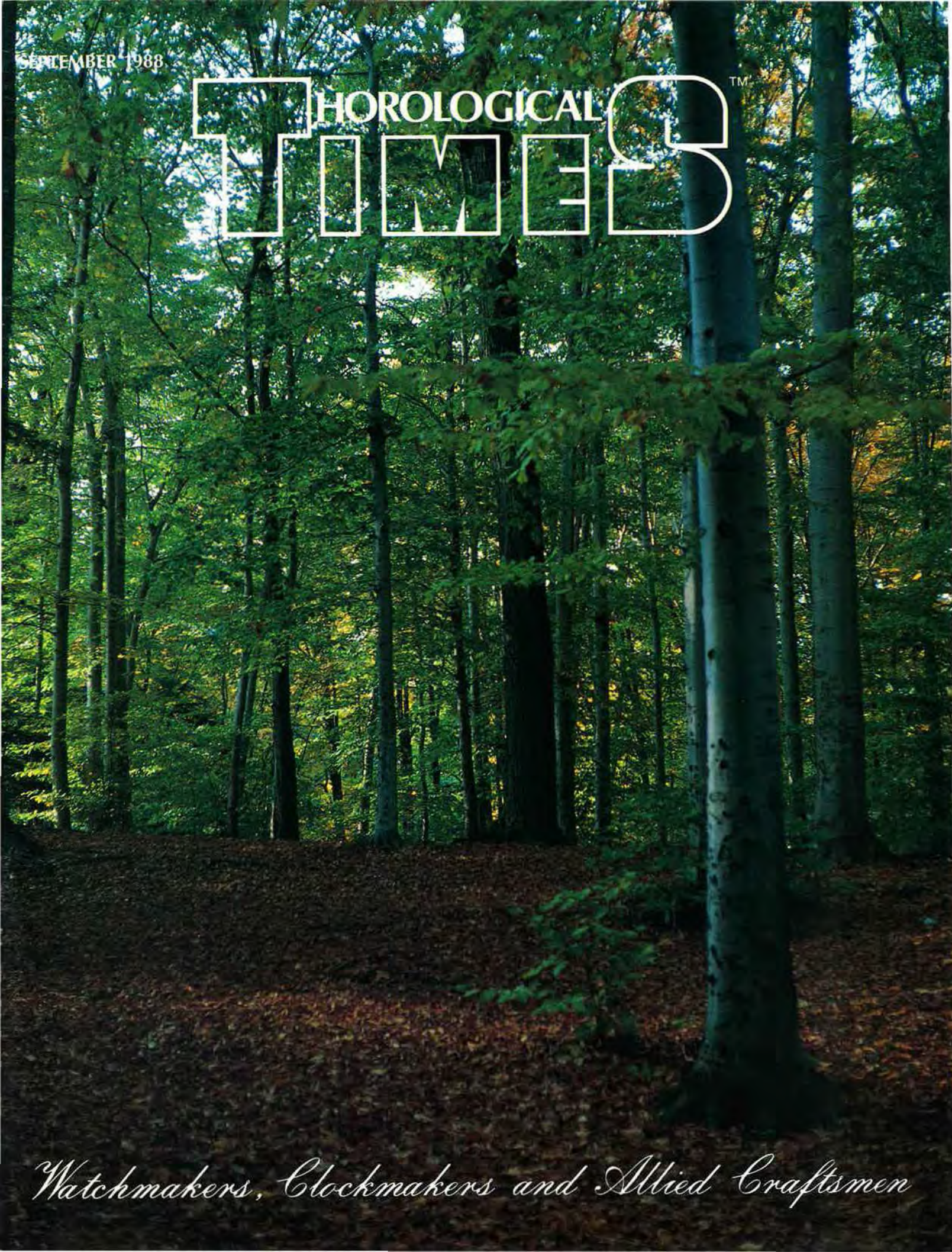
SEPTEMBER 1988

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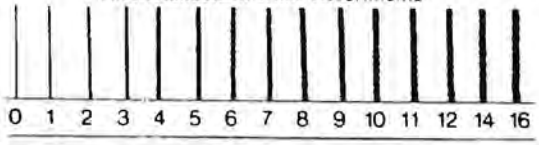
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VOLUME 12, NUMBER 9 SEPTEMBER 1988

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Official Publication of the American Watchmakers Institute

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President's Message

The Affiliate Chapters group has long been a valuable asset to AWI. We need and appreciate the grassroots contact. How better can AWI sense the needs of its members except through interaction with the chapters throughout the country. Many of their recommendations to the Board of Directors have become AWI policy.

AWI is a valuable asset to the Affiliate Chapters. Our slide-tape and video programs are made available at no cost to the chapters, and our speakers and workshops are provided at minimum cost. Each chapter is entitled to one AWI speaker per year at a cost of only one half of travel expenses. This savings alone more than compensates for the chapter dues.

AWI provides a page in *Horological Times* for the Affiliate Chapter column. The "Association News" provides free publicity for chapter news and activities. The annual chapter reports and convention surveys are reprinted and made available to all chapters so that they can learn from the experience of others. The Annual Affiliate Chapter Achievement Award is presented to the chapter who, in the judgement of its peers, provided the best service to its members.

AWI will provide, upon request, regional membership lists to the chapters for their use in local membership recruitment or other worthwhile reasons. AWI will mail announcements of chapter-sponsored programs to all AWI members within their area.

For those of you who are not served by a local organization, AWI will provide extensive assistance to any group desirous of forming a guild. This would include publicity mailings, speakers, workshops, advice, sample by-laws, and any other service that would be of value in starting up a new organization.

Why am I extolling the virtues of our AWI-Affiliate Chapter relationship? You—the lay member—may say, "What does this have to do with me? All this is for my leaders to know and use."

Simply put, the chapter leader is no better than the support of the members, and the members must be properly informed in order to properly provide this support.

Less than 20 chapters were represented at the last Affiliate Chapter meeting out of a potential of 41. I fully realize that the expense of sending delegates can be a real challenge, but I suggest that the benefits will make it well worth the effort to secure the funding. The chance to share your experiences with your peers from coast to coast, and to be one on one with people like Henry Fried and Marvin Whitney alone would make the effort worthwhile.

Tom White, Affiliate Chapter Chairman, has been diligent in communicating these things to your leaders, but your leaders must have your cooperation and support in order to make these things reality. It's not too early to start now to make it possible for your chapter to send a delegate to next year's meeting. Better yet, also come yourself.



Robert F Bishop

ON THE FRONT: Emery Park in Elma, NY. Photo by Mark Krueger, Williamsville, NY.

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Up Front

The AWI Logo Contest entries for 1988 were all winners in good public relations for the entrant and AWI members everywhere. All were well thought out, professional, attractive, and practical. Judged the best was Joseph C. Verruni of Norristown, PA, followed by Robert Little, Logan, OH, and Susan Packer, Smithfield, UT.

In the 1988 AWI Logo Contest entries of stationery, statement and business card won first place for Joseph Verruni. An arresting business card won second place for Robert Little; third place winner Susan Packer submitted stationery, envelope, and business card imposing the logo on an antique escapement.

In addition to the above, entries included a warranty card, a clock repair label, advertisements, and job envelopes.

AREA REPRESENTATIVES

AWI Directors are elected at large and thus represent all members at AWI meetings. Each year the President assigns specific areas of membership to a particular person as their area of responsibility. These individuals are known as Area Representatives. In recent years we have assigned these responsibilities to the various elected directors.

Frequently, when a member wishes to bring something to the attention of the Board, he or she usually selects a Board member they know personally or go directly to the President or to an AWI staff member. Some members feel more comfortable having one person designated to represent them. They want this person to serve as an ombudsman. Since communication is an essential part of insuring a viable organization, we are pleased to make these Area Representatives available for that purpose.

Area Reps will welcome the opportunity to be of service to any member residing in the area they represent. Call upon them as often as you like. Below is a list of the various Area Representatives and regions they serve.

James Adams 21 Public Square Shelbyville, IN 46176	Indiana Illinois Missouri
William Biederman 107 S. Water St. Sparta, WI 54656	Wisconsin Iowa Kansas Nebraska
Robert F. Bishop 132 Ida Drive Glenshaw, PA 15116	Pennsylvania Canada International
James H. Broughton 4443 Janice Marie Blvd. Columbis, OH 43207	Ohio Michigan
Alice B. Carpenter P.O. Box 147 Tarboro, NC 27886	North Carolina South Carolina
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Ben Matz 3208 168th Street Flushing, NY 11358	Massachusetts New York
Robert Nelson 5026 Portland Avenue Minneapolis, MN 55417	Minnesota North Dakota South Dakota Colorado Wyoming
Marshall F. Richmond Rt. 2, Box 228C Milan, IN 47031	Arkansas Kentucky Tennessee
Dwight Tubb Box 23 Dike, TX 75437	Texas Oklahoma Louisiana New Mexico
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Questions & Answers



Henry B. Fried, CMW, CMC, FAWI, FBHI, ★FNAWCC

30-HOUR QUARTER STRIKE CARRIAGE CLOCK

Q I am writing to you with two requests. I hope that you may be able to give me some information on a small clock that I own. I am including some photographs of the clock. It is obviously meant to be wall hung, probably near a bed, as it is a quarter repeater. Its dimensions are almost one-inch deep by four-and-one-quarter inches wide by six inches long. The two squares in the back are of different sizes, the setting square being the larger of the two. The name on the dial is:

LHARDY DUBOIS**

while the movement seems to be unmarked. The number 518 can be discerned in the back view in the lower left quadrant. The movement appears to be of French pattern and is in excellent condition, running with the least bit of winding.







I would appreciate any information that you might be able to furnish me about it or the maker. I would like to restore the missing piece that originally must have been on the end of the pull cord, hopefully you might be able to give me an idea of what a typical piece looked like.

My second request is: What is the correct relationship of the banking pin on a cylinder wheel relative to the cylinder?

Gerard B. Stuyck
Alamogordo, NM

A *Your photos show a fine quality 30-hour quarter strike "pendule d'voyage" (carriage clock) of the 1790 period.*

My records show L. Hardy and a Dubois at Rue St. Honore at Paris between 1783-89. This is a large pocket watch repeater mounted in this fine "bronze dare" case. As for the pull-piece, generally a silver bead in pear form or a pearl-piece should do.

As for the cylinder information, obtain my book "The Watch Escapement" which has about the most on this escapement. It'll answer your questions.

Henry B. Fried



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Cross section - inside diameter (in mm)			
Battery Hatch Gaskets	60-1750	75-2760	90-2670
	60-1790	75-2790	90-2710
	60-1970	75-2825	90-2740
45-0810 *	60-2100	75-2880	90-2780
40-1100 *	60-2165	75-2910	90-2810
40-1250 *	60-2500	75-2940	90-2840
60-1000 *	60-2700 *	75-2970	90-2850
	60-2800 *	75-2990	90-2860
Caseback Gaskets	60-2900 *	75-3005	90-2880
	60-2950	75-3080	90-2900
35-1800 *	60-3000 *	75-3100	90-2930
35-2000 *	60-3190	75-3140	90-2950
35-2100 *	60-3260		90-2980
35-2400 *	60-3400	80-1650	90-3000
35-2500 *		80-1690	90-3020
	70-1760	80-1750	90-3040
40-1400 *	70-1850	80-1870	90-3050
40-1500 *	70-1890	80-2030	90-3060
40-1600 *	70-1930	80-2100	90-3100
40-1700 *	70-1960	80-2750	90-3140
40-1900 *	70-1980	80-2800	90-3160
40-2300 *	70-2080	80-2840	90-3180
40-2700 *	70-2130	80-2900	90-3200
40-2780	70-2330	80-2910	
40-2800 *	70-2470	80-2930	95-2050
40-2900	70-2660	80-2960	95-2840
40-3000 *	70-2710	80-3050	95-2960
40-3070	70-2760	80-3070	95-3000
40-3080	70-2780	80-3130	95-3180
	70-2810	80-3160	95-3360
50-1650 *	70-2870	80-3240	
50-1770	70-2900	80-3280	100-1900
50-2030	70-2940		100-2625
50-2070	70-2980	85-1880	100-2750
50-2200 *	70-3005	85-2330	100-2850
50-2400 *	70-3020	85-2660	100-2910
50-2500 *	70-3060	85-2790	100-2930
50-2600 *	70-3080	85-2840	100-2950
50-2700 *	70-3140	85-2940	100-2975
50-2800*	70-3200		100-3000
50-2840	70-3260	90-1830	100-3050
50-2900 *	70-3300	90-1850	100-3075
50-3000 *		90-1880	100-3175
50-3100 *	75-1650	90-1920	100-3200
50-3200 *	75-1880	90-2050	100-3280
50-3300 *	75-1920	90-2070	
	75-1980	90-2130	* New size
60-1450	75-2160	90-2220	
60-1550	75-2600	90-2510	



Borel Waterproof Gasket ASSORTMENTS

O-Ring		Price
60/1	1 each of 86 sizes	18.75
60/1B	1 each of 120 sizes	26.00
60/3	3 each of 86 sizes	37.50
60/3B	3 each of 120 sizes	52.50
61/1	1 each of 42 sizes	10.95
62/3	3 each of 8 best sizes	6.25
64/3	3 ea of 22 thin sizes	19.95

Round Flat		Price
58/1	1 each of 91 sizes	26.50
58/3	3 each of 91 sizes	55.70
55/3	3 each of 8 best sizes	16.50

New Black Flat		Price
59/2	2 each of 30 sizes	19.95


FLAT GASKETS

New Black Flat
(soft rubber)

Refill #	Inside diameter	Outside diameter
101	15.00 x	17.00
102	17.00 x	18.00
103	17.80 x	18.70
104	18.50 x	19.50
105	19.20 x	20.30
106	19.50 x	20.50
107	20.00 x	21.25
108	21.00 x	22.50
109	22.25 x	23.75
110	23.00 x	25.00
111	24.00 x	25.50
112	23.50 x	25.50
113	24.00 x	26.00
114	25.50 x	26.50
115	26.00 x	27.50
116	26.50 x	27.50
117	26.50 x	28.50
118	27.00 x	28.50
119	27.25 x	28.75
120	28.00 x	29.25
121	28.00 x	29.50
122	28.50 x	29.50
123	29.00 x	30.00
124	28.50 x	30.40
125	29.00 x	30.50
126	28.75 x	30.75
127	29.50 x	31.00
128	30.00 x	31.50
129	30.00 x	32.00
130	31.50 x	33.50

Flat Waterproof Gaskets

REFILL NUMBER	STOCK NUMBER	WIDTH OF BAND M/M	INSIDE DIA. M/M	OUTSIDE DIA. M/M
00	616	.60	15.90	17.10
0.	616½	.50	16.50	17.50
0A	617	.55	16.90	18.00
0B	618	.55	18.00	19.10
0C	619	.50	19.20	20.20
1.	619½	.60	19.80	21.00
1A	620½	.60	20.35	21.50
1B	621	.60	21.00	22.20
2.	621½	.60	21.60	22.80
3.	622½	.60	22.35	23.45
3A	623	.50	22.90	23.90
4.	623½	.60	23.40	24.60
5.	625	.65	25.00	26.30
6.	626	.60	26.00	27.20
7.	626½	.65	26.80	28.10
8.	627½	.60	27.85	29.10
9.	628½	.60	28.55	29.75
10.	717	.70	17.00	18.40
11.	718½	.70	18.60	20.00
12.	720½	.70	20.60	22.00
12A	723	.75	23.10	24.60
13.	724	.75	24.00	25.50
13A	724½	.70	24.60	26.00
14.	725½	.70	25.65	27.00
14A	726	.75	26.00	27.50
15.	726½	.75	26.50	28.00
16.	727	.70	27.10	28.50
17.	727½	.75	27.50	29.00
18.	727½	.70	27.70	29.10
18A	728	.75	28.00	29.50
19.	728½	.70	28.20	29.60
19A	728½	.70	28.60	30.00
20.	729	.70	29.00	30.40
21.	730	.75	30.00	31.50
21A	730½	.70	30.40	31.50
22.	731½	.75	31.50	33.00
23.	817½	.80	17.20	18.80
24.	818½	.80	18.20	19.80
25.	819½	.80	19.30	20.90
26.	821½	.80	21.60	23.20
26A	823½	.80	25.50	25.10
26B	824½	.80	24.60	26.20
26C	825½	.80	25.60	27.20
27.	826½	.85	26.30	28.00
28.	826½	.80	26.60	28.20
29.	826½	.80	26.80	28.40
30.	827½	.85	27.30	29.00
31.	827½	.80	27.60	29.25
32.	827½	.80	27.85	29.50
33.	828	.80	28.00	29.60
34.	828½	.80	28.35	29.90
35.	828½	.80	28.70	30.30
36.	829½	.80	29.40	31.00
37.	830½	.85	30.60	32.30
38.	831½	.80	31.65	33.30
39.	834½	.80	34.20	35.80
40.	913½	.90	13.20	15.00
41.	917	.90	16.90	18.70
42.	918	.95	18.05	19.95
42A	920½	.90	20.20	22.00
43.	921	.90	21.00	22.80
44.	922½	.90	22.40	24.20
45.	925½	.90	25.25	27.00
46.	925½	.95	25.55	27.45
47.	926½	.90	26.80	28.50
48.	928½	.90	28.20	30.00
49.	928½	.90	28.60	30.45
50.	929	.90	28.90	30.70
51.	931½	.95	31.20	33.10
52.	932½	.95	32.80	34.70
53.	933½	.90	33.20	35.00
54.	1022½	1.05	22.40	24.50
55.	1024	1.00	24.00	26.00
56.	1024½	1.00	24.50	26.50
57.	1025	1.00	24.90	26.90
58.	1026½	1.00	26.50	28.50
59.	1026½	1.05	26.80	28.90
60.	1027	1.00	27.00	29.00
61.	1028½	1.05	28.70	30.80
62.	1029	1.00	29.00	31.00
63.	1029½	1.00	29.80	31.80
64.	1032½	1.00	32.30	34.30
65.	1125½	1.10	25.25	27.50
65A	1127½	1.10	27.25	29.40
66.	1224½	1.20	24.80	27.20
67.	1226	1.20	26.00	28.40
68.	1227½	1.15	27.20	29.50
69.	1228	1.20	28.00	30.40
70.	1230	1.25	30.00	32.50
71.	1230½	1.15	30.70	33.00
72.	1235	1.20	35.15	37.55

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Bench Tips



Joe Crooks

Clean Before You Clean

The first tip this month is from David Caldwell of Coventry, CT.

