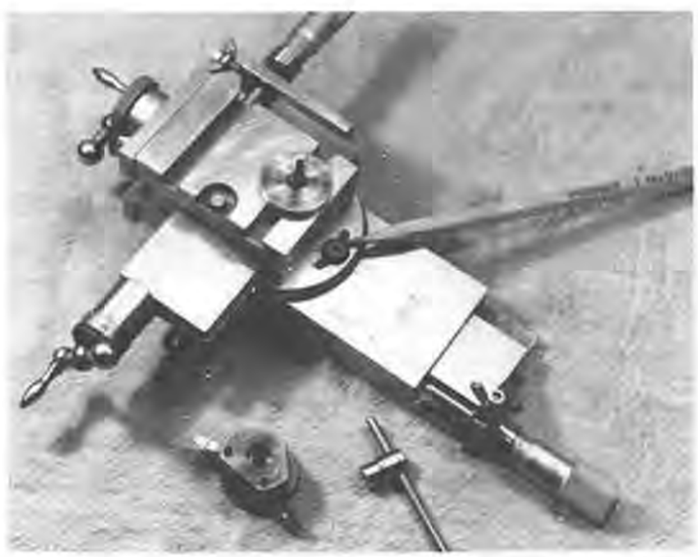

Figure 2. The Levin unit has a second lock between lower and center slides. Note the height adjustment spacer on the tool holder drawbolt.

velvet. Better? I think so; however, small chips work their way into those small bearings and present a maintenance problem. I do like the ball bearings.

Notice this slide is fitted with two micrometer stops. In Figure 1 these same attachments were filled with two dial gauges. This is an add-on feature that greatly improves the time-efficient use of any tool slide!

Looking at the underside in Figure 3, we see the stop-block that aligns the slide against the near-edge of the lathe bed. Though not as precision as the Levin counterpart, this stop-block can also be set up at an angle. Not frequently used in that mode, it does extend tool utility. Also in this figure we see the tool post, spacer, drawbolt and nut with the operating rod. I like this slide very much! What do I recommend to you? I recommend the one you can afford, that operates in a time-efficient manner, and that will yield a profit to your class of business.

The way of life is that our tools almost fit the job at hand. It's rare that everything works out exactly perfect! Figure 4 shows how I cope with the problem. Among these pieces you will find spacers for tool post, drawbolts, lathe drawbar and collet adapters, special shaped allen wrenches, saw and cutter arbors, and many other items. Each piece was made for a special purpose, saved, and reused over the years. This is just a small portion of the devices that I use to make the day-to-day work easier.

One thing that makes lathe work easier is accessibility. Many years ago I decided that a lathe fixed to a bench is like being in jail! Now all of my lathes are mounted on kitchen butcher clocks or cut boards. Most of them are on blocks about 12 x 16 inches. This permits turning the machine to the most convenient position for the job at hand. I work many jobs looking directly into the right lathe end. Some jobs I work right-handed from that position with the

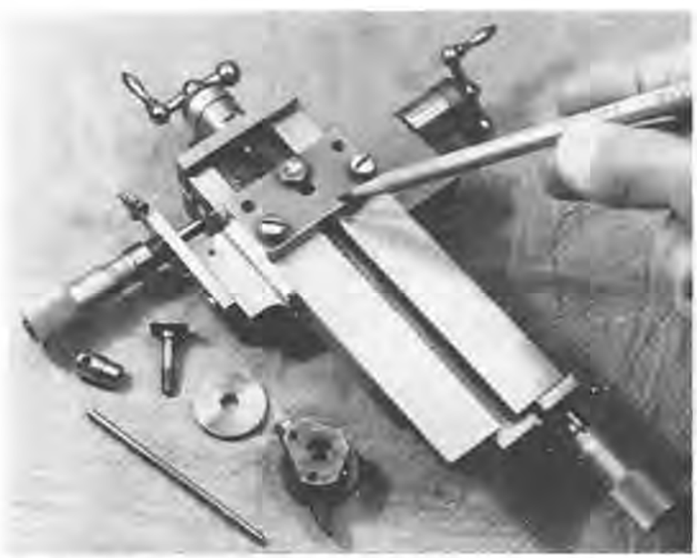

Figure 3. Underview showing the stop-block for alignment against the lathe bed front edge. This is not an original Levin component.

Figure 4. A group of adaptive devices and tools used in lathe work--a never-ending need.

lathe running backwards. Don't ever let tradition or peer opinion impede finding a better way to work efficiently!

Turn your attention to the lathe motor control. It is not unusual to start and stop the lathe motor 100 times per hour. Now how long does that take? That's wasted time. Several things can help here. Learn to leave the motor running, where feasible. Place a fixed switch on the motor so that it does not tie up one of our body limbs. Use a fixed-speed motor that is of the quick-start type. Get the heavy pulleys off your countershaft; wood pulleys have good belt traction and start-stop quickly. Use larger pulleys and slower motor speeds for quicker response.

Do I have a solution to all of the lathe problems? No, but let's look at some of my methods. Look over Figure 5. This is a setup to avoid, where possible. This big heavy chuck makes a grand flywheel.

Figure 5. Watch this booby trap. Don't run the tool slide under the chuck jaws. Even worse, don't get a finger caught in this trap.

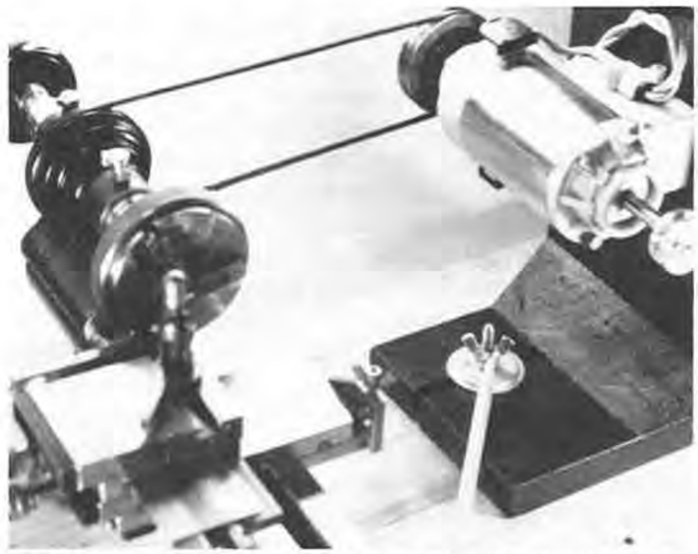

Figure 7. A quick and easy method of belt adjustment is essential to productivity.

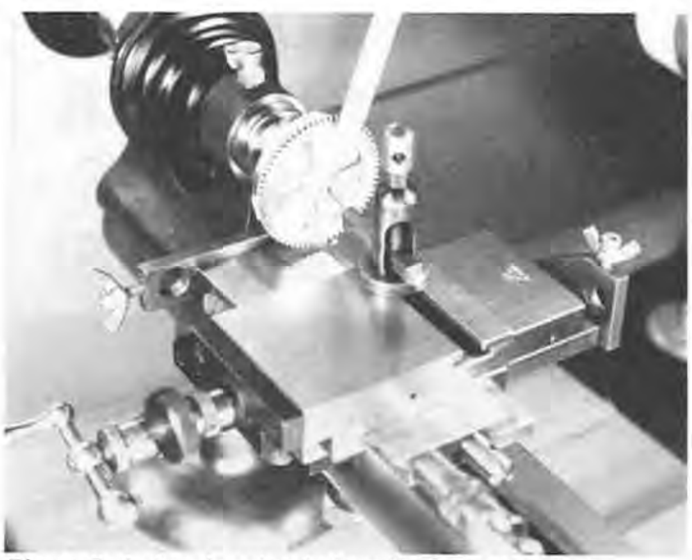

Figure 6. A classic setup to true the bore of a clock wheel. This is a tool slide by HR mounted on a Derbyshire lathe.

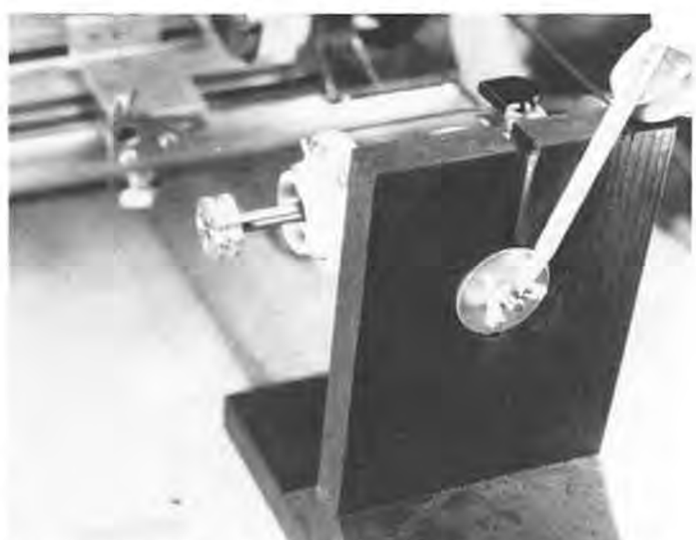

Figure 8. This motor mount permits easy height adjustment. It also presents either pulley to its load in vertical or horizontal position.

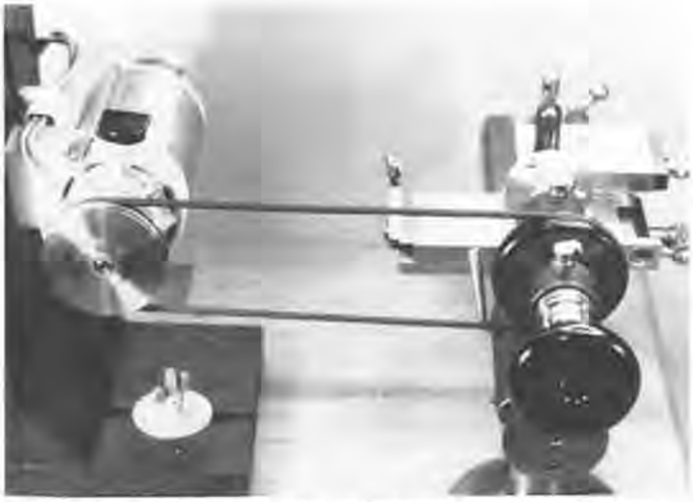

Figure 9. Use large pulleys to improve traction at lower belt tension.

Fast-starting motors with this one means slipping belts, and it's a slow stopper. Study the edge of the tool slide near the chuck jaws. If you run your tool slide under those jaws at high speed you may need a new lathe Likewise if your finger gets in that area you may need a new finger and lathe! Avoid this setup where possible, and avoid high speeds with it.

I like the setup of Figure 6. This is the job of boring the wheel center hole to fit an existing hub. The wheel is held on a small faceplate with double-sided sticky tape (carpet tape). This is a Derbyshire lathe, HR tool slide, and a universal tool post. A dial gauge on the cross slide is a nice aid to be used on this type of job (not shown here).

Here is a drive system I prefer (Figure 7). The motor has four fixed speeds in the range of approximately 1,200 to 3,600 RPM, controlled by a hand-operated switch. The indicated wing-nut holds the motor bracket to the lathe base. Belt tension can be altered quickly. From Figure 8 we see the single motor mounting bolt which permits height adjustment, exchange of motor end driving the lathe, as well as mounting the motor vertical with either pulley topmost. I use the motor in a vertical position to drive the milling spindle in a wheel and pinion cutting setup. This is a 24-volt DC (direct current) motor fed via an audio cable and a quick connector.

My preferred belt system is shown in Figure 9. The motor pulley is about the same as the largest lathe pulley. This method was selected because of the improved belt traction with lower belt tension. I use three lathes with the identical drive, with the exception of pulleys. This pulley is steel; the small one is aluminum. Wood pulleys on the other two machines will start and stop quicker.

I would like to urge every reader to strive for time-efficient methods and increased productivity. This is a sure method of increasing our earnings. ❑

Pickle Barrel

JEWELRY CRAFTING AND REPAIR

Drawplates, Drawtongs, and the Rolling Mill

MARSHALL F. RICHMOND
CMW

There are some tools that are useful and advantageous to have, even though they are not necessary tools. They're only practical to use under certain circumstances. Drawplates and drawtongs come under this category.

Metals that can be shaped with these tools can be purchased. This is not always practical, however, because to always have the sizes and shapes of metals (especially gold) such as wires and tubing requires a very expensive inventory, much of which will be used very little or never at all. Ordering small pieces takes time, and usually requires a minimum order. Therefore, often the job being worked on will not support the inflated cost. With a rolling mill, a set of drawplates, and a pair of drawtongs, a piece of wire can often be reduced in size to make a hinge pin or to replace a wire in an earring that requires a size not in stock. Tubing can be made by rolling a piece of metal to the correct thickness, and then, by drawing it through the drawplate, it can be formed into tubing that can be used for hinges.

It is true that seamless tubing can be obtained from your material supplier in most any popular size (either thick wall or thin wall). The tubing that you manufacture would have a seam. The seam can be hard-soldered. If the homemade tubing is to be attached to a piece of jewelry or watch case, the seam should be butted against the piece and then soldered.

When solder gets inside the tube, you can remove it by broaching the hole, which probably will be needed when installing the hinge pin. Tubing can also be used for tubular rivets such

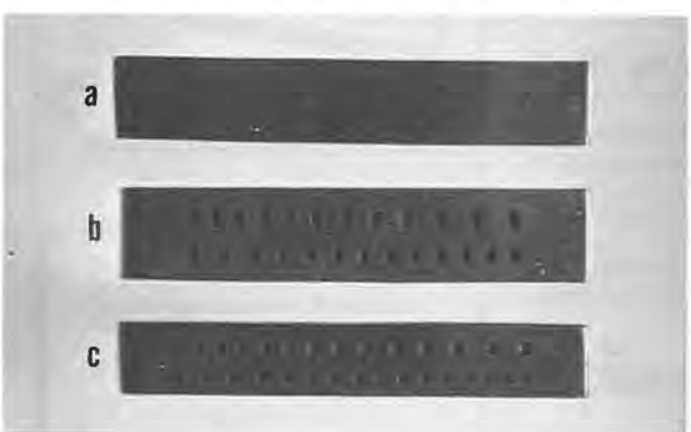

FIGURE 1

FIGURE 2

FIGURE 3

as are used on emblems where attached to drilled stones. Although most work I do is in karat gold, in repairing catches, fasteners, or bracelets, many of these repairs can be done using brass, nickel silver, or sterling silver. I prefer nickel silver to sterling because it is harder and tougher, but it is also harder to draw through the drawplate.

Drawplates are available from your tool and material supplier. They are available in any number of combinations and size holes, but for jewelry work it is wise to have the ones with the smallest holes which are graduated up to as large as you are apt to need. Figure 1 shows three drawplates: a) round holes, b) half-round, c) square. These are the plates that I have, and they've always been adequate to handle my needs. Each hole is tapered; thus, when wire is pulled through, the taper reduces the size of the wire. The wire can again be pulled through a slightly smaller hole and again through smaller holes until the wire is downsized to your need.

Tools and equipment needed for using drawplates are: **drawtongs** (Figure 2a); **rolling mill** (Figure 3); and **bench vise** (Figure 4a). Other hand tools that are needed for general jewelry work are files, jewelers saw, pliers, brass and steel hammers, torch (or equivalent) for annealing.

Preparation probably takes much longer to explain than to do, but if reducing the size of round wire, it should be cut to length first, keeping in mind that if reducing the size by half it will lengthen it to approximately twice as long. Also, keep in mind that to start the wire through the hole smaller than the wire, the end to be started should be filed to a taper so that enough goes through the drawplate to be able to grasp with the tongs. Also, as the wire is drawn through the plate, it will get harder as well as longer, so after two or three draws through smaller holes it will become necessary to again anneal it.

