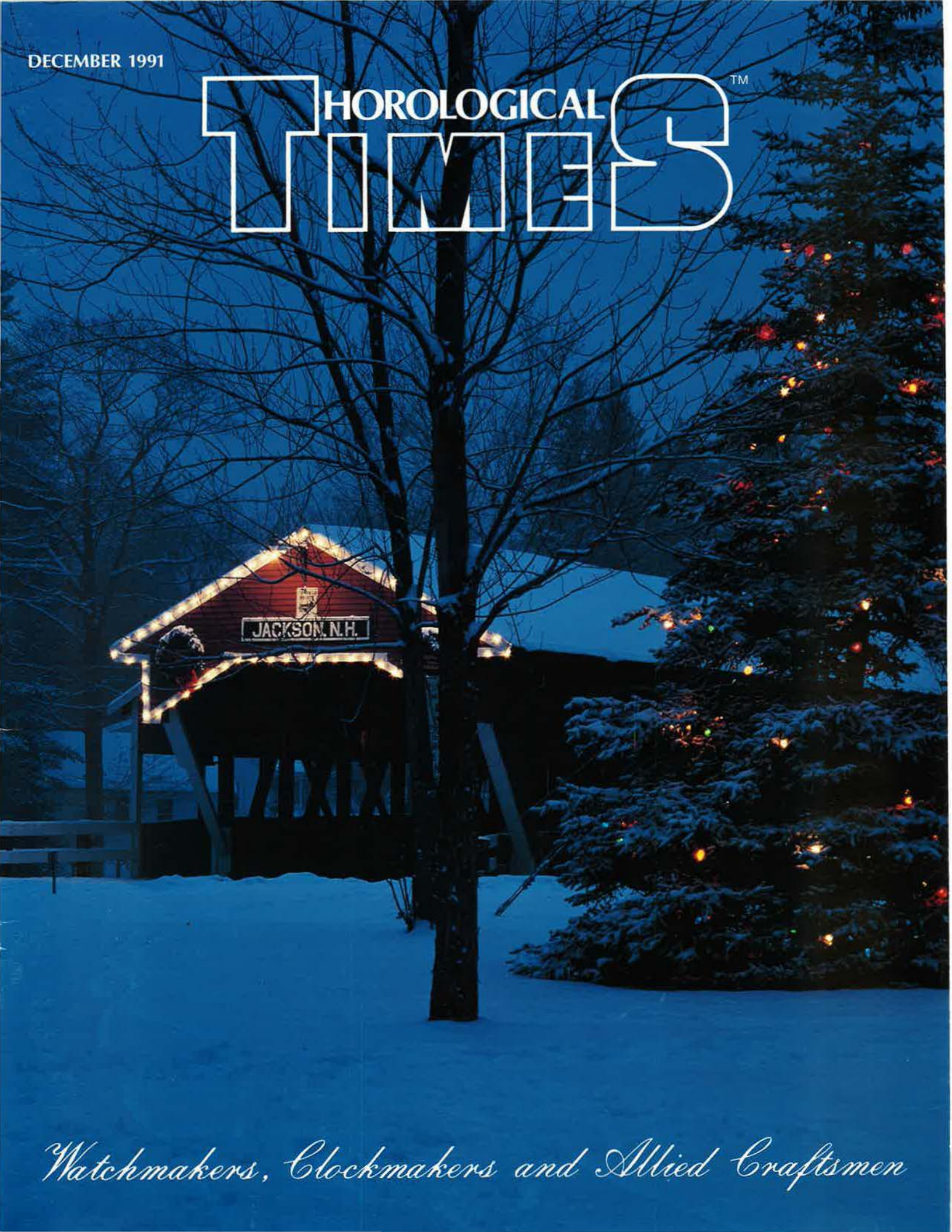
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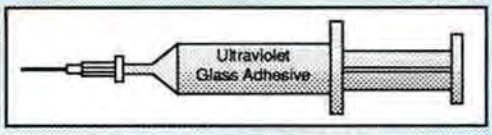
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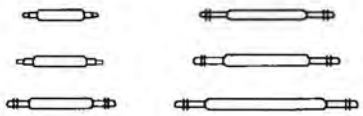


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President's Message



I have been hearing weather reports from around the country of snow in the Rockies and in the northern-most states. For us in North Carolina, this means not only that winter is on its way, but it also means that this signals the beginning of the holiday season. It means it is time to get into high gear with our Christmas plans.

Last year I asked you to give a special gift to a special person. I asked you to take the time to thank those persons who give of themselves to serve in your local guilds, who travel and bring workshops to the local areas, and those who run the office of AWI.

And you did. I had reports from people who had received a note of thanks from people they had had contact with over the years.

I want to thank each one of you who wrote and thanked someone for the time and effort they had put in to help their fellow watchmaker, clockmaker, and jewelry repairman.

This year there is something else I would like to talk to you about. As you know, January is membership renewal time. Yes, I KNOW, money is tight. Yes, I KNOW, you are retiring soon, if not already.

Let me address the situation of retiring. When you retire, are you going to throw down your tools and never touch another timepiece or piece of jewelry brought to you for repair? So far, I have not seen that happen in our part of the country. It seems we are not able to completely abandon our profession . . . even if we only work at it just for family members. Besides, how can you not be a little curious about the new technology being developed daily in our field? Then, how in the world can you NOT renew your membership? The way things are changing, it would be taking a chance to touch ANYTHING if you didn't keep up with the changes, and the best way to do that is to remain a member of AWI and continue receiving *Horological Times*.

Now, about the business of money being tight. So, what's new? It may be a little tighter now, but I have generally found that we find the money to do most of the things we really want to do.

I'm going to ask you to do something for me this year. No, not for me, for you and for your fellow horologist. When you receive your membership renewal application, think about what I have said. Think about the man down the street who may really not be able to afford the membership fee. Think about the person who has never been a member of AWI and isn't aware of all the information packed into each issue. Think about those youngsters in the field who are not "joiners" and have been reluctant to become a member of AWI. (Think about these persons in particular. When most of us DO retire, these are the persons who will be the mainstay of the horological workforce.)

When you send in your membership renewal, I would like to ask you to consider giving just one person, who does not now receive it, a gift subscription to *Horological Times*. What better present can you give anyone? What better way can you show a fellow horologist a hand of friendship? What better way can you help guide that youngster in the field than to show him the best source of information available to him?

To each and everyone of you, SEASON'S GREETINGS from our house!

Alice B Carpenter

Holiday scene in Jackson, New Hampshire. Photo courtesy of F. Sieb/H. Armstrong Roberts, Philadelphia, PA.



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Bench Tips



Joe Crooks

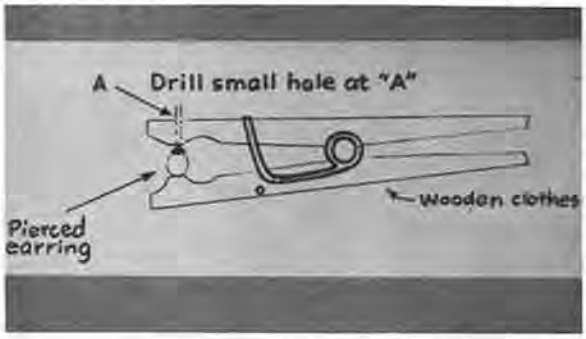
Miscellaneous Bench Tips

An easy way for holding a part such as a clutch or winding pinion, while buffing it on a wire wheel, is to screw the part onto a fine rattail file. It holds securely and doesn't loosen even at high speeds.



While it is not recommended for soft parts that may burr, such as brass, it does work nicely on almost any steel part that has a hole in the center of it.

A common clothespin is used in the next suggestion for holding a pierced earring while cementing a pearl or small stone. By hollowing out the bottom jaw slightly, the pearl is not only held in place, but it is also centered. These clothespins make excellent clamps for many cementing jobs. The jaws can be reshaped to fit a specific need. For more delicate jobs, the tension can be adjusted by removing some of the temper in the spring.



A simple addition to the Watchmaster microphone movement holder will increase its versatility. It sometimes becomes desirable to rate a watch with the hands and dial intact and without securing the movement in a movement holder first. Some movement holders do not adapt well to holding all fully assembled movements in the dial-up position. This is especially true of certain automatic models in which the oscillating weight gets in the way. And if placed dial-down, the



sweep second hand doesn't clear. Of course, the movement can be positioned dial-up on the bottom of the pickup holder without using a movement holder. But even then it will occasionally slip. A surefire remedy for all of these possibilities is achieved by adding a jump ring to each of the four prongs of the pickup holder. The jump rings should be fairly heavy and be sized to fit snugly on the prongs. It is positioned just below the bend on the prong. A small drop of epoxy will hold them permanently. (In addition to holding dialed movements, the distance between the prongs has been reduced to the extent that they will hold the smallest uncased movement securely.)



Use an old or discarded movement holder or case clamp to serve as a stand for a micrometer of the U-shaped frame type. Tightened in place it stands upright and permits a freedom of use that amounts to a third hand. ❑

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Questions & Answers



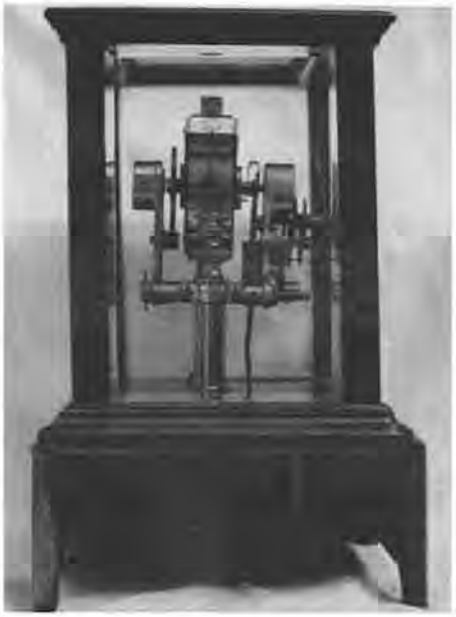
Henry B. Fried, CMW, CMC, FAWI, FBHI, ★FNAWCC

Eureka Electric Clock
1906

Q I am enclosing photos of a clock that we have been wanting to restore for some time now. It is a Eureka electric clock, patent #14614, 1906, No. 2847. Beyond knowing that this type of clock was a giveaway with chemical orders, we are stumped.

The clock is in a glass and wooden cover and is bolted onto a wooden base. The dial is missing, as is one wooden panel on the base, and we were wondering if the clock originally had a seconds hand. Further to this, we are interested in knowing if the clock should be on the slight angle (as seen in the photo below) and if you could find out where we could purchase cloth-covered wire, as the original is a tad worn.

John and Victoria Castanias
Edmonton, Alberta, Canada











A *This is a nice collectors' item, and I hope that with only a little study and attention you should get this clock going again.*

I don't think that using a plastic-covered wire would detract from the originality of the clock. Almost all such older clocks by this time have had their cloth-woven insulations worn away and replaced with safer, more efficient connections. The instruction by Coleman from his book The Best of Coleman *and from the book by Wise should fill you in*

(Please turn to page 8)

Borel WATERPROOF GASKETS

Write for samples.





Borel O-Ring Gaskets for Casebacks and Battery hatches

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	



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O-Ring		Price
6/3	3 each of 30 nos.	21.50
60/3	3 each of 60 nos.	39.00
63/3	3 each of 100 nos.	65.00
64/3	3 each of 22 nos.	19.95
#10 mixed bulk asst. (50 pcs.)		8.50

Round Flat		Price
55/3	3 each of 18 nos.	16.50
58/1	1 each of 80 nos.	26.50
58/3	3 each of 80 nos.	58.50
#9 mixed bulk asst. (50 pcs.)		7.50

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



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

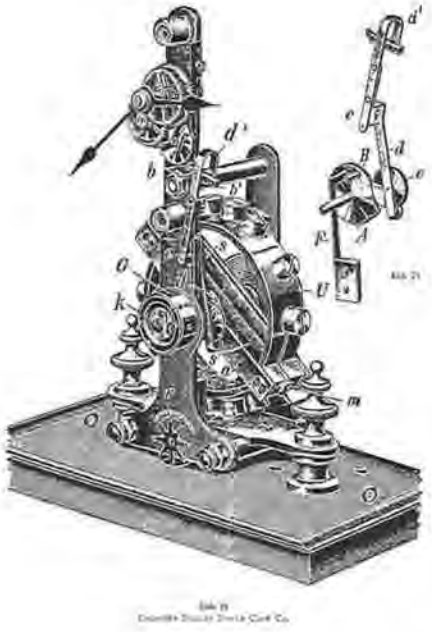
REFILL NUMBER	STOCK NUMBER	WIDTH OF BAND M/M	INSIDE DIA. M/M	OUTSIDE DIA. M/M
00	616	.60	15.90	17.10
0.	616½	.50	16.50	17.50
0A	617	.55	16.90	18.00
0B	618	.55	18.00	19.10
0C	619½	.50	19.20	20.20
1.	619¾	.60	19.80	21.00
1A	620½	.60	20.35	21.50
1B	621	.60	21.00	22.20
2.	621½	.60	21.60	22.80
3.	622½	.60	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.	626¾	.65	26.80	28.10
8.	627¾	.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.	727¾	.70	27.70	29.10
18A	728	.75	28.00	29.50
19.	728½	.70	28.20	29.60
19A	728¾	.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	23.50	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.	826¾	.80	26.80	28.40
30.	827½	.85	27.30	29.00
31.	827½	.80	27.60	29.25
32.	827¾	.80	27.85	29.50
33.	828	.80	28.00	29.60
34.	828½	.80	28.35	29.90
35.	828¾	.80	28.70	30.30
36.	829½	.80	29.40	31.00
37.	830½	.85	30.60	32.30
38.	831¾	.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.	926¾	.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.	932¾	.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.	1026¾	1.05	26.80	28.90
60.	1027	1.00	27.00	29.00
61.	1028¾	1.05	28.70	30.80
62.	1029	1.00	29.00	31.00
63.	1029¾	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.	1224¾	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.	1230¾	1.15	30.70	33.00
72.	1235	1.20	35.15	37.55

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QUESTIONS & ANSWERS
(Continued from page 6)

adequately. The energy source will last longer if you can do anything to suppress the sparking at the contacts. Some have placed a diode concealed at the base of the clock to eliminate the sparking. The contact is silver on one side and a bone is glued onto the other side to prevent a contact in the opposite direction.