I repair antique clocks for most of the dealers in my area. When I first remove the movement from the case, I preclean it in a five gallon pail of old ultrasonic solution before taking it apart to inspect pivots, rebush plates, etc. This is an extra step in repair but once it is included in your cleaning process, it is easy and makes it so much nicer to work on a movement that has most of the surface grime removed.

This preclean solution can get pretty nasty with sludge after a while, not something you want to be dipping your hands into to take out precleaned movements. I had been looking for some type of basket to use and even tried to make one out of some wire mesh material used for animal cages. That was galvanized and reacted with the solution. It didn't last more than three months.

My wife was having her annual tag sale and among her best buys was something called a "vegetable crisper." It is a stainless steel basket made of fine gauge wire intended to hold lettuce while being washed. It has two handles built into the folding wire top and is about 10 inches in diameter by 12 inches high. I grabbed it to try as a precleaning basket and she charged me 50 cents. It worked so well, I bought two more "crispers" at a local gourmet shop for $9.00 each and cut one down to fit in my ultrasonic tank.

David, I made a basket from galvanized mesh to use in my ultrasonic machine and the reaction with the cleaning solution would electroplate the clock parts with black spots–had to buff to get it off.

I had a friend who worked for a restaurant supply manufacturer and he got me a sheet of stainless steel wire mesh about two times as thick as standard galvanized screen wire–probably same gauge and mesh as your "crisper."

My point is, I made this stainless steel basket with three compartments to keep the time, strike, and chime wheels apart while cleaning because I'm too dumb to tell which are which and it saves me lots of time.

Try It In Reverse

Our second tip is from Ken Law of Prescott, AZ.



An old-time repair option for the typical kitchen clock great wheel with worn teeth is to simply reverse it.



Here it is ready to start its new life after being reversed on its arbor.

Ken, you are right about this being an old-time repair tip. Back during WWII, when I went through instrument school at the Navy yard in Washington, one of my instructors showed this tip to repair ship clocks while out at sea. I thought, my God, are we going to be out on the ocean so long that the clock wheels will wear like that? And we just about did before I got out of Japan!

SEND YOUR TIPS TO: Jingle Joe, AWI Central, 3700 Harrison Avenue, Cincinnati, OH 45211.

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The "KEY TEST FOR QUARTZ WATCHES" by Ewell Hartman, CMW is a quick and simple method of locating the problem in a quartz analog movement. The only tool required is a meter.

Material and instructions for learning this test is supplied by the AWI-ELM Trust as part of their educational work. There is no charge to any group wishing to learn this test. There are great benefits to learning this in a group setting. However, for individuals who may not be able to participate in a group, it is available to them also.

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BULLETIN BOARD

A. NEW REQUESTS

BEZEL FOR A BULOVA PHOTO WATCH

Henry Frystak, Linden, NJ, who frequently responds to "Bulletin Board" requests, is now seeking help with one of his problems. It is a Bulova Photo Watch, the kind that has a little button near the 6 o'clock position. When pushed, the whole body of the watch hinges up, revealing a place where a photo can be glued in. This is a watch that was built in limited quantities in 1950. He needs a bezel or complete case.

WATERBURY 3-PLATE CHIME CLOCK

From Port St. Lucie, Florida an AWI member writes: "My problem is with the chime and strike levers. These were all messed up when it came into the shop." *Horological Times* published an article by Steven Conover on a Waterbury 3-plate chime clock; however, it used a count wheel device and as the photo shows, this one has a rack and snail. Any help will be appreciated.



GLASS SHEETS FOR CRYSTALS

An AWI member from Charlotte, North Carolina is seeking a source for sheets of glass from which to fabricate crystals. He writes that the glass should be from 1 to 1½ mm thick.

POLISHING COMPOUNDS

A Tennessee member writes that he has tried a number of substitutes for oilstone powder and diamantine. While some of the substances come close to being a satisfactory substitute, he would like to continue his tests. He further comments that with today's advanced technology there just may be new products that will even do a better job than the old standbys: oilstone powder and diamantine.

B. RESPONSES

FOREIGN MAKER?

Joseph Wise, Tremont, Ohio responded to the request for the origin of the clock shown in two "Bulletin Board" photos in recent months. The clock in question looks similar to a Waterbury. Mr. Wise confirms the speculation of Henry Fried that the clock appears to be like those made by a Japanese firm using the trademark: 

He is unsure of the spelling, but thinks it may have been "Sakosha," a brand of Seiko. Not all of the movements were signed; they were manufactured about 1900-1910.

BLACK OXIDIZED FINISH

After going to press with the August issue, the "Bulletin Board" received a number of additional suggested products with which to produce a black finish on plaques and trophies. This list will be sent to anyone interested if they will send a stamped (25 cents), business-size envelope.

OTHER AFTER-PRESSTIME RESPONSES

Again, after going to press with the August issue, the "Bulletin Board" received a number of additional responses; some dealt with the squeaking pendulum, floral clocks, Hamilton electric watches, Ansonia "Swinger" suspension springs, to name a few. As these responses "straggle" in, they are always forwarded to the member(s) expressing interest in them. If you can contribute to a question asked several months before, please do so; we will add it to our file and forward it to the person seeking help.

C. ITEMS STILL NEEDED

STARK LATHE

An AWI member in Cape Coral, FL has purchased a wheel cutting lathe manufactured by the Stark Tool Company of Waltham, MA. From the center of the collet to the bed measures 2¾ inches. AWI's call to directory service in Waltham, MA failed to reveal a listing for this firm, and AWI's lathe expert, Archie Perkins, has no data on it. Our member seeks an operator's manual. If you can provide a manual, we will photocopy it and return your manual to you.

CUSTOM-MADE WATCH MAINSPRINGS

Several requests in recent weeks dealt with individuals who were restoring older watches and who found the need to replace a rather odd-sized watch mainspring. The "Bulletin Board" would like to develop a source list of individuals or firms who will custom make watch mainsprings.

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," *Horological Times*, 3700 Harrison Ave., Cincinnati, OH 45211.

SUPPORT THE AWI MOVEMENT BANK

The purpose of the AWI Movement Bank is to insure the availability of spare parts for vintage watches now and for the future.

The Movement Bank is a cooperative venture by AWI and the AWI ELM Trust. The Institute is currently seeking donations of old movements, partial movements, and watch parts from retirees, estates, and persons interested in helping preserve the past for future generations.

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Karl Keyes
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Our Readers Write

I am responding to Mr. Yegerlehner's letter which appeared in the July '88 issue under "Questions & Answers" (page 8). I believe everyone is entitled to their opinion, and like everyone I have my own on the subject of bushing replacement.

I have only been at the bench for about 15 years and only 12 of those have been full time, so I guess I have about half the experience that Mr. Yegerlehner has had, or maybe less than that, since I have never been able to properly repair 140 clocks in a month. Furthermore, I'm definitely not in a position to try to tell Henry Fried anything about the repair of anything, especially clocks!

If you refer to an article written by David Arnold in the July '82 issue of the *Horological Times* entitled "Curing Catastrophic Wear in Modern German Movements," Dave explains that the materials used in the manufacturing of these movements is extremely soft and flakes up when it comes in contact with a burnisher (or clock plate), and these tiny flakes of metal, when mixed with oil, become a liquid abrasive. This mixture grinds away not only at the pivots but the plate in which they are turning as well.

When replacing a bushing, regardless of the material (brass or bronze), the pivot must always be in good condition, free of burrs, scoring, and microscopic bits of any plating material that may have embedded themselves into the soft steel. If in fact the steel is as soft as suggested by Mr. Arnold in his article, I see no hope for any bushing–brass or bronze–lasting for 20 to 30 years.

In response to the question raised by Mr. Yegerlehner about why some of the manufacturers are advertising the use of bronze bushings, well hey, it sure sounds good. I think they feel that by using bronze bushings instead of making their arbors out of harder material, their movements will probably run for longer periods of time, and they probably will; but when they finally do stop running, you probably ought to have a copy of that article on how to repivot.

Take a look at an early French round plate movement sometime that has been neglected and you will find that the pivots in many cases will be worn severely. Most of these pivots are at 55 to 65 Rockwell and they have been destroyed turning in a *brass* plate. If the proper type of brass is used and the pivot is of a good quality material and is finished properly, I see no reason for the use of 22 bronze bushings in any movement. Maybe the manufacturers are trying to solve a problem that they created in the first place. Let's face it, bronze bushings are easier and cheaper to make than hard steel arbors and pinions.

If you are dissatisfied with the quality of the bushings available on the market from Germany or Switzerland, there is a company in the good old USA now manufacturing a very high quality hard brass line of bushings which uses the German size system. I have used these bushings and am very pleased with the results! They are a good deal harder than the current foreign products available, and for an added "kicker," they just happen cost less, too. These bushings are available from Timesavers in Algonquin, IL and a number of other material suppliers.

Remember to keep those pivots polished and clean. There will be occasions where repivoting is the only long-term solution to this problem. You should probably also try those new American-made bushings. I'm sure you'll like them.

In closing I would also like to invite Mr. Fried to visit my shop, just to be able to say that he was there. I'm sure if I had to have someone looking around my shop to see what's happening, I'd want it to be Henry Fried! I know there's a lot to be learned from the man.

Dave Stephens, CMC, CW
Palatine, IL

I'm sending a picture of a clock we've had for over 49 years. We got it as a gift and the clock has been the most faithful we've ever had. It once was struck by lightening; the cord was burned off, so we put a new cord on, and it's never stopped since.

I just want someone to know that the people of the good old "US of A" make good things. I don't know where the credit should go. I don't know what happened to the Sessions Clock Company, but I had to tell someone. I remain a very thankful owner of a Sessions product.

Cecilia Hoover
Grosse Ile, MI

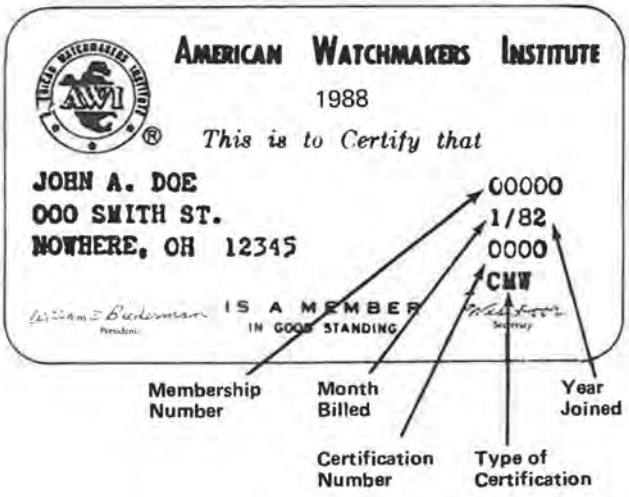


Your magazine is the most interesting and informative watchmaking magazine I have ever read, and I have looked forward eagerly to its arrival every month for many years.

W.L. Tetley
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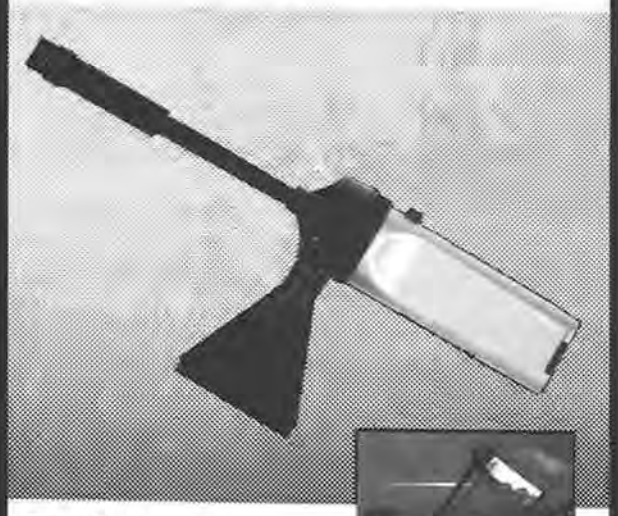
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Old Watches



Charles Cleves

Illinois Wristwatches

Many collectors like the Illinois Watch Company because of the high quality watches they produced. When discussing what they like in particular, names like *Bunn Special, Sangamo Special, Pennsylvania Special,* or *Benjamin Franklin* are likely to be heard. The Illinois Watch Company produced so many varieties of high-grade pocket watches that it would take a lifetime to collect all of them.

One of the most underrated products of this company are the wristwatches they produced. Of the truly American-made wristwatches, Illinois made the most unusual Art Deco case styles of that time period. Because they were 100% American made, there doesn't seem to be a large demand for them in Europe or Japan. Since most of the outrageous prices for wristwatches are coming from these foreign markets, the price has remained very low. I don't understand why the foreign buyers like the odd-shaped Hamilton electrics so well but don't seem to get as excited over the unusual Illinois. The only model that does seem to get any respect is the *Piccadilly* model (Figure 1). As far as I know, this model was only made in gold-filled. I've only seen seven or eight watches of this model, altogether, at all the shows these past ten years. I have seen approximately two thousand Hamilton *Pacer* models in the same time period. Why are both these models worth $300 in good running condition? I've asked myself this question several times. I think Illinois watches are a great investment and show great potential in the near future. For this reason I have not sold any of my Illinois wristwatches in the last five years. I'll have to admit I would have given you the same advice three years ago.

There aren't many exciting areas of wristwatch collecting left where extremely unusual watches can be bought as cheaply as what the Illinois can. One of my favorite models is the *Marquis* (Figure 2). The curved lines on the dial along with the curved case and the second bit at the 9:00 position make this model a classic. This model can be seen for sale at all of the NAWCC shows and can be bought between $75 and $125. Gruen watches with curved gold-filled cases are bringing much more money even though the Illinois is much scarcer.



Figure 1 - Piccadilly



Figure 2 - Marquis



Figure 3 - Beau Brummel



Figure 4 - Ensign



Figure 5 - Chesterfield



Figure 6 - Ritz

The main reason is that all of the foreigners accept the Gruens but few recognize the Illinois watches as being of much importance. Combine this with the fact that our dollar is so weak, and you can see that whatever the Japanese and Europeans like will turn out to be the most expensive. This is not all bad; it gives the novice collectors something affordable to collect.

Figures 3, 4, 5, and 6 show some more examples of the unusual case styles that were typical of the Illinois Watch Company. All four of these case styles can be bought for less than the *Marquis* model. Figure 3, the *Beau Brummel*, was similar to the *Marquis*. It had a slightly curved case but a more geometric look than the tapered look of the *Marquis*. Figure 4, the *Ensign*, also had the hand-engraved look of the previous two but a more traditional design. Figures 5 and 6, the *Chesterfield* and the *Ritz*, are bold examples of Art Deco design. The geometric pattern shows well in these pictures but the real beauty can only be seen in person. Both of these watches are two-tone, white, and yellow gold-filled.

If you have been considering collecting but just couldn't decide which direction to go, then Illinois wristwatches could be for you. Buy only models in Illinois-marked cases. Recased movements are plentiful and don't go up in value. Try to find watches with the original finish on the dial because most of the dial refinishing companies can't duplicate the luminous too well. It looks too bright and new. If you stick to these guidelines, you will be making a better investment.

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CLOCKS Inside & Out!

By Dean H. Armentrout, CMBHI

Photographs used with kind permission from The Antique Collectors Club's edition of Tom Robinson's "The Longcase Clock," 1981.

PULL REPEAT

Occasionally the clock restorer is called upon to replace missing or incomplete pull repeat work. The fact that many 18th century clocks have had every component removed by an earlier repairer does not make the task any easier. The intent of this article is to briefly look at the development of repeat work in regard to the 17th and 18th centuries and explore the various steps a restorer can take to authentically reproduce missing components. By way of example, an individual restoration will be focused on and the research and restoration process explained.

DEFINE PULL REPEAT

First it would be best to define the term repeat and discover why it was included on some clocks of the day. Broadly, repeat work on clocks means that the owner can, when desired, trip some part of the strike mechanism and cause the time to be announced audibly. Pull repeat denotes that the mechanism is tripped by pulling a cord that is usually found extending through a hole in the case. There were other methods employed such as the pull/push lever used by some early English makers. Although we tend to associate this feature with bracket clocks and to a lesser degree wall clocks, there are examples of longcase clocks with repeat function. This feature found on so many clocks of the period causes one to question why it is there at all.

WHY WAS IT DEVELOPED?

Certainly the sheer novelty of pulling a string and hearing the clock strike must be considered as reason enough to invent repeating work. As with the addition of automata, repeating work gives the clock a whimsical touch. However, there must have been a stronger reason for some clockmakers to have gone to such lengths to equip their timepieces with this feature. Perhaps the answer can be found by examining the environment and lifestyles of those who lived during the 18th century. To what degree poor household lighting and poor eyesight of clock owners contributed to the introduction of repeat work is a controversial question. Certainly if one was born with poor eyesight the handicap had to be endured for life, and there is at least some possibility that repeating the time audibly was helpful. One very illuminating clue on the use of repeat work comes to us in a novel by Jane Austin. In it the mistress of the house uses the pull repeat on the family clock to repeatedly call slow moving genteel guests to table for tea. From *Ree's Clocks, Watches, and Chronometers 1819-20* we get the following reference: "The next invention worthy of

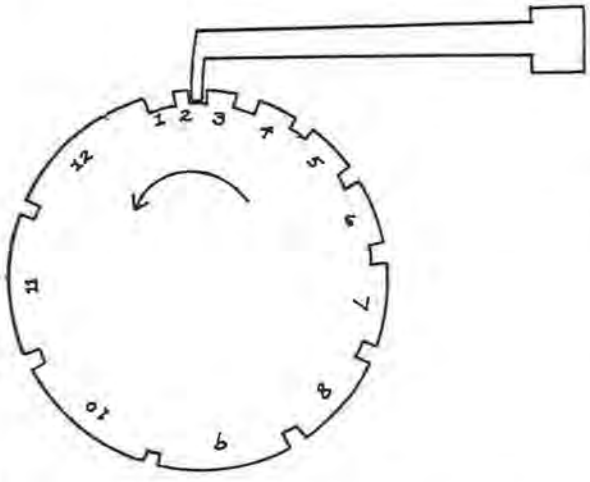
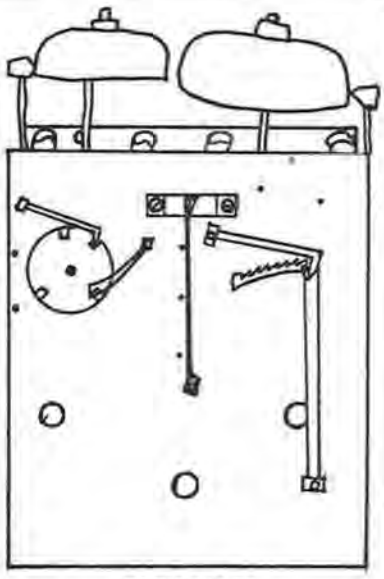


FIGURE 1. Illustrates how the locking plate is a progressive device incapable of the repeat function.