To prepare flat metal strip for making tubing, first roll it in the rolling mill to the thickness you want the wall. For tubing with outside diameter from 1.3mm to 2.3mm, the thickness of the metal should be approximately .3mm; however, this thickness can vary (depending on the thickness of the wall desired). The width can be for a 4mm outside diameter tube approximately 10mm. Again, the end should be cut to a taper so it will protrude through the hole enough for you to be able to grasp it with the drawtongs.

(Please turn to next page)

FIGURE 4

Drawing round wire to reduce the diameter is done by first putting the drawplate with the sizes of holes needed to make the reduction you need in a bench vise that is mounted on a solid bench. Have the small ends of the tapered holes facing you. From the back, start the tapered wire through a hole that the wire will go through. Keep moving to a smaller hole just slightly smaller than the one the wire will pass through. (Figure 4a shows the bench vise, b the drawplate, c the drawtongs, and d the wire protruding through the hole in the drawplate grasped by the tongs to be pulled through.)

In preparing the wire it should first be annealed, which is done by heating to a cherry red with a torch or other heating device (Figure 5b). It can be cooled (quenched) in room temperature water, or slow-cooled if it is a nonferrous metal. However, if it is a *ferrous* metal, it must be slow-cooled to make it dead soft. After two or three draws this should be done again, for as the metal gets harder and more brittle it can check or break; also, the harder the metal is, the more apt it is to do damage to the drawplate. As the jaws of the drawtongs are quite rough and the wire is soft, sometimes after one or two draws the tapered end may break off and have to be re-shaped again. When wire is reduced in diameter thickness, it gains length so it is easy if reducing the diameter by one-half to expand the length by double. With experience, most of these sizes, lengths, and widths can be determined with simple measuring tools, eyeballing, and mental calculations, which can be far faster than using formulas and mathematics.

Figure 6 shows a piece of round wire 1-1/2mm in diameter (marked a) which is drawn through eight reduction holes on the drawplate, and annealed three times to a diameter of .5mm. Note that the length in Figure 6b shows it to be about twice as long as original. This .5mm diameter wire was needed to make repairs on a diamond watch band.

The rolling mill is a much used piece of equipment in my shop because I do not stock a large inventory of sizes and shapes of precious metals. Therefore, pieces of gold or silver can be made to thickness in the rolling mill and then cut to size with the jewelers saw. Most new rolling mills available today can be with smooth rollers for flat work or combination with half of the rollers for flat work and the other half for rolling wire of different sizes. My mill has flat rollers (Figure 3). It can handle metal up to 3 inches wide and from 3 to 4mm thick, and reduce down to less than 1/2mm thick. Reducing a large sheet of heavy metal to a small thickness is not really practical, for in doing jewelry crafting and repair most reducing jobs will rarely use metal over 2mm thick or 1 inch wide. The same consideration should be used in keeping the metal soft and pliable by annealing often when making reductions in thickness. (Figure 3a shows rolling mill with plate coming through.)

Making tubing from flat metal using drawplates is started by choosing the size tubing needed. Making a tube 2mm in diameter will require a piece of flat metal .3mm thick and 5mm wide.

Figure 7a shows a piece of metal 1mm thick and 5mm wide reduced to .3mm thick, and it picked up about 1/2mm in width. The extra 1/2mm width will not affect the total diameter of the finished tube, for it can just be drawn through a smaller hole which will increase the length and possibly increase the wall thickness.

Figure 8 shows the metal after one end is tapered for starting through the drawplate, giving enough protruding to get a firm grasp with the drawtongs. Anneal the metal so it will be dead soft. To make the starting easier, the piece can be put in a bench vise with half the width protruding above the vise jaws, then bent over, forming an angle. The piece should be put through the drawplate (held firmly in the vise) in the smallest hole so that it can easily be pulled through. Then continue on each draw made in the next smaller hole until the edges come together. Measure the outside diameter and then continue to draw through smaller holes until the correct diameter is reached. The inside hole in the tubing may not be exactly the diameter needed if it is to match other tubes of a hinge. To match the inside diameter of a tube, insert a wire or drill in the old piece and measure. Then drill or broach the new piece to bring it to correct size.

If it is the middle tube of a hinge, it should be cut to length and soldered on the lid or whatever part it is to work with. After soldering with the seam against the metal, it will also have the seam soldered. Now is the best time to broach or drill the hole to the desired size.

Figure 9 shows the completed tubing. Note that one end is cut diagonally to show the hole in the center and the other end is rough and flat from gripping it with the drawtongs.

FIGURE 5

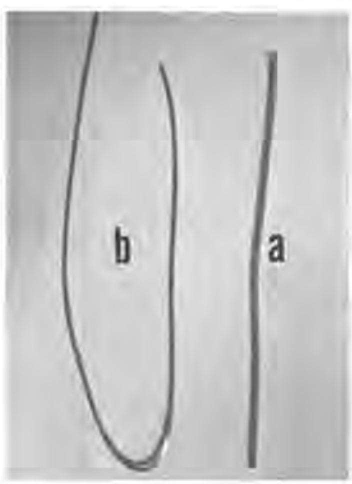

FIGURE 6

FIGURE 7

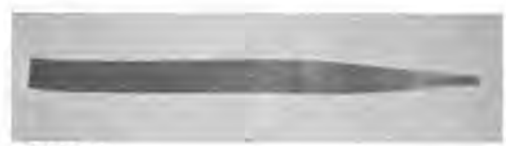
FIGURE 8


FIGURE 9

Loss in waste material always happens when working metal, such as the rough ends have to be cut off when finished drawing wire or tubing, or when filing or cutting. All these small pieces and filings should be saved, for if working with karat gold the scrap saved is worth the value of the fine gold which amounts to eight or nine dollars a pennyweight, at $350 per ounce gold. Silver or other precious metals also have a good salvage value, if sent directly to a refiner. In doing jewelry crafting and repair, there are many sources of salvage precious metals. When sizing finger rings smaller, a piece of gold is always cut out, or when replacing a head or shank the old ones being replaced can be saved for salvage.

When remounting people's rings or jewelry, the pieces that the stones are removed from are usually karat gold. On remounts, I have always allowed the customer 70% of the fine gold content value to apply to the cost of the labor and materials in doing this work. When downsizing rings, the price is less if the piece is kept by the jeweler. Naturally, if the customer requests the cut-out portion be returned, the price is slightly higher. I have always tried to be completely fair and honest with my customers, unless they appear to be trying to take advantage of me: then the transaction turns to one of self-defense.

Job completion. As soon as possible, job completion has always been my intent. It is irritating to have to start work and lay it back for lack of material, so I try and have enough material on hand to complete any job that I start without having to hold it over waiting for material. Although this is a strong belief, I do hold a small percent over awaiting material some even on back order. However, with the tools and equipment I have to work with and the ingenuity that I have developed over a lot of years, holdovers or lay-backs are very few in my shop.

In next month's issue we'll continue our discussion of tools and equipment, with their advantages, disdvantages, and cautions in their use and care.

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Clocks *Inside & Out*

By Dewey Clark

Balance Assemblies: Principles of Operation and a Little History

Part II: Balances with Secondary Compensation

Once it was understood that middle temperature error resulted from the difference in response to temperature between a steel hairspring and bimetallic balance, two approaches became obvious. One involved using materials other than steel for the balance spring, or steel and brass for the balance, in an effort to eliminate the need for a compensating balance. The other approach involved using mechanical affixes on the balance itself to make its response to temperature changes more like the response of the balance spring.

Experiments with various materials included using gold and glass for the balance spring. Palladium alloy balance springs, found in some pocket watches, were used from the last quarter of the 19th century and by Mercer as late as 1980. Palladium alloy springs are not as sensitive to temperature as steel and require much less temperature compensation on the balance. Ultimately, Elinvar, Nivarox, Conel, Elginium, etc. became standard materials for balance springs. These balance spring alloys maintain a constant strength throughout the temperature range and require no temperature compensation on the balance.

Mechanical affixes. The other approach, mechanical affixes to the balance, yielded a great number of interesting and effective designs. Timepieces containing these balances are historically important and it is important to disturb the balance as little as possible.

The logic of the mechanical affix is to change the shape of the rate of change in the moment of inertia of the balance in response to changes of temperature. If the temperature response of the balance could be made to match the temperature response of the balance spring, then middle temperature could be eliminated.

One of the most interesting affixes was used by Loseby. This affix was a miniature mercury thermometer attached to the balance. As the temperature increased, the mercury moved toward the balance center; as the temperature decreased, the mercury moved toward the rims altering the moment of inertia of the balance to keep the balance matched to the strength of the balance spring. This was an effective affix and has been found on marine chronometers and pocket chronometers.

The difficulty with the Loseby balance was that it required great skill to fit to the balance and it was easily broken or distorted. Very few mechanical affixes were able to overcome these limitations.

Poole's balance. John Poole was a noted London chronometer maker who committed suicide in 1868. In 1845, Poole introduced a practical mechanical affix which was relatively easy to construct and robust enough to withstand handling. See Photo 1.

Poole's balance is an example of an affix designed to alter the shape of the temperature response curve at the lower end of the temperature range (Figure 1). It did this by restricting the outward movement of the bimetallic arms of the balance. This was done by attaching a brass block near the timing screws. This brass block carried a set screw which could be adjusted to prevent the full length of the free arm from continuing to expand outward in falling temperatures. In effect, the Poole auxiliary shortened the free arms at the lower temperatures. Compare the rate curve of the Pool balance with the rate curve of the Earnshaw balance (Figure 2).

The theoretical graph shown in Figure 1 indi-

Photo 1. Poole's balance from a chronometer by John Poole of London, ca. 1858.

cates how the Poole balance reduced middle temperature error. The rate response curve in lower temperatures was much more shallow than the low temperature response of the Earnshaw balance, while the high temperature response remained the same. This produced a rate of +.9 seconds/day at 50 degrees (point A on Figure 1), instead of the usual 0 seconds/day rate found with an Earnshaw balance. The rate still peaked at 70 degrees with a rate of +1.5 seconds/day. This reduced

Figure 1. Rate of Poole's balance across temperature

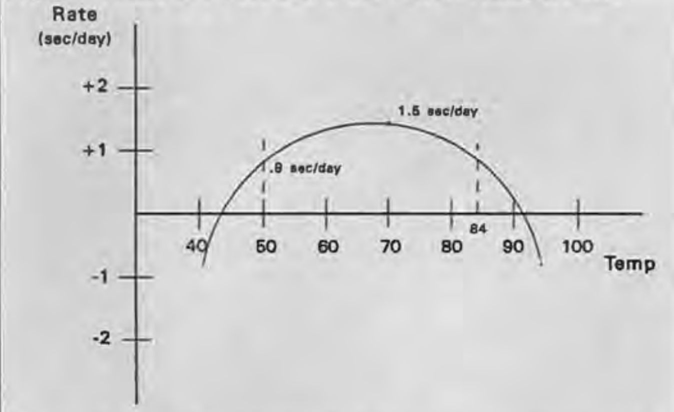


Figure 2. Rate of Earnshaw's balance across temperature

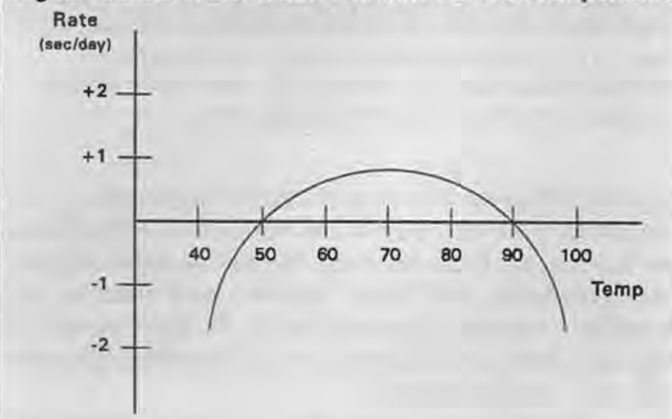


Photo 2. Early Kullberg balance from a chronometer by Pennlington and Batty of Liverpool, ca. 1895. While difficult to see, the affix is on the short balance arms.

the rate difference between 70 and 50 degrees from +1.5 seconds/day for the Earnshaw balance to +.6 seconds per day for the Poole balance. Simply by adjusting the timing weights, the Poole balance could then be adjusted to a rate of 0 seconds/day at 50 degrees and 84 degrees (point B on Figure 1) with the resulting peak error of +.6 seconds/day.

This balance was easy to construct, withstood handling quite well, and performed very well. As a result, it was very popular in precision portable timepieces of the mid-nineteenth century.

Eiffe's balance. Around 1835, John Eiffe designed a balance constructed to alter the upper end of the temperature response curve. This was done by arranging a steel arm, which carried weight screws, on the inner side of the balance arms. These steel arms carried a check screw adjusted so that the inward motion of the laminated balance arms would push the steel arms, and their weights, toward the balance center at warmer temperatures.

This action is quite different than that of the Poole balance. The Poole auxiliary slowed the rate at which the effective diameter of the balance increased at the lower temperatures by restricting the outward motion of the free arms in falling temperature. In contrast, the Eiffe balance depends on the inward movement of the laminated arms to pick up and carry the compensation weights mounted on the extra steel arms. This action increases the rate at which the effective diameter of the balance gets smaller in rising higher temperatures. While their principles of operation are quite different, the Poole and Eiffe balances have similar effects on the temperature response curves.

The Eiffe balance was extremely difficult to construct and set up. The adjustment was easily disturbed by the dirt found on wooden ships and it had to be handled with extreme care during repair. As a result, it was readily superseded by Poole's design.

Kullberg's balance. Victor Kullberg was perhaps the pre-eminent chronometer craftsman in history. No other individual in history took more first prizes at the Greenwich chronometer trials. Victor Kullberg is credited with at least three original balance designs that successfully controlled the middle temperature error. Watches, carriage clocks, and chronometers made by Victor Kullberg are highly sought after.

Aside from the level of finish Kullberg applied to his timepieces, much of his success in the time trials can be attributed to the design of his balance. Unlike the Poole or Eiffe balances, the Kullberg balance is designed to flatten the peak of the temperature response curve. Like the Eiffe balance, the Kullberg balance provides secondary compensation by using the movement of a second set of weights.

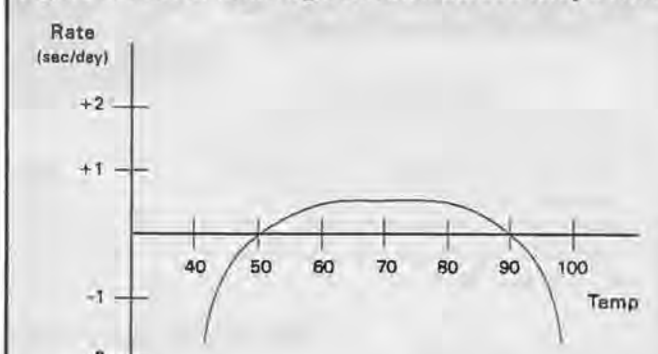
There are two major differences between the Kullberg balance and the Poole balance. First, the Poole balance modified the shape of the rate curve in the lower temperature range; the Kullberg balance modifies the curve at the upper temperature range. Perhaps more importantly, the Kullberg auxiliary is built into the balance, making the Kullberg auxiliary less likely to be thrown out of adjustment.

Graphically, the Poole balance was designed to change the rate error across temperature from an upside-down "U" to give a more shallow curve at the lower temperatures while displaying the same shaped curve at the higher temperatures. This still left a temperature at which the rate error peaked.