I don't recall ever seeing these with a second hand. Most dials were made of glass so that the mechanism could be observed. I assume if you should use thick, clear lucite and use "Zipatone"-applied numerals, it would be acceptable. I worked on these years ago, and still have one which I intend to get going. (It has no dial or hands, either.) Under a glass it should display an eye-catching horological motion.



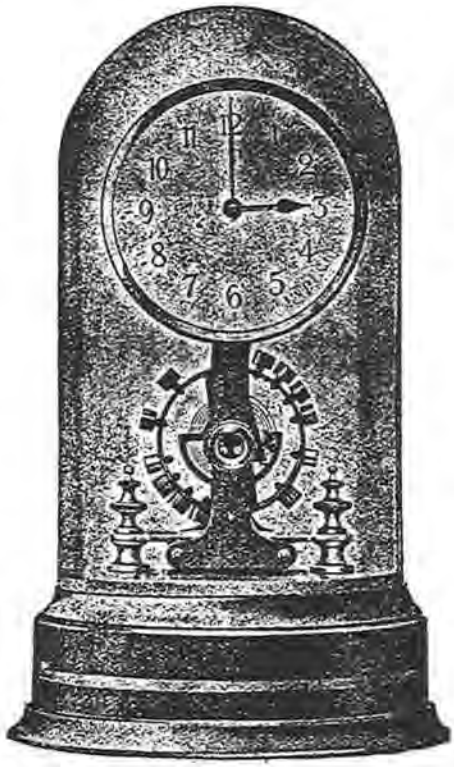


Abb. 23
Stutzuhr Eureka Clock Co.

Q The use of tin laps and diamantine are recommended in horological literature for bringing out the highest polish on steel. I recently got a price quote on 400 grams (0.88 lb.) of 20 mesh tin for $208!! This tin is USP quality and is probably purer than is required for polishing.

My question is this: Although adding lead will soften tin, could readily available 60-40 or 50-50 lead solder be used as a good substitute for pure tin on a polishing lap?

Looking forward to your always authoritative answer, with many thanks.

Robert W. Watus
Owego, New York

A I didn't realize that pure tin was so expensive now. It isn't quite necessary to use tin alone to obtain that high polish on steel. My block is 3 square inches by 3/4" thick. I got mine with much older stuff in a group purchase many, many years ago.

In polishing steel, the polishing material such as diamantine (crushed crystals of aluminum oxide) is used in conjunction with an agent such as pure tin or bronze (bell metal) which itself is an alloy of copper and tin, or some hard agent such as ivory or even boxwood.

To polish flat steel, the surface must first be ground by using fine oilstone powder. That surface then must be absolutely clean. Some older watchmakers used to take bread and spittle, knead it until it was almost dry, and used it to blot upon the surface to pick up any stray grains of the previous grinding or flattening operation. The diamantine then was mixed with fine watch oil upon a specially prepared surface (also uncontaminated) a little powder at a time until the mixture was almost the consistency of putty, mixed with a springy spatula made from a weak clock mainspring.

This was then placed on the lap and the very, very clean piece of steel placed face-down on the lap, and with steady circular or figure-eight motion with the finger, worked the piece across the lap. This was continued until the object would seem to float across the lap when the pressure was lifted. It takes a bit of practice and some knack to get the right feel and method, but it's quite a rewarding joy when it is done successfully. Cleanliness of the surface and the right mixture of the diamantine with the spatula is a good fraction of a successful operation.

Soft iron also makes a good lap for the polishing agent. This is shown in The Watch Repairer's Manual.

Polishing pivots with diamantine is much easier, and the polishing material can be diamantine or rouge with tin, copper, or ivory laps. Boxwood also will do it, and finishing with a burnisher is best since it results in a case-hardened pivot.

Like the old cliche when the little boy in downtown New York with a violin case under his arm asked an old lady how to get to Carnegie Hall, she replied, "Practice, practice, my son!"

Henry B. Fried
❑

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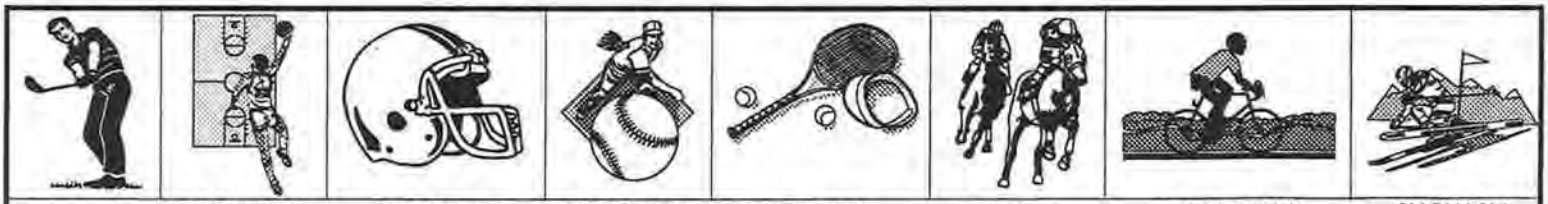
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BULLETIN BOARD

A. NEW REQUESTS

CONSORT WATCH
Jim Stanley, Fort Wayne, IN, is seeking a distributor and/or service agent for the "Consort" watch.

LECOULTRE CALIBRE T813
Lora Clemence, Johnston, RI, is seeking spare parts and service information for a LeCoultre calibre T813. Since the Jaeger LeCoultre Service Department cannot supply, we hope a "Bulletin Board" reader will have this information.

SETH THOMAS GRANDFATHER CLOCK
Milo W. Bresley, Bloomington, MN, is inquiring about a Seth Thomas grandfather clock. The clock case measures 7 feet, 3 inches high without the top finial. He has been told there were claw feet on the base. He would like to know the shape and size of the top finial and the shape of the base feet. If anybody has knowledge of the clock, Mr. Bresley would appreciate a photo and measurements of the finial and the feet.

One photo is of the case front view; the other is of the rear view showing the movement at the top and the bell unit in the bottom.

The bell unit was manufactured by The Regina Company, Rathway, NJ. It was set up to play only one tune after each hour strike of the clock. The unit has 14 bells and plays six different tunes.





ULYSSE NARDIN BROCHURES & CATALOGS
Marvin E. Whitney, Alexandria, VA, is researching material for articles he is preparing about the famous Ulysse Nardin firm. He is interested in pamphlets, brochures, and catalogs dealing with watches and chronometers produced by this firm. One catalog in particular was published about 1920 by Bigalke & Eckert Company, 527 Fifth Ave., New York, NY. They were the sole U.S. agent for Ulysse Nardin during that period. A reprint of this catalog is available; however, Mr. Whitney seeks an original for the purpose of reproducing some of the photographs and illustrations. Any materials loaned to Mr. Whitney will receive the special care they deserve and providers will be acknowledged in the finished articles.

B. RESPONSES

LENZKIRCH A.U.G. CLOCK
Sterrie Weaver, Pearl Harbor, HI, writes in response to the request on how to set up the Lenzkirch A.U.G. clock in the September "Bulletin Board."

I have the same movement which I recently cleaned and set up in accordance with the following procedure.

The clock is a German ting-tang which strikes two notes, one low and one high, to denote the quarters--one ting-tang at the quarter, two at the half hour, three at quarter to the hour, and strikes the hour with a single hammer.

There are two hammer arbors which are operated by the same pin wheel. The hour wheel has a double snail attached--the front one for the normal







hour strike and the rear (behind the hour wheel) for the quarter hour strike. The rack has two tails attached, the front for the hour strike and the rear for the quarter hour strike.

At each quarter hour a lift pin on the cannon pinion lifts the lifting piece (A) which unlocks the rack hook (B) and lets the rack fall until the rear tail falls into a notch on the rear cam. This allows the clock to strike one, two, or three ting-tangs (both hammers). At about 10 minutes before the hour a pin on the minute wheel raises lever (C) which has a pin on the inside of the plates and raises the high note hammer (lower) clear of the pin wheel so that the hours are struck with a single hammer wheel.

On the hour the rear rack falls on a deep notch which allows the front tail to fall on the hour snail and strikes the hour. After the hour is struck, the pin on the minute wheel allows lever (C) to return to its normal position and two hammers will strike the quarters.

The motion works is marked in a similar manner to that of a French striking clock so that the match marks on the minute wheel, the hour wheel, and the cannon pinion will line up. If the match marks are not there you can set up the three wheels, test for each quarter and the hour, and adjust as necessary. The points to check are that the correct strike is sounded at each quarter and the correct number is struck at the hour. I hope this helps you adjust your movement.

TIME BARREL DIMENSIONS FOR SETH THOMAS 124

Two "Bulletin Board" readers have responded to this request:

Steven G. Conover, Reading, PA, publisher of the ***Clockmakers Newsletter*** writes:

The Seth Thomas 124 does not have true mainspring barrels. They are "boxes" which are tubular pieces that look like barrels. These are fixed to the lower front plate with rivets or, on some models, screws.

The chime mainspring box is 1-3/4 inches in diameter. The time and strike are each 1-1/2 inches in diameter.

If the reader would like to borrow a Seth Thomas No. 124 from ***Clockmakers Newsletter****, I can loan it.*

Carroll Bell, College Station, TX, writes that he is working on a 1939 Seth Thomas 124 and finds that the time and strike measurements are the same. They are:

Time and Strike	same size
Inside Diameter	35.5 mm
Outside Diameter	37.7 mm
Inside Depth	17.6 mm
Outside	19 mm

OLD CUCKOO CLOCK PARTS

Walter Celli, DBA Clock Doctor, 42 Birchwood Terrace, Nanuet, NY 10954, reports that he can often supply older parts from the many "used" movements he has collected. Many others have suggested that serious cuckoo clock repairers purchase old cuckoo clock movements from flea markets, etc. to obtain a supply of "used" parts for older clocks.

C. ITEMS STILL NEEDED

TELECHRON CLOCKS

Richard Porter, Minneapolis, MN, has two requests regarding Telechron electric clocks:

(a) Does anyone know of technical data sheets and/or cross-reference usage charts for Telechron "b" and "H" type rotors?

(b) Can anyone supply information on a Telechron Auxiliary model #4A01 tambour case, time only clock by Warren Telechron Co. of Ashland, MA? This clock is 110 volts but it has a balance wheel movement incorporated into it to keep it running during power outages.

SMQ CLOCKS FOR AUTOMOBILES

Richard A. Osterman, San Jose, CA, would like to know if any readers have been successful in installing SMQ fit-up clock movements in automobiles. He wonders if shock and vibration of an automobile would cause a problem.

ETERNA-MATIC WATCH MOVEMENTS

This may not exactly be a "Bulletin Board" item, but Jim Lubic is in need of a variety of Eterna-Matic watch movements for use in Project Extend. We can offer you a tax credit for any you care to donate to our training program.

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

AS A CLOCKMAKER TURNS

BY J.M. HUCKABEE, CMC, FBHI

More Clockmaking Lathe Tips

THE COLLET DILEMMA

Continuing from the previous month, let's attack a major problem in outfitting a previously owned lathe for clockmaking. We were discussing a watchmakers lathe for our purpose. The one illustrated is a Moseley style lathe using the Moseley conoidal collets as built by Boley. Now try to find collets for that one! But don't dispair, a study of dimensions of the collets of bygone years will show that many styles "almost fit." Now, let's turn this "almost fit" into an advantage.

Study Figure 1. Here we have ten collets that are similar but not interchangeable. The identified collet is a true Moseley conoidal piece. The extreme right collet is WW style, and the extreme left one is by Boley for a Moseley spindle. The body diameter of all of these will slip into most lathe spindles called 8-mm. Inspect the keyway width and length. We find wide, narrow, long, and short keyways. Likewise, we have several underhead shapes and several body lengths. All of these collets function perfectly in the lathe pictured in the previous article. Here is what I do.