FIGURE 2. Basic configuration of rack and snail as it finally evolved. By virtue of its design, it can be repeated.



BACK PLATE

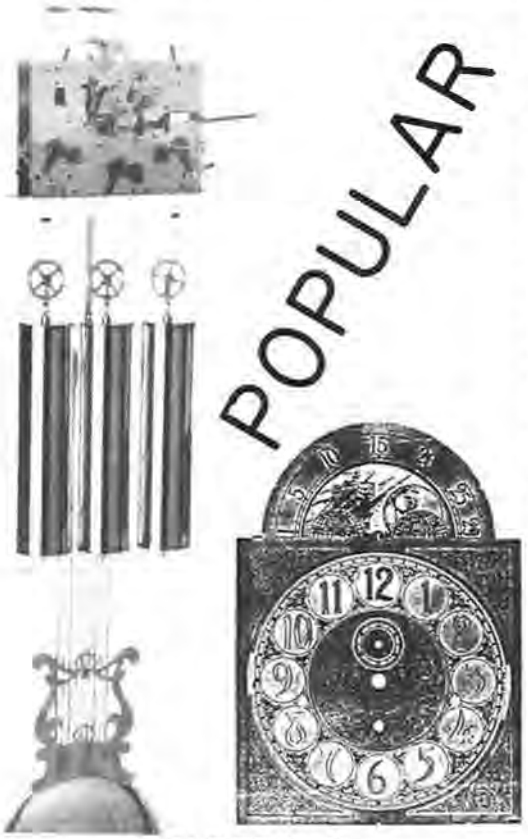
FIGURE 3. An example of a movement employing both rack and locking plate simultaneously, circa 1700.

notice in clockwork was the mechanism of repetition, by means of which the clock is made to obey the pull of a person in bed who, from any cause, may wish to know the hour which was last struck . . . " Indeed, evidence of this more practical use is sometimes found on longcase clocks where an arrangement has been made to allow the owner to pull the repeat cord from his bedside in an upper floor bedchamber. A hardwood pulley is mounted on an iron spike embedded in the seat board, the repeat cord is looped though the pulley to direct it upward to the room above.

Another and probably most likely fact that should not be overlooked is that the clockmaker himself probably made his pieces more appealing and saleable with the inclusion of a craftily constructed repeat mechanism that would promote his reputation among his peers and the public. This would also explain the more complicated and more finely tuned repeat mechanisms, which ultimately would result in the repeating watches (of which Daniel Quare, 1648-1724, is credited with making the first). The need and desire to enable clocks to repeat, then, existed during the last half of the 17th century. But before this could be accomplished, a different system of striking would need to arise because the device in use on striking clocks since the beginning of mechanical timekeeping could not repeat.

DIFFERENCE BETWEEN COUNT WHEEL AND RACK

The locking plate (also known as the count wheel) had been used for centuries and except for a few notable variants it was the sole form of striking work. Examining the details of its function (see Figure 1) it becomes obvious that it is useless if one wants it to repeat. It is a progressive device, in that once having struck, say one o'clock, its only possible function next is to strike two o'clock and so on through all the hours. A method was needed to allow the strike train to continually repeat the number of blows as many times as necessary. The device that filled the bill perfectly was the rack and snail (see Figure 2). According to William Derham, author of *The Artificial Clockmaker*, 1696, the Reverend Barlow is credited with the invention of the rack in 1676. Some experts have now discounted this. Whether the details are solid fact or not, what is important to note is that the first application of the rack was meant solely for use in repeating work and only later was it employed as a controller for the strike train. According to the authors of *Early English Clocks* (Dawson, Drover, and Parkes 1982): "The earliest instance of its use known to the writers is in a clock by Joseph Knibb, which has a tic-tac escapement and Roman striking. The repeating mechanism is crowded into the top right-hand corner of the plates and is of the type which continued to be used in timepiece movements where all the blows are provided by the separate mechanism. These clocks had count wheel striking at this time, and the number of blows struck by the repeating train is controlled by a snail and the quarter blows are determined by a face cam on the minute wheel and a pumping piece." In other words, for a time clocks were being produced that simultaneously employed both count wheel and the rack and snail (see Figure 3); however, it was spring clocks that made use of the rack before weight driven clocks. Furthermore, it is interesting to note that on some of the earliest examples of clocks that emloyed the rack for hourly striking it was mounted between the plates on its own arbor. In fact, on these examples only the snail and rack tail are mounted on the front plates. The gathering of the rack was performed by a portion of the third, or pallet wheel arbor, shaped in the form of a gathering pallet. (Restorers familiar with the strike



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train of the Morbier clocks will note the similarity.) When the rack had been fully gathered, a projection on the back of the rack obstructed the progress of the train by coming against a pin mounted on the third wheel (see Figures 4 and 5).

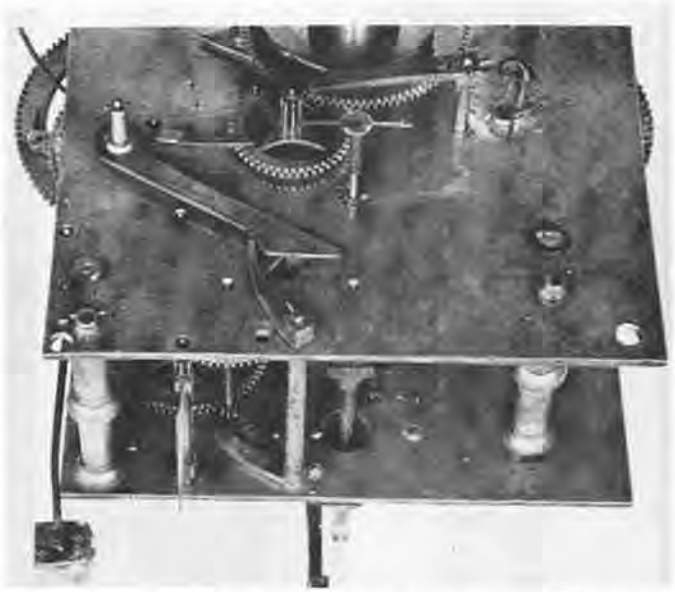


FIGURE 4. A longcase clock by Henry Stocker, circa 1700, clearly shows an internal rack gathered by the adjacent third wheel arbor. The rack tail is visible on the front plate.

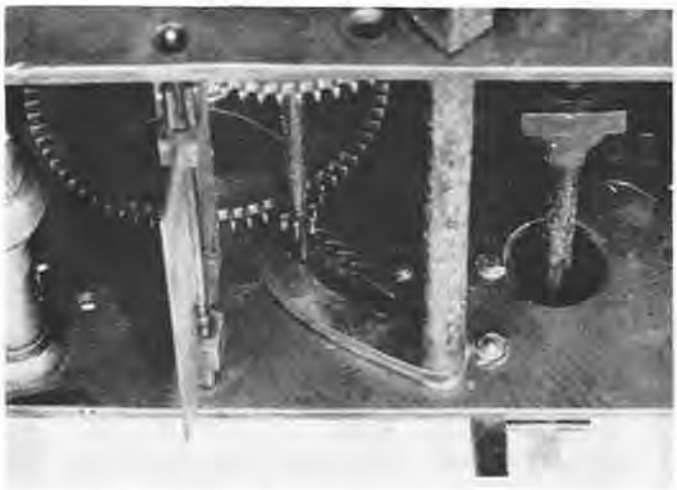


FIGURE 5. Close-up of #4 movement.

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THE VARIATIONS

Once the usefulness of the rack became known to clockmakers of the day for both repeating work and normal strike functions it was employed in a mind-boggling array of variations (see Figure 6). As mentioned above, some longcase clocks were known to have had repeat work. A longcase movement that was specifically designed to repeat (as distinct from those that merely used the rack and snail) can be identified by the presence of a leaf spring mounted on the front plate which extended above the lifting piece, at the end of which a hole was drilled to tie the repeat cord to. This spring insured the return of the lifting piece to be ready when the time came to strike. Very often this spring has been removed by 'restorers' of the past. The one-time presence of the return spring on the front plate is revealed by an empty screw hole and an empty steady pin hole.

In order to repeat the latest hour accurately as close to the new hour as possible some makers employed a star wheel and jumper. This arrangement meant that the snail remained motionless throughout the hour (being free from the hour wheel) and was only advanced when indexed by a pin mounted on the cannon pinion. This usually takes place just a few minutes before the new hour so that during the greater part of the hour the latest hour is sounded.

Repeating work on clocks can be looked at as being in one of two categories. Either the repeat mechanism has its own source of power separate from the power source of the striking train or it uses the power of the strike train. This holds true whether the clock is spring driven or weight driven. In the first case, power is sometimes derived from

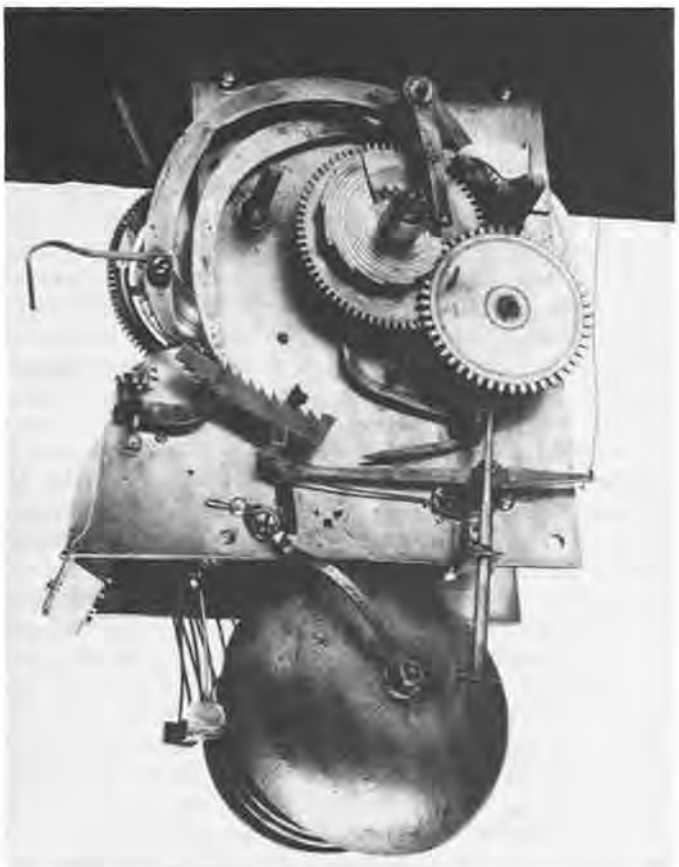


FIGURE 6. Illustrates the imaginative, if not bizarre, forms the rack took, here on a movement by Jos. Cobham, circa 1725.

a small coiled spring housed in a spring box, or alternatively from one or more sturdy leaf springs. In both instances the charging or winding of the springs is done in the act of pulling the repeat cord. When the repeating is powered by the strike train, enough reserve power is allowed at the planning stage to ensure enough to last throughout the winding period. For instance, the strike weight on a longcase clock with repeat work will not fall at the same rate as the time weight if the repeating mechanism is not used.

It was largely English makers who, during the last quarter of the 17th century, introduced quarter repeating spring clocks. This means that when repeated the time is announced to the nearest quarter hour. At first the quarters were struck on a single bell, one of a higher pitch than the hour bell. At a later point the quarters were struck employing two bells (referred to as ting-tang), but always of a higher pitch than the hour bell. On some later clocks the quarters were sounded on a nest of several bells (often six). In this form, for each quarter past the hour a descending series of notes was sounded followed by the hour bell. It is this period where the incredibly varied and complicated use of the rack and snail in repeat work is most evident.

RESTORING MISSING OR INCOMPLETE REPEAT WORK

This variety and complexity makes the restoration of pull repeat work quite a challenge to today's restorer. Luckily there are some good reference books to consult such as *Hobson's Choice* by Charles Hobson (an English restorer who documented repeating work on clocks that passed through his hands). Another source of information is Thiout's *Traite de l'Horologerie* published in Paris in 1741. Using clear line drawings, it describes a large number of clock mechanisms. The above mentioned book *(Early English Clocks)* describes a large and varied cross section of repeat mechanisms.

The clock movement itself can supply clues as to how missing components might have been shaped. For example, scratches and rub marks on the plates sometimes indicate places where spring boxes or detents made contact. Other clues the restorer can use are features that are an integral part of an existing component, that is for example, a gathering pallet-shaped protrusion formed from an arbor that would have interacted with a rack which pivoted between the plates. Empty holes (the boon and bane of clock restorers!) are often clues that can lead to a plausible theory. Viewing other pieces made by contemporaries of the maker in question can lead to solutions. One very important point to make here is that it is important not to alter the clock in any way merely to satisfy a pet theory. Drilling a hole in a plate, for example, where one never existed is no answer. This practice makes the job of subsequent researchers all the more difficult. Probably the single most important concept to stress is certainty of the authenticity of the components being replaced. This is easier said than done, but in the interest of an honest restoration, there is no other choice.

AN EXAMPLE . . . THE HOOGENDIJK RESTORATION

By way of example, next time a pull repeat restoration will be explained and the research and fabrication process will be dealt with.



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Airplane Clock, Waltham Models XA and XX

37s, 8-Day



Figure 1. Waltham airplane clock.



Figure 2. Back plate view of Waltham's 37 size, 8-day 7, 9, 15 jewels airplane/automobile clock movement.

Both of these models were fitted with Waltham's famous 37 size, 8-day clock movement (Figure 2) and housed in a black metal, four-lobe, 3-1/8-inch AN aircraft case. This clock was attached to the aircraft's instrument panel so the pilot could note the mean time at a glance and not for aero-astronomical navigation. The metal dial was black with luminous hands, dial graduations, and numerals. A small seconds dial was located just below the 12 o'clock mark. The glass crystal was retained in a knurled, screw-type bezel. The winding and setting knob was located beneath the case at the 6 o'clock position.

The XA model was subjected to a more difficult performance test since it had to be able to perform accurately under extremely difficult environmental conditions such as vibration, exposure, and sudden and extreme barometric and temperature changes commonly encountered in aircrafts. Since this instrument had these capabilities, it became a standard aircraft timepiece for the U.S. Army Signal Corps, the U.S. Army Air Corps, and the U.S. Navy Air Service. Also, because of its excellent performance (time wise) and the need for accurate time to operate its telephone switchboards, this model was used extensively by the American Bell Telephone Company.

In 1927, the XA model sold for $36.50, while the XX model was priced at $25.00 since it was not subjected to such a rigid test.

The model XA Waltham airplane clock became well-known in aviation circles, not just because of its fine performance, but for its use during several historic flights in man's conquest of the air.

The XA was selected as one of the few instruments to be mounted on the instrument panel of the *Spirit of St. Louis*, and used by Charles A. Lindbergh during his famous solo transatlantic flight May 20-21, 1927 from New York's Roosevelt Field to LeBourget Field on the outskirts of Paris.

It was also carried on the *Southern Cross*, the first U.S.-Australia Pacific flight. On May 31, 1928, Sir Charles Kingsford Smith, highly skilled and noted Australian pilot, accompanied by Captain Charles T. P. Ulm, co-pilot, and two Americans, took off from Oakland, California in the Fokker trimotor monoplane *Southern Cross*, flying via Hawaii and the Fiji Islands to Brisbane, Australia.

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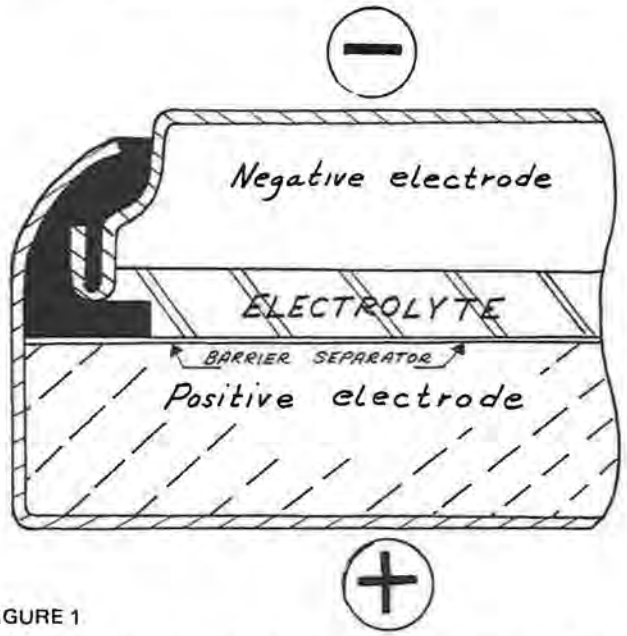


FIGURE 1

MERCURY AND SILVER CELLS—The anode or negative pole of the cell is composed of zinc amalgam in both mercury and silver cell types. The electrolyte is a solution of caustic soda or caustic potash. The cathode of mercury cells is mercury oxide and in silver cells it is a monovalent silver oxide or bivalent silver oxide.

Considering the many millions of cells produced at an incredibly low cost per cell, the extreme high quality of this product is amazing.

Sometimes cells will leak. The aqueous electrolyte easily penetrates the slightest gaps and is very difficult to contain in a closed space. Because the chemical elements used in cells are highly active, electrolyte leakage can and does cause serious corrosion and chemical burn problems in electronic movements. This is seen as holes burned through insulators and chemical burn residue seen on cells. Spent or discharged cells should be removed from electronic movements. Because of internal pressures, weak cell seals can and do break down to the point where they seriously contaminate and harm the host movements.

Unlike silver oxide cells, the cathode of a lithium cell as well as the elctrolyte are manufactured from different materials of different electrical potentials. This is evident in the fact lithium cells are produced in 1.5 volt and 3 volt types.

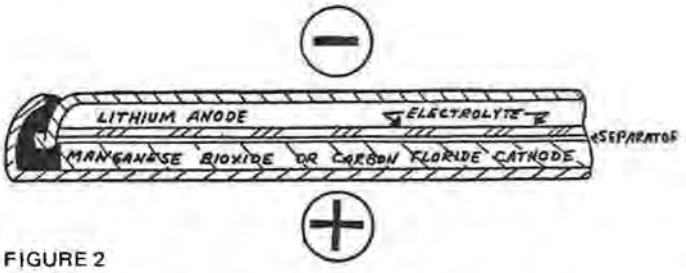


FIGURE 2

LITHIUM CELLS—Because of the low conductivity of the electrolyte in lithium cells these are made with large anode and cathode surface areas to facilitate the necessary difference in cell positive/negative potential. The larger the area the more negative electrons and positive ions available on the cell surface areas. Other chemical materials are also used for the cathode than manganese bioxide and carbon flouride.