On the other hand, the Kullberg balance comes into action at the upper temperature range and was designed to flatten the middle temperature error across the temperature design range (Figure 3). Graphically, the Kullberg balance makes the curve of the inverted "U" much more shallow.

The early form of the Kullberg balance. There are two forms of the Kullberg balance, generally referred to as the "early" and "late" forms. In the early form (Photo 2), the balance was cut approximately 20 degrees away from the balance arms. The resulting

Figure 3. Rate of Kullberg's balance across temperature



Movado
Always in Motion
PART 2

Movado introduced an enormous amount of new styles and designs, and this is well documented by the sales catalogs between 1910 and 1921. Close to 704 different case designs of ladies' and gent's wristwatches are pictured in these catalogs (Figure 8). More than half of the watches have "Chronomètre Movado" printed on their dials, and quite often the tiniest ladies' wristwatches featured a second hand. From these early catalogs it is also evident that Movado offered the same type of watches under different trade names, such as "Ralco," "Mistral," "Tanit," and others (Figures 9 and 10).

A portion of the wrist and pocket watch collection from the time around 1915 was signed "Rosenberg-Wallach, Joyeros, Lima Peru," which was most likely the general agent for Peru (Figure 11). Furthermore, these early catalogs are indicative of Movado's concentration on wristwatches: almost half of the models offered before World War I were already wristwatches.

Some of the earlier wristwatches were designed neither as ladies' nor gent's watches, but to be worn by both genders. This design idea has been used by Movado more often, as we will see later. The "Ermeto" is just another example of this type of watch.

The caliber 150MN (with four adjustments) is already listed in a catalog from the time around 1910, and still appeared in a Swiss spare parts catalog in 1949. This caliber has been produced for over four decades by Movado and used as a base caliber for many different models. The design of the movement has become a Movado trademark, and is easily recognized by the shape of the train wheel bridge with the bulges for the three jewels for the third, fourth, and escape wheels. This basic movement design has been used up to the fifties from the early caliber 105 to the 19-ligne pocket watch caliber 800M.

The following is a closer look at three early "Chronomètre Movado" watches equipped with the 10-ligne caliber 150MN with four adjustments:

1) The first one is a white gold wristwatch in the shape of a half moon. The case is curved to follow the contours of the wrist (Figures 12 and 13). This unique piece was made around 1914 for the Spanish or a Spanish-speaking market, since the country of origin is printed as "Swiza" on the dial. The form had priority over the function, and the relatively small movement is fitted to the backside of the extremely curved dial. The movement has a "Geneva" style finish (stripes on all bridges) and the three train wheel jewels were bezel-set (chaton) and secured with screws.

2) The second is a large gent's wristwatch with a curved stainless steel case. The dial with its carefully painted Arabic numerals (with shaded lines) and the skeletonized hands indicate that this piece was manufactured in the 1920s. A decade earlier, rectangular watches were often produced with indentations (as shown in Figure 16) to increase the optical effect of the curvature. Clearly visible are the large numerals at the 12 and 6 o'clock side of the case, whereas the others are smaller. The movement, which bears the serial number 190728, is still relatively small in comparison to the dial, but better proportioned as it was the case with the first watch. The size and shape of the movement appears to be less of significance than the shape of the case and the dial design. The aim was clearly to achieve a variety of designs by using less components, i.e., using the same caliber in many case variations.

3) The movement (serial #188353) of the third "Chronomètre" (Figures 17 and 18) fits snugly inside the relatively small "Staybrite" case with 28.5 mm outer diameter. This is optically balanced by the wide tubings which hold the movable case lugs. The design appears to be one of the earlier mentioned unisex styles, which could be worn by both genders. Despite the relatively small size, the dial has been well designed and is very easy to read. This piece was probably manufactured in the early 1930s.

These examples of three early Movado "Chronomètres" illustrate the large variety of case designs produced since the beginning of the century, from an imaginative half-moon-shaped case without regard to the shape of the movement in the earlier years to a more harmonious design of cases to follow the round outlines of the movement.

Many of the watches produced by Movado could be rated as being average or slightly above. The first major breakthrough was the development of the Polyplan in 1912 (inspired by Isidore), where form and function have been combined in a unique way.

THE POLYPLAN

The Polyplan is the result of the most consequent design for an elongated rectangular wristwatch to follow the curvature of the wrist (Figures 19 to 21). The design called for such an extreme curvature, that a movement with a mainplate on one level could not be the solution. Even the principal of the "Curvex" watches (developed in the 1930s), with the trainwheel on one level but the mainplate and bridges angled, would not have provided the solution for this design. The other alternative, to use a very small round ladies' movement, was not chosen because of the relative inaccuracy of smaller balance wheels.

The solution adopted by the Movado designers was unusual, and so far has never been repeated: the movement was to follow the curvature of the case by angling the mainplate on two sides by 25 degrees. The movement had therefore three levels, and the name chosen for this product reflects this fact--"Polyplan" could be translated as "many-leveled" (similar to "Polygon" as being many-sided).

Located on one side of the mainplate (at 6 o'clock) is the balance wheel and the balance bridge. The balance wheel is kept in motion by a palette fork which is bent by 25 degrees. The crown and the winding mechanism is located at the 12 o'clock side of the movement. The setting wheel is engaged to the minute wheel at a 25-degree angle. (Note: Interestingly, the setting mechanism, the cannon pinion, and the hour wheel are located on the same side of the mainplate as the train wheel, the barrel, and the balance wheel. B.W.S.) The design of the Polyplan was protected in Germany by the patent No. 257360 of June 11, 1912.

The Polyplan, produced in various shaped cases (rectangular, tonneau, oval, etc.) was not an everyday product and, because of the relatively high production costs, an expensive timepiece. Commercially, the Polyplan was probably never a great success, but today it belongs to a group of highly collectable timepieces, and is easily recognized by its typical elongated, curved shape, as well as by the

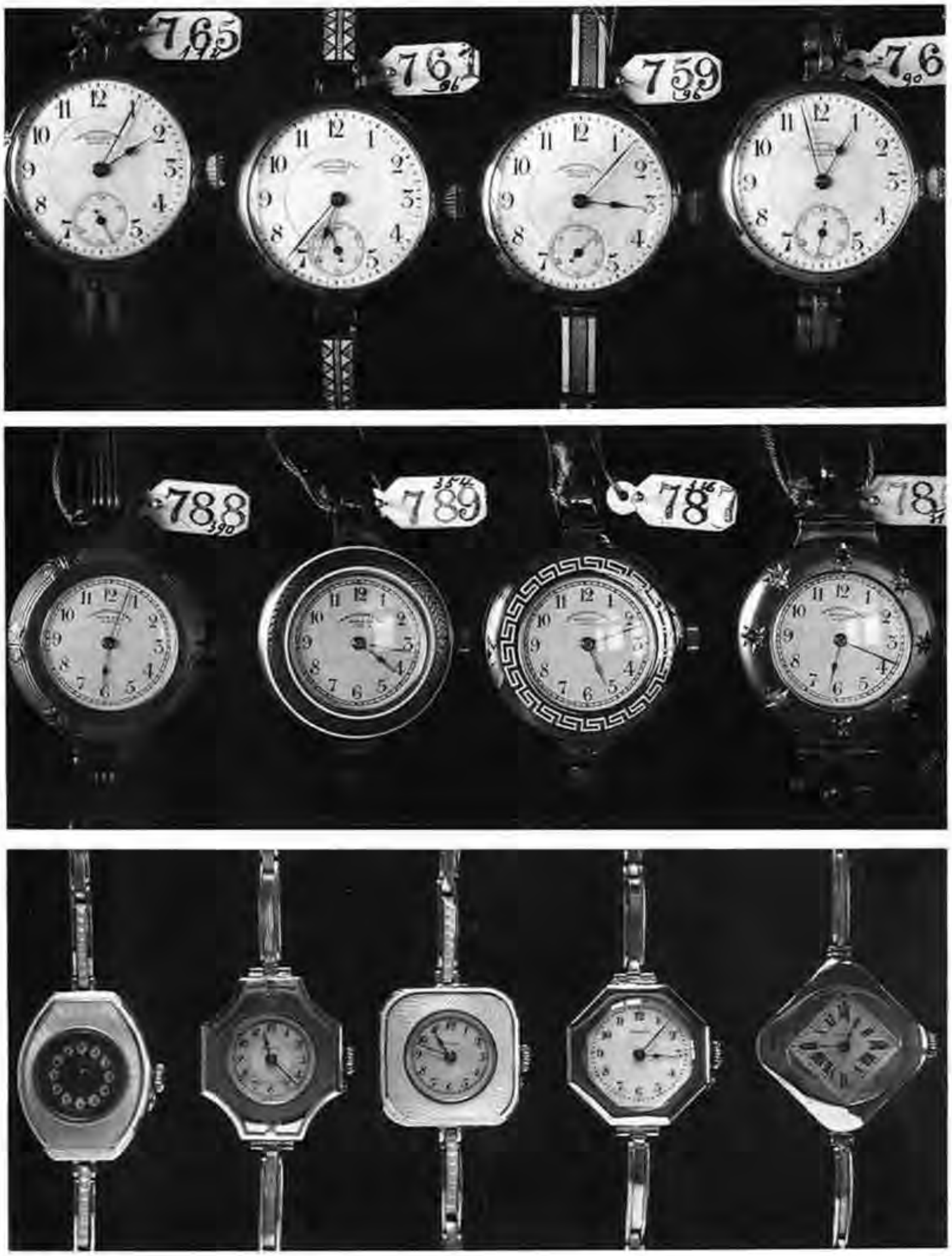


Figure 8. Various Movado wristwatches made between 1910 and 1921.

position of the crown at 12 o'clock.

THE SOLDIER'S WATCH

The Polyplan was an experimental, willful, and nonconformistic design. The next major watch developed by Movado was just the opposite--the Soldier's Watch of World War I.

This was the first time in the history of the wristwatch that an historical event led to the development of a specific type of watch. The conditions of the war required a bigger and very reliable product. Luminous markers or numerals were as important as luminous hands. The dial and the crystal were protected by a broken-through hunting cover, which allowed the reading of the time without the need to open the watch. Most cases were round or tonneau shaped and made out of steel or silver (Figures 22 and 23).

Until now, it has not been studied thoroughly as to which company invented and developed this kind of wristwatch. It is reported that Girard Perregaux made the first type of grill covered watches around or before 1910 for the German Navy. But authors Jacquet and Chapuis name Movado as the initiator of the Soldier's Watch in their famous book *Histoire et technique de la montre Suisse* (Basel and Olten, 1945, pg. 154). Many Swiss companies exported this type of watch between 1914 and 1918 to the various countries at war, which was probably a commercially successful business because of the large demand.

Besides the known Soldier's Watch made by Movado, similar products were introduced by Eterna, Omega, IWC, Longines, Girard Perregaux, Ulysse Nardin, and also by the American companies Waltham and Ingersoll. (Note: See Marvin E. Whitney's article "Military Wristwatches" in the *Horological Times*, March 1992. B.W.S.) However, the Movado piece is the more esthetically pleasing version, technically better and more thoroughly developed. Its 13-ligne movement had been developed around 1914 in record time, despite the fact that the company was partially closed due to the lack of work force which was drafted at the beginning of the war as a precaution by the Swiss authorities.

The Soldier's Watch (page M16) is equipped with a high-quality movement, and all bridges have been covered with a fine circular finish. It has 17 jewels, a bimetallic balance wheel for temperature compensation, four bezel-set jewels (chatons), and five adjustments. The latter is very rare for such an early wristwatch, and may be viewed as the continuation of the tradition established with the older "Chronomètre Movado" watches, where four adjustments were made.

The success of the Soldier's Watch with its high volume production was most likely responsible for the need to construct a third building at Rue du Parc in 1917. At the same time, the corporate structure changed and the company was incorporated under the name "Fabriques Movado." This fact is very important for the research in the history of watchmaking, since it helps to date Movado watches: all movements made after 1917 bear the engraving "Fabriques Movado" or "Movado Factories."

We would like to take a look at some of the calibers produced around that time. A photo exists which was taken about 1917 showing 15 movements in their respective sizes (Figure 24). We do not know if this represents all the calibers manufactured at that time. The 15 movements are signed "Movado Watch FY" (FY stands for factory). Seven of the movements shown are made for pocket watches, one hereof (165) for hunting cases ("Savonette"). Among the remaining eight calibers, five are for wristwatches (158 to 163) whereas the last three were probably designed for ladies' pendant or lapel watches (to conclude from the position of the winding stem, balance wheel, and the fourth wheel). The latter have a smaller diameter (between 19 to 24 mm) than the wristwatch calibers (between 23 to 29 mm).

With the exception of two calibers, regardless of their size (8-1/2 to 18-1/2 lignes), all movements have the same basic configuration as the caliber 150MN we mentioned earlier. The train wheel bridge with its three typical bulges to underline the position of the third, fourth, and escape wheel jewels is familiar to us, as well as the barrel bridge with the center wheel jewel and the elegantly curved balance wheel bridge. Besides having various sizes, the differences were primarily in the quality of the finish (i.e., the treatment of the surfaces, the jewels and bezel-set jewels, and numbers of adjustments).

The only two exceptions with respect to this basic configuration are, for one, the movement (158) used in the Soldier's Watch described earlier with its unusual narrow angle-shaped train wheel bridge. The execution shown here, however, is different from the one pictured in Figures 22-23, since it does not have bezel-set jewels. The other exception is the elongated rectangular Polyplan movement, the only one not round.

Most of the movements pictured had 15 to 17 jewels and featured mainly four--sometimes five--adjustments. Only two pocket watch movements (165 and 166), 18 respectively 18-1/4 lignes, have seven adjustments and 21 jewels each. Since they are serialized (unusual for Movado movements), these movements were prepared for chronometer testing. Both have been beautifully finished, and movement 165 is signed "Chronomètre de Bord" and "Observatoire de Neuchâtel." This movement with serial No. 360021 has passed the chronometer test at the Neuchâtel Observatory in the category of deck watches.

Some movements have an engraving referring to the Swiss patent #34976, which we mentioned earlier (Figure 7).

Among the five wristwatch calibers pictured in Figure 24 is the well-known caliber 150MN (162). The two other round calibers with the typical Movado layout are the calibers 105 (162) and 470 (160). We will find these movements again in a catalog published 34 years later, together with the large pocket watch caliber 800M (154).

Figure 9 (left). Advertisements for the brands Mistral and Tanit, made by the Ditesheim company.

Figure 10 (below). A pocket watch, signed "Mistral," made by the Ditesheim company.

N° 14,545. — 15 avril 1902, 8 h. a.

L. A. & J. Ditesheim, fabricants,

Chaux-de-Fonds (Suisse).

Montres, parties de montres.

MISTRAL

N° 15,402. — 16 janvier 1903, 8 h.

L. A. & J. Ditesheim, fabricants,

Chaux-de-Fonds (Suisse).

Montres, parties de montres et étuis.

TANIT

It is important to note that most of the movements shown in Figure 24 have at least four but up to seven adjustments, including the smallest ladies' pendant movements (164 and 169) which have four adjustments. This confirms the previous statement that Movado was one of the first manufacturers (and earlier than most competitors) to focus on precision timekeeping of wristwatch movements. And, it underlines the fact that Movado marked even their smallest wristwatches as "Chronomètre."