First, determine what is required to make the strange collet enter the spindle. Usually the first indicator is the spindle key--too wide or too deep in the spindle, or too tall. Solutions are reshape, relocate, or remove the spindle key. This will get the collet into most spindles. I use these modifications with good results. When doing repetitive work that requires a collet change, I prefer to remove the spindle key.

Now, let's say we have the collet almost full depth in the spindle. Coat the collet with a dye (lacquer pin) and look for the point of touchdown. That conflict will usually show where the head-swell begins. Many lathes have a moderately hard spindle that can be cut with a tool-steel bit. Simply take a light cut inside the spindle. Spindles that are too hard require grinding. Again, check for touchdown. The touchdown should be very near the entry of the spindle mouth. After the bearings have been cleaned, lubricated, and adjusted, a cut in the touchdown region, if needed, will restore the spindle to an acceptable accuracy.

We have now met all of the problems except length. If you need to accommodate short collets, cut away sufficient material from the drawbar hub, then make up a spacer so that you will accommodate longer collets. This permits outfitting a lathe that may be near useless with collets available. This is economic redemption of whatever is available in low cost, previously owned tools. Does it work? Yes! The lathe shown in the previous issue is a prime example.

This collet dilemma is even greater than "will the collet fit?" The big question is: "How many?" Take a look at Figure 2. I own about three times as many collets as shown here. So, what is my recommendation? The array here can only be economically justified by "the very rich or the very foolish workman." I mostly qualify as the last category! About 12-18 collets aptly chosen will serve most



Figure 1. The pitfall of many collet types.



Figure 2. How many collets will I need?

workmen quite well. As we continue this series, take note of how few collet sizes I will be using.

The drawbar spacers are easy to make, but you may need someone to do this on a larger lathe. Study Figure 3 for some examples that I use on various lathes. This picture shows pieces from five different lathes, all the same idea but each unique in size.

THE TOOL REST QUESTION

Refer to Figure 4. The left rest is a Boley tip-over. The two center pieces are the "dumb kind," they do not tip over. The two right pieces are English-made by IME, tip-over type, and one with a file support roller. The rest indicated is custom-made with no provision for a draw bolt. It is by far the most productive rest of the group.

Figure 5 shows how to hold the custom tool rest. The third finger will rest against the front edge of the lathe bed and the small finger goes under the bed. This technique controls location and clamps the rest to the lathe bed. It can be moved and secured ten times per minute with complete ease.



Figure 3. Drawbar adapters will solve many collet problems.

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TOOL BITS

Let's talk tool bits. The tool indicated in Figure 6 is a hobby knife from Radio Shack. The cutting edge is ground away and then sharpened as a parting tool. This will cut anything up to moderately hard steel, faster than the same could be cut with a jewelers saw. The second knife is used as a marking scriber on a running piece. The remaining tools are hand-held gravers for turning. Each have half-inch diameter handles and are held in pencil fashion.

Drill bit holders may have various forms. Most of the holders in Figure 7 are various types of a pin vise. The tool indicated is a tailstock runner for a specific bit. This is a production-type drill bit holder.



Figure 4. What type of tool rest will we need?

MEASUREMENTS

Lathe work requires many forms of measurement devices. We have some classic tools in Figure 8. Simple steel scales are always useful, as is a dial caliper and micrometer. The micrometer on the left is built to measure very small wire and other filaments. A one-inch micrometer, six-inch steel scale, and a six-inch dial caliper will serve most needs of the clockmaker.

FORWARD

Next issue we will deal with turning, center location problems, and drilling. ❑



Figure 5. Method of holding the fixed rest.



Figure 7. Various methods for holding drill bits.



Figure 6. What tool bits will we need?



Figure 8. Tools for making measurements.

PLANS FOR AWI'S '92 HOROLOGICAL TOUR WELL UNDERWAY

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The 1992 AWI Horological Tour, to be guided by Henry B. Fried, will visit three countries over a 17-day period. Some of the highlights: Paris, where the French horological industry center will receive our group as well as arrange our visit to a Parisian horological manufacturer. Also a meeting is being sought with the Paris branch of the French watch and clock collectors. The usual Parisian sights and sightseeing is also on our itinerary.

After Paris, we will visit the Chateau country of France, which includes Blois, where watch enamelling was first introduced, as well as seeing a good collection of such items.

Plans are also in the making to visit Geneva, Switzerland. There we will be visiting Patek Philippe and other fine makers as well as the Patek Philippe museum. After Geneva, we will visit nearby Anemasse to visit the watch factory in that small city. From there, we'll take a tour of Mont Blanc with a cable car to its upper reaches.

Our next stop will be Madrid, Spain. From there we'll go to Seville, site of the World Expo '92. Then we'll tour Spain's famous cities such as Cadiz and Marbella, Malaga, and Granada. We'll make a visit to the horological museum in Jerez de Frontenac, which also is a center where cherry wine is produced.

The tour starts May 4th, a time which will provide good weather without needs for various clothing requirements. Advantage Tours will supply all meals, with a projected price of about $3,900. Write for brochure and details today! **AWI 1992 TOUR, c/o AWI Central, P.O. Box 11011, Cincinnati, OH 45211.**

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PART LXXII
REPIVOTING WATCH PINIONS

Another tool that can be used for repivoting watch pinions is shown in Figure 1. This tool can be made by the watchmaker. View A shows a top view of the tool. The base of the tool is a lathe shoe which fits the bed of the lathe being used. A block of 1/4 inch thick sheet brass or steel is mounted on top of the shoe at the end of the shoe as shown. The brass or steel block is shaped as shown with a hole to fit the arbor of a lantern disc. The hole is made far enough off-center from the lathe center to allow the holes in the lantern disc to be exactly on center with the lathe center. The arbor is held tightly in its hole by tightening a tension screw on the block which closes up a split hole around the arbor. The holes in the lantern disc are beveled for centering the end of a pinion while a center is spotted in the end of the pinion and the hole is drilled for the new pivot.

View B, Figure 1 shows an end view of the attachment. The shoe forming the base of the attachment is shaped to fit a Webster-Whitcomb style lathe bed. This attachment could just as well be fitted to a Moseley shoe to fit a Moseley style lathe bed.

View C, Figure 1 shows an edge view of the attachment, and View D shows a bottom view of the attachment. The bottom view shows the four flathead screws that hold the block to the lathe shoe of the attachment. Two steady pins are also used to locate the block on the lathe shoe. The lathe shoe has a center hole for a bolt used to hold the shoe to the lathe bed. The T-rest bolt can be used in place of a regular bolt to hold the attachment tightly on the lathe bed. When the T-rest bolt is used, the T-rest can also be used on top of the shoe and be tightened in place at the same time as the lathe shoe is tightened to the lathe bed.

DRIVING THE WHEEL AND PINION WHEN REPIVOTING

Figure 2 shows how the lantern disc in the attachment is used to support the pinion arbor for spotting a center and drilling the hole for the new pivot. Also shown is a method that can be used to drive the wheel and pinion while the end of the pinion arbor is being worked on. The drive arrangement consists of

Figure 1

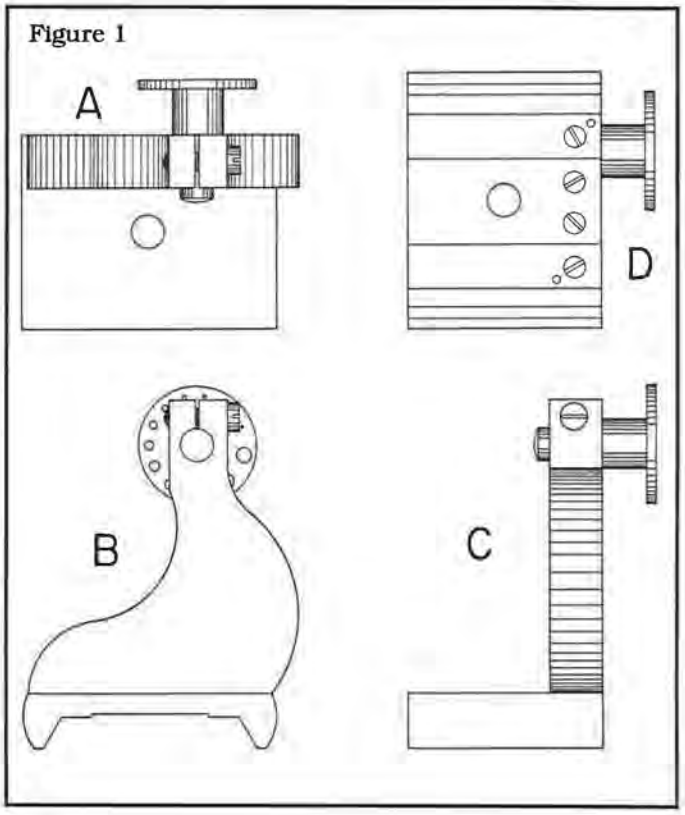


Figure 2

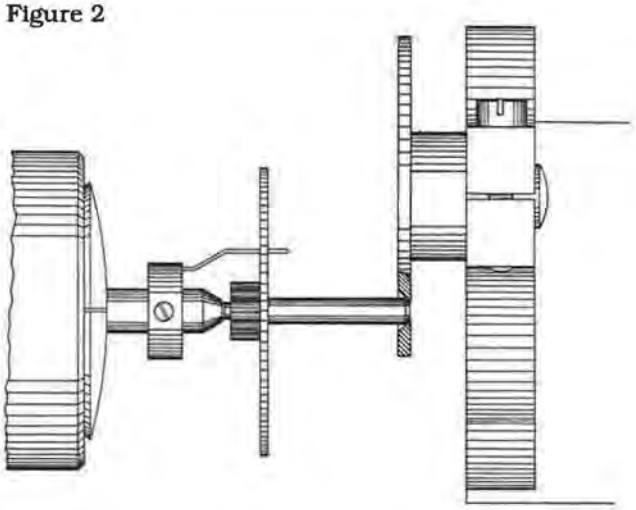
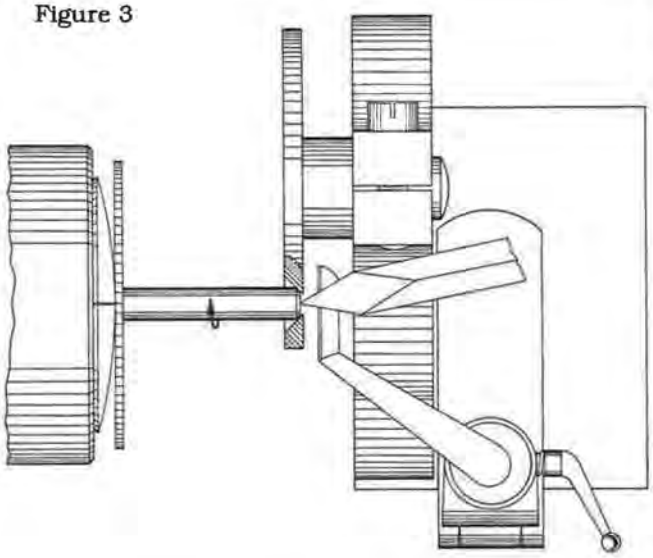


Figure 3



a runner which is chucked true in a lathe wire chuck to support one end of the pinion and a collar with a drive pin which is held on the runner with a set screw. This collar can be adjusted back and forth on the runner so the drive pin can be engaged against a spoke of the wheel.

Another method of holding the pinion for driving it is to chuck it in a wire chuck as shown in Figure 3. When this method is used, the end of the pinion arbor must run absolutely true where it

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Figure 4

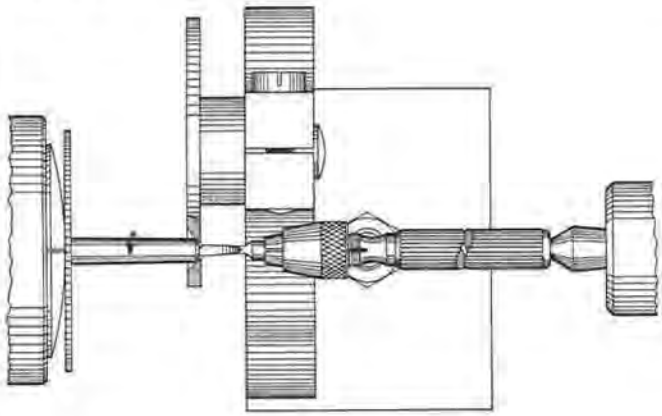
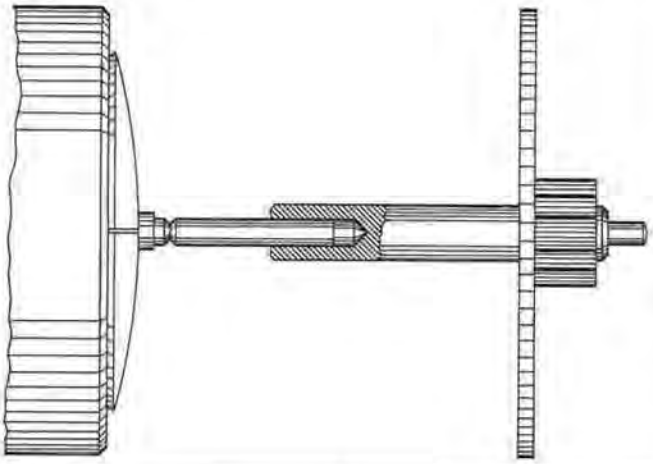


Figure 5



contacts the beveled hole in the lantern disc. This is because the other end of the pinion is held in a rigid manner in the wire chuck. The first method that is shown in Figure 2 is recommended as being the better method of driving the wheel and pinion when using the lantern disc.