Research has now progressed to the point where a solid electrolyte is replacing a liquid one. The advantages of lithium cells over silver oxide cells are: (1) the stored energy within the lithium cells is greater; (2) non-aqueous electrolyte has a much lower penetrating ability, making it far easier to effect a seal on these cells; (3) the electrolyte is less corrosive and in the event of leakage will do less damage; (4) the self-discharge rate is very low; (5) lithium cells have a shelf life up to three times longer than silver oxide cells; and (6) the natural built-in resistance of lithium cells is not greatly affected by temperature.

The major problems (at present) with lithium cells is high internal resistance and the electrolyte having a low conductivity. This feature is being compensated by fabricating thin cells of large diameter. Also, the deliverable voltage and internal resistance varies during the working life of this cell.

In spite of great progress made in cell sealing, there is still some isolated cases of cells physically breaking down. In some cases, this can create serious corrosive problems within the host movement. This corrosiveness is caused by the electrolytes in silver and mercury cells. This leakage appears as salting between the cell seals and is responsible for the corrosive action.

There is a distinct electrical attraction between the

negative electrode of the cell and adjoining metal components of the movement other than the designed voltage potential of that cell.

Corrosion will happen more readily at higher humidity levels and high temperatures. It is not unusual when changing cells in a movement to see a residue, generally wet, in the cell well in the movement and a corroded, to some degree, negative cell strap or contact. These areas of wet leakage MUST be cleaned away; if necessary, even to replace the affected cell straps.

All cells are subject to either an accidental or natural self-discharging effect due to the natural internal chemical reactions that transpire. Accidental self-discharge results in a sudden total loss to the cell of electrical potential. Natural self-discharge is a gradual and steady loss of cell electrical potential. This is caused by: (1) parasitic reactions with its surrounding environment; (2) corrosive effects reduce the quantity of useful, active chemical material within the cell; or (3) electrolyte leakage, which causes external and internal short circuits. In internal short circuiting, the barrier separator plays a very important role. As said earlier, it (1) prevents the chemical migration and resulting self-destruction of cell materials; and (2) the separator is a seal between the electrolyte and the cathode.

The natural loss of cell potential in a silver oxide cell is directly related to the surface area of the separator material. In other words, the larger the cell diameter the greater the loss of cell potential.

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7.9 mm	2.7 mA
9.5 mm	3.6 mA
11.6 mm	5.4 mA

Again, self-discharge characteristics in terms of cell thickness:

Cell Thickness	Loss Percentage Per Year
1.6 mm	18-21%
2.1 mm	13-15%
2.6 mm	8-10%
3.1 mm	6 - 8%
3.6 mm	5 - 6%

These self-discharging characteristics can be minimized by storing in temperatures not exceeding 20° C and humidity levels of less than 50%.

On stored movements it is wise to remove cells from electronic movements to prevent leakage damage. Watches in inventory for a year or more have radically reduced effective cell life and will necessitate a consumer cell change prematurely. It is best to remove the fitted cell on stock arrival and fit a fresh cell on watch delivery.

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QUARTZ CLEAN INSTRUCTIONS

QUARTZ MOVEMENT PREPARATION:

To clean a quartz movement, remove the coil, circuit board and any plastic wheels or retainers mounted in the movement. THERE IS NO NEED TO DISASSEMBLE THE GEAR TRAIN. Grasp the metal mainframe of the movement with the movement grippers or a sturdy pair of metal tweezers. Do not hold the movement with your hands. Be cautious not to grasp fragile portions of the movement.

AIR-BRUSH PREPARATION:

Open the valve on the propellant can or turn on air compressor. Press the trigger of the air-brush straight down to release only air (fig. 1). As the trigger is drawn back, while still depressed, solvent is released.



fig. 1

MOVEMENT CLEANING:

While holding the movement at arms length with the movement grippers, press down the trigger of the air-brush (fig. 2) and pull it all the way back for maximum solvent spray pressure. Hold the movement 1/2 INCH IN FRONT OF THE AIR-BRUSH NOZZLE. Rotate the movement in order to spray into it from all angles. For approximately SIX SECONDS, spray directly into the gear train of the movement aiming into the wheels of the gear train through pivot holes on both sides of the main plate. IMMEDIATELY BLOW OFF any remaining solvent by pushing the trigger forward and pressing straight down. Be careful not to pull back on the trigger during the drying procedure. Blow the solvent out of the movement. Do not allow the solvent to evaporate from the movement. IT MUST BE BLOWN OFF to carry away the dissolved contaminants. If the movement does not run after cleaning, disassemble the gear train and look for damaged wheels or obstructions, especially on the rotor.



fig. 2

LUBRICATION AFTER CLEANING:

Quartz movements require little or NO lubrication. All cleaned movements should be electrically tested for their low voltage capabilities. Movements that run at 1.2 volts or below do not require lubrication. Setting mechanisms occasionally require lubrication, especially the cannon pinion clutch mechanism. Lubricate sparingly, if at all. Excess lubrication can inhibit movement performance.

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SHOP TALK



Wes Door, CMW

A Repair or a New Watch?

Repair? Being watchmakers we are capable of repairing just about any watch that our customers decide to bring to us.

New watch? If the repair cost will be excessive, then we may sell a new watch instead of repairing the old one.

Retrofitting? If the watch is quite new or an old watch "full of sentiment," it may be easier to sell a new module. Retrofitting is a very viable method and is an option between repairing the customer's watch and selling a new one. It is important to reach the proper solution as to whether we should repair, retrofit, or sell a new watch.

Generally our customer will depend on our suggestions or at least they will listen to us and then make their decision based on our recommendations. We must be honest with our answers and not try to sell a new watch to each customer, although this sounds like a good idea and we could use our bench just to adjust watch bands. Seriously, most of our time will not be spent on a new watch sale, but rather on either repairing or retrofitting.

Most of us are going through a self-taught training program at our bench and, in so doing, we are gradually learning how to repair quartz watches. We have equipment to make some of the preliminary tests necessary to decide (within a few seconds) if our problem is electronic or mechanical. This is probably one of the most important decisions that we must make and we find ourselves doing this several times a day. To be proficient we should be able to examine a customer's watch while they wait and advise them of the cost of repairs so they can decide immediately if they want to leave the watch for repair.

Since most repairs are battery replacements, we should start by checking the cell in the watch. It is helpful to first check the old cell. If it is dead and/or very low under load test condition, then replace it with the proper new cell. It is a good idea to take an extra five seconds and also test the new cell before installing it. Now, we must be sure that the watch runs. We may have some sort of a tester, maybe one that beeps to indicate that there is an impulse. This tells us that the electronic system is O.K. In addition to this we must observe the hands to be sure they are turning. If the watch has a sweep second hand, it is easy to see it turn as it advances once each second. If there is no sweep hand, then we must watch the minute hand very closely and we may have to wait for a much longer period of time. The longer the wait between impulses, the easier it is to see the minute hand jump. For instance, with an impulse every 30 seconds it is easy to observe the very large ½ minute jump that the minute hand makes. If we see the hands jump or turn we can be hopeful that we have completed our work and have repaired the watch properly.

If there is any question at all that this watch may come back later, then we should mention this possibility to our customer. It is better to tell them that the old battery wasn't "down" that far, but the meter showed that the battery *probably* was the problem. However, if the watch does stop again more work will be necessary. This approach helps us in several ways. It protects us in case the watch does stop and assures our customer that we want the watch returned for future repairs. So many times when a watch stops after putting in a new cell, a customer will exclaim: "You just put a battery in may watch and it already stopped. I guess you didn't use a very good battery."

If we test the watch and it has an impulse (showing us that the electronic portion is O.K.) but the hands do not turn, then it probably has a blockage in the train from dirt or the train wheel bearings are dry. This is getting more common and we must quote accordingly. Taking train wheels out and other disassembly work seems to take more time than the conventional mechanical watches, probably because we are not used to working on quartz and some of the train wheels are very small. We also have to learn a little more about where some of those funny-looking parts go. I shouldn't say "funny-looking," but you know what I mean, some parts are just hard to figure out the first few times.

Maybe because of this some feel that we should retrofit every chance we get. Sometimes this does make sense, since the price of many modules is less than the price of cleaning the watch. I think we should be careful and not get too "exchange happy," at least not until we have had a lot of practice learning how to repair quartz.

We have equipment to make preliminary tests and we have discussed the necessity of being able to make a quick test to see if our problem is electronic or mechanical. Practice makes us more efficient and soon we will be able to increase our speed and thereby make a fair wage.

As on mechanicals, quartz watches (analogs) require replacing the crystals, stems, crowns, etc. There are some differences which we must learn. The stems in quartz watches generally all snap into place without setting parts shifting out of place, which is a usual occurrence in older mechanical watches. However, if a stem breaks we might need to disassemble in order to remove the old broken stem. We also need a good assortment of quartz crowns which includes the newer, smaller tap sizes including taps 11, 12, and 13.

There are many quartz watches that are well worth repair and others that are worth retrofitting. With some of the low grade watches it is sometimes better to just sell a new watch. This is for us to decide with our customer.

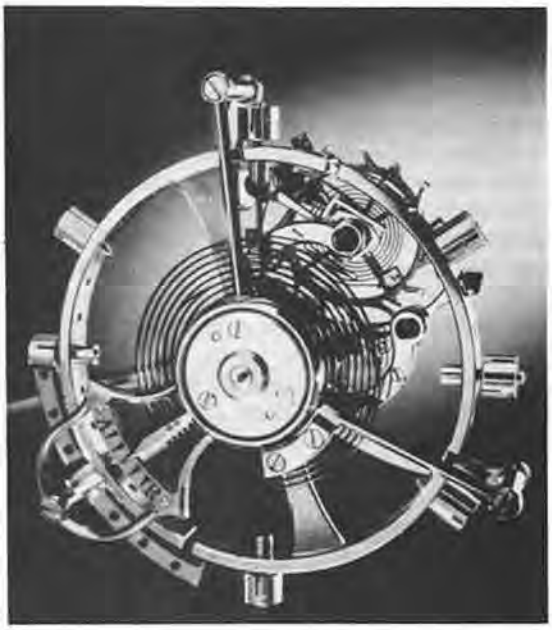
Quartz watches are getting easier to repair all the time. The more we repair them, the easier they get. Don't you agree?

HOROLOGICAL SHOWCASE

GOLD CASED TOURBILLON
BY DEREK F. PRATT

This month's feature from an "Exhibition of British Clock & Watchmaking Today" is by Derek F. Pratt. It is a gold cased tourbillon with silver engine-turned dial indicating dead seconds. The carriage contains a one second remontoire, the functions of which are to isolate the carriage wheel train and to achieve the condition of a stationary carriage during impulse to the balance. The watch was commissioned by Urban Jurgensen & Sonner, Copenhagen.





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Part XXXIII

CALCULATING FOR MISSING WHEELS AND PINIONS

When restoring antique watches, it is very important that the watchmaker be able to calculate for missing wheels and pinions. This is to determine the number of teeth or leaves the missing members must have for the watch to keep correct time when the balance wheel makes a given number of vibrations per hour.

Some older 18 size American watches have slow trains which have center wheels with 64 teeth and center pinions of 10 leaves. The same make, size, and models were also made with fast trains that have center wheels with 80 teeth and center pinions with 12 leaves. Therefore, if an 18 size American watch is being restored which has a missing center wheel and pinion, then it may be necessary for the watchmaker to calculate the train to determine whether the watch has a slow train or a fast train in order to locate or make a new center wheel and pinion.

Figure 1 shows a watch train layout which has a missing center wheel and third pinion. This train is for a watch which beats 18,000 times per hour.

PROBLEM NUMBER 1

For calculation purposes we will designate the missing center wheel with an x and the missing third pinion with a y. All of the other members of the train show their numbers of teeth and leaves. The problem is stated and solved in the following manner:

$$18{,}000 = \frac{x \times 75 \times 60 \times 15 \times 2}{y \times 10 \times 6} = \frac{2250x}{y}$$

$$18{,}000 = \frac{2250x}{y}$$

$$\frac{18{,}000}{2250} = \frac{x}{y}$$

$$\frac{x}{y} = 8. \text{ (8. is a ratio)}$$

When different numbers are multiplied by 8, we find different combinations of center wheels and third pinions which would be useable with the other wheels to cause the watch to keep the correct time. Example:

PINIONS	WHEELS
6 X 8 =	48
7 X 8 =	56
8 X 8 =	64
9 X 8 =	72
10 X 8 =	80
11 X 8 =	88
12 X 8 =	96

PROBLEM NUMBER 2

Figure 2 shows an example of the second problem. In this case, the third wheel and pinion are both missing. The problem is stated and solved in the following manner.

$$18{,}000 = \frac{64 \times x \times 60 \times 15 \times 2}{y \times 10 \times 6} = \frac{1920x}{y}$$

$$18{,}000 = \frac{1920x}{y}$$

Figure 1

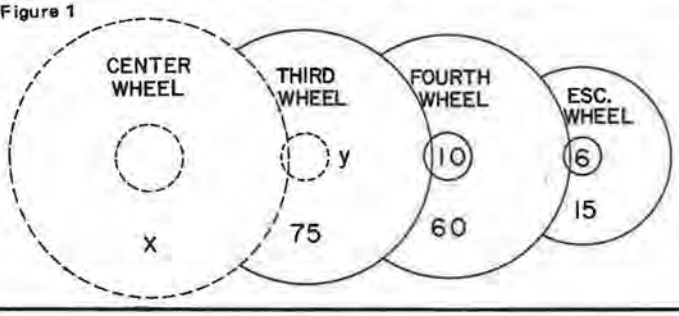


Figure 2

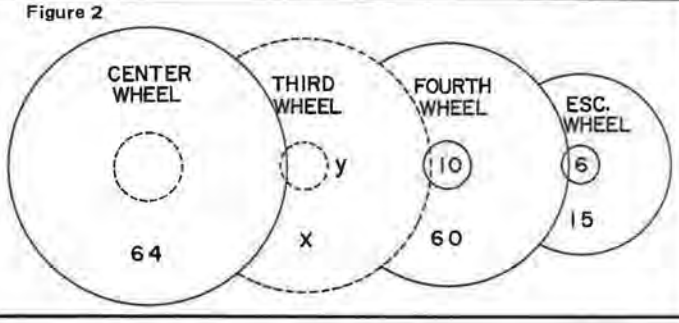


Figure 3

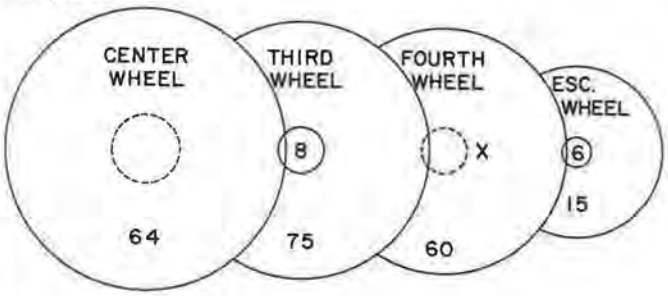


Figure 4

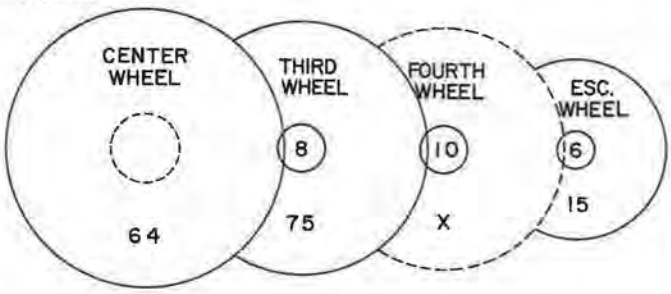
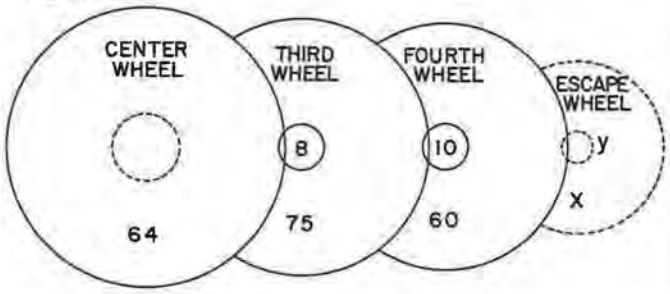


Figure 5



$$\frac{18,000}{1920} = \frac{x}{y}$$

By reducing these two figures to their lowest terms, we would have:

$\frac{75}{8}$ = 75 teeth for the missing third wheel and
8 leaves for the missing third pinion

PROBLEM NUMBER 3

Figure 3 shows an example of the third problem. In this case, the fourth pinion is missing. The problem is stated the following way:

$$18,000 = \frac{64 \times 75 \times 60 \times 15 \times 2}{8 \times x \times 6} = \frac{180,000}{x}$$

$$18,000x = 180,000$$

$$\frac{180,000}{18,000} = x$$

x = 10 (leaves for missing fourth pinion)

PROBLEM NUMBER 4

Figure 4 shows the layout for problem four. In this case, the fourth wheel is missing. The following method is used to state and solve the problem.

$$18,000 = \frac{64 \times 75 \times x \times 15 \times 2}{8 \times 10 \times 6} = 300x$$

$$18,000 = 300x$$

$$\frac{18,000}{300} = x$$

x = 60 (teeth for the missing fourth wheel)

PROBLEM NUMBER 5

Figure 5 shows the layout for problem five. In this case, the escape wheel and pinion are both missing. The problem is stated and solved in the following manner.

$$18,000 = \frac{64 \times 75 \times 60 \times x \times 2}{8 \times 10 \times y} = \frac{7200x}{y}$$

$$18,000 = \frac{7200x}{y}$$

$\frac{18,000}{7200} = \frac{x}{y}$ Reduced to its lowest terms, we would have:

$$\frac{x}{y} = \frac{5}{2}$$

When these two figures are multiplied by 3, we will obtain the numbers for the missing escape wheel and pinion. Example:

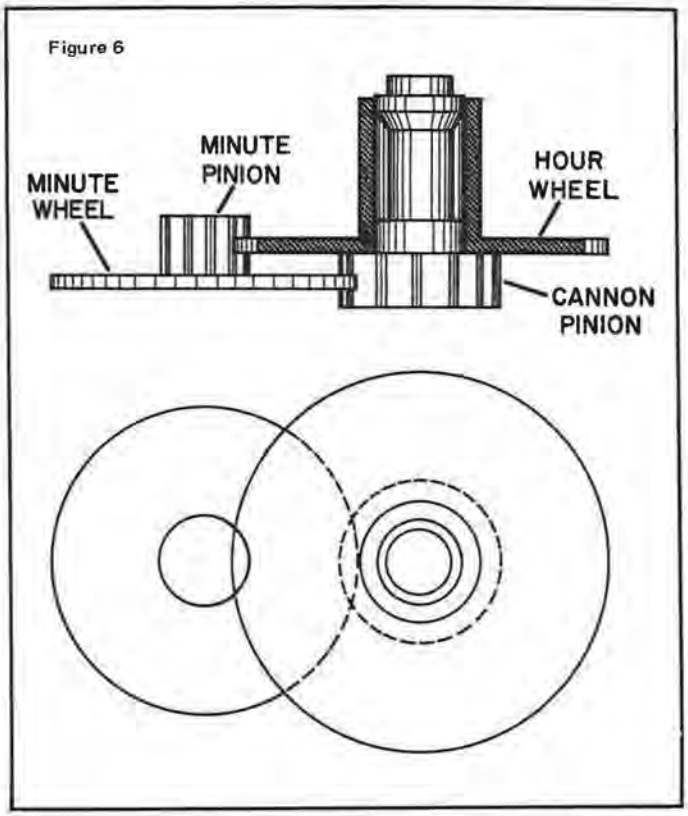
$\frac{5 \times 3}{2 \times 3}$ = 15 teeth for the escape wheel
6 leaves for the escape pinion

CALCULATING DIAL TRAINS

The most common dial train is one which is designed for a 12-hour dial. This dial train has a 12:1 ratio. The minute hand makes 12 revolutions to 1 of the hour hand.