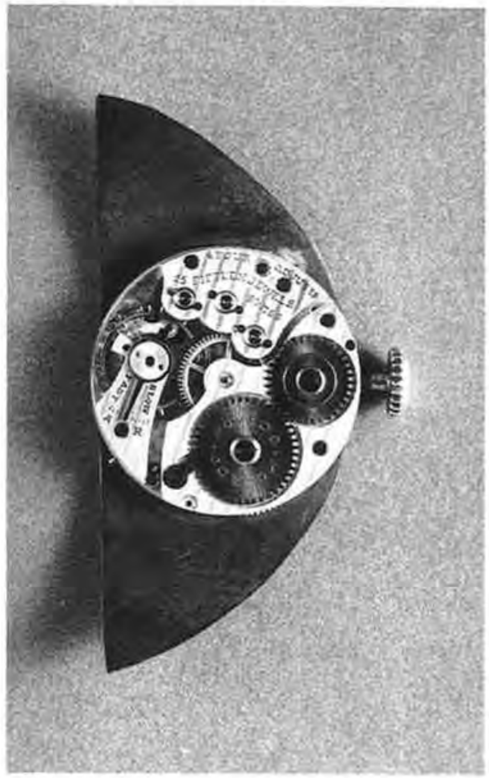
Besides focusing on the production of wristwatches, Movado participated successfully during the 1920s with their pocket watches at chronometer competitions of the Neuchâtel Observatory. After 1923, Movado was able to hire two excellent watchmakers who specialized in precision timing: Louis Augsburger and Edmond Ditesheim. (Augsburger was apparently also working for Ulysse Nardin). Those two men were responsible for many prizes won up to 1929. Most were prizes for chronometers made in serial production. However, two first prizes were won in 1923 in a competition to commemorate the 100th anniversary of Abraham Louis Breguet's death. In the same year, eight Movado pocket chronometers adjusted by Augsburger received prizes. Edmond Ditesheim, who was a cousin of the four Ditesheim brothers, became responsible for the timing department.

This tradition continued in the 1930s with the renowned Werner Albert Dubois. Movado then belonged to a group of seven Swiss watch companies (the others were Omega, Zenith, Ulysse Nardin, Patek Philippe, Longines, and Paul Ditesheim), who dominated the competitions at the English Teddington Observatory with their precise pocket watches equipped with balance wheels and hairsprings made out of new alloys. For example, in 1936, the 25 best deck watches were all made by Swiss companies and equipped with a Guillaume balance wheel.

Figure 11.

Movado advertisement, mid-twenties.

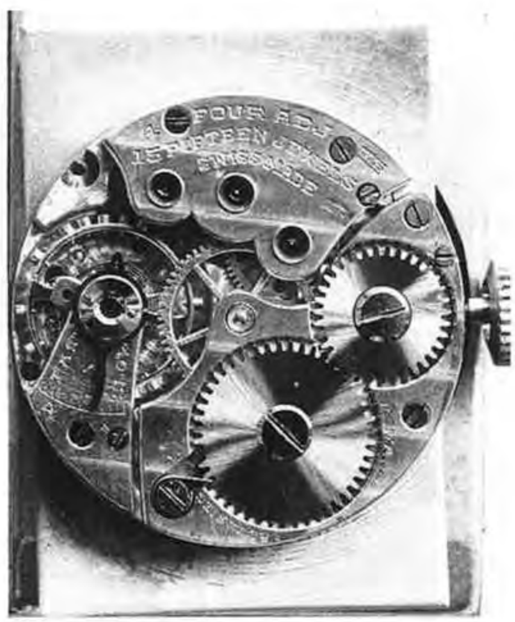
Figures 12 and 13. Wristwatch "Chronomètre Movado" with half-moon-shaped case and movement caliber 150MN, ca. 1914.



13

Figure 16. Rectangular Movado wristwatch with indented case.

14



Figures 14 and 15 (left and above). Wristwatch "Chronomètre Movado" with rectangular stainless steel case, caliber 150MN, from the 1920s.

Figure 17 and 18 (below and right). "Chronomètre Movado" with round stay-brite case, caliber 150MN, from the 1920s.

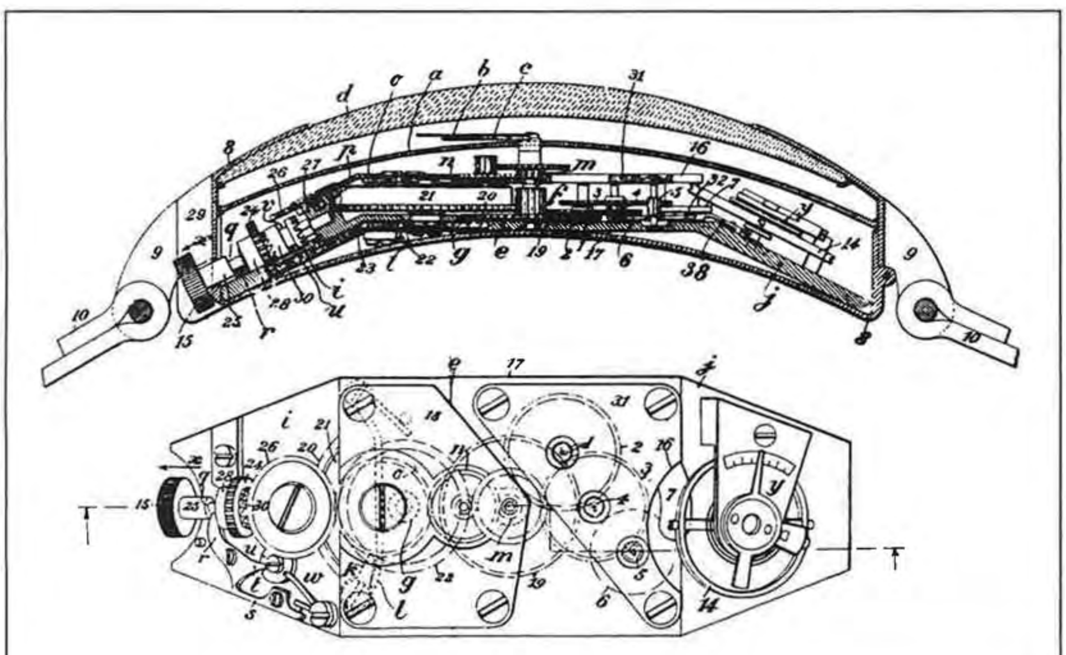


Figure 19. Technical drawing of the Polyplan.

Figure 20. The Polyplan, version with oval gold case and black dial.

Figure 21. The Polyplan, version with rectangular gold case and silver dial.

Figures 22 and 23. The Soldier's Watch, made by Movado during World War I.

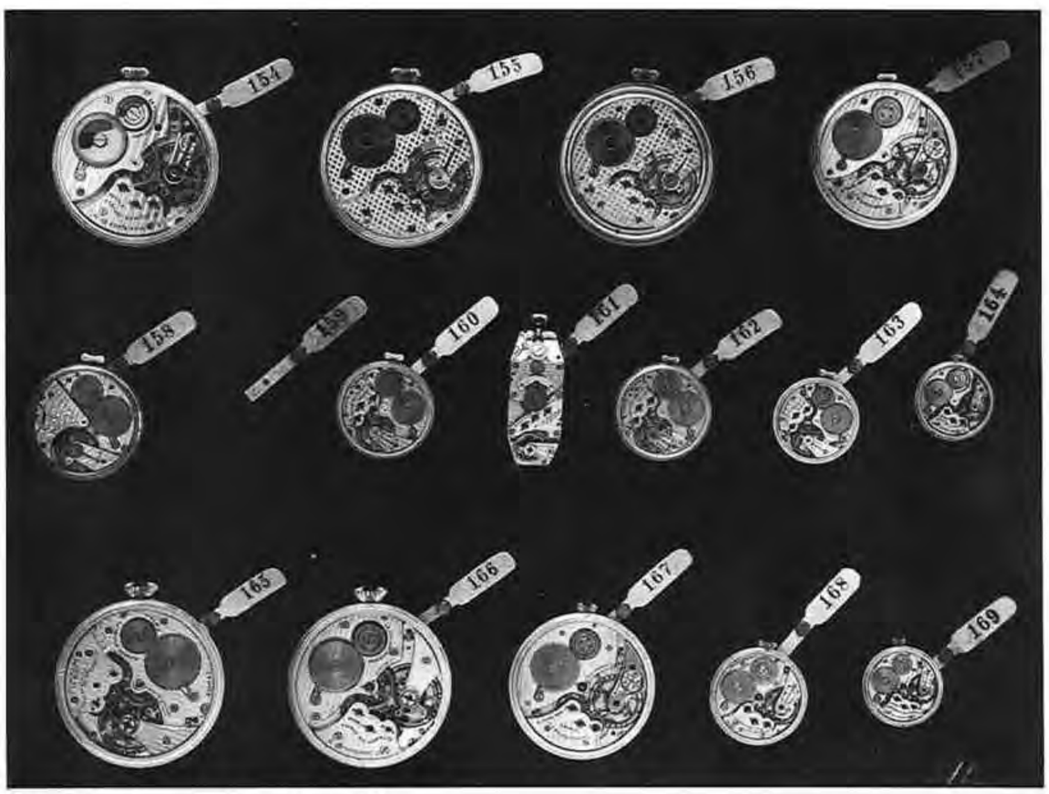


Figure 24. Movements manufactured by Movado around 1917.

Photo 3. Later Kullberg balance from a chronometer by Hohwu of Amsterdam, ca. 1905. The affix is on the long balance arms.

Photo 4. A later Kullberg balance removed from the instrument.

short arms were cut longitudinally so as to have a lower and upper portion that were independent of each other. The lower portion was fixed to the crossarm so that it would not bend with temperature while the upper portion was allowed to remain free and to respond to temperature just like the long arms of the balance rim. The fixed, lower arm carried a check screw that controlled the range of movement of the free, upper short arm.

The long free arms of the balance move in and out with temperature, giving the classical inverted "U" shape curve of the Earnshaw balance. However, in the upper temperature design range of the balance (usually 60 to 90 degrees Fahrenheit), the short arms add the movement of additional mass. In effect, this extra boost increases the rate at which the effective diameter of the balance is reduced as temperature increases. When combined with a palladium balance spring (which required less temperature compensation than steel springs), the early form of the Kullberg balance reduced middle temperature errors to insignificance, given the speeds of ships of the day.

The late form of the Kullberg balance. While the early form of the Kullberg balance could withstand handling by repairmen, it was a complicated balance to construct. The later form of the Kullberg balance (Photos 3 and 4) was as effective as the early Kullberg balance, but simpler in construction.

In this design, the auxiliary compensation was moved to the end of the long free arm. The lower portion of the auxiliary which carries the check screw is no longer rigidly fixed, but moves at the same rate as the rest of the long free arm. However, the check screw still limits the action of the upper free arm to the temperature design range of the balance. Physically, the construction is quite different, but the principles of action are the same as those of the early Kullberg balance.

Other balance designs. There are as many as 25 known designs of balances, all intended to eliminate middle temperature error. Many of these were failures. One of those ineffective designs was even created by Kullberg. While most of the innovative balance designs were created by important, high-grade makers such as Dent, Ulrich, Eiffe, and Molyneaux, virtually all of the innovation was done to improve the performance of marine chronometers. Only the few innovations that achieved commercial success (determined by cost of production, effectiveness, and ability to withstand handling) were used in watches and carriage clocks. So, while of interest to collectors or historians, those balances will not be described here.

The balances described in this article are the ones most likely to be encountered by repair persons. The major piece of advice is to not readjust the distribution of weight on these balances. If a new staff must be fitted to a deck watch, remove the old staff by cutting it off and replace the new staff with correctly sized punches and light riveting. Chronometer staffs are fitted to the staff hub with screws, making it unnecessary to cut the staff off the balance.

Since these balances are kept in the horizontal position, poise errors are nonexistent, particularly in view of the fact that they are not subjected to the rolling motions of shipboard use. Any change in the distribution of the mass on the balance rim will destroy the temperature compensation and, given the nature of owners of these kinds of timepieces, lead to complaints that the accuracy of the timepiece was better before it was repaired.

Photo 5. An experimental balance by Bliss and Creighton of New York, ca. 1845. The only structural innovation is that the balance rim is cut exactly 90 degrees from the balance spokes--a precursor to the Guillaume balance. This design would lessen the errors due to changes of centrifugal force.

The final installment will describe the use of alloys in the balance assembly. The use of alloys eliminated middle temperature errors for all practical purposes and directly led to the demise of compensating balances. ❑

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Greg Hostetter
Chairman
AWI Membership Committee

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In our shops, it is important that we periodically re-evaluate our pricing structure to make sure that we cover the costs of doing business. Have you ever stopped to calculate how much it costs just to be able to walk into your shop? There is rent on the shop space itself, heating costs, and electricity for the lights and machines. There are the lathes, cleaning and timing machines, benches, and other tools. To this, you can add telephone, advertising, taxes, and other vital necessities without which you couldn't be in business. Oh, yes, don't forget to pay yourself for your time, talent, and expertise.

Why do we need to re-evaluate periodically? Because the cost of everything required in a shop keeps going up every single year. And don't forget another important thing: Don't you like to get a raise now and then?

Just as we evaluate our cost of doing business on an ongoing basis, AWI does the same thing. This year, a modest $5 increase in annual dues was in order. This was the first increase in seven years. A conservative inflationary factor of 4% annually during these seven years indicates a 28% erosion of available operational funds. Some ask what happened to all that money AWI received from the sale of some of its collection watches. This is a legitimate question.

The money from the sale of these watches cannot be spent. To spend just one penny of it would cause AWI to be subject to capital gains tax on the sale. The principle from the sale remains untouched in a trust fund; only the interest can be used for operating costs. After seven years, revenue simply was not enough to continue the education programs at their present level. The additional money required to continue them was projected to be approximately $30,000. A $5 increase in annual dues generated just about this amount.

Never before has membership in AWI been such a good value for the money. Membership continues to grow, the magazine *Horological Times* is larger than ever, giving more information on watches, clocks, and other related topics. The cost of AWI membership is still less than the cost of some other horological magazines alone, yet the *HT* ranks as one of the finest technical magazines available.

Where else can you go to get a week of high-quality, in-depth training at Project Extend on a variety of topics, at no charge? AWI even offers grants to assist in the travel and lodging costs.

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In addition to all that, AWI still gives you the technical hotline, lending library, technical bulletins, home-study course, publicity, individual assistance, and many other services. More than ever, AWI gives a lot of bang for the buck.

What about the other horological associations? Are they a better value than AWI? Would I be better off dropping my AWI membership in favor of one of these other organizations? There are other horological organizations, both in the United States and abroad. They each emphasize different areas, and as such, they each offer benefits to their members. What one organization is weak in, the others usually make up for, and vice versa. Multiple memberships can greatly increase your knowledge and abilities. But, in technical information and education, AWI is still the leader.

Is $45 per year for AWI membership worth it? This is a question only you can answer. AWI offers services that aren't available anywhere else. What do you tell a customer who sets a watch on your bench, asks your price, and then asks, "Is it worth it?" Like value of a watch to a customer, the value of AWI membership to a member is individual. AWI has a lot to offer, and is one of the best values you will find.

Several people have told me that AWI services could be cut in half, and the increase doubled, and it would *still* be an incredible value to them. This, plus the constant increase in members, says that a growing number of people feel AWI membership is worth it. Encourage your horological friend to take advantage of the great value, and join AWI! ❑

The Watchmaker's Lathe

By Ron DeCorte, CMW

RON DE CORTE *is AWI's newest instructor at AWI's Education Center, Project Extend. His specialty is servicing high-grade and complicated watches, and the restoration of antique watches. DeCorte will be teaching these skills at the Education Center in the course called "Watch V," which involves advanced service and restoration of pocket watches.*

From time to time, Mr. DeCorte will share his expertise with readers through articles especially written for Horological Times.

As watchmakers find the need to truly become involved in the "making" aspect of the craft, the development and upgrading of lathe skills becomes essential. It is fitting that the lathe is the subject of Mr. DeCorte's first article in this series.