SPOTTING THE CENTER

Figure 3 shows how the center is spotted in the end of the pinion arbor prior to drilling the hole for the pivot plug. The center is spotted with a sharp pointed graver. To support the graver, it is necessary to use an L-rest in the hand rest because of the distance between the end of the pinion arbor and the position where the hand rest needs to be fastened on top of the shoe of the attachment. The hand rest and the shoe of the attachment are held tightly on the lathe bed by the hand rest bolt. Note: Before the center is spotted, regardless of the method used, one should stone off flat any of the old pivot remaining on the end of the pinion arbor without touching the polished shoulder of the pinion arbor. An Arkansas stone slip may be used for this purpose.

When centering up the desired hole in the lantern disc for the pinion being worked on, a sharp true male center is used in the tailstock spindle, then the disc is locked into position with the binding screw on the attachment. If a tip-over hand rest is used to hold the L-rest, then after the center has been spotted, the L-rest can be tipped back out of the way while the hole is drilled for the pivot plug. The pinion arbor is turned in the direction of the arrow for spotting the center.

DRILLING THE HOLE

Figure 4 shows the hole being drilled for the pivot plug. The drill selected should be .02 mm to .04 mm larger than the finished pivot is to be. This is to allow for finishing the new pivot. The drill is held in a small pin vise for drilling the hole. The pin vise is guided by the tailstock spindle. A male center is used in the tailstock spindle to go into the hole in the end of the pin vise to center the pin vise. A better way of guiding the pin vise when one has a chuck holding tailstock is to chuck up a rod in the tailstock which fits the hole through the pin vise. This allows the pin vise to be guided for drilling deep holes without having to reset the tailstock spindle as one proceeds to drill the hole. When drilling the hole, one should keep the drill clean and sharp. The drill can be cleaned often with the fingers which will also keep the drill lubricated at the same time. Cutting oil is not usually needed when drilling a hardened pinion arbor.

The shape of the drill is very important. One should start out with a drill that is quite pointed (100 to 110 degrees); then, when the drill stops cutting and is resharpened, the drill can be made more blunt (118 to 120 degrees). When this is done, the drill has more of a tendency to skim off the burnished surface at the bottom of the hole so the drill will start cutting after it has been resharpened. Sometimes it is necessary to sharpen the drill with a rounded end or even a square end in order to remove the burnished bottom of the hole and to finally drill the hole to the finished depth. The finished depth of the hole should be at least two times the length of the finished pivot for regular pivots and to a distance equal to one-half the length of a seconds pivot for seconds pivots. In order to avoid burnishing the bottom of the hole, the drill must be kept very sharp. Very little pressure is applied to the drill and the lathe is run very slowly.

If the pinion arbor is too hard to drill, it can be tempered to make it softer. This can be done in the following manner. Take a piece of copper or brass rod, chuck it in the lathe, and drill a hole in the end of the rod that the end of the pinion arbor will fit closely into. A handle can be placed on the end of the rod to hold onto while using the tool. The rod is heated in the flame prior to placing the end of the pinion arbor into the hole. The very end of the pinion arbor only is placed in the hole in the rod. The pinion arbor near the end of the rod is watched for any color

change. When the color changes to blue, the pinion is removed from the hole in the rod and let cool in the air. If this tempering does not allow it to be drilled, then the pinion arbor is polished and retempered to blue again. Sometimes even after tempering a pinion arbor, the drill will not cut. This may be because when the pinion was made and hardened, it was overheated (burned) in the heating process which resulted in a very coarse crystallized structure in the pinion. This structure is very hard on a drill. When this condition exists, one should heat the end of the pinion arbor to a very dark (dull) red in order to anneal the very end of the arbor only. In some cases, one can use a carbide drill in order to avoid having to heat the arbor to the dull red color.

MAKING THE PIVOT PLUG

Figure 5 shows the pivot plug being made and fitted to the hole in the pinion arbor. The pivot plug should be made from blue steel pivot wire. The wire is first chucked true in the lathe. Then the wire is turned down with a slight front taper. This is so the plug will match the hole in the arbor more closely. Note: When a hole is drilled, the drill usually makes the hole slightly larger at the front end of the hole; therefore, one should taper the plug slightly to match the tapered hole that the drill made. The plug should be

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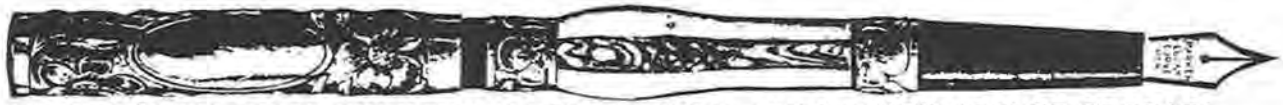
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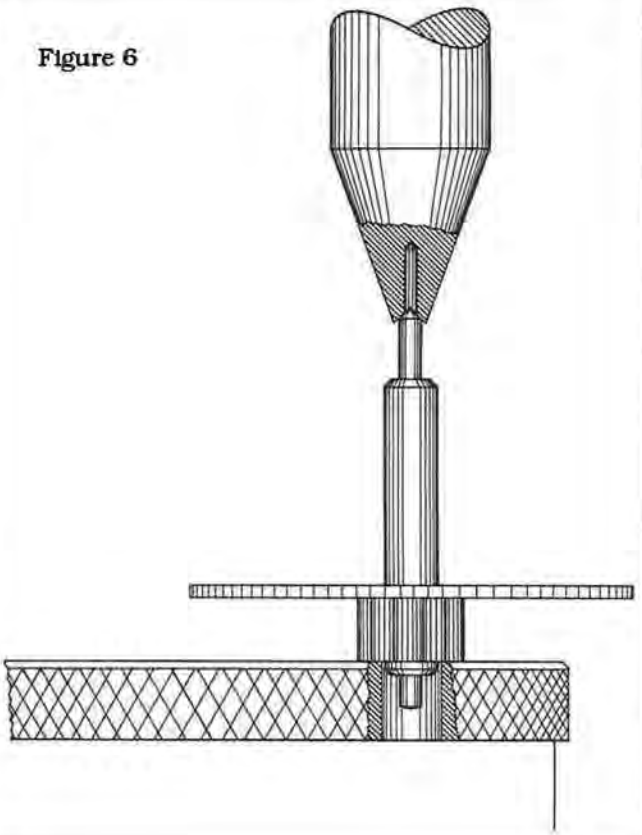
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Figure 6



of such a diameter that it fits the hole snugly and its end is at a distance from the bottom of the hole which is equal to one-fourth of the depth of the hole. After the plug has been turned to fit the hole in the arbor correctly, a deep groove is turned on the plug so it can be broken from the wire. After the groove has been turned on the plug, the pinion arbor is placed on the plug and the plug is broken off of the wire. This is done to avoid losing the plug. Note: When turning the groove on the plug, be sure to allow enough length on the plug for pressing the plug in the bottom of the hole and to make the pivot on the plug.

INSTALLING THE PLUG

Figure 6 shows how the pivot plug can be seated in its hole. To do this, the pinion head is seated on the die plate of the staking tool over a hole that just clears the pivot shoulder section of the pinion as shown. Then a small taper mouth punch is used over the pointed end of the pivot plug to stake the plug to the bottom of the hole. This method tends to help keep the plug straighter during the staking process compared to just tapping the plug in with a hammer.

TURNING THE PLUG TO SIZE

Figure 7 shows how the pivot is turned to size and shape. To do this, the end of the pinion arbor is supported in a hole in the lantern disc which allows the shoulder of the arbor to protrude through the hole slightly so the shoulder of the pivot can be finished at the same time as the pivot is finished. When the pivot is being turned to size, the graver is supported on an L-rest as shown. The pivot should be left slightly oversized to allow for its finishing.

FINISHING THE PIVOT

Figure 8 shows how the pivot is ground and polished to size and finish. A sapphire burnisher can be used to remove any graver marks on the pivot and then the pivot is polished by using a boxwood slip and diamantine or Linde A®. This is shown in View A, Figure 8. View B shows how the end of the pivot is rounded and finished.

This concludes the series on pivot work.

"Antique Watch Restoration" will continue next month. ❑

Figure 7

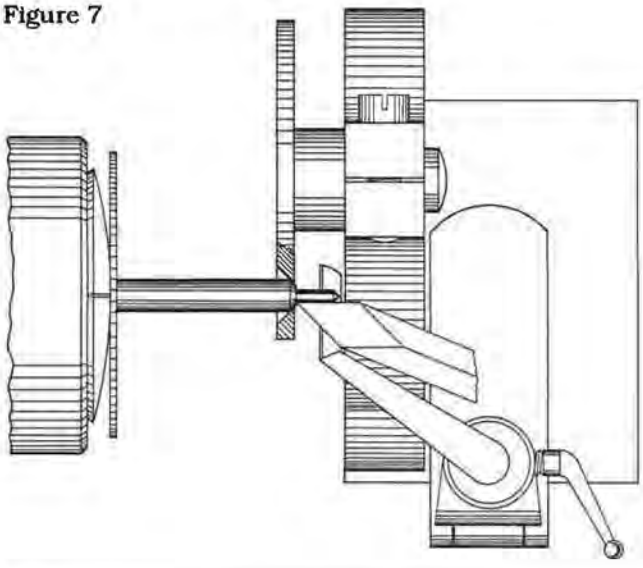
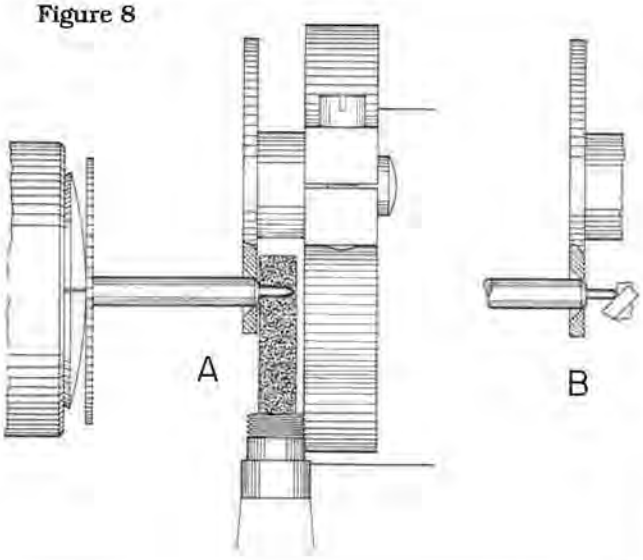


Figure 8



ROCK QUARRY et tu



Fred S. Burckhardt

Christmas Partying

With the Yuletide season upon us once again, a flood of fond memories rush back to enhance this holiday season.

My thoughts drift back to late one Christmas Eve night when a few last-minute shoppers were still milling around in the store and the sound of Christmas carols drifted from the shop. The music was supplied by the Watchmakers and Jewelers Chorus. They've been practicing the last few months just so they could bring their sweet-sounding melodies for everyone's enjoyment on this holiest of nights.

Outside, the snow had already started to drift against the storefront. A little boy in ragged clothes with a homemade crutch under one arm stood peering through the window at the decorated tree and brightly lit decorations. One employee, dressed as Santa, took the boy a cup of hot cocoa and several presents. With tears of happiness rolling down his rosy cheeks, the little boy waved and said, "God bless us everyone!"

When the last customer left, the door was locked. All the employees gathered around the tree in a circle. Holding hands, we all sang "Silent Night." Christmas presents were exchanged, and after partaking of some refreshments of cocoa and cookies, it came time to close the store. There was a little sadness in having to leave. We all enjoyed each other's company and relished the time we spent working together. But we had to leave now, as the Watchmakers and Jewelers Chorus planned on visiting several rest homes and orphanages to present their tidings of good cheer.

As each employee left, the boss presented them with a Christmas goose and an envelope containing a Christmas bonus. When everyone had gone, the boss turned out the lights, locked the front door, and standing for a minute in the freshly fallen snow, said to himself, "What a wonderful life!"

Now that you are all choked up, let me tell you the *real* story.

It was Christmas Eve, and getting close to closing time. The boss promised we would close early. This meant instead of nine o'clock we would close at eight fifty-five.

One customer was left--an older woman who couldn't decide between a three-dollar silver chain or a five-dollar watch band. The guys in the shop had already been bending their elbows and were singing "Nellie Had a New Dress." The woman customer was finally told to make up her feeble mind because we wanted to get out of here as it was beginning to sleet outside. Some young punk with a baseball bat walked up to the window, smashed it with the bat, and grabbed some of the jewelry. Luckily he was caught, beaten up, and turned over to the police.

The woman couldn't make up her mind, so she was told to leave and go bug somebody else. The shop gang settled down a little, only because they wanted to hear Tom, one of the watchmakers, recite "The Face on the Barroom Floor." They always did enjoy good poetry.