Some of the early watches had 10-hour dials, which have a ratio of 10:1. This type of watch is called a decimal watch.

Figure 6



In the 1940s, watches were made for the U.S. government with military dials or 24-hour dials. The dial trains in these watches have a ratio of 24:1. The minute hand makes 24 revolutions to one of the hour hand.

Figure 6 shows a dial train layout. When the watch is running, the cannon pinion drives the minute wheel and the minute pinion drives the hour wheel. On the other hand, when the watch is set, the minute wheel drives the cannon pinion and, at the same time, the minute pinion drives the hour wheel. When a watch has a 12-hour dial, the total dial train ratio must be 12:1. If the ratio between the cannon pinion and the minute wheel is 3:1, then the ratio between the minute pinion and the hour wheel must be 4:1 because 3:1 X 4:1 = 12:1. The formula for calculating dial trains is:

$$\text{Ratio} = \frac{\text{Minute Wheel Teeth} \times \text{Hour Wheel Teeth}}{\text{Cannon Pinion Leaves} \times \text{Minute Pinion Leaves}}$$

If we substitute figures in the formula, we would have:

$$\text{Ratio} = \frac{36 \times 32}{12 \times 8} = 12 \text{ or } (12{:}1)$$

Any combination of figures that will give a 12:1 ratio can be used with a 12-hour dial. Table 1 shows some gear combinations that are suitable to be used with a 12-hour dial.

Table Number 2 shows some gear combinations that are suitable for a 24-hour dial. A gear combination that is suitable for a 24-hour dial must have a ratio of 24:1. Example:

$$\text{Ratio} = \frac{\text{Minute Wheel} \times \text{Hour Wheel}}{\text{Cannon Pinion} \times \text{Minute Pinion}}$$

Substituting figures:

$$\text{Ratio} = \frac{32 \times 42}{8 \times 7} = 24 \text{ or } (24{:}1)$$

Table Number 3 shows some dial train gear combinations for watches which have 10-hour dials. When calculating dial trains for these watches, the total ratio must be 10:1. Example:

$$\text{Ratio} = \frac{\text{Minute Wheel} \times \text{Hour Wheel}}{\text{Cannon Pinion} \times \text{Minute Pinion}}$$

TABLE NUMBER 1

(FOR 12 HOUR DIAL)

Cannon Pinion	Minute Wheel	Minute Pinion	Hour Wheel	Cannon Pinion	Minute Wheel	Minute Pinion	Hour Wheel
8	24	8	32	12	24	10	60
8	24	7	28	12	30	10	48
8	20	10	48	12	36	12	48
8	24	10	40	12	48	14	42
8	32	10	30	12	48	16	48
10	24	6	30	12	48	10	30
10	24	8	40	12	45	15	48
10	30	8	32	14	32	8	42
10	30	10	40	14	35	10	48
10	25	10	48	14	42	12	48
10	40	10	30	14	42	10	40
10	40	12	36	16	32	8	48
10	30	12	48	16	30	10	64
10	40	14	42	16	48	12	48
10	40	15	45	18	36	8	48
12	24	6	36	18	54	10	40
12	24	7	42	20	40	10	60
12	36	8	32	20	60	12	48
12	24	8	48	24	48	10	60

TABLE NUMBER 2

(FOR 24 HOUR DIAL)

Cannon Pinion	Minute Wheel	Minute Pinion	Hour Wheel
8	32	7	42
8	32	8	48
10	40	7	42
10	40	8	48
10	40	10	60
10	48	10	50
12	48	10	60
14	56	10	60
14	56	12	72

TABLE NUMBER 3

(FOR 10 HOUR DIAL)

CANNON PINION	MINUTE WHEEL	MINUTE PINION	HOUR WHEEL
8	20	7	28
8	20	8	32
10	25	8	32
10	20	8	40
10	20	10	50
10	25	10	40
12	24	10	50
12	25	10	48
12	32	12	45
14	40	12	42

Substituting figures, we would have:

$$\text{Ratio} = \frac{20 \times 28}{8 \times 7} = 10 \text{ or } (10{:}1)$$

CALCULATING FOR MISSING DIAL TRAIN MEMBERS

When restoring antique watches, it is quite often found that one or more members of the dial train are missing. This requires that some calculations be done to find the number of teeth or leaves the missing members must have to be assured that the hands will turn in the proper relationship to each other and keep the correct time. The rules used for calculating for a missing wheel or pinion in the dial train are as follows:

1. To find the number of leaves in a missing pinion in the dial train of a watch with a 12-hour dial, use the following formula:

$$\text{Missing Pinion} = \frac{\text{Minute Wheel Teeth} \times \text{Hour Wheel Teeth}}{\text{Leaves of Known Pinion} \times 12}$$

2. To find the number of teeth in a missing wheel in the dial train of a watch with a 12-hour dial, use the following formula:

$$\text{Missing Wheel} = \frac{\text{Leaves in Cannon Pinion} \times \text{Leaves In Minute Pinion} \times 12}{\text{Teeth of Known Wheel}}$$

Note: If one is calculating for missing wheels and pinions for a 24-hour dial, then 24 would be used in the formula instead of 12. Likewise, if one is calculating for missing gears for a 10-hour dial, then the 12 in the formula would be replaced by 10.

The following examples are used to show how the formulas are used:

1. Suppose we have a cannon pinion missing in a watch which has a 12-hour dial. The minute wheel has 36 teeth, the hour wheel has 32 teeth, and the minute pinion has 8 leaves. How many leaves must the cannon pinion have? We would use Formula Number 1 in this case.

$$\text{Missing Cannon Pinion} = \frac{36 \times 32}{8 \times 12} = 12 \text{ leaves}$$

2. An hour wheel is missing in a watch with a 12-hour dial. The minute wheel has 30 teeth, the cannon pinion has 10 leaves, and the minute pinion has 10 leaves. How many teeth must the hour wheel have? We would use Formula Number 2 in this case. Example:

$$\text{Teeth in Hour Wheel} = \frac{10 \times 10 \times 12}{30} = 40 \text{ Teeth}$$

3. A minute wheel only is missing from a watch with a 12-hour dial. The cannon pinion has 10 leaves, the minute pinion has 12 leaves, and the hour wheel has 36 teeth. How many teeth must the minute wheel have? Use Formula 2:

$$\text{Teeth in Minute Wheel} = \frac{10 \times 12 \times 12}{36} = 40 \text{ Teeth}$$

4. A minute pinion is missing. How many leaves should it have if the cannon pinion has 10 leaves, the minute wheel has 30 teeth, and the hour wheel has 48 teeth? We would use Formula Number 1:

$$\text{Minute Pinion} = \frac{30 \times 48}{10 \times 12} = 12 \text{ leaves}$$

CALCULATING DIAL TRAINS will continue next month.

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FORUM

Albert Dodson
CMC

Ralph Geiger
CMW, CMC, CEWS, CMBHI

The FORUM is a column devoted to the discussion and debate of horological piffle, practices, and problems. Comments can be controversial, but should always remain within the bounds of good taste. Responses should be sent to: **AWI FORUM, P.O. Box 11011, Cincinnati, OH 45211.**

DEAN STIRS UP A HORNET'S NEST

Wait a minute, Mr. Armentrout! In response to one of your "pet peeves" (June 1988), those screw-in bushings are one of the greatest inventions of our time. They are fast, easy and simple to install, can be closed and broached open, and when all else fails, nothing compares with the fact that when worn out you can simply unscrew the old and screw in the new . . . within seconds. They even look good. Their selling point ("installed without taking the movement apart") is true, also.

This is not to say that I do not disassemble my movements, for I do. I also hand-clean and inspect every part. But when a bushing is needed—"Presto!" in goes a screw-in bushing.

Not needing to take the movement apart is extremely convenient when the "cheapy" clock enters the shop and/or the customer doesn't want to spend any money (often both). "Presto!"—install a screw-in bushing, a little oil, and you've made the customer happy, as his clock is running again. You have also made a small profit for yourself! Why send him back to the discount store when you can fix it?

Let me close by saying that I will have to agree with other points you mention. Incidentally, I am not affiliated with the folks who make the screw-in bushing system; I'm just a horologist, like yourself, who has found a good thing. Also, thank you, "Forum," for letting me share what I can with my peers.

—Rick Hargraves

I think that some of the people who just want to air their pet peeves should buy a larger pair of shorts, so they are not so irritable, and relax in a chair and write us some good constructive articles and usable tips.

—Ken Leeseberg

We agree, Ken. To clarify our objectives, this column hopes to be an exchange of information and opinions for the purpose of challenging dogma and raising awareness. Petty complaints are useless, but a healthy and hearty discussion could possibly change one's entire outlook. R.G.

Dear Sir:

Qualifications such as CMC and CMBHI are intended to convince the public that the holder knows what he/she is doing. However, after passing their exams, not all people work to the standards so attained. I consider the AWI exams to be basically practical, though one or two of the multiple choice theoretical questions seem unfairly ambiguous.* Although more comprehensive, the BHI exams seem to me somewhat burdened with material which is unlikely to be required by most practitioners.

Considering restorations, I see nothing wrong with braided nylon or monofilament, but Dean Armentrout is aghast at the idea. What would he use on an OG? Catgut doesn't work too well here; it's too springy, and it wasn't used originally, either. Unbraided cables twist, causing the weights to rotate during winding.

I always put springs into barrels by hand—and I would be glad if Dean Armentrout would send me his "pyramided" mainsprings instead of trashing them. I think if he measures the inch-ounce torque of such springs against winder-inserted springs, he will find little or no difference. The weak pyramiding force certainly cannot cause any significant problems when the spring is in the barrel, and I think that inserting the spring by hand is the superior method. To me, most mainspring winders are downright dangerous and I refuse to use one.

As for "ada" pivots and threaded bushings, I heartily agree with Mr. Armentrout; they are creatures that should not have been born. I class them with hole closing punches and center punch merchants who ring pivot holes with destructive pivot scoring pits.

I always teach and apply what I have learned from experience to be sound methods of doing things. I think that AWI should do likewise and for the most part it seems to do so. There has been the odd lapse in *Horological Times*, however, and although I'm no poet:

"I trust I'll never again have to look
at a nut and bolt for a barrel hook."

—John Plewes, CMC

**All of the AWI written exams have been revised and rewritten within the past year. R.G.*

In response to Dean Armentrout's letter:

When an old movement is going to be run by its owner, I believe in using modern materials when they do no damage and improve durability. In particular, I disagree with the continued use of catgut on either weight-driven clocks or those equipped with fusees. Gut failure is common after a period of time and may result in damage that can range from bent teeth and fractured pinions to case bottoms being knocked out or actually disassembled on the wall. Having discussed this with museum curators, I have found that two of the most notable (in this country) use Aramid fibre cable. It is four times stronger than steel by weight, is extremely flexible, will not kink or set into coils like gut or nylon, and can be untangled and reused even if it has become wrapped around the winding arbor off the end of the cable drum.

If a movement was to be displayed without being run, I would say, "Fine, go ahead and make it look authentic." But if the movement is going to be run, let's use the best material for the job to lengthen the working life and prevent any possible damage from cable failure.

"Amen" to Dean's comments on mainspring winders, "ada" pivots, and screw-in bushings.

In response to "A Proper Finish For Clock Plates": The wanton destruction of the surface of clock plates with steel brushes is to be condemned in the strongest possible terms. This is done only with the most callous disregard for the originality and integrity of any clock, and those who do it should be banished from the trade. The careful use of a soft brass bristled brush, by hand, in water-based clock cleaner, will brighten even the most darkened and neglected brass without removing any appreciable metal. If followed with brushing with chalk dust to finish the brightening (as recommended by our late dear friend Otto Benesh), the brightness lasts for years. The customer will see a bright, clean movement, without the destruction caused by a steel brush.

We must always remember, once the original metal is gone or scratched or changed, we can never return it to its original state. Clockmakers in another 200 years will judge us collectively by how well we pass the clocks that cross our benches on to them. The marks from steel brushes will still betray our worst efforts.

David G. Arnold, CMC, CMBHI

(Please turn to page 48)

GOT AN OPINION?

GOT THE FACTS?

WRITE US WITH YOUR THOUGHTS!

WATCHES Inside & Out!

By J.L. Asbrock

QUARTZ WATCH TECHNOLOGY IS ON THE MOVE AGAIN

Just when you thought the technology of quartz watches had leveled off for awhile, the industry has produced several new and exciting innovations. From Seiko comes the development of the Seiko automatically generated quartz watch known as Calibre 7M which contains an Automatic Generating System (AGS). Seiko has also developed the Calibre 5S series which features a sweep second hand that moves in a smooth and continuous manner (see Figure 1A, B and C).

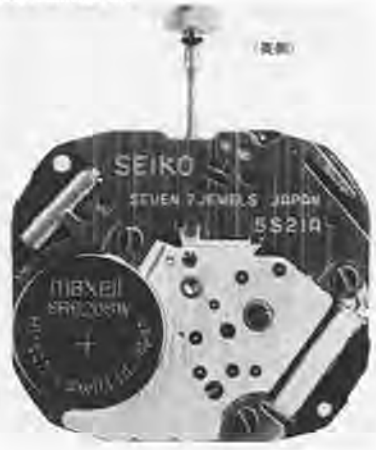
Figure 1A - Calibre 7M



Figure 1B - Calibre 7M



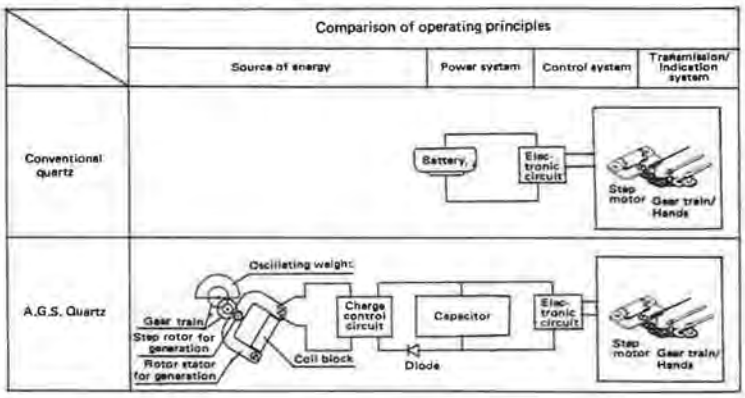
Figure 1C - Calibre 5S



The Swiss Watch Industry has introduced its version of the generator watch; they call it the "Generotor" System. One Swiss firm, Jean d'Eve, recently introduced a Generotor System watch they call "Samara." The Samara is housed in an ultra-modern case. The Samara was recently displayed at the Jewelers of America Show in New York, New York. All three of these new watch innovations are quartz analog watches and maintain the accuracy we have come to expect from quartz watches.

The Automatic Generating System and the Generotor System depend on the movement of its wearer to cause the oscillating weight to turn, just as does the conventional automatic mechanical watch. The rotary energy created by the revolving oscillating weight is converted into electrical energy which actually powers the watch. The obvious advantage is that these watches operate without an energy cell, thus affording quartz watch accuracy with a degree of independence never before found in other quartz watches. The Hattori Seiko Service Bulletin No. 13 compares the operating principles of their conventional quartz watch to those employed in their AGS quartz system (see Figure 3).

Figure 2 - Taken from Seiko Bulletin No. 13.



The oscillating weight is linked through a gear train to the rotor in a miniature generating system. Electrical energy created by this miniature generator is stored in a capacitor which serves the same function as the energy cell in the conventional quartz analog watch. The electrical energy stored in the capacitor powers a step motor quartz movement not unlike one already familiar to today's watchmaker. When the capacitor has been fully charged the electrical energy stored can power the watch for approximately three days (72 hours), even if it remains off the wearer's wrist. The energy level of the watch remains the same if it is worn for approximately 10 hours a day once the capacitor has been fully charged.