Our goal is to train highly proficient craftsmen who can handle highly profitable work in an arena where prepackaged replacement parts do not exist.

Editor

This article is the first in a series on the use of the watchmaker's lathe. These articles are intended to help those who do not own a lathe or those who are just starting out. It is my personal opinion that every person who takes watchmaking seriously should have, and know how to use, the watchmaker's lathe.

The first step will be to select a proper lathe for the work we wish to accomplish. An 8mm WW style lathe is my first recommendation, pictured in Figure 1. I would choose this type of lathe for two important reasons: 1) The 8mm size has been the most popular size collet for watchmakers for a long time. 2) Also, the WW style lathes are quite sturdy and are readily available. If a lathe of another style is all that is available to you, then it should be 8mm if at all possible. Choosing a lathe, say 6mm bore size, will severely limit your choice of collets and accessories should you decide to supplement your inventory of lathe tools.

Once a lathe has been located and you have decided it will serve your needs, it is time to examine the working condition of the lathe.

Figure 1. 8mm WW style lathe.

Check the line-up of the headstock and tailstock by inserting male centers in both the headstock and tailstock. The tailstock is moved very close to the headstock until the centers almost touch and the relationship of the centers are examined from two positions that are 90 degrees apart (in other words, from the front and top attitudes). If the centers appear as in Figure 2, then the headstock and tailstock can be considered to be in line. If they appear as in Figure 3, then the headstock and tailstock are not properly matched, and great difficulties will arise when trying to drill holes, such as when repivoting.

Next, remove the center from the headstock and rotate the headstock at a moderate speed. Watch the angled face that the

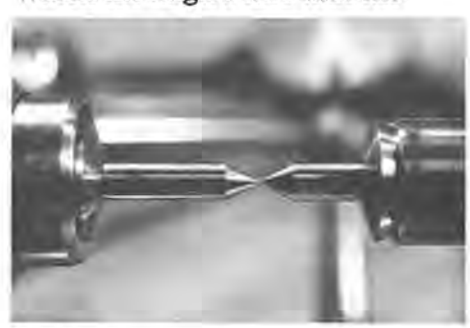

Figure 2

Figure 3

collet head draws into. The light reflections should remain stationary. If there is more than a very minor movement (or jumping) of these reflections, then the spindle should be checked with a test indicator. A good headstock should run within .01mm (.0004 inch) total indicator readout. Any more runout than this may compromise high-quality work.

Now check the truth of the tip down tool rest. With the headstock and tailstock centers in place, align the front edge of the rest parallel with the center line of the headstock and tailstock, as shown in Figure 4. Now move the T-rest up or down until it is slightly below the center line of the centers. The surface of the rest should be parallel to the center line of the centers (Figure 5). If it looks like Figure 6, then the working surface of the rest must be filed or machined true.

If the preceding tests are to your liking, then proceed with setting up the lathe for use.

When setting up a watchmaker's lathe, it should always be positioned in an area that affords good lighting and is comfortable for the operator. If it is at all possible, the lathe should be securely mounted to a bench or working surface devoted exclusively to this purpose (Figure 7). If this is not possible, then the lathe may be mounted on a 3-point lathe mount, such as that shown in Figure 8. This latter setup is acceptable only if space limitations prevent permanent installation. This nonrigid setup may allow the lathe to move while the operator is working, and also affords very little latitude in adjusting belt tension when changing pulley positions.

Figure 4

Figure 5

Figure 7

Figure 6

Figure 8

The lathe shown in Figure 7 is mounted in a manner that I consider to be very acceptable. This setup also makes use of a countershaft between the motor and the lathe. The use of the countershaft allows greater flexibility in regard to belt interfacing between pulley steps as well as allowing the use of overhead drives for powering lathe accessories. Note that the countershaft pedestal (pivoting point of countershaft) and the lathe head pulley cluster shown in Figure 9 are in line. This allows the driven end of the countershaft (nearest the motor) to be moved closer or farther away from the motor for proper belt tension without disturbing the distance between the countershaft pulley cluster and the headstock pulley cluster.

As with any precision tool or instrument, if it is not properly cared for and maintained, it will not perform its job. Therefore, before the lathe is used it should be disassembled and cleaned. After a thorough cleaning, it should be oiled and reassembled. Do not overtighten the bearings when reassembling the headstock. There should be a minute amount of movement from left to right between the spindle and the headstock bearing, or the bearing surfaces will become damaged. To make sure this is set properly, rotate the spindle by hand and

Figure 9

Figure 10. Micrometer.

Figure 11

tighten the bearing lock nut until resistance is felt. At this point, the lock nut should be loosened 1/16 to 1/8 of a turn. This procedure should be done at least twice a year or about every 50 hours of work. The headstock bearings should be oiled frequently with light spindle oil, clock oil, or high-grade motor oil.

When choosing and setting up a lathe, certain tools and accessories must be acquired. One of the most important accessories for the lathe is a good set of collets. These collets should be of the highest quality that can be obtained. Collets that do not run true when fit into the spindle are of very little value if high-quality work is to be performed. For instance, if you have an 8mm lathe, you can use a micrometer to check the outside diameter of the collets (Figure 10). If this diameter checks less than 7.98mm, the collet *might* not run true when placed in the spindle for use. Also, collets that have had their jaws deformed by improper use (such as in Figure 11) should be avoided. A good range of collets for most watchmaking work is from .3mm to 3.6mm in steps of .1mm. Another type of collet that is most useful is the jewel holding collet (Figure 12). This type of collet is used by placing it in a larger collet (usually the .48 or .50mm collet) and is used for holding jewel settings that must be reworked.

Figure 13 shows a jewel collet with the adjustable stop extended beyond the nose of the collet. It is essential that these collets have the stops in them when purchased.

Figure 12. Jewel holding collet.

A small drill chuck shown in Figure 14 is also handy for tailstock work as well as holding odd-shaped or sized work in the headstock. A good metric micrometer (Figure 10) and a quality vernier or dial caliper (Figure 15) are very useful measuring tools for lathework. A wide variety of files are also essential to most lathe projects.

Figure 16 shows a few different types of files: flat file with safety edge, screw slotting file, triangular and round files, and a diamond nail file. The latter type of nail file is available at most drug and discount stores and is very useful for hard surfaces.

A proper set of gravers for turning are necessary and are available in a variety of shapes, sizes, and materials, such as tool steel and carbide. Figure 17 shows the carbide tip graver, tool steel graver, steel burnisher, and square and triangular Arkansas stones. It is important to have the proper sharpening mediums for the different types of gravers. For instance, carbide gravers need a diamond surface to be sharpened, and tool steel gravers should be sharpened on a wet stone.

The sharpening mediums shown in Figure 18 are: a two-inch diameter resinoid bonded grinding wheel, two-inch diameter plastic disc charged with diamond paste for honing and polishing carbide graver edges after grinding, fine grain India stone for grinding steel

Figure 13. Jewel collet.

Figure 14. Small drill chuck.

gravers, and hard Arkansas stone for honing and polishing steel graver edges after grinding.

Figure 19 shows a compound cross slide and two different types of file rests. I do not consider the cross slide to be of much value for turning watch type work, although it is essential for holding accessories such as milling and dividing attachments. The file rests shown are of the single roller type (center of Figure 19) and the double roller type (right). Either one or both types will be of great help (although not absolutely necessary) when filing flat surfaces such as winding squares on stems.

The final tool on my list of lathe accessories is the Jacot tool (Figure 20). Although this tool does not fit onto the lathe, it is essential to put the final finish on the pivots of completed lathe projects, such as balance staffs and pinions. Figure 21 shows this tool set up in the vise for use. It is important when purchasing one of these tools that all of the components are complete and in good working condition. In other words, there should be no chipped edges or rust, especially on the surfaces that the pivots will come into contact with. ❑


Figure 19. Compound cross slide and two file rests.

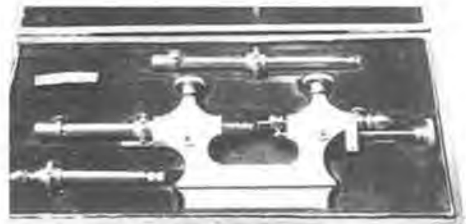
Figure 20. Jacot tool.


Figure 21. Jacot tool set up in the vise for use.


Figure 15. Vernier caliper.


Figure 16. Different types of files.


Figure 17


Figure 18. Sharpening mediums.

Ask Huck

CLOCKMAKING BITS

By J.M. Huckabee
CMC, FBHI

About . . .

WHERE TO BEGIN LATHE WORK

and

LARGE CLOCK DIALS

Q. How do I begin to learn to use a watchmakers lathe? What should be my first tools and projects? What chucks will I need?

A. This is a big order! I'll treat this from my personal viewpoint as a clockmaker.

The way to begin is to begin now! Pick some projects that can be accomplished in a short time, those that require inexpensive raw material are frequently used in clock repair and result in a job you are pleased with. It's important to the learning process to achieve some degree of early success.

I recommend collets 16 or 17, 32, 40, 48, and 64. These will accommodate 1/16, 1/8, 5/32, 3/16, and 1/4 inch stock. Obtain about a foot or so of brass rod in these fraction sizes. Many hobby stores have this material. You will need a few gravers--two or three for starters. These can be 1/8 inch square with a sharpening stone or wheel. Add to this a few small flat files, the finer cuts being most suitable. About three or four drill bits in the 0.032-0.063 inch range will be needed with a pin vise handle.

Make a taper pin from the 1/16 inch stock. This is mostly file work. Try several sizes and lengths; become familiar with speeds, cutting rates, and finishes. Making taper pins isn't very time-efficient, but is a good stepping stone of learning.

Make a bushing from the 1/8 inch stock. Learn facing, turning center locating, drilling, and cut-off. Learn to handle the small pieces and make cuts accurately and quickly. Lathe-turned bushings can be very time-efficient. I make bushings in less time than most workmen can find one in an assortment.

Make a click rivet. Learn to size lengths and diameters to fit existing pieces. A click rivet is very time-efficient work because it's always a perfect fit. Learn to cut professional fits and finishes. These rivets will use the larger brass rod, namely 3/16 or 1/4 inch for the mid-range sizes of clocks.

Make a knurled hand nut for an old American clock. You will need a tap to cut the internal thread, a 2-56 is the nearest fit I've found for these nuts. Look at the examples on some of the Random Clock Talk Tapes for simple methods of making knurled nuts, bushings, and tool sharpening.

A companion die to the 2-56 tap will permit you to make screws from the 5/32 inch rod stock.

The foregoing suggestions deal only in headstock-held work. Progress into working longer pieces between centers. Make some tailstock pivot beds for use in pivot polishing work. The lathe is the king of all power tools. I've never known a person who regretted learning to operate one.

And the way to begin is to begin now.

Q. How are large clock dials assembled, and how do you service the hands? What is the method of changing a bad hand?

A. My experience with tower clock installation was all with IBM clocks. However, I have serviced many other makes, mostly Howard and Seth Thomas.

Let's describe a dial installation. The IBM dials in 72-inch diameter was most popular in my early years with the company. These dials were vitrolite, a type of glass an inch thick. The numerals were sandblasted to a depth of about 1/4 inch and filled with a permanent dye material. The center hole was about 4 inches in diameter. This type of dial weighed about 600 pounds.

The dial had a strip of nesting material around the outside edge, made of lead, about 2 inches wide and a half inch thick. The dial and its nesting was fitted into a cast aluminum bezel about 1 foot wide and 6 inches deep. The nesting added about 100 pounds, and the aluminum bezel a little over 200 more pounds. The motion work was held in place by a large threaded bushing and nut through the center hole. The hands, motion works, and universal joint added another 100 plus pounds. The entire dial assembly weighed just over 1,000 pounds!

The dial was shipped assembled, less the hands and motion works. The crate was very strong, with eyes for loading and hoisting, and a base which held the crate upright in transit. Each side of the crate was removable, and also the base was detachable.

The case was lifted about one foot above ground, the sides and base removed, and motion works and hands installed.

The hoisting crane would now lift the dial and crate to the tower and, with hardware supplied, bolted securely to the building surface.

Once the dial and crate were securely in place, the dial was jacked out of the crate into the prepared tower opening. The bezel was then secured into the tower. Now the crate was unbolted from the building and lowered to the ground. The crates were very expensive and returned for credit.

Shortly after the time of sale, the customer received a full set of dimensioned drawings of dial, bezel, hands, crate, and building features required for installation. This material also gave a recommended method of installation suitable for the related contractors to work from.

There was a certain romance with tower clocks that I enjoyed, and I still have fond memories of those years. Most of the clocks I installed in the late 1940s and 1950s are still in operation.

In the early 1960s I visited Mr. J.E. Coleman many times. We often swapped stories about tower clocks. Each of us had lots of colorful experiences. We both needed a crane to change the hands. ❑

If you have a question, please write:
"Ask Huck," c/o *Horological Times*,
P.O. Box 11011, Cincinnati, OH 45211.

AWI 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.** Members requesting these items will be advised of their availability and will contact you direct.

LL1 Gruen 723 Set Bridge

LL3 Rolex Case #1625 Spring for Rotating Bezel

LL5 South Bend 12 size Hairspring

LL7 Bulova 17A Fourth Wheel

LL8 Fleuier 20 Pallet Complete (FEF) 19 ligne, Part #710/295.

If you can supply any of these items, please contact:
AWI Material Search Network,
AWI Central,
P.O. Box 11011, Cincinnati, OH 45211

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Antique Watch Restoration © 1993
Part LXXXVIII

ARCHIE B. PERKINS
CMW, FNAWCC, CMBHI

Repivoting a Duplex Watch Balance Staff

When restoring duplex watches, it is common to find a broken pivot on the balance staff. When this occurs, one has two choices. One choice is to repivot the balance staff; the other choice is to make and fit a new staff. Since it requires more work to make and fit a new staff, it would be more logical to repivot the staff. This is true if only one of the pivots needs replacing. If both pivots are broken or badly damaged, one may prefer to make a new balance staff.

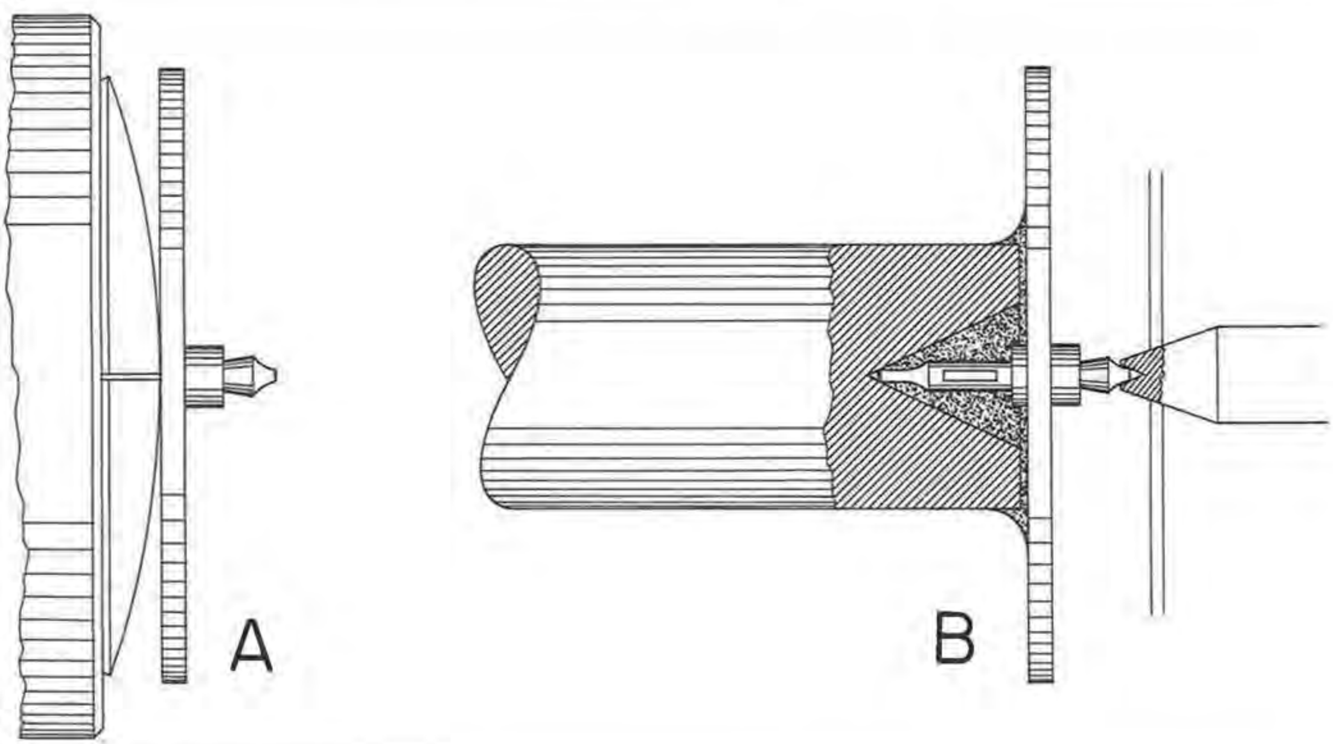
Repivoting a balance staff is no more difficult than repivoting a train wheel; in fact, repivoting a balance staff is possibly easier in many cases. Many of the original balance staffs in antique watches could be saved if the restorer would repivot them instead of replacing them.