Elma Sue, one of the sales people, walked into the shop dressed in her Santa's Elf costume. You may think this sounds cute, but Elma Sue pushed 300 pounds and she looked like a giant ripe tomato. A few disparaging remarks were made, and Elma Sue left crying. There never was too much couth displayed in that shop.

When all the merchandise was put away, the boss gathered everyone together and announced that since business was off a little he had to decide between a new car for his wife or a bonus for the employees. He decided on the new car. This announcement didn't exactly raise the level of Christmas cheer. If it hadn't been for Miss Dunlittle, the matriarch of the store, the boss would never have made it out of the door. They took their hostility out on her by hanging her to the top of the tree in place of the star.

When things settled down a little, the boss came back in, and to show his appreciation, he gave everyone a five-dollar bill. (Did you ever see a person with five-dollar bills sticking out of every orifice of his body?)

After some more partying, it was decided to adjourn to the local tea house. As the employees were leaving, the boss gave them all a goose--not the fowl kind, but it was foul. The girls complained and slapped his face, but a couple of the fellows kind of liked it and got back in line.

When everyone had gone, the boss turned off the lights, locked the door, and thought to himself, *What a rotten way to make a living . . .*

As far as I know, Miss Dunlittle is still up in the tree.

❑

A DEPTHING TOOL FOR CLOCK GEARS

Fabrication & Assembly Instructions

by
Cy Felheimer
FNAWCC

Make parts A and B very carefully. Make sure to bore the .250 .003" holes vertical and that the holes in each leg are parallel. Use a bench press to align the hole if necessary. A .250" drill rod should move freely without binding when inserted through the top and bottom holes in the legs of the channel. This is the only difficult part, and it might be wise to have the holes bored in a milling machine at a shop capable of this work.

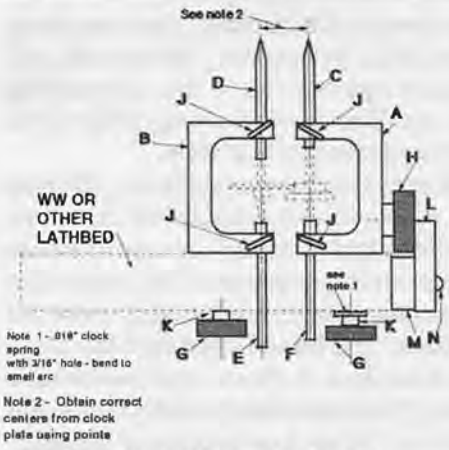
Make the other parts, and assemble as shown in the drawings. The micro adjustment is not required, but is nice to have when using the tool. If you add the micro adjustment, be certain to loosen B slightly before turning H.

This tool may be used on your present watchmaker's lathe. Or, if you find frequent use for the tool, you may buy a used lathe bed at one of our Marts. If you use the tool often on a separate lathe bed, you will want to devise some simple legs for it.

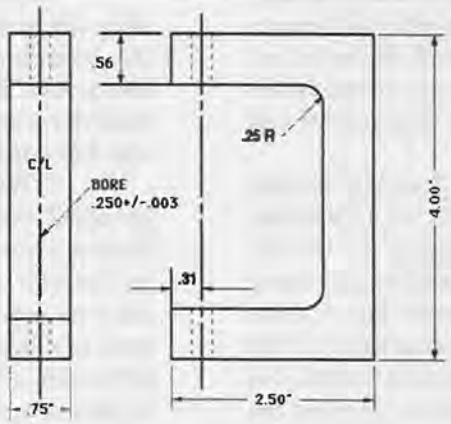
To use this tool, get the proper centers from the clock plate using the pointed end of parts C and D. Then set up the gears in question on Parts E and F. You then can make sure that the gears mesh properly, or if they will be too tight or too loose when the clock is assembled. The tool is most useful when you have cut a new gear or repaired one with inserted teeth.

This tool is actually used in the same manner as the traditional depthing tool but this tool is much sturdier and stiffer than the conventional depthing tool. Also, this tool is less expensive to make than to buy the traditional kind.

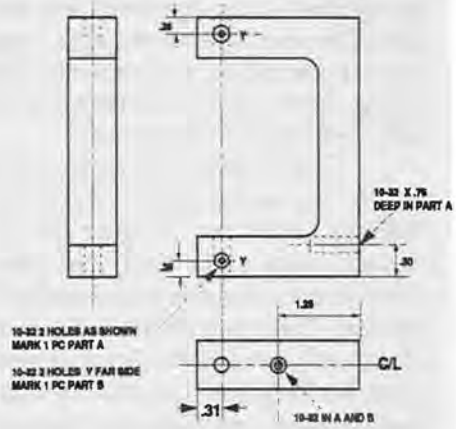
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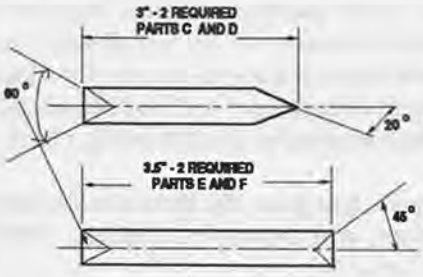
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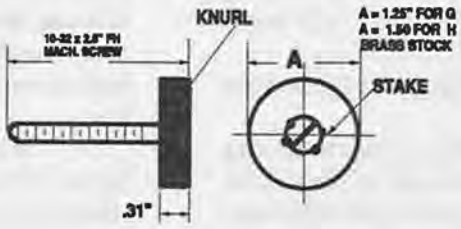
CHANNEL
2 REQUIRED- A & B
MATERIAL 3/4" STOCK ALUM.



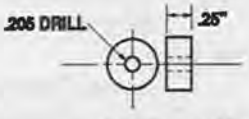
CHANNELS
DRILLING AND TAPPING



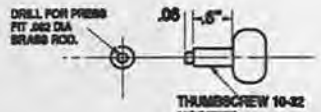
SHAFTS
.25" STEEL DRILL ROD



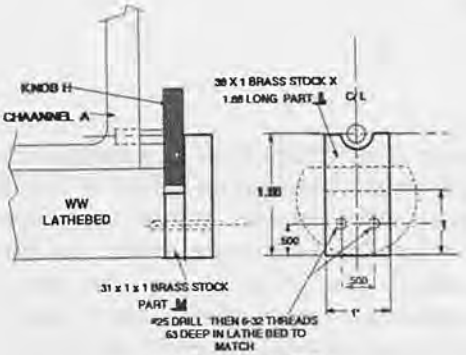
KNOB
2 PART G - 1 PART H



SPACER- PART K
.50 BRASS STOCK
2 REQUIRED



THUMBSCREW
PART J
4 REQUIRED



MICRO ADJUSTMENT
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DEPTHING TOOL FOR CLOCK GEARS

BILL OF MATERIALS
CY FELHEIMER,FNAWCC

A & B	1 each	Channel	3/4" stock Alum. or Brass
C & D	1 each	Shaft	.250" dia. x 3" steel drill rod
E & F	1 each	Shaft	.250" dia. x 3-1/2" steel drill rod
G	2	Knob	1-1/4"dia. x .31"brass & 2 #10-32 x 2-1/2" FH machine screws
H	1	Knob	Same as G but 1-1/2" dia. (optional)
J	4	Thumbscrew	#10-31 steel x 1/2"(commercial)
K	2	Spacers	1/2" dia. x 1/4" thick brass
L	1	Bar	3/8" x 1" x 1-7/8" brass(optional)
M	1	Bar	5/16" x 1" x 1" brass (optional)
N	2	Screw	#6-32 x 1-1/4" RH steel mach. screw

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JEWELRY CRAFTING AND REPAIR
The Flex-shaft Tool and Accessories

One of the most versatile and necessary tools for handcrafting and repairing jewelry is the flex-shaft tool (Figures 1 and 2). This tool can be used for drilling, grinding, turning, reaming, cutting seats for stones, countersinking, routing, burnishing, and even polishing.

ACCESSORIES

There is an unlimited number of accessories that can be used with this tool. Several handpieces that can be exchanged on the end of the shaft are available, but the most used is the one with the key-gear chuck (see Figures 2B and C) which allows a quick change of burs, arbors, drills, or other rotary tools in a larger range of sizes than the other handpieces. Most of the other handpieces use a collet to hold the accessory, and come with a 3/32 inch collet. Other size collets can be purchased separately. The other handpieces are better probably for production work where many like pieces are being manufactured, but for general work where the shanks can be many sizes the key-gear chuck type is the most practical. The standard size for shanks of burs and attachments generally used in the flex-shaft tool is 3/32 inch. Many, however, are 1/8 inch, which require special collets for the handpieces other than the key-gear type. The key-gear type will accept and hold secure from 1/32 inch to 3/16 inch, and will include twist drills as small as number 74, which are about .6 mm. Arbors may be purchased to hold small abrasive or felt wheels for grinding and polishing, and are mostly available in 3/32 inch diameter arbors (see Figures 3B, C, and F).



Figure 1. A--gear reduction; B--direct drive shaft (covered).

DRILLING

For drilling, straight shank drills can be used, or an assortment of 3/32 inch shank drills is available (Figure 4B). For drilling stones or hard-tempered steel, an assortment of diamond points is available (Figures 4A).



Figure 2. A--foot control; B--key-gear chuck handpiece; C--key for chuck.

When drilling, the handpiece can be held in one hand, the work in the other, and the drill can be controlled (as well as the speed) by the foot rheostat control. It is wise to back up the work being drilled with wood such as the filing block, which should be in front of you on the bench. In drilling rings, I have a tapered wood spindle that the ring can be put on and pushed tight against the taper, which allows the drill to enter the wood and will greatly reduce the chances of breaking drills.

The foot control governs the speed of the shaft and is an electric rheostat. The farther it is pressed, the more speed the shaft will turn. Therefore, it is a matter of learning to coordinate the hands and foot to make the flex-shaft tool perform as it should (Figure 2A).

Figure 1 shows one of the older flex-shaft tools with the gear reduction on one end of the motor (Figure 1A) which gives much better control at slow speeds as it will also develop more power. On the other end of the motor, the shaft is under the cover (Figure 1B) which can be removed. The shaft can be hooked up in direct drive with the motor and the cover can be put on the gear reduction. The direct drive can greatly increase the speed, but lessens the power and control at slow speeds. The high speed is used mostly for polishing or for using diamond-charged tools that require high speed.

The newer flex-shaft tools do not have the gear reduction attachment. They don't need it due to the new motors being a much higher torque motor, and will operate with a smooth flow of power at slow speeds as well as high speeds. The gear reduction type tool hangs in a horizontal position and has a shaft extending from each side of the motor. The high torque motor hangs in a vertical position. Its motor shaft protrudes from one end of the motor only, with no changing of the shaft necessary to go from high speed to low speed, or vice versa. The gear reduction attachment allows a variation of speeds from 0 to 5000 RPM, and using the direct drive gives a variation of 0 to 14000 RPM. The high torque flex-shafft tool gives a speed variation of 0 to 14000 RPM. In either tool, to increase the top RPM speed to 35000, a handpiece is available that will give this increase in speed for opera-tions needing it.

FLEX-SHAFT TOOL VS. DRILL PRESS

Using the flex-shaft tool for drilling has some advantages over using a drill press, although pressure on the drill has to be governed by the hands with no leverage such as can be applied with the press. First, the flex-shaft tool is always hanging on the bench where you work, and it is not necessary to move to get to it. The attachments you will use should be in one of the bench drawers, so setting it up only requires a couple of movements of the hands. This is a timesaver.

Next, a mark should be center-punched where the drill is to be started. If it should be slightly off by slanting the handpiece, the point of the drill will creep slightly to the exact place to be drilled, then straightened while still rotating, and the hole can then be drilled in the exact location.

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In using drills, there are some considerations that should be recognized. This is because there are two different materials that drills are generally made of which should be used. Carbon drills can have the temper drawn from them by getting them too hot, while high-speed steel will stand the heat without losing its hardness. Drills should not be allowed to get hot enough to remove the hardness from carbon drills unless the material is too hard for a steel drill to cut. When the drill shows it is not cutting if it is dull, sharpen it; but if the material is too hard for the drill, it should be annealed, or a carbide or diamond drill used instead. Beeswax is a good lubricant to use in drilling, or for that matter for using burs or even sawing. Drills and burs can be touched to a piece of beeswax while rotating and pick up enough lubricant to keep the drill or bur from getting hot. It will smoke if the tool does get too hot before any real damage is done to the tool. The cause of the heating is usually a dull drill, but this should be determined before proceeding with the work.

When in the process of drilling a drill breaks off in the work, it can create a real problem. If a carbon drill is broken off, the hardness can be drawn from the piece broken off by heating the work hot enough to make it a gray color. Then with another drill this one can be drilled out and the hole completed. These very small drills that are often used in jewelry work are difficult to sharpen, but can be done using the flex-shaft tool with a small grinding wheel. I use a separating disc mounted on a 3/32 arbor.