Figure 3

WASHING AGENTS AND THEIR APPLICATIONS (INTERNAL PARTS)

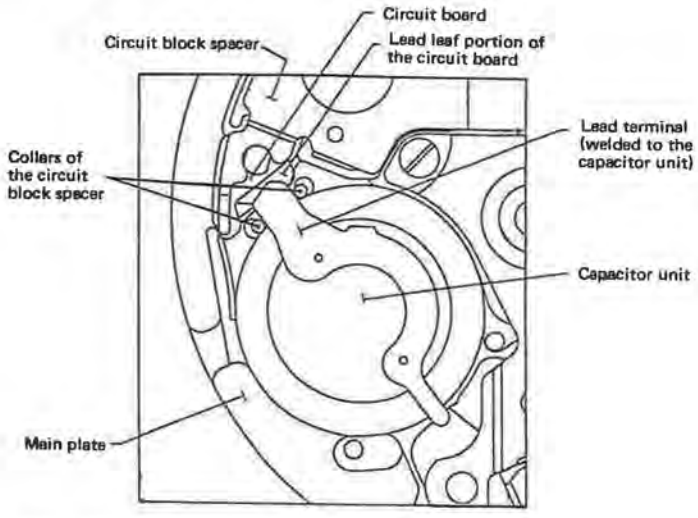
Washing Agent	Trichloroethylene	Benzine	Alcohol	Trichlorotrifluoroethane
Parts				
Plate	No	No	Yes	Yes
Train-Wheel Bridge	No	No	Yes	Yes
Train Wheels	No	No	Yes	Yes
Washers & Frames	No	No	Yes	Yes
Insulators	No	No	Yes	Yes
Reflectors	No	No	No	Yes

The wearer is alerted when the energy stored in the capacitor has reached an extremely low level because the second hand starts moving at two-second intervals. Although in this condition, the watch will run for approximately 12 more hours and will remain accurate while moving at two-second intervals. If the watch does stop because it has used all of the energy stored in the capacitor, swinging it from side to side about 100 times (one minute) will cause it to begin operating again at one-second intervals and provide enough stored energy to operate the watch approximately 24 hours even if it should not be worn.

The Seiko Calibre 7M series can be expected to operate at a monthly rate of plus or minus 15 seconds in normal temperature range. It also provides the same resistance to magnetism, shock, and moisture as conventional quartz analog watches do. Accuracy of the Seiko AGS watch can be measured in the same manner as you would for any conventional Seiko quartz watch, and it can be measured regardless of whether the watch is moving at one or two-second intervals. When measuring for accuracy, the 10-second gate of the quartz tester should be used. It is impossible to obtain a measurement at any other gate.

Because the AGS unit is installed separately from the basic watch mechanism, servicing can be accomplished with comparative ease. The main plate and many parts are made of plastic. However, it is possible to clean them using the same solutions Seiko recommends for such parts in the conventional Seiko watch (see Figure 3 for Seiko's recommendations).

Figure 4 - Taken from Seiko Bulletin No. 13.



Seiko cautions that solvents like trichloroethylene and benzine act upon plastic parts causing serious trouble, such as melting, deformation, and cracking. It is recommended that trichlorotriflouoroethane or alcohol be used when washing plastics. It should also be noted that some casing parts, such as reflectors, may be cracked when washed with alcohol. After washing, the parts should be air dried or dried with the gentle breeze of a hair dryer. Care should be taken that the air produced by the dryer does not become overly hot; if it does, some parts may become deformed.

To remove the crown, the crown should be pulled out to the first click position. When in this position, push the end portion of the setting lever. The crown cannot be removed if it is in the normal or second click position.

The watch is grounded to the case with the spring portion of the circuit block cover (see Figure 4). Care must be taken not to deform this spring. The capacitor unit is installed so that the lead terminal is placed between the collars of the circuit block spacer. This will insure current flow between the lead terminal of the capacitor unit and the leaf portion of the circuit board.

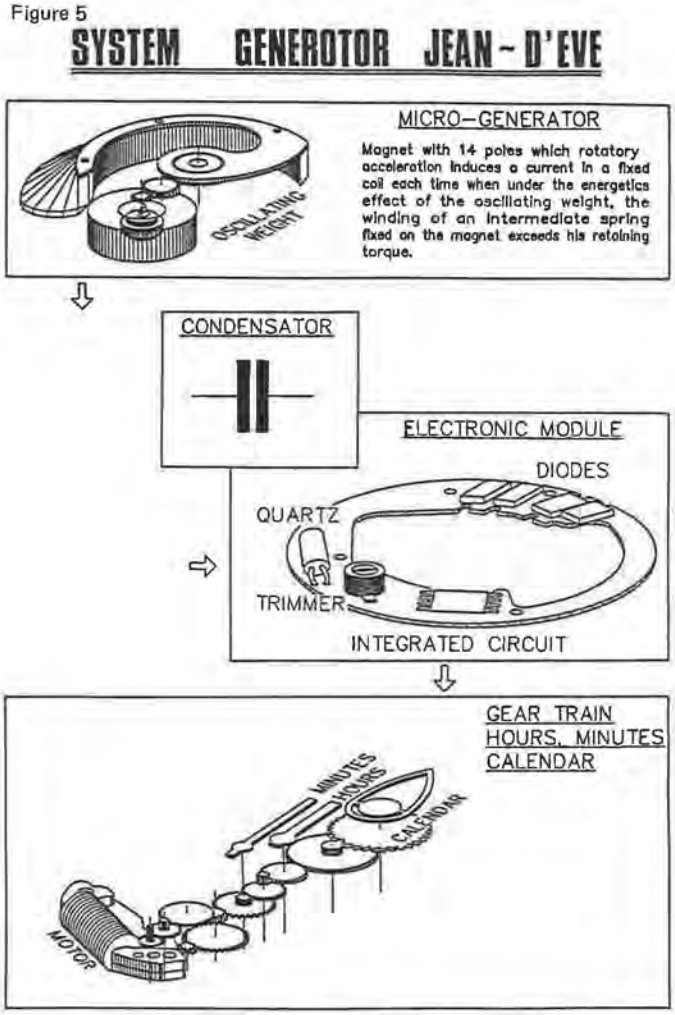
Seiko has developed two calendar calibres of the AGS watch. They are Calibres 7M42A for domestic markets and Calibre 7M22A for overseas markets. They have developed one AGS watch without a calendar, it is Calibre 7M21A and is used in both domestic and overseas markets.

The Swiss Generotor System used in the Samara watch uses basically the same components as does the Seiko AGS (see Figure 5). The Generotor System stores three days of energy for every day it is worn until it reaches a capacity of 10-days reserve. The system takes 10 seconds of wear to become energized for operation. The Samara watch can also be energized with a small "wand" that is applied to the back of the watch. This wand, included with purchase, provides the necessary impulse to activate the hands to turn.

The Seiko sweep-movement quartz Calibre 5S series employs a new system that drives the sweep second hand in a smooth continuous manner rather than the obtrusive effect of the convulsive second hand movement we see in quartz step motor watches (see Figures 6, 7 and 8).

As the step motor turns in one-quarter second intervals, the new system convets its action into a smooth and continuous motion which drives the sweep second hand in a flowing manner, much like the sweep hand motion produced by mechanical and tuning fork watches. The viscous control sweep system consists of a spiral spring and a viscous regulator which converts the stepping motor movement into the smooth flowing second hand motion exhibited by no other step motor quartz watch.

Figure 5



A smooth flowing second hand is not unusual in a quartz clock movement because its size will accommodate a large capacity battery. However, the Seiko Calibre 5S series is the first watch-size quartz timepiece with this feature. Calibre 5S series' battery life is approximately two years.

The accuracy of this timepiece compares favorably with that of conventional quartz watches, producing a rate of less than plus or minus 20 seconds per month at normal temperature range. The movement of the sweep second hand is slightly affected by temperature change. For example, if the time setting is made at 25° C, the second hand will be from 1 to 2 seconds behind the set time at 5° C, and 2 to 4 seconds behind the time set at −10° C. With this in mind, it is recommended that time be set at the normal operating temperature range.

To set the time exactly to the second, pull the crown to the second click positon and the second hand will immediately stop. It will quickly start again as soon as the crown is pushed back into its normal position. To set the hands, pull out the crown to the second click position and turn it clockwise or counterclockwise. When setting the minute hand, advance it to a few minutes ahead of the desired time and then turn it back to the correct time. To set the day of the week, pull the crown to the first click position and turn it clockwise; the crown does not work if it is turned counterclockwise at the first click position. If the battery has been removed from the watch, it will take some time after it has been replaced before the second hand will move at normal speed. For this reason, do not attempt to set the second hand to any degree of accuracy until after the watch has been running for at least 30 seconds.

Figure 6

Courtesy - The Horological International Correspondence

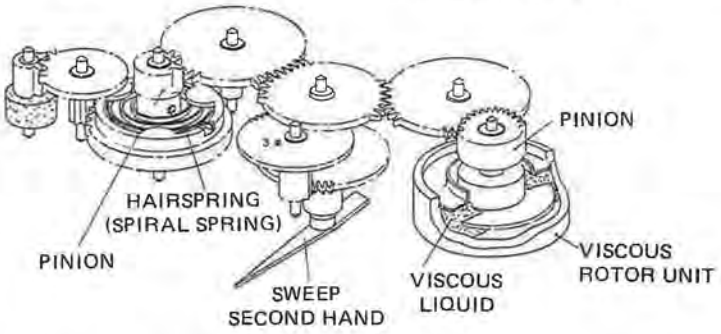


Figure 7 - Hairspring (Spiral Spring)

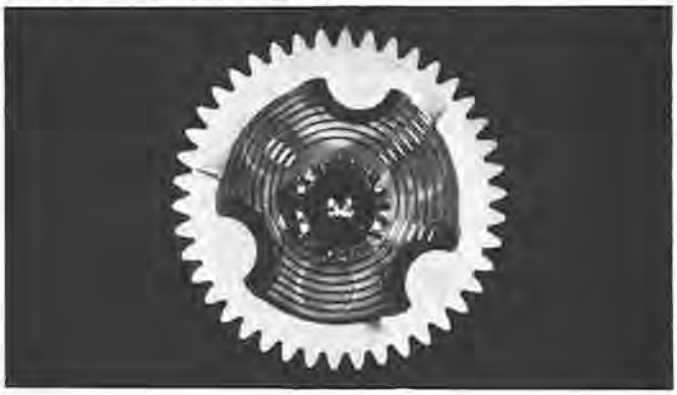
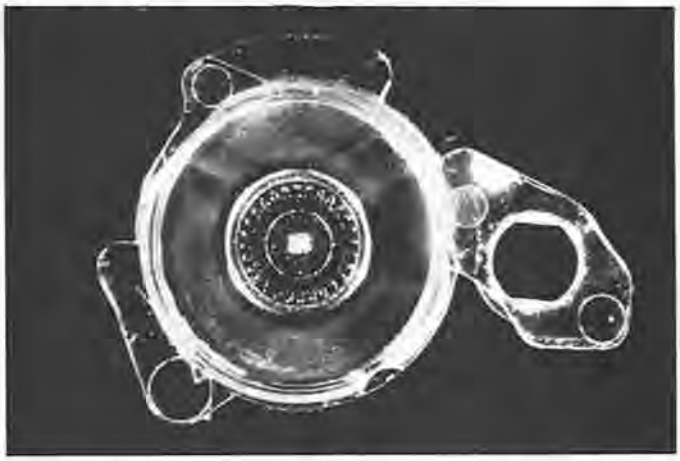


Figure 8 - Viscous Rotor Unit



During disassembly and reassembly, the spiral spring may become deformed if it is unwound or wound excessively. When removing and replacing the hands, pull the crown out all the way to stop the second hand. If the hands are turned with tweezers, etc., undue force will be applied to the spiral spring and it will become deformed. Handle the plastic part of the viscous regulator gently and never pull or turn its pinion because the viscid fluid inside the regulator may leak. Never wash the viscous regulator; all other parts can be cleaned in the same manner as you would conventional quartz watch parts.

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The Horological International Correspondence

THE PICKLE BARREL



Marshall F. Richmond, CMW

JEWELRY FINDINGS

PART 3 –RING PARTS

Whether repairing or handcrafting finger rings, ring findings can play an important role. General watch and jewelry material suppliers stock the commonly used ring findings, while special findings houses stock many of the lesser used findings. Most findings are stocked in 14K gold by any supplier, but platinum and other metals could only be found at the large findings specialty suppliers. As there are standard sizes and cuts of stones including diamonds, genuines and synthetics, settings to fit these stones can usually be found catalogued. However, stones that are not considered standard size and cut (shape) will require a handmade setting or have to be recut to fit a given setting. Customers sometimes have a stone that they want made into a ring or other piece of jewelry or have a piece of jewelry with a stone missing that they want replaced. If the stone is not a standard cut or shape, then a setting will have to be handmade; or, if the customer's setting is not for a standard cut stone then a stone will have to be cut special or an oversize stone can be sometimes reduced to fit. Most stone suppliers have their own lapidary or have access to one so they can supply odd shapes and sizes of stones. In this situation, make allowances for extra time and also a much higher cost for the stone. Many manufacturing jewelers can handcraft any kind or type of setting that is not standard and available from findings suppliers.

SOLITAIRE LADIES' RINGS

As there are many different types and styles of finger rings, it would be impossible to give detailed descriptions of every one and their component parts. I will start with a solitaire ladies' engagement ring.

There are really two parts to this ring: the shank and the head. The head can be broken down into two parts if it is a miracle type, as the top comes off the body of the head as it is gold-soldered on the four corners. Tops can be changed for different size stones or replaced when worn badly, as long as the body is not badly worn. Other type heads are four-, six-, or eight-prong heads that are installed in the shank with hard solder the same as the miracle or illusion heads. Complete heads or tops are available as findings as well as shanks, half shanks, or prong settings. Heads, tops, or prong settings are available in a variety of sizes, so when ordering all you need is the stone size. There are many catalogs available showing ring findings and stones. From these listings it is easy to determine what is standard. This determination should be made before price is quoted on an estimate.

Heads or settings for diamonds can be found for most any size or shape of diamond including round, emerald cut, marquise, pear–all of which require cutting seats when setting the stones. Heads or settings for stones other than diamonds that are not faceted round stones cut like a diamond require other settings. In addition to the diamond cuts mentioned, many are cut flat back with a high dome (called 'cabochon'); some are slightly domed with a flat back. Many of these require a full bezel setting and will set without a very deep setting. However, some of these stones which have a slightly domed top and faceted back with depth require a deep box setting. If it is a standard cut, more than likely a box setting can be found in a findings catalog. If not, it will have to be handcrafted.

INVENTORY FOR RING PARTS

To build an inventory of ring parts (findings) which is necessary if you are to do very much jewelry repair or crafting, it is best to work out a system for buying. Usually when you need one piece you will get a better price if two or more are ordered, so use one and put one in stock for future use. The chances are that if you need this one you will need the second one in the future. With time and experience you will learn from what you have used how many of a piece to order in building an inventory. Anything on hand when doing a repair or making a piece of jewelry saves the time of ordering and waiting plus the cost of shipping for just one piece. It is important to set up a system for storing these pieces–labeled and indexed so you know where to find them when they are needed. I am sure that any supplier would gladly make up an inventory of findings for you if given the amount of money you would like to invest. They would conscientiously send you the fastest moving findings in their stock, but they may not be what you would need in your area. Ten years later you may find most of these findings still in your stock unused. This is why I would recommend that you build your inventory on a trial and error basis. The percentages would be in your favor that the unneeded findings would not accumulate.

Ring parts are necessary for crafting or repair of rings whether manufactured or handcrafted (see Figure 1 for solitaire ring parts). Although most ring repairs can be made without replacement by repairing the part of the ring that is broken or worn, it is always best in analyzing a repair before starting to work on it to determine if it would be less expensive to replace instead of repairing. Also, it's good to try to visualize if, when it is completed, the repaired ring would look as well and be as durable as if the finding had been replaced. A good example of this is a prong head in a ring which can be quickly replaced and the stone reset which makes this part of the ring new. These prongs can also be replaced as strong as the original–if not stronger–even without removing the stone (providing the stone is one that will stand heat). This is often a better solution than replacement because prong heads or settings are made in many types of base. Therefore, the one needed for replacement could be hard to get or not even available, causing the repair to be held up until the replacement could be obtained. It is well to consider that if the prongs get bent releasing the stone, this type of head is not really strong enough to withstand the wear that it is subject to. It might be wise to advise the customer of this and try selling them a miracle or illusion-type head which is more secure. Or, if that is not possible, suggest a prong head with more prongs. If you do make a repair on a weak head or setting and the customer bends the prong(s) again, they will try and hold you responsible even though you did not make or sell them the ring.

SHANKS

Shanks are another repair we are called on to replace frequently. Full shanks and half shanks are available from any findings supplier, and in most cases a half shank is more practical than replacing the full shank. On solitaire ladies' rings, replacing the full shank is quick and easy; rings with side stones or colored stones (either ladies' or gent's) it is usually

more practical to install a half shank. If the old shank is half round it can be replaced using half round ring sizing stock, plain wedding bands that are half round, or sawing it out from gold plate of the proper thickness. In replacing half shanks, I usually cut the ring with diagonal cutting pliers on each side about half-way from the bottom of the worn shank and the head (as close to the head as is necessary to cut off all the worn and thin portions of the old shank). This leaves the end pointed like a wedge. With very little filing, half of a "V" joint is shaped (Figure 2). If using a wedding band, the piece that was cut off can be used to measure how much of the wedding band is needed to make the ring come back to proper size. In selecting the width of the material to be used, where the piece was cut off the ring can be measured with a mm gauge or Vernier calipers. These will show the width of the wedding band or half round stock to use. If using flat stock, the piece that was cut out of the ring can be straightened and used to measure the length piece that will be needed.

The next step using flat stock is to bend the stock that is cut to length. This can be done with a bender or a pair or watchmakers bow closing pliers, then put it on a ring mandrel and half round it with a rawhide mallet. It is of no consequence if the ends do not match perfectly.

As the ends of the ring are filed to a wedge-shaped point, the half shank should have "V" grooves filed in each end to match the ends of the ring where they attach (Figure 2). This can be done with a triangular needle file. When attached this will make a "V" joint. This will be twice as strong as a butt joint which can be used, but is much harder to hold in alignment than the "V" joint while making the first solder joint. After the first side is soldered, it is easy to align the other side with flux; put a piece of solder on the joint and apply heat until the solder flows. The ring can then be rounded with a rawhide mallet on the ring mandrel. I usually try and have the ring come out about a half size smaller than the correct size. With a steel chasers hammer these joints can be hammered against the steel mandrel to the correct size, also proving the strength of these joints.

Shaping and polishing is all that is left to complete the repair. Half shanks can be installed on most any type of ring (ladies' and gent's) with half round, flat, knife-edge shanks of any width.

Colored stone rings for both ladies' and gent's are set in many ways, some prong set, some full bezel set, some part bezel set, and some bead set like a diamond in a flat mounting. As bezels for standard sizes and shape can be purchased, they are easy to install by simply filing off the old one and soldering the new one on with hard solder. For stones that are not standard a bezel can be handcrafted.

MAKING/INSTALLING BEZELS

Here is how I make and install a bezel. Start by measuring the stone. We will use a 12mm x 10mm rectangular stone. Although this is a standard stone and manufactured ones are available, I will use this because it will be easy to explain. This means that a piece of metal 44mm long will be required. It will need to be between 2mm and 4mm wide and .3mm to .5mm thick, depending on how heavy a bezel is needed and how thick the stone is around the edges.