Chucking the Balance Wheel for Repivoting

Figure 1 shows how the balance wheel and staff may be held for the repivoting operations. View A shows the staff being held in a split wire chuck. In this case, the hub of the staff is straight; therefore, it has been chucked by the hub. If the hub should be tapered, one must chuck on the roller shoulder for repivoting the upper end of the staff. One would chuck the staff by the hairspring shoulder to repivot the lower end of the staff.

Another method that can be used to chuck the balance wheel and staff is shown in View B, Figure 1. This is done by cementing up the balance wheel and staff in a cement brass. This method becomes necessary if one is unable to get the staff to run true in a split wire chuck.

Figure 1



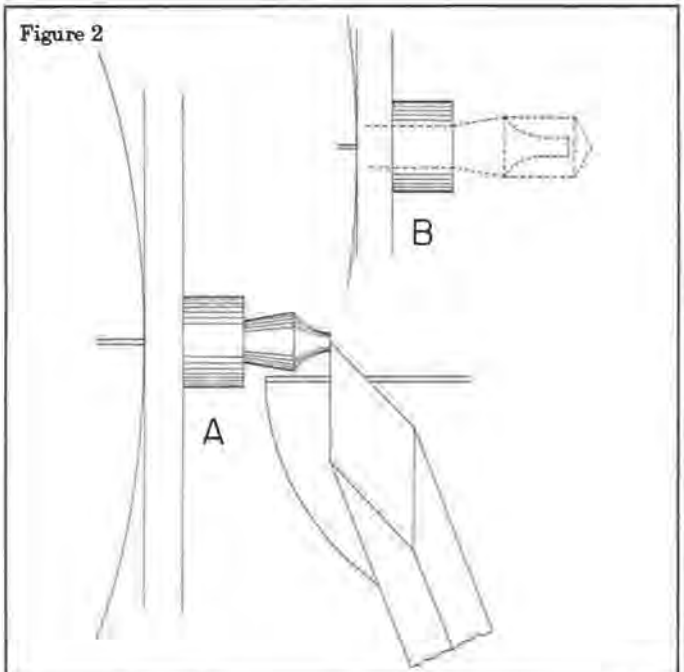
When cementing up a balance wheel, one would turn a sharp female center in the end of a cement brass or a brass rod as shown in View B. The good pivot on the balance staff rests in this center when the staff and wheel are cemented up. The center should not be so deep that the balance wheel rests on the end of the cement brass. This is to assure that the pivot touches and centers up in the "V" center of the cement brass. Both the cement brass and the balance should be cleaned in denatured alcohol before the shellac is applied. This is to cause the shellac to adhere to the surfaces. To cement up the staff and wheel, one would first warm the cement brass with an alcohol lamp flame while the shellac is applied. When the shellac is melted, the balance staff is inserted through the melted shellac until the good pivot goes into the center in the cement brass. Then, a piece of pegwood with a center cut in its end is used over the "T" rest to center the balance staff. The lathe is turning slowly while the pegwood is used to center the staff and to keep the good pivot centered in the center of the cement brass. The pegwood is used while the lathe is kept turning slowly until the shellac cools.

Preparing the Staff for the New Pivot

Figure 2 shows the start of the preparation for the new pivot. View A shows the end of the pivot cone being faced before a center is spotted in its end. This center is for the drill used to drill the hole for the new pivot. The cone should be faced the proper amount. The diameter of the end of the faced cone should be slightly larger than the diameter that the finished pivot is to be. If the end of the cone is faced back too far, this will leave a step in the cone after the new pivot is brought to size which would require the cone to be altered drastically in order to eliminate the step in the cone.

View B, Figure 2 shows another method of repivoting a balance staff. This method is sometimes

Figure 2



Correction to the article "Hamilton 505, *Compensation Procedure for Index Wheel and Endpiece Wear*" by George Hite in the March 1993 issue: Please refer to the second paragraph, left-hand column, of page 32. After further considerations, the author requested that this paragraph be deleted from his original copy. Unfortunately, we failed to do so. This paragraph should be deleted because: *Since wear in both the lower pivot of the index wheel and the endpiece contribute to the malfunction of the 505, it serves no purpose to measure the height of the index wheel.*

Please note this correction. --Editor

used when repivoting a marine chronometer balance staff. This method is also used when the part of the staff containing the pivot is so small and delicate that it would be too weak after it has been drilled to hold the new pivot solidly enough. The first method is considered less time-consuming if the staff will allow for it.

Spotting the Center for the Drill

Figure 3 shows the center being spotted for the pivot drill. The "T" rest is set across the end of the staff, up close to its end as shown. The graver used to spot the center must have a good straight sharp point as shown. If the staff is very hard, it would be better to use a carbide graver. The lathe is reversed for this operation. The center must be cut sharp without any material left in the center; otherwise, the drill may get started off-center which could cause the pivot job to become a disaster. NOTE: Before starting to spot the center, make sure that the cone of the staff runs absolutely true.

Drilling the Hole for the New Pivot

Figure 4, View A shows the hole being drilled for the new pivot. The drill may be held in a small pin vise, as shown, or in a chuck if one has a lathe with a chuck holding tailstock. The drilling operation is more sensitive if the drill is held in a small pin vise and the pin vise is held in the fingers. The drill and pin vise can be guided with the aid of a tailstock. If the lathe has a chuck-holding tailstock, one can take a brass or steel rod that just fits the hole in the end of the pin vise handle. Then, chuck this rod in the lathe tailstock and this rod is used in the hole in the handle of the pin vise to guide the pin vise while drilling the hole.

If the lathe tailstock does not hold chucks, one can use a male taper center in the tailstock spindle to guide the pin vise holding the pivot drill. The male center is used in the hole in the pin vise and the tailstock spindle is advanced as the hole is being drilled.

If the staff should be too hard to drill, it may need to be tempered at its end to a light blue color. This can be done with a brass or copper rod which has had a hole drilled in the center of its end to fit the end of the staff. The rod is first heated in an alcohol lamp flame, then the end of the staff is inserted into the hole in the rod. As soon as the light blue color occurs, the staff is removed from the rod. CAUTION: One should avoid heating the balance wheel. To avoid this, the wheel can be covered with a small piece of wet tissue to protect it from the heat of the rod. Water is used to make the tissue wet.

Figure 3

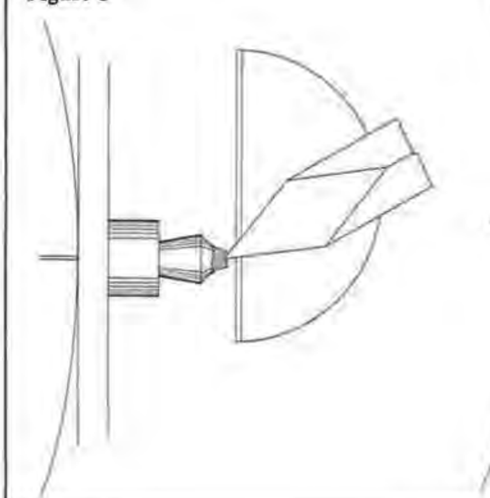


Figure 4

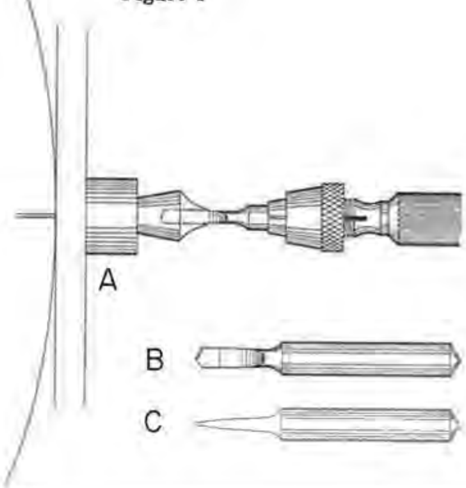


Figure 5

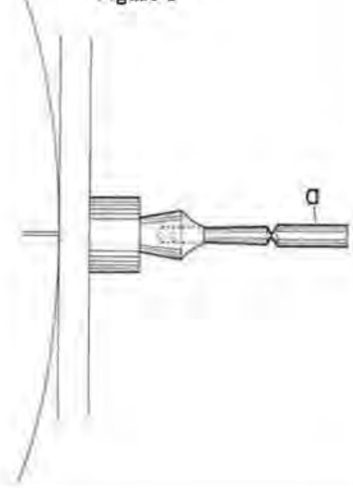


Figure 6

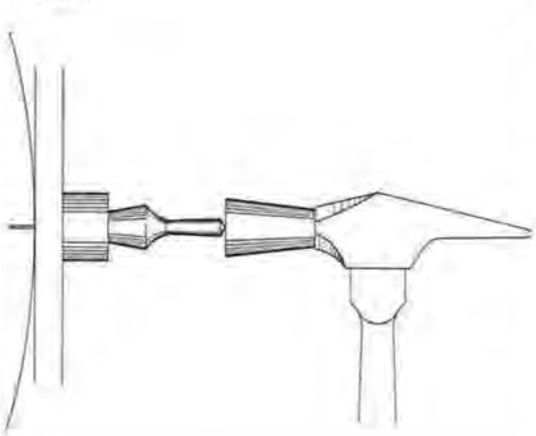


Figure 7

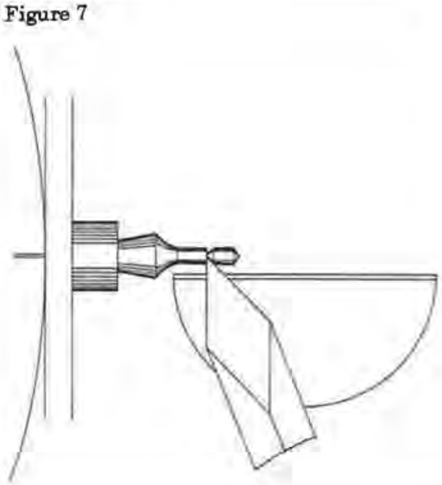
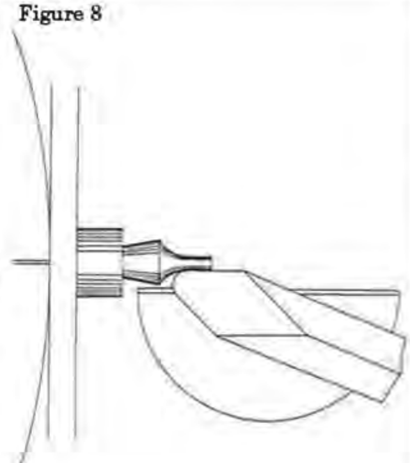


Figure 8



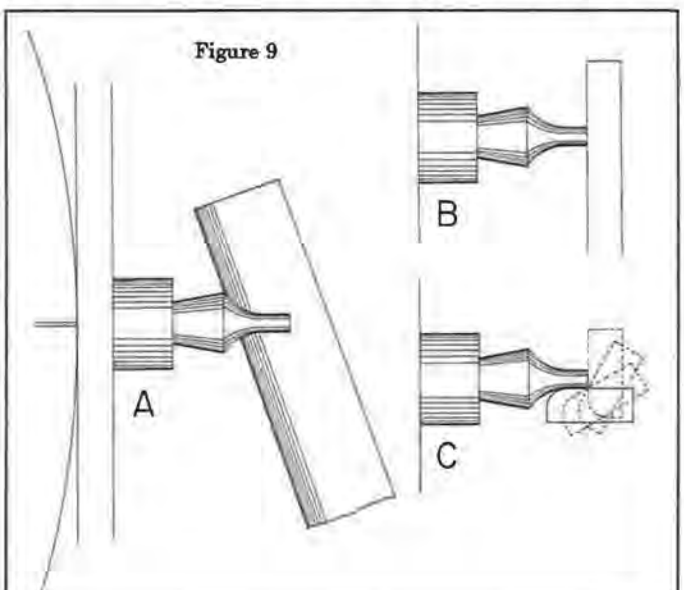
NOTE: When drilling the hole, the drill must be sharp, the lathe should be turning very slowly, and very little pressure is placed on the drill. The drill will cut better if its point is thinned down equally from both sides of the drill. This is shown in Views B and C, Figure 4. The hole should be drilled to a depth which is equal to the length of the pivot including the cone of the pivot. The diameter of the drill used should be about .02mm larger in diameter than the finished pivot is to be. During the drilling process, the drill should be removed from the hole often to clean off the shavings. The shavings are cleaned off with the fingers. Moisture from the fingers will keep the drill lubricated. If the drill stops cutting, one must stop the drilling immediately and resharpen the drill.

Making and Fitting the Pivot Plug

Figure 5 shows the pivot plug being fitted to the drilled hole. The plug is made from good quality blue steel pivot wire. The wire must be correctly hardened and tempered to first blue with some purple in the blue. The plug should be made in another lathe to avoid disturbing the balance wheel after the hole has been drilled. The plug is turned with a slight taper to match the taper in the drilled hole. The end of the plug should be made flat and square. The plug should go three-fourths of the way to the bottom of the hole before the plug is installed permanently. If the taper on the plug matches the taper in the hole, there will not be any wobble on the plug in the hole when it is tried in the hole for fit.

The plug can be installed in the hole by one of two methods. One method is to twist the plug into the hole. To use this method, one would turn a groove around the plug far enough out to allow plenty of length for the new pivot, as shown in Figure 5. Then, the plug is chucked tightly by part "a" of the plug in a pin vise. The lathe headstock is turned slowly while the pin vise is used to twist the plug into the hole. Inward pressure is placed on the pin vise at the same time. When the plug tightens up, part "a" of the plug will separate from the pivot part of the plug. Another way to hold the plug for twisting it into its hole is to chuck the plug into a chuck in a chuck-holding lathe tailstock.

Figure 9



The second method of installing the pivot plug is shown in Figure 6. When using this method, the plug is lightly tapped into its hole with a small hammer as shown. With this method, there is more danger of splitting a thin-walled hole than when using the first method. This danger would be more common when repivoting train wheel pivots. To test the tightness of the plug in the hole, one would go ahead and shape and finish the pivot. If this process does not loosen the plug, the plug is sufficiently tight. If the plug does loosen up, then one must remake the plug.