NEEDS FOR DRILLING

There are many needs for drilling other than for making holes. This includes making holes for rivets, drilling the riveted ends or rivet heads for removing the rivets when necessary in making a repair. Hinges on jewelry or watch cases sometimes have to be taken apart and the hinge pin will not push or tap out, so must be drilled out completely or partially in order to remove the hinge pin. Most of these hinge pins are brass or nickel silver, so with a drill of the proper size these can be drilled out, even though it is a difficult operation. Many watch bands have hinged joints with pins, and some even with screw-threaded ends, that can be put in with a screwdriver and get corroded. When removal is necessary for these, they must be drilled out and replaced with a hinge pin made of rivet wire, and then the ends riveted. Some pins are installed, and either one or sometimes both ends are hard-soldered. Thus, when removal of these is necessary, the only way that I know of to get them out is to drill into the ends where they are soldered. There are many other drilling necessities that will confront you while working at jewelry crafting and repair, so the more experience you can get at it the better equipped you will be to handle it.

Another common use for the flex-shaft tool is for turning metal or wood, or even plastics. Instead of using gravers or lathe cutting tools you can use files for reducing or shaping and abrasive buff sticks for polishing. As the key-gear type of chuck will take rod from 1/12 inch to 3/16 inch in diameter, any of these can be reduced in size by filing while rotating. The handpiece can be laid in a horizontal position on the edge of the bench and held solid with one hand, and the file used with the other hand. I've even used this to make a firing pin for a firearm (gun) using high carbon water-hardening tool steel; when finished, I temper it to the desired hardness.

Since I always make pierced earring posts from 14K yellow or white gold and men's tie tack posts usually from brass or nickel silver, the ends can be shaped by chucking the correct diameter wire in the flex-shaft tool and using it as previously described, shaping the ends and polishing them before hard-soldering them to the earring or tie tack. I've made rivets from brass, nickel silver, copper, or karat gold wire by chucking up a piece of wire the diameter of the rivet head needed and filing while rotating until the shank is reduced to the proper size. Then I turn it around and chuck it by the shank so the head can then be shaped. This may sound like a lot of work to keep from buying rivets that are much less expensive than the time needed to make them. However, to figure out the size needed, find a source, make out an order, purchase a minimum amount, and lay the job back until the material is received. It's much better to take the time to

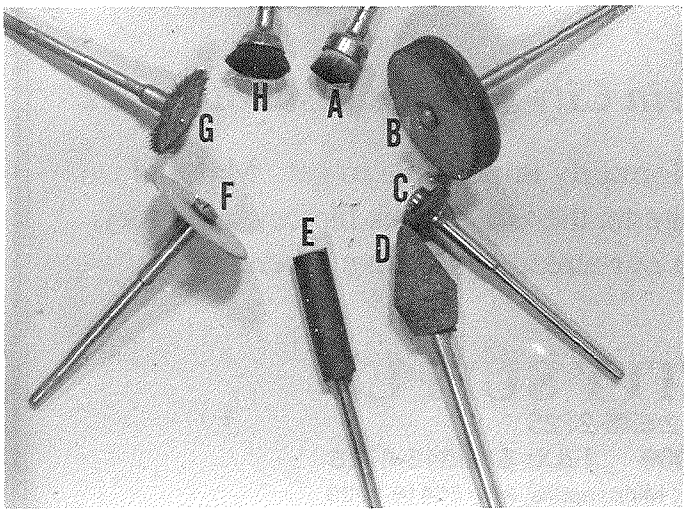


Figure 3

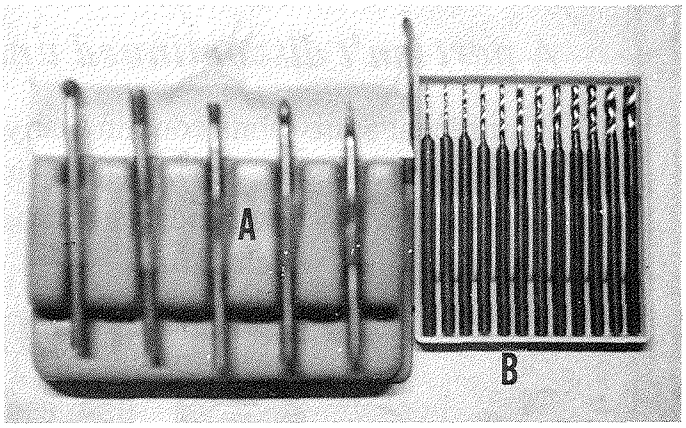


Figure 4. A--diamond points; B--3/32-inch shank drills.

make one finish the job and deliver it in a reasonable amount of time. It's great to have on hand all kinds of assortments of findings like rivets, spring rings, jump rings, etc., but when you don't, it is also great to have the ability to improvise, and the material and equipment to improvise with.

BURS

The use of burs is also a necessity in doing jewelry crafting and repair, and the flex-shaft tool is the most practical tool for driving them. Figure 5 shows seven different shaped burs. These seven burs are used extensively in making and repairing jewelry, and are only a few of the burs that are available. Setting burs are used to cut seats for stones that are round-faceted and shaped like modern-cut diamonds. They're shaped much like the lower half of the stone from the girdle to the culet so when the seat is cut the stone fits the seat. They are available in sets with a cutting diameter starting at 1 mm and increasing in size by approximately .2 to 10mm, which is a set of 30 setting burs. This set will take care of almost all of the setting needs you are likely to encounter. Usually in settings, a hole is already clear through the setting and can be drilled out to about three-fourths the diameter of the setting bur you need to use. This makes it much easier on the setting bur as it only has the edge to cut away. The use of beeswax is also helpful when applied to the cutting edges of the bur, and will greatly increase the life of the bur.

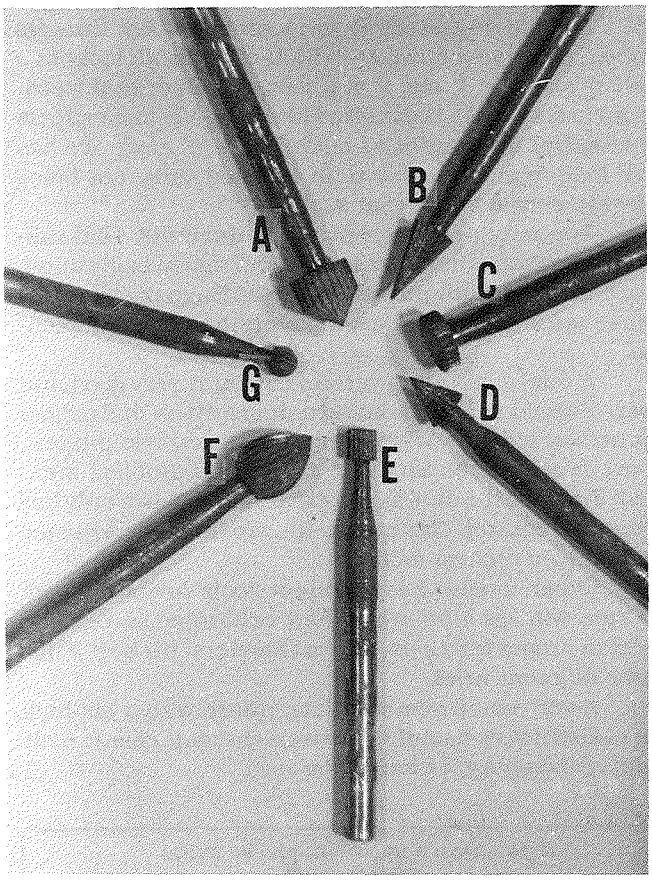


Figure 5. A--setting bur; B--slim reamer; C--wheel bur; D--cone bur; E--cylinder shape bur; F--bud bur; G--ball shape bur.

The slim reamer will cut a tapered hole. It also can be used to round up holes that have had metal hard-soldered in them to compensate for wear and many other uses in removing metal from inner arc surfaces. The wheel bur can be used as a router, as it has teeth on the bottom as well as on the side of the bur. The cone bur can be used for much the same as the slim reamer, only the angle of cut is greater because the bur is shorter. The cylinder-shaped bur can be used much the same as the wheel bur, only having a longer body it will take a longer cut on the sides. This is better for working the sides of deeper depressions. The bud bur is excellent for countersinking where countersink-type rivets are to be used. The ball shape bur is excellent for making half-round depressions for making seats for round stones like pearls or beads which are to be cemented in. One other bur that is not shown that I find useful and timesaving is the cup bur which has an inside dome with cutters and can round the end of a prong, bead over a stone or the end of a rivet, leaving a perfect dome or bead. These come in a variety of sizes, from small enough to finish beads on melee stones to large enough for finishing beads on large stones.

There are many other types of burs and many uses for the flex-shaft tool that have not been mentioned, but like any other tool and attachments, the ability and ingenuity of the person using it is what makes it useful. Practice and experience are the most important methods of developing this ability and ingenuity.

In the next article, the rolling mill and reducing the size of metals will be discussed.

❑

CORRECTION

Please note the following correction for the book review *Habsburg--Art of Breguet* which appeared on page 38 of the November issue. In column #2, the 4th paragraph from the bottom, we wish to point out that Phineas Fogg made his around-the-world trip in 80 days, not 8. Society was not jet-propelled in those days . . .

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Ask Huck

CLOCKMAKING BITS About...

By J.M. Huckabee
CMC, FBHI



THE HAMMER and MEASUREMENTS & TECHNIQUES

Q. I've just looked through a tool catalog and found more than 50 hammers listed. How many of these do I need? How many do you use?

A. I'm glad you asked how many I use. I use lots less than I own! Each hammer has a specific job that it's made for and is best in that application. Actually, I use very few in clockmaking; in fact, about four by count. The hammer is one of the oldest and most useful tools known to man.

Let's discuss how I use the hammer. I use a watchmakers staking tool extensively. My hammer for that tool is a two-ounce brass, with never an exception. Here is the reason. A steel hammer will upset the punch heads and destroy the inverto feature. Also, the staking tool is not a blacksmith anvil and needs a delicate and controlled stroke.

For larger clockwork, I use a two-ounce steel ball-peen hammer with a little larger handle. My large punches are not of the inverto type and commonly need harder strokes. The steel hammer is more suitable. For smaller work, a one-ounce steel hammer is used.

A two-ounce, soft-faced hammer is used for a number of items, but I do not keep this one on the bench full time.

When a protected stroke is needed I use some wood dowels, about three inches long and a quarter to three-quarters of an inch in diameter. The stroke is via the dowel, using it as a soft punch. Harder strokes requiring a no-mar surface are done by overlaying the object with a short piece of polished eight-day mainspring, strike the spring with the hammer, and transfer the blow via the polished spring surface.

Use of lots of sizes of brass and bronze punches, and the wood dowel punches gives a great selection of working conditions with a limited number of hammers.

My methods may be unpleasant to some workmen, and I have no complaint about that. The methods I'm using is the way I learned. On the other hand, I think it would be just great to be an apprentice clockmaker and have access to all of the nice tools that are available today.

Your question prompted a look through a tool catalog; I may not be able to resist ordering some of the nice hammers listed. I've never owned a good boxwood mallet!

Q. Hole gauges are available to measure pivot diameters, but how can I measure the diameter of a pivot hole? What do you use for making measurements in clockwork?

A. I own pivot hole gauges, drill gauges, and wire gauges, plus some others, but I haven't used one of them for many years. The real reason is that to trial-fit a pivot or drill bit in the hole of a gauge plate is just too much trouble.

I use a dial caliper to measure drill bits, pivots, wire, and also for many other measurements. A good dial caliper costs less than the group of gauges mentioned, and has much more speed and utility.

To measure the diameter of a pivot hole, slip a smoothing broach into the hole until snug, then measure the broach at the plate. If you want a more precise measurement, measure the broach at both sides of the plate and take the mean value.

I would suggest that you look into some catalogs of the machine tool industry which offer these tools in a variety of sizes, features, and prices. A caliper that measures up to six inches is the size I like best. Vernier calipers cost less, but are harder to read. The vernier device has better long-term accuracy than the dial unit, not being subject to debris in the gear rack.

You may prefer metric measurements. Dial calipers cost the same in either metric or English calibration. I have both styles, but probably use the English style most because most American materials are in English dimensions.

A dual calibration vernier caliper is very good, but slower. I would not recommend a dual system dial caliper for practical reasons. They have two racks, two pinions, and are much more subject to the debris problem mentioned. Further, the dual system dial caliper I own only has one zero-set control. This means the zero must be adjusted each time you change mode.

Other useful measurement tools are a six-inch steel rule with ground edges and calibrated in decimal inches, in proper fractions, and millimeters. It's best if this is three different rules.

A very small combination square with a six-inch scale is also a very useful measurement tool. Plastic tools are not satisfactory for long-term use. ❑

If you have a question, please write:
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c/o *Horological Times*
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SEEKING PROSPECTIVE CANDIDATES FOR THE AWI BOARD OF DIRECTORS

The committee involved with securing candidates to run for the AWI Board of Directors is seeking recommendations from the membership. If you plan to suggest a possible candidate, please send that individual's name and background to: Mr. James H. Broughton, Chairman; Nominations for Board of Directors Committee; AWI Central; 3700 Harrison Avenue; Cincinnati, OH 45211.

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

Mr. Broughton must receive all recommendations before December 31, 1991 to be considered for the 1992 election.