Using a rolling mill, the metal is rolled to thickness and then cut to the width and length. The corners are bent with pliers so the two ends will come together, preferably on one of the long sides. This is gold soldered and fitted over the stone so it is not too tight a fit. If a little too tight, it can be loosened by putting a piece of smooth steel in a vise and peening (hammering) the sides which will stretch if tapped with a steel chasers hammer. After it fits satisfactorily over the stone, make sure that the edge to be used as a bottom is perfectly flat and sets flat on the ring top. The bezel can then be soldered in place.

This is done the same when using a manufactured bezel. The only difference in making an oval or round bezel

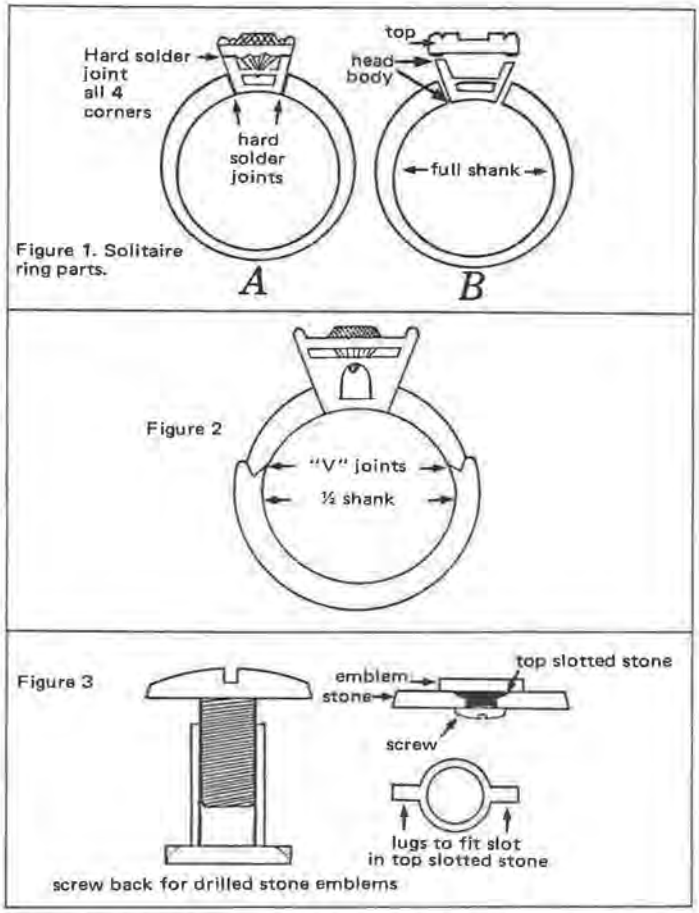


Figure 1. Solitaire ring parts.

Figure 2

Figure 3

is in obtaining the length of the metal. Since I am not a mathematician, I arrive at the length by wrapping a piece of paper, string, or soft wire around the girdle of the stone and marking it. Then the length is measured when the piece is straightened out. The ends are then hard soldered together and shaped so the stone fits into the prepared bezel. Installing it is done the same as with the square or rectangular one. A full bezel is no doubt the most secure setting for shaped stones. In making bezels for stones that are not of standard size (or irregular cuts as is often found in turquoise stones set in silver settings) the same procedure can be used as with round, square, or oval stones. Of course in replacing silver bezels use silver metal and silver solder.

EMBLEM RING REPAIRS

Many rings are brought to us with an initial or emblem missing or damaged. Usually these are attached to a drilled stone and need to be replaced. Emblems and initials are usually available from your material or findings supplier in two or more sizes and with initials available in block, old English, or script styles. Emblems such as American Legion and many service clubs can only be obtined from that organization. Emblems for the most popular lodges usually can be obtained from findings suppliers. Karat gold lapel emblems or tie tacks can be used by removing the screw back or post and installing screw findings like the ones on initials that have been manufactured for replacement in stones. These have a small lug on each side of the threaded tube made to fit in the slots in a top slotted stone. When the emblem is fitted, installed, and the screw tightened, the emblem will not turn on the stone (Figure 3). When the slot is in the bottom of the stone it is made for a tube rivet that is hard soldered to the bottom of the crest or emblem; when installed it can be riveted with a centering or round bottom punch; and when tight and in alignment a small punch shaped like a small screwdriver blade can be used to punch the edge of the rivet in the bottom stone groove. This will keep the emblem from turning and getting out of alignment.

(Please turn to page 44)



Combined group of AWI tour members at Joint Banquet in Sydney, Australia Feb. 27, 1988. Hosted by Watchmakers of Australia, clock and watch collectors and jewelers.



Part of an assemblage of 185 people at the reception banquet for the visiting tour members of Chapter 102, NAWCC, Feb. 27th. Thirty-five visiting tour members made up the tour.

1988 AWI South Pacific Tour

Henry B. Fried
CMW, CMC, FAWI, FBHI, *FNAWCC



Henry Fried
Tour Guide

This year's tour to Australia, New Zealand, and Tahiti was an enjoyable and horological success. Meetings with watch and clock collectors, watchmakers, clockmakers, and jewelers; visits to watch and clock shops, museums, private homes with collections, and visits to horological schools were among the highlights of the 21-day tour.

Part of the advance group starting earlier set foot in Cairn, base for Australia's Great Barrier Reef. Later, this group connected with the main group when they landed in Sydney, making a tour total of 35 people. The group was made up of jewelers, watchmakers, and collectors from all over the United States, and one tour member from Switzerland, Adolf Benz, a watch manufacturer.

In Sydney the group was welcomed with a gracious banquet at a fine golf club. The hosts were a coalition of the watchmakers, jewelers, and collectors who had never met them before but welcomed them in grand style. After mingling with their hosts, Mr. Ross Robinson, FBHI, FGHI, AWI and horological instructor at the Sydney Technical College acted as Master of Ceremonies. He introduced various Australian dignitaries, among whom were Herman Knie, prize-winning clockmaker; Michael Smith of Smith & Smith, a sponsor of the banquet; and Doug Minty, president of the Australian Chapter 72 of NAWCC. AWI past president and technical director Henry Fried introduced each of the tour members and gave a short historical lecture. Other speakers were Carl Parker, president of the Horological Guild of Australia NSW, and Robert Williamson, president of Sydney Clockmakers' Society. There were approximately 150 local people at that banquet.

The following day visits were made to clock shops, private collections, and beautiful local and historical sights. A few visited the Sydney Technical College with its excellently equipped horological shops.

After the Sydney visits, flights to Alice Spring and Ayers (red) Rock, a flight took the group to Melbourne. There they visited the many local sights and had meetings with horologists, collectors, and had an opportunity to visit private clock collections. An evening reception provided an opportunity to meet the local organizational leaders, among whom were Mr. Switzer and Mr. Ashton, two founders and past presidents of the Australasian Horological Guild. They were accompanied by a contingent of local watch- and clockmakers. The following day a small group visited the Weisel Clockshop where Mr. Weisel displayed some special tools he had designed to facilitate his work. Others of the tour visited opal merchants where some purchases were made.

After Melbourne, a flight took the group to New Zealand and to Christchurch, with its many fine parks, museums, and very English atmosphere. Tour member Dubois of Glens Falls, a tower clock enthusiast, and Marybess Grisham of Texas, certified watchmaker and NAWCC chapter president, were given a tour of local tower clocks by Mr. Rogers who is a resident and is preparing a book on these. Meetings were held with the local officers of their guilds, and many friendships were made.

From Christchurch a flight was made to the Hermitage near the base of Mt. Cook, that country's highest peak. Some took small planes to the vast glacier fields. In Queenstown the groups were separated into two couples each, who were billeted in fine private homes to experience some close personal contacts and fine local home cooking and hospitality. All thought it was an enriching experience.

From Queenstown trips were made by boat to New Zealand's south island fjords with their spectacular waterfalls surrounded by high mountains with sheer drops into the fjords. Still later a day was spent in Invercargill, New Zealand's



Left to right, above: Henry Fried of AWI with Charles Switzer, Sr., and Mr. Ashton, founders and past presidents of the Australasian Horological Institute during visit at the Weisel Clock Shop.
Below: Mr. Holgate presenting to AWI gift from New Zealand Horological Institute. Photo of Wellington Harbor (now hung in Cincinnati headquarters).





Above right: John H. Ellis, FBHI, MCNZHI, with massive skeleton clock in marine motif form, made entirely by Mr. Ellis and shown at reception to Chapter 102 visitors in Auckland, New Zealand in March.

At right is a close-up of the clock made by John H. Ellis exhibited at the reception in Auckland.



southern-most city, windy, chilly even in their summer, viewing along the way thousands of the country's 80 million sheep.

In the nation's capitol city, Wellington, the local horological societies had prepared an active program for the group. A visit to their observatory provided the Blairs and the Frieds with a rare view of their precision instruments and time-telling devices, all guided by the head of that station atop the highest hill in that city. In the evening, the entire group was called for by Ian Young to visit his home and view his collection of clocks. Later, the same group continued by bus to attend a high tea (82 steps up from the roadway) to the home of Bill and Marie Holgate who provided fine food and dessert. The group was given an opportunity to examine the many clocks which he had made from raw materials. Among those attending from the local guilds were Henry Rogers, an NAWCC clock prize winner; Peter Robinson, Chairman of the local N.Z. Horological Institute; Hans Wedenberg, one of their founders; Mr. and Mrs. Ashley Wells, both watchmakers; George Foster, who writes for *The Horological Antiquarian*, and Dr. Donald Urquhart-Hoy, a clock collector and surgeon. Mr. Fried, representing AWI, made a fine presentation of a certificate of appreciation and a book for their library. Mr. Ian Young, representing the N.Z. Guild and an AWI affiliate, made a formal presentation of a framed view of Wellington harbor (now hanging in the Cincinnati headquarters).

The following days provided visits and overnight stays in Rotorua, New Zealand's "Yellowstone Park" with thermal geysers, boiling mud fields. The whole area is tapped for its thermal heat and marketed. That evening the group was entertained by the local Maori tribes with ceremonial dances and entertainment. A visit to the world-famous glow worm caves was thrilling.

The last stop in New Zealand was in Auckland, that country's largest city with its many fine shops and stores where the group had an opportunity to buy souvenirs and local artifacts.

In the evening the group was met by a local dignitaries of their horological institute. Among these were William Brockman, Graeme Apeight (a past chairman of the N.Z.H.I.), Bob Harap (one of the few "Master Craftsmen" in New Zealand), and Meal Bekingham (who is the local Seiko representative). Also present was Graeme Hall, an AWI member, who also was a tour member on AWI's first tour to Switzerland. Jim McKinnon, a local tower clock specialist, also took some of the group members to view these elegant old massive clocks and at the same time to see the interiors of some more impressive old buildings, one in the Auckland University.

The last stop on the way home was in Tahiti and Bora Bora, where the group rested, snorkled, fished, slept, and ate well.

The AWI group consisted of many repeat travel members. These were: Mr. and Mrs. Frank Addy of South Carolina, Eugene Augustin of Clear, Alaska, Morris Barax of New York, Adolf Benz of Berne, Switzerland, Mr. and Mrs. Harry Blair of Marlboro, New Jersey, Mrs. Ruth Brethorst of Mahomet, Illinois, Mr. and Mrs. Hadred L. Brown of Paducah, Kentucky, Alton and Mrs. Dubois of Glens Falls, New York, Henry B. and Mrs. Fried, Milton and Mrs. Heller of New York City, Roy and Mrs. Malm of Owatonna, Minnesota, Mr. Gil Margolis of Riverdale, New York, Clifton and Mrs. Matz of Urbana, Illinois, Henry McKay of Long Branch, New Jersey, Dolores Nowaczyk of Vancouver, Washington, George and Mrs. Reeves of Fullerton, California, James Robinson of Kimbal, Nebraska, Marion Royael of San Rafael, California, Walter and Mrs. Serr of Orange, California, Elmer and Mrs. Tazuma of Seattle, Washington, Lois Ward of Washington, D.C., and Marybess Grisham of Dallas, Texas (who helped with some photos and details of this report).

Affiliate Chapter Column



Scott Chou

All Chapter Members...

This was the keynote address given before the Affiliate Chapter delegates on Friday, June 24, 1988 at the recent AWI Annual Meeting held in Cincinnati.

First, on behalf of the Seiko Hattori group and myself, I would like to thank all of you for giving me the honor and opportunity to address you at your annual Chapter Meeting.

The AWI has and continues to provide the trade members and watchmakers with up-to-date service information and skills which, in turn, also contributes help to the manufacturers and all companies providing after-sales service for the consumer.

The Seiko Hattori Group, as one of the leading watch manufacturers, does appreciate this organization and members. We are more than happy to continue supporting the American Watchmakers Institute by automatically distributing all technical information which is published for all timepieces so that all members can benefit from the Institute's programs.

There are many improvements and changes made in the quartz watch since the first one was introduced to the market 18 years ago. In conjunction with new technology and innovations, Seiko manufacturers have continued research and development of new products. Recently several new products have been successfully produced. The new technology developed the Automatic Generator watch which converts motion into electric energy and restores the power into the capacitor in order to keep the watch running up to 72 hours without activity. It is like the traditional automatic watch where they are free from the need of battery replacement.

Another new product is the constant sweep hand where you do not see the lapse motion.

As to material innovation, today almost all watch components from case and strap external parts to the mainplate, training wheel, and wheel bridge are made of plastic. The watch industry is going to use more plastic parts in the movement because the merits are greater than the demerits–from a manufacturer's/engineering point of view–it is the trend of future products. In order to be successful in the service trade we must learn how to service this type of product such as–

> *–What the precautions are on service, as assembly and disassembly, setting hands, washing agents, etc. This is most urgent information for the trade, otherwise the movement and parts can be easily damaged in the repair procedure due to lack of service knowledge.*

One of the questions most often asked and wondered about is what is the future of the watchmaker. Of course I am not God, hence I cannot predict what will be happening in the future. However, from past experience I must say that it will depend on the individual who is keeping up with the watch trade technology innovations and service skill.

In relation to servicing of new products, indeed they are more complicated and also require more knowledge. Therefore, we must continue to learn to service.

I must say to be master in the trade of watchmaking is what we have to do, instead of looking into what the manufacturers have done.

NEWS ...from all around the ASSOCIATION...

NEW JERSEY

On June 14, 1988 the Watchmakers Association of New Jersey meeting featured Marvin Whitney on "Ship's Chronometers." Mr. Whitney began his slide presentation by tracing the history of chronometers from the British government's offer of 20,000 pounds for a device which could be used at sea to accurately determine longitude. After showing slides of Harrison's chronometers, he continued by describing the escapements developed by Pierre Le Roy and John Arnold.

Mr. Whitney brought everyone up to the WWII era, when he was involved with chronometers for the war effort. He noted that Hamilton delivered its first ship's chronometer in February of 1942. He brought several Hamilton ship's chronometers with him to show the fine workmanship. His slides showed many details such as Hamilton's helical hairspring, balance, and detent. Hamilton produced extremely accurate timepieces in a very short time from mass-produced parts. This was contrasted with Elgin's chronometers, none of which passed tests during the war.

At the end of his talk, Mr. Whitney touched on atomic clocks and the Naval Observatory. A question and answer period followed, with many members interested in the Hamilton chronometers on display.

VIRGINIA



A view of one of the group sessions at the Horological Association of Virginia 1988 Convention at Virginia Beach, VA, April 29 - May 1.



The power structure of the Horological Association of Virginia during a break at their Virginia Beach 1988 Convention. Left to right: Judy Draucker, secretary-treasurer; Robert G. Grissom, 2nd vice president; Stanleigh W. Palen, 1st vice president; Steve Black, immediate past president; and Fred T. White, president.

OHIO

The Greater Cincinnati Jewelers and Watchmakers Association held its second quarter meeting on April 27, 1988. The topic was stone setting. Charles Cleves demonstrated setting stones using a Graver Meister and Dennis Jefferies demonstrated different types of settings the old-fashioned way.



Pictured from left to right around the bench are: Mardie Biederman, Dave Ducher, Jim Lubic, Grace Jefferies, Roy Hovey, Charles Cleves, and Dennis Jefferies sitting at the bench.



The Ohio Valley Watchmaking Institute Watch Repair and Jewelry Repair Class of 1988 at a recent trip to the AWI Museum. Pictured from left to right, front row: Rob Manford, Connie Miller, and Elaine Martin; second row: Glenn Davidson, Gary Gomia, and Larry Thompson; back row: Jim Downs, Ed Watkins, Jim Lubic (instructor), Aaron Crandall, and Fred Furkin.

UPCOMING CONVENTIONS

Iowa Jewelers & Watchmakers Association
Convention & Trade Show
September 10-11, 1988
Airport Hilton Inn — Des Moines, IA

New York State Watchmakers' Association
50th Annual Convention
September 30-October 2, 1988
Sheraton Inn — Binghamton, NY

Illinois Watchmakers Convention
October 14-16, 1988
Jumers Castle Lodge—Peoria, IL

Florida State Watchmakers Association
43rd Annual Convention
October 28-30, 1988
Hilton Inn Gateway — Kissimmee, FL

New Products and Literature

NEW GLASS STARTER SYSTEM FROM AMERICAN PERFIT

The American Perfit Crystal Corporation is offering a "Glass Starter System" that truly lets watch repair personnel fit glass crystals themselves.

This system consists of a crystal grinder and the "Fitting Glass Watch Crystals" video tape, plus an assortment of one gross each of regular unfinished crystals and flat unfinished tempered blanks. The crystals provided in these assortments are extensive enough to allow you to fit most of the bezels in today's market. Anyone attempting to fit a crystal should become skillful with these tools and a little practice.

The "Glass Starter System" is available from your watch material supplier.

BRASS CLOCK BUSHINGS FROM TIMESAVERS

Timesavers has introduced a new line of American-made brass clock bushings. These bushings are harder than the foreign brands since they are drawn to size which work hardens the brass. They are then machined and finished on state-of-the-art precision equipment. This new system uses KWM reamers. At this time they are available in the more popular sizes. For a free sample and pricing, send a self-addressed, stamped envelope to: **Timesavers, Box 469, Algonquin, IL 60102; (312) 658-2266.**

JEAN ROULET "CHAMARET" MANTEL CLOCK

A classical touch added to a pure modern design gives its personality to this Jean Roulet mantel clock made of gilt solid brass. Black Roman numerals are engraved on the bezel encircling the dial in dark finish. The quartz movement is also made by Jean Roulet.