Making the Pivot on the Plug

Figure 7 shows how a sharp-pointed graver is used to turn off the excess material from the end of the plug when one is making the new pivot. The pivot should be left long enough to allow for finishing its end.

A rounded point graver is used to turn the plug down in diameter to form the new pivot. This is shown in Figure 8. At the same time that the plug is being turned down for the pivot, the rounded point of the graver is used to blend the curvature of the cone into the pivot diameter. If this is done correctly, one will not be able to tell that the staff has been repivoted, especially after the pivot has been ground and polished.

Finishing the New Pivot

Figure 9 shows the process of finishing the new pivot. View A shows how a stone such as a fine jasper stone can be used to grind the pivot smooth prior to burnishing and polishing the surface of the pivot. Note that the corner of the stone or burnisher needs to be rounded in order to finish the cone of the pivot. Also, note that the stone or burnisher is used at an angle with the pivot in order to finish the cone of the pivot at the same time that the pivot is finished.

View B, Figure 9 shows how the pivot can be shortened with a stone and its end finished with a burnisher.

View C, Figure 9 shows how a burnisher is used on the pivot to burnish the diameter and end of the pivot and how the burnisher is used over the corner of the pivot to remove any burrs from the corner of the pivot. After the pivot has been brought to size and burnished, it is given its final polish with a boxwood slip and Linde A or diamantine. One should moisten the boxwood slip with denatured alcohol prior to applying the polishing material.

Repairing the duplex escapement will continue next month.

❑

Shop Talk

Wes Door, CMW

Attending Seminars, Workshops, and Conventions

Most of us have attended seminars, workshops, and conventions, and also we probably have participated in them one way or another.

WORKSHOPS

Possibly a workshop requires us to bring our own bench hand tools and work on a newly described watch module. This hands-on training is very important to us. Coupled with this training and the accompanying handout instructions, we can return home and be quite proficient.

With the changing types of watch and clocks available, it behooves us to take advantage of any and all training programs that are offered to us.

Mini bench courses got started at AWI a few years ago when the real need existed. The first real change (or breakthrough) occurred as the first electric watches entered our industry. We made a temporary mini bench extension table to place on top of the hotels' tables to raise our bench to a normal working height for watchmakers.

This first battery watch was a challenge to our ability. We had to learn new things, including using a battery as motive power. Also, from this point forward, we would not use our demagnetizer except on the old conventional watches. We would buy non-magnetic screwdrivers and tweezers. It was the start of a new way of life at our repair bench. The rubbing action of the make and break contact system of these watches soon found the need for some improvements. Some of the readers of this article may be fortunate enough to *not* remember these. Those who *do* remember can attest to the fact that every cleaning and overhaul job also required the replacement of the complete balance unit. The point is, *we still need bench courses.*

After the electric, we had electronic watches (no physical make and break contacts). We also had Accutrons (a tuning fork watch), quartz watches (LED and LCD), and then analogs (with hands again). All of the above, plus watches with more complications, gives us a real need to continue our workshop courses, both around the country and at the Project Extend Education Center in Cincinnati.

SEMINARS

Seminars are similar to workshops, with this difference--generally we can leave our bench tools at home and just bring a note pad and a pen to take notes. My dictionary says that *seminars* are "small groups doing advanced study." These are important for all of the reasons given above.

CONVENTIONS

One definition of *convention* is "assembly," and, of course, this is true. We get together (assemble) and compare notes and exchange ideas with our fellow members. Within a convention we may have workshops and/or seminars.

Some people define *conventions* as "an excuse to get out of town." This may be one of its functions, and probably not a bad one. We do need to get away once in a while. Most of us work in an environment alone or with few people around us, so we really need the benefits gained by associating with others.

TOGETHERNESS

In many of our states (including my state of Washington), the horologists have separate conventions from the jewelers. I personally think this is unfortunate. I can remember the good old days when the conventions seemed to include everyone. The horologist was not thought of as the necessary evil. The service department was a very important part of a complete jewelry store. There are still some stores that have service departments and realize their importance.

Recently I attended the Minnesota State Watch and Clockmakers Convention. They are a nice exception to the rule, well, sort of an exception. They have their state convention at the same time and at the same place as the jewelers convention. They also print a booklet which includes both conventions.

Their program for the horologist included an excellent presentation and demonstration by a company selling state-of-the-art timing machines. Also presented were programs on clockmaking, insurance, etc.

The jewelers had a trade show for those who had the urge to buy. Their program included a selling type speech by Sam Arnstein and a presentation on gemology by Deborah Hiss of the GIA (Gemological Institute of America). Before Mr. Arnstein's speech, Greg Hostetter and I spoke to him to exchange a few ideas with some interesting agreements. ❑

The National Institute of Watchmaking:

A Division of the Joseph Bulova School
Woodside, NY

Brian D. Murphy

Brian Murphy with a student at the Joseph Bulova School.

Perhaps it was the creation of Calibre 89 that threw mechanical watchmaking and complicated watches into the limelight, or maybe it was the nostalgia craze that brought these beautiful watches from the first half of this century to the attention of collectors. Whatever the reason, there have been dramatic changes in the watch industry, as well as people's perception of watches.

By now I would be very surprised to find someone in our trade who has not seen the positive direction for the field of watchmaking; we have seen so much evidence to that effect. Trade publications like *Modern Jeweler* have responded to the trend by adding the "Modern Times" section to their magazine addressing changes in the watch industry, and the *Watch and Clock Review* continues to grow and develop. And yet it is not just the people inside the industry who have seen the changes, but people outside the industry as well. As numerous articles about watches, watchmakers, and even watchmaking schools appear in various publications like *Crains New York Business* and the *New York Times*, it seems that it is not only the watchmaker who is fascinated with watches.

In 1980 when much of the Swiss industry was still in recession, the firm of Patek Philippe would make a calculated gamble which would bring the art of fine Swiss watchmaking worldwide attention. After nine years of design and painstaking labor, the 1,728 parts would emerge as Calibre 89, the world's most complicated watch and the firm's greatest accomplishment, in time to celebrate Patek Philippe's 150th Anniversary. What would soon follow would be record-breaking prices at notable auction houses as a new generation would become attracted to complicated watches, and Patek Philippe would become a household name. The growing interest in these mechanical wonders and the possibility of their rarity after so many years of quartz domination, coupled with a new wave of nostalgia, has influenced the success of the secondary market. Watch auctions have become a part of the regular repertoire of prestigious auction houses like Sothebys and Christies, as the watch continues to gain in image from functional tool to that of collectible, status symbol, and work of art.

In turn, the growing fascination with fine timepieces has brought about many changes for the industry in a short period of time. Expansion on the part of companies like Rolex and Audemars Piguet as well as new ventures into manufacturing by Cartier and Tiffany & Co. further signal the growing success of the Swiss watch industry. Not only has the number of watches produced increased, but the percentage of mechanicals produced as well. The introduction of the automatic Swatch and the recent acquisition of Blancpain and Piguet by SMH shows growing evidence of the strength of the mechanical watch and the potential increase in sales of luxury watches.

As the growth in the industry continues to accelerate, the Swiss watch companies face a worldwide shortage of the skilled workforce necessary to produce and service the watches turned out by its own growth. Estimates by WOSTEP Director Antoine Simonin predict the need for 25,000 qualified watchmakers over the next ten years. Several watch manufacturers have already begun to address this problem by starting apprenticeship programs within their own factories and to give support to various watch schools in Switzerland. The success of WOSTEP is the direct evidence of this ongoing effort here as well as the hard work of the WOSTEP staff.

Further development and the desire of the Swiss watch industry to preserve its heritage and assure its future has also brought about many changes for the Joseph Bulova School, including the recent renaming of the watchmaking section to The National Institute of Watchmaking. Through the efforts of Peter Laetsch of the Swiss Watch Information Center, and Richard Switzer, the school's Director, development of a new future for the school has begun. The organizing of support and subsequent financial donations of the Swiss watch manufacturers in the New York City area has enabled the school to undergo a revitalization which included the reconstruc-

(Continued on page 41)

One of the classrooms at the Joseph Bulova School.

WOSTEP's Plan to Improve Servicing of Mechanical Watches

The Swiss watch industry has developed a plan to improve the servicing of mechanical watches worldwide. Antoine Simonin, director of WOSTEP in Neuchâtel, Switzerland, will explain this plan to interested American watchmaking schools who are members of AWI's Research & Education Council. REC and school representatives will meet to discuss the plan this month during their 1993 annual meeting. Here are details about the Swiss plan, and the rationale for it.

WOSTEP (the Watchmakers of Switzerland Training and Educational Program) of Neuchâtel, Switzerland has just launched an ambitious global plan to raise the level of training of watch repairers worldwide. It is vitally important for the watch industry to reach this objective if it is to ensure that the best possible quality of after-sales service is universally available for Swiss-made watches. A number of leading watch companies are collaborating in this project.

SERIOUS GAPS

What is the point of manufacturing, in Switzerland, a very sophisticated chronograph if, at the end of the chain of distribution, the retailer is unable to explain it? And even if he does sell it, he cannot provide the proper service for it on the spot?

This is a double problem which the Swiss watch manufacturers experience every day. They produce the best products in the world but, in certain regions, the retailers and the repairers reveal some serious gaps. And these have a harmful effect on sales. They also create the risk of reducing the capital of confidence in Swiss-made watches.

AFTER-SALES SERVICE: A VITAL ADVANTAGE

The quality of after-sales service is a significant element in the reputation and image of Swiss watches and it is essential that all those carrying it out should be well trained. However, this has not been achieved yet. The level of professional watchmaker training around the world is not uniform, and gaps often exist. The training programs are quite varied: subjects and studies differ from one country to another, even from one school to another. Furthermore, certain developing markets (the countries of Central and Eastern Europe, for example) have no training infrastructure. A great amount of information and training is needed, as 25,000 qualified watchmaker-repairers will be needed in the coming 10 years to provide service for the complicated watches in use worldwide (see last section showing how this figure is calculated).

JOINT PROJECT

Recognizing the seriousness of this need, WOSTEP contacted a number of its 77 members and launched the idea of a joint project. For the time being, 10 companies have agreed to join in, and others have said that they may wish to take part later. The participating companies decide on the amount and the nature of their investment (in cash and material). The plan which WOSTEP is implementing started with the creation of a working party within WOSTEP to study how:

1) to coordinate the training programs followed by the watchmaking schools and technical centers around the world, and
2) to coordinate the support given to the schools and technical centers (regular dispatch of material, watches, tools, documentation, updating courses for instructors, advice, etc.).

It should be emphasized that, in the framework of this project, WOSTEP will not carry out training itself, except in the case of courses which it is to give for instructors on the latest methods of training. The actual training of watchmakers is the task of the watchmaking schools and technical centers to be aided and supported by WOSTEP and its members.

To follow the plan further, the working party set up two groups: a watch repairer group and a technical sales assistant group. The watch repairer group is in the process of preparing three documents. One of these describes the whole basic training program which will take 2,500 to 3,000 hours and will enable beginners to acquire very extensive watchmaking skills. A technical sales assistant group has developed a new concept and training program for a more versatile retail salesperson who, in addition to selling, will be able to carry out minor repairs, checks, and adjustments, thus freeing the watchmaker for more elaborate work.

THREE STAGES

The plan covers three stages:

Stage 1: Preparation (2nd half of 1992 to 1st half of 1993). *Objectives:* 1) to draw up programs for the training of watchmaker-repairers; 2) to create a program for the training of technical sales advisers; 3) to list resources available; 4) to translate the documentation into English and Spanish; 5) to inform people in business and political circles; 6) to prepare two training seminars.

Stage 2: Launching (2nd half of 1993 to 1994). *Objectives:* 1) to form a technical action group; 2) to select 20 schools to receive special support; 3) period in Switzerland for foreign instructors; 4) dispatch of material to schools.

Stage 3: Running (1994 to 1997). *Objectives:*

1) selection of new schools; 2) follow-up for schools already supported; 3) support for Swiss schools; 4) prizes for best students.

The objective is to help 20 schools per year, selected from all over the world, starting in 1994. The ultimate target is to provide to 80 watchmaking schools, representing nearly a third of the establishments worthy of this name in the world as a whole.

The provisional budget established for the whole of the operation (1992-1997) comes to about 1.6 million Swiss francs.

WOSTEP IN BRIEF

The Watchmaker Training Center (WOSTEP) is a school of advanced watchmaking which teaches exclusively in English. Its purpose is to train foreign watchmakers (and, since recently, Swiss watchmakers, too) in after-sales methods for Swiss-made watches. In the 25 years that it has existed, it has trained 52 groups successively, totalling nearly 500 watchmakers. It has been run by Mr. Antoine Simonin since 1976. WOSTEP is set up as an association and has 75 members representing the chief Swiss watch brands and associations. It also has a number of foreign members in the same field. The State of Neuchâtel is also a member of WOSTEP.

PREVIOUS SWISS SUPPORT

WOSTEP's worldwide training program is not the first. The Swiss watch industry's concern to see that those who sold and repaired its watches were well informed resulted in the introduction of a first program in the 1960s. At that time, the Swiss Watchmakers Federation (FH) and Ebauches SA set up a worldwide network of training centers (in 15 countries) and 19 watchmaking schools, which were opened particularly in developing countries.

At the same time, the FH, supported by Ebauches SA, opened a training center for watch wholesalers and retailers, as it also appeared that their level of professional ability in certain countries was not up to modern requirements. This center, the CFH Institute in Lausanne, still flourishes today, though on a slightly different basis.

At the beginning of the 1980s, due to the difficulties experienced by the watch industry, the essential activities were concentrated. The FH drastically reduced the number of its information centers. Three still survive, in key regions (New York, Hong Kong, and Tokyo, plus a delegate for Latin America based in Buenos Aires). Some of the technical centers were taken over by ETA SA Fabrique d'Ebauches, a member of the SMH group. Since the middle of 1983, ETA is the only watch company to maintain a network to systematically support watchmaking schools and technical centers abroad.

25,000 IN THE NEXT 10 YEARS: THE CALCULATION

How is it estimated that 25,000 qualified watchmaker-repairers will be needed in the next 10 years? The figure seems enormous, but it is the result of a simple series of observations made by Antoine Simonin, director of WOSTEP. This is how it goes:

1) In the last 5 years Switzerland has produced 7 million complicated mechanical and quartz watches. This means that, over a period of 10 years, 70 million units will be put on the market.

2) By the time 10 years are up, 30% of these watches will have been returned to the manufacturer for an overhaul. This means that 21 million units (30% of 70 million) will need to reach the expert hands of a watchmaker-repairer.

3) If all goes well, a watchmaker-repairer can overhaul 800 complicated watches a year (3 per working day).

4) If a watchmaker can overhaul 800 watches, how many watchmakers will be needed to overhaul 21 million? Divide 21 million by 800 and you get the figure of 26,800. For the sake of simplicity, you can round this down to 25,000.

The above refers to the qualified watchmakers required to overhaul medium to top price timepieces, i.e. those which best illustrate the prestige of Swiss watchmaking.

❑

SCHOLASTICALLY SPEAKING

(Continued from page 39)

tion of the main classroom, the upgrading of equipment, installation of new benches, lighting, and the addition of a new shop area and polishing room. In conjunction with the physical improvements that have taken place, the additional training of instructors has begun with sessions at WOSTEP as well as the Rolex training center in Geneva, Switzerland. The result of these changes, and the recognition of the press for the field of watchmaking, has brought about increased enrollment at the school beyond its present capacity. The earning potential of graduating watch students has become competitive with salaries realized by recent college graduates. Students graduating from the watchmaking program are achieving starting salaries in the range of $22,000 to $32,000 a year, giving a renewed recognition of a technical education and a new appreciation for the art of watchmaking.