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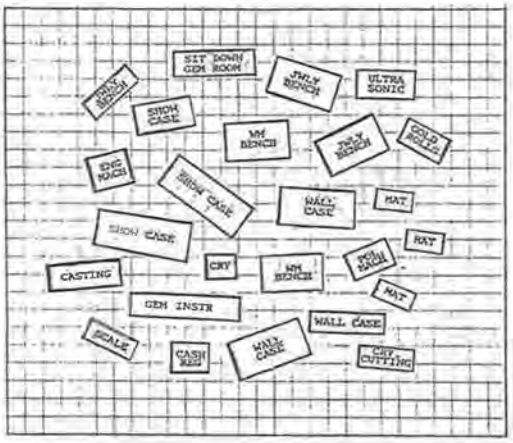
Part 4

Store Fixture Arrangements

We have discussed store locations and store shapes and sizes. We will presume we have selected a location and our store footage is 24 x 28. These measurements are for our examples today and in no way are they a recommendation as to the "ideal" store size.

We will also presume that we have the exact number of fixtures shown in Figure 1. These 25 items are to scale with the background squares shown here. Each square equals one foot. Notice there are 28 squares in one direction and 24 the other.

FIGURE 1



LAYOUT WITH PAPER CUTOUTS

There is an easy way to make up these scale models of showcases, etc. The scale I used here is 1/4 inch equals one foot. First, we need to stop at our favorite office supply store, but don't tell them that you are used to working in metric. If you do, they will sell you a construction pad marked out with 10 squares per inch (still not metric but similar only to the extent of dividing something into 10 parts). What we really want is a regular pad which has 8 squares per inch. Figure 1 is

FIGURE 2

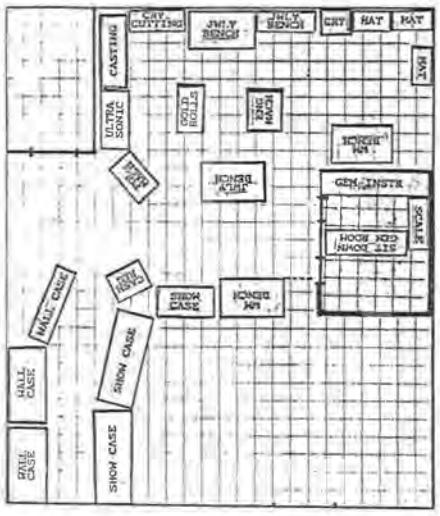


FIGURE 3

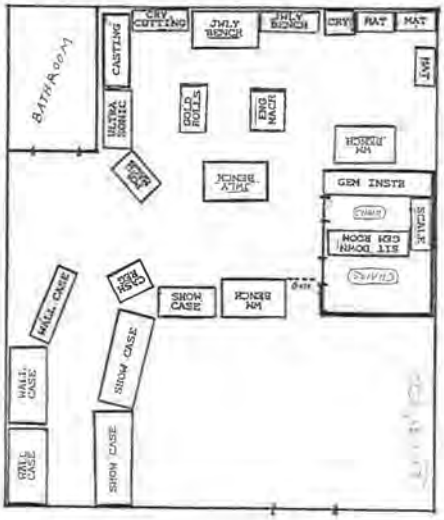
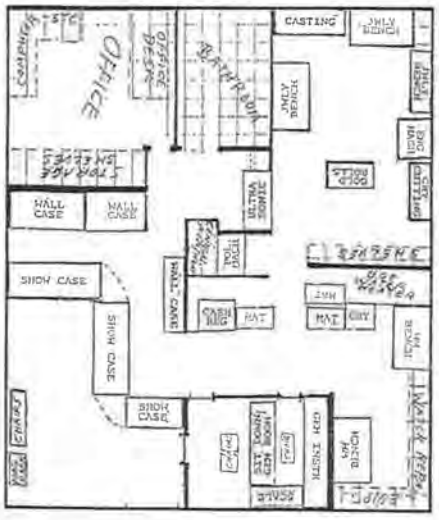


FIGURE 4



from such a pad. Each of these squares were 1/4 inch; however, they were reduced in this article to save space, so don't measure them now as they will measure smaller in this article.

Since each square equals 1 foot, we need to measure each of our fixtures and draw them to their proper size as shown in Figure 1. For example, one of the showcases shown here measures 5 feet by 2 feet; therefore, we cut out a piece 5 squares by 2 squares to represent the size of this showcase.

Before we start cutting paper showcases, etc. we need to glue (or double-face tape) one sheet of our scale paper to a light cardboard. Next, we measure all of our major fixtures and cut them out to scale. Take another sheet of the draft paper and draw a border which is 7 inches by 6 inches. At 1/4 inch per square, let's see . . . that's 4 per inch times 7 inches equals 28, by 4 per inch times 6 equals 24. As we said, this is just the example we are using today. We should use the proper measurements to represent our own store or department that we are renting, buying, remodeling, or whatever.

Now that we have cut out all of our paper fixtures, we certainly do not want to arrange them as shown in Figure 1, do we? Do you think these will actually fit in a store space this size? Remember, these are cut out to scale (1 square = 1 foot). The answer is yes, as shown in Figure 2.

ARRANGING FIXTURES

Now we need to take our 25 cutouts and put a small piece of double-face tape on the back of each one. This will allow us to arrange and rearrange these paper fixtures to meet our needs and personal desires. We can count the squares to check out the various spaces. For instance, I notice we have about 17 times 10 feet of space for our customers. Does this give us the open feeling we need? Maybe so, for now, and later maybe we will want to add more wall cases and showcases. For now, maybe two or three chairs and a magazine rack would be nice. See Figure 3 which is the same as Figure 2 except we removed our draft paper squares for easier viewing in this article; we also added chairs and a magazine rack for our customers. Of course, we do have chairs in our gem room for those who we invite in. Notice, we have a gate between our gem room and our watchmaking take-in bench. This allows customers to enter our gem room only when invited. We can also keep an eye on our customers while we are polishing their rings or doing a minor repair job. We do not need to turn our back on our customer while we are ringing up that big sale. We could put a watch band display in that triangular space in front of the cash register (between the two showcases).

When business builds up, maybe we should move the front watchmaking bench to the back, then we would have room for another showcase up front. We may also want to put a partition in front of the jewelry repair bench.

Since the bathroom was already in this building, it might be good thinking to place an additional sink on the outside of the bathroom wall next to our ultrasonic cleaning machine.

There are many arrangements we can have, and Figure 4 shows these same 25 fixtures in a completely different arrangement. This floor plan is exactly the same size and the 25 items are exactly the same as we used in Figures 2 and 3. The only additions are the items that I printed by hand, such as the office, bathroom, hot water heater, central air/heat, shelves, etc. There are several walls and/or partitions as shown by the heavy black lines. The repair department is out of the customers' sight. The polishing machine is between the jewelry repair department and the watch repair department. The office has its own desk so that mail doesn't pile up on one of the repair benches. The gem room has a sit-down counter showcase so diamond rings, etc. may be displayed under its plate glass top.

So, if it's a new store or you're just remodeling, I highly recommend getting out the scissors and draft paper and making a mockup first. It's a good way to start the New Year.

I hope you and yours have a Merry Christmas and a Happy New Year! ❑

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MOTIVE POWER

By Gerhard M. Hutter
CMW, FBHI, FNAWCC

THE WEIGHT AS A MOTIVE FORCE

The weight is the simplest motive force with which to drive a clock, and gravity is the most consistent power used in horology. The weight has many advantages over a mainspring, uniform power being the greatest. Before the use of the mainspring, weights were the only form of driving force in stationary clocks. From modest longcase and wall clocks to astronomical regulators, all benefited from this even power source.

The length of a clock case restricts the drop of the weight and thus its running time. A pulley can double the running time, but the weight has to be increased more than twofold as the pulley absorbs some of the power. The size of the pulley should also be taken into consideration, for a stiff steel cable with a small pulley can add to the loss of power. The larger size is found in precision regulators and is there not for aesthetic reasons but for the most consistent advantages of power.

Weights come in many different forms, sizes, and materials, from pieces of stone to brass shells filled with sand or mercury. When a lost weight for a grandfather clock needs to be replaced and 13.5 pounds barely keeps the clock running, an additional 10 percent is needed to overcome any deficiencies. So, a 15 pound weight is sufficient to run the clock, and the size and material is our next consideration. The most commonly used metals today--cast iron, brass, or a brass shell filled with lead--need a closer look. The specific gravities of these three metals make a big difference and determine the size of the weight.

Cast Iron	7.3 g/cm^2	or cubic inches
Brass	8.5 g/cm^2	or cubic inches
Lead	11.3 g/cm^2	or cubic inches

To calculate the volume of a cylinder, use the formula:

$$V = 0.7854 \times D^2 \times H$$

V = Volume, D = Diameter, H = Height

Many standard weights have a diameter of 2.5 inches and a height of 7.5 inches. To construct an attractive proportional weight, the average height should measure between two to four times its diameter.

Volume = 0.7854 x 6.25 x 7.5 = 36.82 cubic inches

Multiply the specific gravity of the material with that of water and volume. The specific gravity is the number indicating how many times a certain volume of a material is heavier than an equal volume of water. The density of water differs slightly at different temperatures. The weight of one cubic inch of water at 62 degrees Fahrenheit is 0.0361, and that of lead 11.342 pounds. Multiply the specific gravity of lead, by the volume in cubic inches, by the specific gravity of water (0.0361), and the result is 15.02 pounds.

$$W = V \times G \times M$$

W = Weight, V = Volume, G = Spec. Gravity, M = Material

$$W = 36.82 \times 0.0361 \times 11.3 = 15.02 \text{ pounds}$$

For example, a thin brass shell 2.5 inches in diameter and 7.5 inches in height, filled with lead, would weigh 15 pounds. When cast iron is substituted for lead, the dimensions increase by nearly 35 percent. The three weights found in large grandfather clocks are usually brass shells filled with lead, very attractive, and need much less space.

To make the weight out of cast iron, the diameter has to increase to three inches and the length to eight inches. Many iron weights have rounded tops and bottoms, and the height should be increased accordingly. Therefore, the formula of volume for cast iron is:

$$\text{Volume} = 0.7854 \times 9'' \times 8''$$

$$V = 56.55 \text{ cubic inches}$$

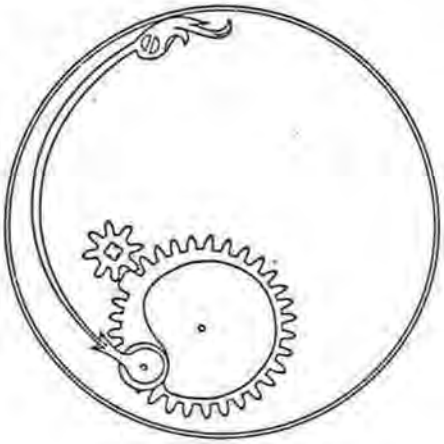
$$\text{Weight} = 56.55 \times 0.0361 \times 7.3 = 14.9 \text{ pounds}$$

THE MAINSPRING AS A MOTIVE FORCE

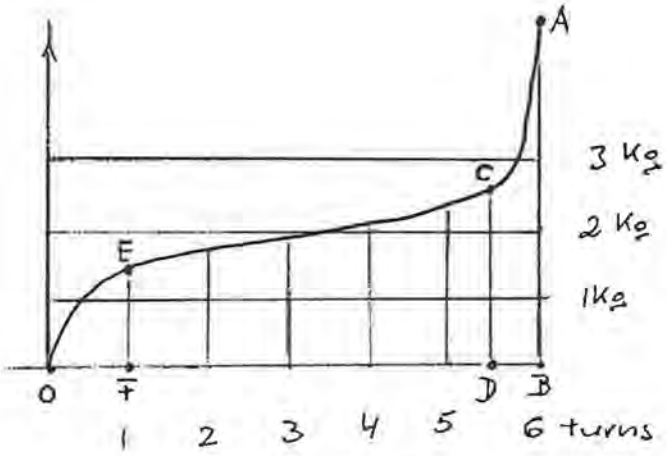
Mainsprings are thin blades or ribbons of hardened and properly tempered steel, in sufficient length, coiled up in a spiral form inside a barrel. The maximum elasticity of a material determines the limit of compression, torsion, or tension. Past this

point, the mainspring will deform or break, no longer able to return to its original form.

Clocks and watches fitted with a mainspring appeared in the 1500s. The well-known philosopher Cardanus (1501-1576) had many interesting theories regarding the mainsprings used in clocks and addressed them in his 10 volumes of *Exaereton Mathematicorum*. At this time, the manufacture of a long strip of steel of consistent thickness and hardness was very difficult. It took centuries to perfect the art of making spring steel. Most continental clockmakers and watchmakers used French mainsprings because of their superiority.



Stackfreed



French Clock Mainspring

The Stackfreed was a brake that suppressed some of the large power of the spring when fully wound and overcomes some of the power variances. It consists of a kidney-shaped piece that is geared to the barrel and a heavy spring that equalizes some of the power.

The next improvement in mainspring power arrived with the development of the fusee. This arrangement with a verge escapement produced a much better timekeeper, with a minute hand that made it easier to read the time. A manuscript published by Almanus in 1475 mentions a fusee, and in paintings of the same time period similar devices can be seen. In the Germanische Nationale Museum is an unusually ornate table clock; it is in the form of a cathedral and incorporates a fusee. Originally, this clock caused much debate because it was thought to be made for Philip the Good in 1530. It would have been the first clock with a fusee, but experts determined later that it was made much later.