For more information contact: **Jean Roulet Clock Co., 3737 Montuso Pl., Encino, CA 91436; (818) 990-2486.**

Jean Roulet



SWEST RELEASES CATALOG W-89: WATCH MATERIALS AND TOOLS

Swest, Inc. has published a new specialty catalog of watchmaker's tools, supplies, equipment, and genuine materials.

Catalog W-89 is 64 pages of the largest selection of products specifically related to the watchmaking industry brought together in one catalog, according to Swest officials. Included are such items as cleaning machines and solutions, case openers, loupes, oilers, hand removers, staking tools, movement testers, timers, crown assortments, screw assortments, gaskets, crystals, spring bars, books, etc. Also included are select clockmaking items such as mini-quartz movements, fit up movements, hands, etc.

To receive Catalog W-89 and related brochures, contact: **Swest, Advertising Dept., P.O. Box 540938, Dallas, TX 75354; (214) 350-4011.**

MAXELL UNVEILS SMALLEST EVER WATCH BATTERIES

To accommodate the increasing trend toward miniaturization in the battery-powered watch market, Maxell's Battery Division has introduced the two smallest micro silver oxide watch batteries ever designed.

The new SR416SW, which is 4mm in diameter and 1.6mm in height, and the new SR421SW, 4mm in diameter and 2.1mm in height, meet today's increasing demand for larger power capacity in a compact size for state-of-the-art watch designs. The SR416SW and the SR421SW join Maxell's full line of silver oxide, alkaline, and lithium manganese dioxide batteries.

For additional information on the micro silver oxide battery or other Maxell Battery products, contact: **Maxell Corp. of America, 22-08 Route 208, Fair Lawn, NJ 07410.**

SEIKO'S NEW MICKEY MOUSE WATCH AND CLOCK DISPLAY

Seiko Time Corporation has announced the introduction of a Mickey Mouse product display ideal for counter top, window, or wall.

Designed to meet the requirements of jewelry, gift, and department stores, the new display can accommodate as many as six Seiko watches and four clocks. This sturdy display has two shelves and will also contain four special promotion cards: Mother's Day, Father's Day, Graduation, and Christmas, plus one Mickey Mouse card which will enable this display to tie in with peak selling periods of the year.

The 16-inch unit prominently features Mickey Mouse together with the Seiko Style logo. It is pilfer resistant, allowing use in high traffic areas. This display, designed to complement the other Mickey Mouse point-of-purchase materials, is available from Seiko's nationwide network of authorized distributors.



Seiko

HEAVY DUTY POLISHING MOTOR FROM KASSOY

A heavy duty, ½ HP polishing motor is now available from Kassoy. This powerful, double spindle unit has a sealed motor and greater suction power than comparable units, the company states. Easy to reach, changeable filters allow easy access to sweeps. Other features are shielded lights, on/off switch for motor and lights, and rubber feet mountings. The unit (DC77) measures 33" wide X 10" high X 22" deep. It weighs 68 lbs., and can be shipped via UPS. Its price is $384.25.

Write or call: **Kassoy, 28 W. 47th St., New York, NY 10036; toll free: 1-800-4-KASSOY; in NY state call (212) 719-2290.**



Kassoy

"SEA HAWK" DIVERS WATCH FROM GIRARD-PERREGAUX

With its striking yet rugged good looks, Girard-Perregaux's new "Sea Hawk" ranks as a true sports and leisure watch. Its steel, gold and steel, or solid gold case houses a self-winding movement with a choice of handsewn leather strap, steel, or steel and gold bracelet. It is water resistant to a depth of 500 m, with screw-lock crown and scratch-resistant sapphire crystal, plus a unidirectional rotating bezel for deep-sea diving.

Contact: **Girard-Perregaux, P.O. Box 1245, Englewood Cliffs, NJ 07632; (201) 568-4920.**

Girard-Perregaux



THE FRED V. FOWLER CO. RELEASES NEW CATALOG

The Fred V. Fowler Company has announced publication of their new Catalog 1888, "Quality Measuring Instruments and Precision Tools." Inside are 496 pages of the most complete line of precision instruments—electronic, mechanical, and optical—available in the world today, according to a company spokesman.

For a free copy of the all-new Catalog 1888, contact: **Fred V. Fowler Co., Dept. L, 66 Rowe St., P.O. Box 299, Newton, MA 02166; (617) 332-7004.**



Fowler

REVUE THOMMEN'S WATCH WITH SOLAR COMPASS

This wristwatch features a solar compass. Fitted with a coverlid with aperture and center disc with 24-hour rotation, it indicates the

four cardinal points in relation to the position of the sun, and shows the time in 12-hour and 24-hour cycles along with the date. The 10-micron goldplated case is water resistant to 30 m. Contact: **Revue Thommen SA, 2300 La Chaux-de Fonds, Switzerland.**



Revue Thommen

PATEK PHILIPPE WOMEN'S "CALATRAVA" WATCHES

From Patek Philippe's "Calatrava" line, two women's models in 18K yellow gold are pictured below. Their bezels are set with about 0.83 ct. of diamonds, and frame porcelain-white dials featuring Roman numerals. The watches come with gold bracelet or leather strap, quartz movements, and water-resistant cases.

Contact for more information: **Patek Philippe, 10 Rockefeller Plaza, New York, NY 10020; (212) 581-0870.**



Patek Philippe

AUDEMARS PIGUET NEW TANTALUM WATCH

Audemars Piguet has introduced the 'world's first tantalum watch.' It has a self-winding chronograph movement with 21K gold center rotor lodged inside a tantalum and pink gold case fitted with a croco-strap with foldaway clasp. Tantalum is a rare metal, akin to platinum, but more blueish and impervious to acids. Its melting point is about 3000°C.

For more information contact: **Audemars Piguet, 350 Fifth Ave., Suite 1014, New York, NY 10118; (212) 947-1055.**



Audemars Piguet

JEAN D'EVE'S NEW SELF-ENERGY GENERATING "SAMARA" WRISTWATCH

Swiss watchmaker Jean d'Eve recently introduced the new "Samara" wristwatch at the Jewelers of America Show in New York.

After three years of research and development, Jean d'Eve has introduced a technological discovery: The Generotor System which operates the watch. The actual name, Samara, refers to the motion of the maple seed conveyor that whirls as it falls to the ground, distributing the seed from which the maple tree grows.

The watch operates without a battery, and with a simple wrist motion generates energy to run—therefore never needing to be wound or opened. It stores three days of energy for every day it is worn, storing up to ten days of energy. Regenerating the Samara takes only ten seconds of wear.

Water-resistant to 99 feet, the Samara has a suggested retail price of $995.00. It will be available in fine jewelry and department stores nationwide.



Jean d'Eve

CLOCK WEIGHT CARRIER

The "Weightlifter" was designed to deal with the awkwardness of handling heavy, fragile brass weights which are easy to drop and damage. The "Weightlifter" is made of 18-ounce nylon reinforced vinyl for carrying clock weights, with an exclusive 2-way carry strap. It comes with special weight covers—"tube socks"—the right size for clock weights. The weight bag has three compartments that will hold any size clock weight. Just slip a sock over each weight and slide it neatly into a pocket. The shoulder strap leaves both hands free to carry tools, movement, and pendulum.

The "Weightlifter" retails at $40 but is presently being offered at $35 (plus $2.50 shipping in Cont. USA). Contact: **Dean Bull, 3017 Marmac, Traverse City, MI 49684; (616) 946-9500.**



Stores neatly folded in tool box

Special 2 way carry strap

Includes 3 soft weight covers

Weightlifter

BREITLING'S HUNTER-TYPE WATCH

This hunter-type timepiece in 18K pink gold with two coverlids houses a complex movement in the grand tradition featuring a minute repeater, a chronograph, and a perpetual calendar. Superbly finished, it comprises some 1300 parts, circular-grained, chamfered and polished. Other features include century-old movement blank from the Vallee de Joux, 18,800 vph, 33 jewels, bimetallic or Glucydur balance wheel and hand-made gongs.

Contact: **Breitling USA, 47 Water, Norwalk, CT 06854; (203) 853-2141.**



Breitling

OMEGA COMMEMORATES ITS 20th OLYMPICS WITH LIMITED EDITION CHRONOGRAPH

Less than 200 commemorative edition chronographs, each numbered and featuring a back-side engraving that salutes the International Olympics, are being issued by Omega Watch in the U.S. to coincide with the 1988 Summer Games in Seoul, Sept. 19-Oct. 2. The chronograph marks an entirely new addition to the "Seamaster" sport and travel collection, and with a worldwide edition limited to only 1000, the design is expected to increase in value.

Jacques Irniger, president of Omega in the U.S., said that hand-held Omega chronographs were originally used to time athletes at the 1932 Olympics. The Commemorative "Seamaster" chronograph wristwatch has the capability to time to 1/100th of a second (the same standard used officially by the Olympics), and features a unique combination analog-digital dial with day and date calendars, plus memory for storage and record display of up to 13 time finishes or race laps. It is available in 18K gold and steel bezel and case. The watch is water resistant to 660 feet with a water-tight case, screw-lock setting crown, and scratch-resistant sapphire crystal. Suggested retail is $595.00.

For more information contact: **Omega Watch Corp., 35 East 21st St., New York, NY 10010.**



Omega

Book Review

PRACTICAL BENCHWORK FOR HOROLOGISTS, Revised Eighth Edition, by Louis & Samuel Levin. 5 x 8" soft covers, 381 pages, 475 figures. Unabridged republication by Arlington Book Co., P.O. Box 327, Arlington, VA 22210, 1988 @ $19.95.

For many years, this book first published in 1938 and revised in 1950 was among the very best for the journeyman watchmaker who used it as a ready reference and by those who wished to upgrade their skills. The late Louis who survived his son Samuel were both craftsmen of the highest stature. Samuel was trained by his father, and became an excellent draftsman as well. Father and son were engaged in making high-grade equipment for the watchmaker. They also published a monthly trade journal, *Horology*, which also was the official organ of the Horological Institute of America.

The Levins' precision lathes, attachments, and equipment were highly respected and used by horologists and in related industries. Today the third generation of this company no longer produces horological products, now specializing in precision equipment for optical and similar industries.

The reproduction of this book—while not of the same quality of earlier, bound, and glossy paper stock editions—contains all of the later revised editions. The illustrations and the masterful exposition of the subjects contained make it a valuable and important reference in the library of any serious clock- or watchmaker.

Their illustrated analysis of the watchmaker's lathe is expertly done. Samuel Levin's fine line drawings are among the finest in horological literature. While the reproductions of the photographs from the original, earlier editions suffer a bit in this current reproduction, the line drawings come out well.

This book is divided into various sections. Among these are: Tools and Their Uses, Repair Problems, Adjusting, The Watch Rate Recorder, Watch Performance, Mechanical Drawing, The Lever Escapement, and Jewel Bearings. However, a wealth of information, some not found in other volumes, makes this study of its pages rewarding.

The chapters on lathe work and the uses of its various attachments are comprehensively covered. The uses of the tailstock, idler pulleys, taper shank tools, all types of chucks, face plate uses, step balloon, three- and four-jaw chucks, bezel chucks, and milling and screw-cutting attachments are among the subjects covered and among the best described in horological literature. Horological measuring devices are shown and explained in detail. Drills, cement brasses, lapping and pivot polishing devices (transverse grinders) are equally well-treated. Other hand-methods of high-grade pivot polishing are included as well.

There are many pages of tables. Some of these give drill equivalent measurements and numbers, millimeters, inches, Stubbs steel-wire and drill numbers. Others include double depth of screw threads, pendant and crown taps, watch screw taps and their mm-inch sizes for Elgin and Waltham watches. There is a chart on "Gears for Use With a Metric Slide Rest" to convert threads to inches or from inches to millimeter cutting. Included is a table for setting the proper angles of the slide rest for making end mills or clutch wheels, tables for diameter of squares of stems, mathematical charts of equations solving odd-beat timing machine traces, indexing the universal and differential milling attachments in wheel and pinion cutting.

Detailed instruction in making a screw cutting attachment to the watchmaker's lathe and wheel-cutting attachments, making cutters of all types and how to use them, are included.

A section on gearing explains the epicycloid used in watch gears. The section on the rounding-up tool is the finest in any book. Filing fixtures and a 9-page section is devoted to "How to Make a Filing Machine" attachment to the watchmaker's lathe, which shows how this is used to make setting parts, bridges, detents, and other small parts.

The adjustment of precision dials, especially those on chronographs and minute repeaters, is helpful as well. The negative setting mechanism, mainspring, and barrel repairs are treated likewise.

Jewels and the tools to set these take up 15 pages of illustrated instruction. Replacing pallet jewels, screwhead polishing devices and how to use them, pivot polishing and straightening and staff making are shown. Cleaning a minute repeating watch takes up 16 pages. Hairspring, position adjusting, poising, and the watch rate recorder are covered.

A chapter on Observatory Requirements shows tables of standards used at that time by the U.S. Bureau of Standards, National Physical Laboratories at Teddington (Great Britain), Besancon (France), and in Switzerland makes for helpful references.

Methods of drafting and a 16-page chapter on the lever escapement completes this thesis.

While original copies of these earlier editions bring premium prices, this soft cover reprint, while not up to the quality of the original printings, should make a useful first grade reference to any watchmaker who aspires to upgrade his knowledge and skills repairing finer and older watches.

Henry B. Fried

PICKLE BARREL

(Continued from page 37)

TOP PLATES

Top plates for diamond heads are available separate of the complete head and in many different types or styles. These tops can be obtained for single stones or multiple (cluster) stones. The miracle or illusion heads have prongs already at the corners, making it easy to set the stones but the proper top plate for the size stone must be used. The bar type top plate will accommodate a good range of sizes of stones because the bars go from corner to corner of the plate with the the center drilled. To set the stone, all that is needed is to enlarge the hole, cut the seat for the stone with a setting bur, and the prongs or beads can be easily formed from the bars where they come to the edge of the stone. The millgrain flat plate for men's rings have prongs at the corners, so if the correct size is used after the seat is cut, they can be pushed over the girdle of the stone and beads formed with a beading tool. Very little or no bright cutting is needed as the top is already beveled from the edge to the bead, polished, and the millgrain outer edge is already finished. This can take away a lot of work in setting and hand engraving, and also requires much less skill. A novice can turn out a professional job using these tops. Since it seems that today the name of the game is money, income, profit (or whatever you choose to call it), the wise use of jewelry findings can play an important part in improving a jewelry craftsman's livelihood, as well as his professionalism.

Next month we will discuss handcrafting settings for stones that are not standard cut.

Classified Ads

REGULATIONS AND RATES

Ads are payable in advance $.50 per word, $.60 per word in **bold type.** 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. August issue closed for copy on July 1st.)

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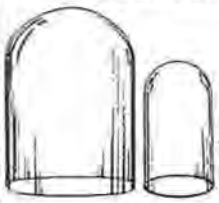
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Dates to Remember

SEPTEMBER 1988

8-11—Intermountain Jewelers Association's 27th Annual Convention; Jackson Hole Racket Club Resort; Jackson Hole, WY. For information: Ann Marie Molenaar-Schram, 1439 SW 4th Ave., Ontario, OR 97914; (503) 889-3213.

10-11—Iowa Jewelers & Watchmakers Association Convention and Trade Show; Airport Hilton Inn; Des Moines, IA.

18-21—Hong Kong Jewellery and Watch Fair, Regent, New World, Sheraton, Shangri-La and Gold Mile Holiday Inn Hotels, Hong Kong. (212) 355-4060.

24-26—Jewellers and Watchmakers of New Zealand Trade Fair, Epsom Showgrounds, Auckland, New Zealand. (09) 889-313.

30-Oct. 2—New York State Watchmakers' Association, Inc. 50th Annual Convention; Sheraton Inn, Binghamton, NY.

OCTOBER 1988

1-2—Horological Association of Indiana Fall Workshop and Annual Meeting; Holiday Inn S.E.; Indianapolis, IN. Information: HAI, P.O. Box 723, Shelbyville, IN 46176.

8-9—Horological Association of Virginia Fall Seminar, Richmond, VA. For more information contact Steve Black, Rt. 1, Box 154-D, Hardy, VA 24101; phone (703) 344-4446.

8-9—Restoration of Fusee Watches Bench Seminar (AWI); Ralph Geiger, instructor; Seattle, WA.*

14—Jewelry Industry Distributors Association (JIDA) 1988 Industry Visitation Program held at B. Jadow & Sons facilities in Austell, GA (outside Atlanta, GA). For more information write JIDA, 113 W. Franklin St., Baltimore, MD 21201.

14-16—Antique Watch Restoration Bench Seminar (AWI); Archie B. Perkins, instructor; Boston, MA.*

14-16—Illinois Watchmakers Annual Convention; Jumers Castle Lodge; Peoria, IL.

20-23—National Association of Watch and Clock Collectors (USA) 9th Annual Seminar "French Horology 1660-1820," Getty Museum; Malibu, CA. Information: Herbert Gold, 11995 Darlington Ave., Los Angeles, CA 90049; (213) 486-2136 (24 hrs.).

28-30—Florida State Watchmakers Association 43rd Annual Convention; Hilton Inn Gateway; Kissimmee, FL.

FEBRUARY 1989

10-14—INHORGENTA 89, Munich Trade Fair Centre, Munich, West Germany. For more information contact Gerald G. Kallman, Five Maple Court, Ridgewood, NJ 07450-4431. Phone (201) 652-7070.

* Contact AWI Central for more information.

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FORUM

(Continued from page 32)

Dear Sirs:

Regarding the proper finish for clock plates, the cleaning solution will brighten them, and if anything further is needed I use a very soft brass brush to brighten further. On some occasions I use a brass brush wheel lightly, and spray with clear lacquer. This does not remove the original texture of the finish, but does brighten things nicely. I very seldom do much more than hand brush (bristle) any wheel, unless they are so discolored as to make the job look very bad.

Keep up the good work with the "Forum." I enjoy the entire magazine, and read it immediately upon receipt.

—K.L. Kunath, CMBHI

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One of the perplexing problems of running a repair business is what to do with a customer's property which was left for repair and not called for after the repairs were completed. Over the years, my box of such items has become a problem for insurance coverage, money, and time invested and space they take in the safe or vault. I find that watch and jewelry repairs that are still in my care after six months or more may well have been reported as lost to insurance companies and replaced with something else. What to do? When do we close the book on uncalled-for repairs? When do you finally take possession—after a year, or two, or three? Or do you wait a little longer for the customer to call? I would like to hear from the membership about this problem. —A.H. Dickinson

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