As those of us in the area of education anticipate the growth of our field and await the most recent progress on the part of the Swiss Watch Industry, and the coordination of WOSTEP to provide worldwide support for the training of watchmakers, we see numerous changes that have taken place in a short period of time. We have come to understand all of these events as just another step in the learning process that will help us address the needs of our industry, our students, and our consumers.

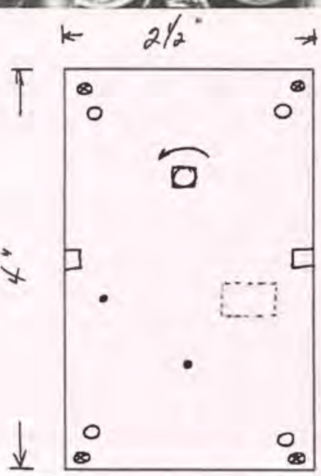
❑

BULLETIN BOARD

A. NEW REQUESTS

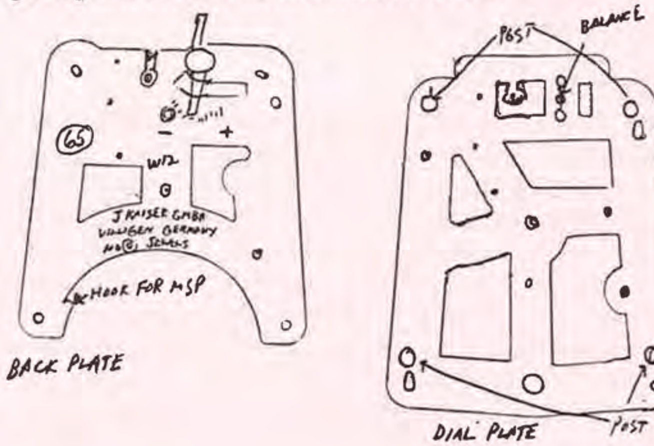
SCHEMATIC FOR L&R MASTER CLEANING MACHINE
Howard Alcorn, Cleveland, OH, is seeking a schematic for an L&R Master Cleaning Machine. We have an operators manual but no schematic for this machine.

S. HALLER 400-DAY CLOCK
Several members have inquired about how to let down the power on the S. Haller 400-Day (Elgin) Clock pictured along with a sketch of the back plate. The only way we have figured out is to use your finger as a brake on the escape wheel to control the power during letting the clock run down with the verge removed. Does anyone have a better way?



6mm LATHE CHUCKS
Roy LaRue, Jr., Clayton, KS, is seeking 6mm chucks (collets) for an American Watch & Tool Co. Lathe No. 179. Chucks fitting the small Geneva pattern lathe, such as the Lorch and Wolf-Jahn, will probably do.

J. KAISE W-12 CLOCK
Louis Swingle, Binghamton, NY, seeks a source for spare parts for the clock sketched below.



PORTESCAP VC10
Wit Jarochowski, Okmulgee, OK, is seeking a schmematic and operators manual for a Portescap VC10.

B. RESPONSES

OBSOLETE TIMEX WATCHES
Several others have indicated they have obsolete Timex watch parts available.

REMOVING LABEL IMPRINTS
Robert Rolfe, Susan Packer, and Jack Peardon have all offered solutions to this imprint problem on old watch crystals.

NEW HAVEN PENDULUM BOB
Gene Brown and Loren Skonberg both sent detailed sketches to help Scot Grahm with details of this unusual pendulum.

SKELETON CLOCKS
W.R. Smith, Powell, TN, supplied a very complete price list on workshop manuals to make skeleton clocks and other interesting horological projects.

WATCHMASTER G-48 TIMER RIBBON
Marvin Blasser, Dallas, TX, suggests checking stationery and office supply stores. Find a ribbon the same width and wind that ribbon onto the spool from the timer.

HOUSE OF 1000 CLOCKS

After asking the question, Bernie Petit called several days later with the answer. Beth Hostetter, Rochester, MN, also supplied the address:

House of 1000 Clocks
Weisser GMBH
An Der Bundesstrasse 33
D-7740 Trieberg, Germany

C. ITEMS STILL NEEDED

ATLANTIC WATCHES

George Stuscavage, Martinez, CA is seeking a U.S. source for "Atlantic" watches which are known to be popular in Poland.

PIERRE RUECI

Donn Kummer, Albany, OR, would like to know who distributes the "Pierre Rueci" watch.

WEIGHT SHELLS FOR FLOOR CLOCKS

Donn Kummer also seeks a source for brass shells (empty) for floor clock weights. AWI would like to develop a list of several sources.

BRANSON ULTRASONIC CLEANER B-12 SCHEMATIC

Bob Carlson, Houston, TX, is seeking a schematic for a Branson B-12 Ultrasonic Cleaner. Requests to Branson in the past have gone unanswered. If you can supply, we will copy and return your original.

TIMING WASHERS

Robert Little, Logan, OH, is seeking sources for timing washers to fill in specific sizes he needs. AWI would be interested in sources for complete assortments as well.

NEW TOWN CHIME CLOCK

John McGrory, Glen Gardner, NJ, seeks wiring details for a clock marked "New Town Chime Clock CH2502."

JERGER CHESS CLOCKS

Roy Burkey, Tucson, AZ, seeks a U.S. source for spare parts for German-made Chess Clocks manufactured by Jerger. Identifying marks are W6 and 386.

COLE PALMER ULTRASONIC CLEANER

Laurie Cusher, Hyde Park, NY, seeks a schematic for a Cole Palmer Ultrasonic Cleaner (tank type) Model 8845-5.

Do you have information regarding this month's requests? Do you need information about one of this month's responses? If so, send a self-addressed, stamped business-size envelope and your request to: "Bulletin Board," c/o AWI Central, 3700 Harrison Avenue, Cincinnati, OH 45211. ❑

CLASSIFIED ADS

REGULATIONS AND RATES

Ads are payable in advance $.70 per word, $.80 per word in **bold type.** Classified display ads are $30.00 per column inch, 2-1/4" wide. Ads are not commissionable or discountable. The publisher reserves the right to edit all copy. Price lists of services will not be accepted. Confidential ads are $4.00 additional for postage and handling. The first of the month is issue date. Copy must be received 30 days in advance (e.g. June issue closes for copy on May 1st).

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Dates to Remember

APRIL 1993

4–Servicing ETA Quartz Chronographs Bench Course (AWI); James Broughton, instructor, Chicago, IL.*

18-20–AWI Southwest Technical Conclave, Las Vegas, NV.*

23-25–Horological Association of Virginia Convention, Williamsburg Hilton, Williamsburg, VA.

23-25–Wisconsin Horological Society Convention, Radisson Inn Downtown, LaCrosse, WI. For more information call (414) 554-0804.

MAY 1993

8-9–Basic Lathe Bench Course (AWI); James Lubic, instructor; New York, NY.*

15-16–Lathe Accessories Bench Course (AWI); Roy Hovey, instructor; New York, NY.*

21–Servicing ETA Quartz Chronographs Bench Course (AWI); James Broughton, instructor; Dallas/Ft. Worth, TX.*

21-23–Texas Watchmakers Association Convention, Green Oaks Inn, 6901 W. Freeway, Ft. Worth, TX 76116.

JUNE 1993

4–Servicing ETA Quartz Chronographs Bench Course (AWI); James Broughton, instructor; Raleigh, NC.

4-6–North Carolina Watchmaker's Association Annual Convention; Holiday Inn North; Raleigh, NC. For detailed information call Alice Carpenter (919) 823-2944.

25–AWI Affiliate Chapter Meeting, Radisson Inn, Greater Cincinnati Airport.. Contact AWI Central for more information.

26-27–AWI Annual Board of Directors Meeting, Radisson Inn, Greater Cincinnati Airport. Contact AWI Central for more information.

28-30–Basic Watch Repair Bench Course (AWI); James Lubic, instructor; Dallas, TX.*

JULY 1993

23-25–Watchmakers Association of Ohio Convention, Park Hotel, Columbus, OH.

24-25–Introduction to Clock Repair Bench Course (AWI); Buddy Carpenter, instructor; Salt Lake City, UT.*

AUGUST 1993

21-22–Striking Clocks Bench Course (AWI); John Nagle, instructor; Austin, TX.*

21-22–Repair of the Atmos Clock Bench Course (AWI); Gerald Jaeger, instructor; Seneca Falls, NY.*

21-22–Basic Pocket Watch Bench Course (AWI); Alice Carpenter, instructor; Pittsburgh, PA.*

22–Servicing ETA Quartz Chronographs Bench Course (AWI); James Broughton, instructor; Nashville, TN.*

SEPTEMBER 1993

17-18–Cross Slide Lathe Bench Course (AWI); Roy Hovey, instructor; Orange County, CA.*

17-19–Advanced Clock Repair Bench Course (AWI); Roland Iverson, instructor; Des Moines, IA.*

18–Mechanical Chronographs Bench Course (AWI); James Lubic, instructor; Tucson, AZ.*

18-19–400-Day Clock Repair Bench Course (AWI); John Nagle, instructor; Tucson, AZ.*

18-19–Repair of the Atmos Clock Bench Course (AWI); Gerald Jaeger, instructor; New Orleans, LA.*

19–Staffing & Escapements Bench Course (AWI); James Lubic, instructor; Tucson, AZ.*

19-20–Cutting Arbors & Stems Bench Course (AWI); Roy Hovey, instructor; Orange County, CA.*

25-26–Hairspring Vibrating Bench Course (AWI); Joseph Cerullo, instructor; Pittsburgh, PA.*

OCTOBER 1993

1-3–New York Watchmakers Association Convention, Holiday Inn, Seneca Falls-Waterloo, NY.

8-10–Illinois State Watchmakers Convention; Clock Tower Inn; Rockford, IL. For more information contact: Jack Donovan, 124 North St., Normal, IL 61761.

10–Servicing ETA Quartz Chronographs Bench Course (AWI); James Broughton, instructor; Austin, TX.*

16-17–Hairspring Vibrating Bench Course (AWI); Joseph Cerullo, instructor; Denver, CO.*

23-25–Florida State Watchmakers Association Convention, Ramada Hotel Resort, West Palm Beach, FL.

30-31–Repair of the Atmos Clock Bench Course (AWI); Gerald Jaeger, instructor; Arlington, TX.*

30-31–Cuckoo Clock Repair Bench Course (AWI); James Williams, instructor; Minneapolis/St. Paul, MN.*

NOVEMBER 1993

5-6–Cross Slide Lathe Bench Course (AWI); Roy Hovey, instructor; New York, NY.*

6-7–Striking Clocks Bench Course (AWI); John Nagle, instructor; Salt Lake City, UT.*

6-7–Hairspring Vibrating Bench Course (AWI); Joseph Cerullo, instructor; Austin, TX.*

7-8–Cutting Arbors and Stems Lathe Bench Course (AWI); Roy Hovey, instructor; New York, NY.*

***For more information on AWI Bench Courses, Project Extend, and Regional Seminars, contact AWI Central, P.O. Box 11011, 3700 Harrison Avenue, Cincinnati, OH 45211; (513) 661-3838; Fax (513) 661-3131.**

Ad Index

AWI BENCH COURSES 1993

To register for these courses, please send with your request a registration fee of **$35** per instruction day (for AWI members) to:
AWI Central
3700 Harrison Ave., P.O. Box 11011
Cincinnati, OH 45211

PLEASE NOTE: Registrations are limited and will be selected by the *EARLIEST POSTMARKS*. You may register by fax if you wish; if so, please include your Visa or MasterCard number, card expiration date, and signature.
FAX: (513) 661-3131
INFORMATION: (513) 661-3838

COURSES & INSTRUCTORS

Advanced Quartz Watch Repair
Robert Bishop, CMEW
Basic Pocket Watch
Alice Carpenter, CMW, CMEW
Introduction to Clock Repair
Buddy Carpenter, CMC, CMEW
Advanced Clock Repair
Roland Iverson, CMC
Repair of the Atmos Clock
Gerald Jaeger, CMW, CMEW, FAWI
Basic Lathe
Basic Watch Repair
Mechanical Chronographs
Staffing & Escapements
James Lubic
Cuckoo Clock Repair
James Williams, CC
400-Day Clock Repair
Striking Clocks
John Nagle
Servicing ETA Quartz Chronographs
James Broughton, CMEW
Cross Slide Lathe Course
Cutting Arbors & Stems Lathe Course
Lathe Accessories
Roy Hovey
Hairspring Vibrating
Joseph Cerullo, CMW, CMC

APRIL 1993
4--Servicing ETA Quartz Chronographs--Chicago, IL
18-20--AWI Southwest Technical Conclave--Las Vegas, NV

MAY 1993
8-9--Basic Lathe--New York, NY
15-16--Lathe Accessories--New York, NY
21--Servicing ETA Quartz Chronographs--Dallas/Ft. Worth,TX

JUNE 1993
4--Servicing ETA Quartz Chronographs--Raleigh, NC
28-30--Basic Watch Repair--Dallas, TX

JULY 1993
24-25--Introduction to Clock Repair--Salt Lake City, UT

AUGUST 1993
21-22--Striking Clocks--Austin, TX
21-22--Repair of the Atmos Clock--Seneca Falls, NY
21-22--Basic Pocket Watch--Pittsburgh, PA
22--Servicing ETA Quartz Chronographs--Nashville, TN

SEPTEMBER 1993
17-19--Advanced Clock Repair--Des Moines, IA
17-18--Cross Slide Lathe Course--Orange County, CA
18-19--400-Day Clock Repair--Tucson, AZ
18-19--Repair of the Atmos Clock--New Orleans, LA
18--Mechanical Chronographs--Tucson, AZ
19--Staffing & Escapements--Tucson, AZ
19-20--Cutting Arbors & Stems Lathe Course--Orange County, CA
25-26--Hairspring Vibrating--Pittsburgh, PA

OCTOBER 1993
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16-17--Hairspring Vibrating--Denver, CO
30-31--Repair of the Atmos Clock--Arlington, TX
30-31--Cuckoo Clock Repair--Minneapolis/St. Paul, MN

NOVEMBER 1993
5-6--Cross Slide Lathe Course--New York, NY
6-7--Striking Clocks--Salt Lake City, UT
6-7--Hairspring Vibrating--Austin, TX
7-8--Cutting Arbors & Stems Lathe Course--New York, NY

PROJECT EXTEND CLASSES FOR 1993

Contact AWI Central for the General Information brochure for Project Extend and specific course brochures for classes that interest you.

May 3-7	**Clock III** (antique restoration)	**David Christianson**
May 10-14	**Watch VI** (basic pocket watches)	**Alice Carpenter**
June 7-12*	**Lathe I** (basic)	**Roy Hovey**
June 14-19*	**Lathe II** (advanced)	**Roy Hovey**
July 19-24*	**Lathe I** (basic)	**Roy Hovey**
July 26-31*	**Lathe II** (advanced)	**Roy Hovey**

*** 6-day class**

Aug. 16-21*	**Lathe I** (basic)	**Roy Hovey**
Aug. 23-28*	**Lathe II** (advanced)	**Roy Hovey**
Sept. 13-17	**Watch Case Repair**	**M. Richmond**
Sept. 20-24	**Clock I** (basic)	**James LaChapelle**
Sept. 27-Oct.1	**Clock VI**	**John Nagle**
Oct. 4-8	**Clock II**	**Roland Iverson**
Oct. 11-15	**Clock Case Repair**	**James Williams**
Oct. 25-29	**Clock V** (CMC Prep)	**James Lubic**

*** 6-day class**