Physical laws govern the mainspring, and for the best results several conditions have to be fulfilled. To receive the highest turns of an arbor, the space of the fully wound mainspring has to be equal the space of the mainspring at rest.

To calculate the length of a mainspring, start with the equation:

$$D_1 = D_2 = 0.745\ D$$

To arrive at the turns of a mainspring at rest, take the thickness of the mainspring-pack at rest and divide it by the thickness of the mainspring:

$$T_1 = \frac{D_c}{t} \quad \text{to:} \quad T_1 = 0.127 \times \frac{D_1}{t}$$

To arrive at the turns of a mainspring-pack in the fully wound-up position, take the diameter of a fully wound mainspring minus the mainspring arbor divided by two mainspring thicknesses:

$$T_2 = \frac{D_1 - D_A}{2t} \quad \text{to:} \quad T_2 = 0.206 \times \frac{D_B}{t}$$

So we find the highest amount of possible turns by taking the turns of a mainspring at rest and subtracting them from the turns of a fully wound mainspring:

$$W = T_1 - T_2 \quad \text{to:} \quad W = 0.079 \times \frac{D_B}{t} \quad 0.08 \times \frac{D_B}{t}$$

The theoretical length of a mainspring is:

$$L = 0.349 \times \frac{D_B^2}{t} \quad 0.35 \times \frac{D_B^2}{t}$$

To this length, one barrel diameter is added to compensate for the tempered ends at the barrel arbor and the fastening point inside the barrel:

$$L = 0.35 \times \frac{D_B^2}{t} + D_B$$

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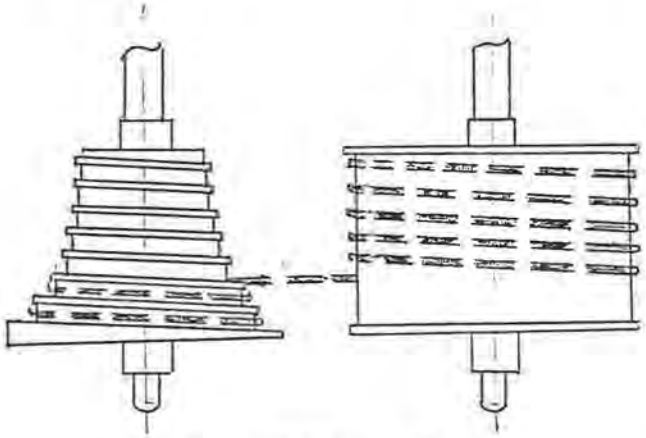
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Grossman's book *Lessons in Horology* uses a similar formula:

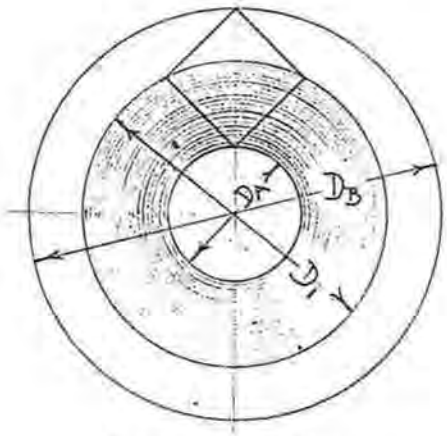
$$L = 2 \times 3.1416 \times R \ (5/6 \times N + 1/2)$$

In which the diameter of the barrel is given as R and N is the amount of coils at rest.

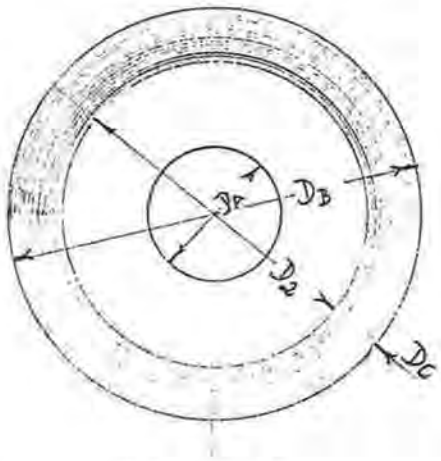


Fusee with Mainspring Barrel

To determine the revolutions of the arbor, subtract the number of coils in the fully wound-up position from the coils in the run-down position. If the mainspring at rest has 15 coils and there are 22 coils when fully wound, the barrel should make seven turns.



Mainspring Fully Wound



Mainspring at Rest

The size of the barrel arbor is dictated by the thickness and elasticity of the mainspring. For thin mainsprings, 1/4 of the barrel diameter is sufficient, but for thicker springs, 2/5 is more appropriate, especially to avoid breakage of the mainspring.

The force of a spring can also be calculated from the following formula:

$$M = \frac{E \times h \times s^3 \times \pi \times n}{7 \times L}$$

E = Module of elasticity (for steel 23000 kg/mm^2)
s = Thickness of spring
h = Width of spring
n = Coils of spring at rest
L = Length of spring
7 = Turns of arbor or barrel

In theoretical calculations, the elastic force of a spring increases in equal proportion with each winding. This would be correct for a hairspring which evolves freely, but not for a mainspring--the coils press tightly together and the resettlement action interferes with the calculations. The first and last windings produce the largest variation of power and are, therefore, seldom counted as a useable force. For this reason, the first two to three windings constitute the reserve.

If a clock has an improper mainspring, first calculate the train to determine what we expect from the mainspring and count all the teeth of the barrel, intermediate wheel and pinion, and the center wheel pinion. For example, a French clock movement with a theoretical running time of eight days might have the following parts:

Mainspring barrel	84 teeth		
Intermediate wheel	80 teeth	pinion	12 teeth
Center wheel		pinion	10 teeth

1. One turn of the barrel produces 56 hours of power; five turns of the arbor increases this to 280 hours, or an approximate running time of 11.6 days.

2. Three and a half turns of the barrel keep the clock running for eight days.

By measuring the inside diameter of the barrel and its width, it is possible to calculate such unknown dimensions as the thickness and length of the spring and the diameter of the barrel arbor.

The Swiss have certain standards regarding mainsprings whose average sizes can help find missing factors. All dimensions are metric and are for a barrel radius of 1 mm (10 millimeters are equivalent to 0.3937008 inches).

Number of Rotations	Thickness of Spring	Length of Spring	Diameter of Barrel Arbor
5	0.2490	53.085	0.7968
5.5	0.0239	56.088	0.7648
6	0.0231	58.791	0.7382
6.5	0.0226	61.619	0.7120
7	0.0215	64.260	0.6888
7.5	0.0209	66.800	0.6690
8	0.0203	69.400	0.6490
9	0.0192	74.200	0.6130
10	0.0182	79.100	0.5820
11	0.0173	83.800	0.5540
12	0.0165	88.400	0.5290

This table can be utilized for a French clock in which the inside diameter of a barrel measures 30 mm and five windings will run the clock for more than eight days. For a safety margin or extended running time, add three more turns and multiply the radius of the barrel with that number.

Thickness mainspring: 15 x 0.0203 = 0.3045 mm
Length of mainspring: 15 x 69.400 = 1041 mm
Diameter of arbor: 15 x 0.6490 = 9.735 mm

This table can be used to find an ideal theoretical mainspring size for any watch or clock. For the best results, adjust the numbers accordingly. Many times the arbor is made smaller than one-third of the inside barrel diameter and the length of the mainspring must be increased accordingly.

The mainspring is affected by many variables:

1. The degree of winding.
2. The steel alloy and the heat treatment.
3. The lubricant, one of most important factors, which must cover every part of the spring and has to withstand very high pressure.
4. The variations of temperature and humidity.
5. The finish of the spring. A high-quality mainspring is polished and has rounded corners. When removed from the barrel, it forms a smooth spiral without kinks or flat spots.
6. The inner coil, which has to lie free upon the arbor, with its ends rounded. The hooks on the arbor and barrel as well as the holes in the mainspring should be centered to prevent rubbing against the bottom or cover.
7. The bottom of the barrel and the inside cover must be smooth, without grooves or burrs.
8. The barrel must rotate freely and with little play on its arbor. Polishing all friction points of the arbor can reduce the loss of power, prevent kinking, and results in premature breakage.
9. The hooks should be no longer than the thickness of the spring.

Time is sure a wonder-working god.
In but one hour do run
Many thousand grains of sand;
Just as fast as these
Do move the thoughts of man.

Fredrich Schiller

❑

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EDUCATION

Project Extend! Project Extend from every corner of the Colorado area--I am continually hearing the plaudits of Project Extend.

I don't believe in all my years with the United Horological Association and the American Watchmakers Institute that a program has been met with such enthusiasm, respect, and desire as Project Extend.

I have always felt that a program to upgrade graduate students as well as finished watch and clockmakers was indeed necessary to educate our professional people.

Having seen the complex in Cincinnati in June, I was thoroughly impressed by the Project Extend facility, the equipment and layout of the whole classroom. AWI is to be commended most highly for the effort of all the personnel involved to bring to all of us an opportunity to become more proficient in our chosen profession.

Recently, a graduate student of mine was able to attend a Project Extend course in Cincinnati. He attended with the financial help and goodwill of his employer. They too realize the value and benefits obtained by training to do better, so good customer relations can be realized and improved through competent repair service.

The store he works for has always maintained an excellent relationship with the watchmaker at the bench. They realize the draw a good repair department has to benefit retail sales.

I was very proud to find out while he was at Project Extend that he took the Certified Master Watchmaker Examination, passed, and did receive his certificate.

Not too long ago I was in the store, and the owner proudly took me back to the watch repair department to show me the CMW certificate the watchmaker had received hanging on the wall for all to see.

Since school has restarted and our Colorado Clock and Watchmakers Guild meetings have been enthusiastically received with programs from AWI and demonstrations and hands-on training available from knowledgeable members of the Guild, I have received requests for information on Project Extend for and about the courses available--the cost factor and the accommodations, etc. Some intend to use their motor homes, others the hotels near the center.

My first question to them is, "Are you a member of AWI?" If so, all or most of the classes, instructors, and dates are in the *Horological Times*. If not, write for information from AWI. I believe we should be open to "all who wish to learn." The opportunity is there for all to become better at what they do, and thus demand and receive better salaries and better prices for work well done.

Which brings me to another point in education. There was no one in our industry that prodded and pulled more than Orville Hagans for repairmen to respect their abilities and get paid for what they know and can do in excellent fashion.

Every day a student will bring a clock in that someone soldered, center-punched, epoxied, wired, or taped, or other attempted repairs, because of the lack of knowledge or deceit on the part of the "repair person." We have all seen these attempts in both watch and clock repair: taking money from customers, not caring for the end result, faking their way through our proud and loving profession.

Don't sell yourself short. Restore as well as repair. Get paid for the job you do, and the results will return manifold. I am on the third and some fourth generation families doing the service I have always enjoyed, trying to maintain quality above all else.

Project Extend will give us another edge to overcome the clowns (for lack of a better word) that oftentimes give our profession a black eye. ❑

AWI BENCH COURSES

Just prior to press time a number of classes have been scheduled which do not appear on the back cover. Be sure to use this complete list to plan your seminars for early 1992.

JANUARY 1992
17-19--Advanced Clock Repair--Alexandria, VA.
17-19--Advanced Lathe--Kansas City, MO.
18-19--400-Day Clock Repair--Boston, MA.
18-19--Repair of the Atmos Clock--Los Angeles, CA.
19--Introduction to Quartz Watch Repair--Atlanta, GA.
19--Useful Techniques: Mechanical Watch Repair--Albuquerque, NM.
25-26--Cuckoo Clock Repair--Phoenix, AZ.
25-26--400-Day Clock Repair-- Austin, TX.
26--Servicing ETA Quartz Chronographs--San Diego, CA.

FEBRUARY 1992
8-9--Beginning Lathe--San Diego, CA.
14-15--400-Day Clock Repair--Pittsburgh, PA.
14-16--Advanced Lathe--San Diego, CA.
16--Introduction to Quartz Watch Repair--Albuquerque, NM.
16-17--Striking Clocks--Pittsburgh, PA.
22-23--400-Day Clock Repair--Albuquerque, NM.
22-23--Cuckoo Clock Repair--Orlando, FL.
22-23--Repair of the Atmos Clock--New York, NY.
23--Useful Techniques: Mechanical Watch Repair--Ellisville, MS.
23--Servicing ETA Quartz Chronographs--Phoenix, AZ.

MARCH 1992
14-15--400-Day Clock Repair--Trenton, NJ.
20-21--400-Day Clock Repair--Orlando, FL.
21-22--Repair of the Atmos Clock--Denver, CO.
21-22--Beginning Lathe--Orlando, FL.
22-23--Striking Clocks--Orlando, FL.
27-29--Advanced Lathe--Orlando, FL.
29--Servicing ETA Quartz Chronographs--Bay Area, CA.

APRIL 1992
11-12--Beginning Lathe--Albuquerque, NM
24-26--Advanced Lathe--Albuquerque, NM

MAY 1992
9-10--Beginning Lathe--Alexandria, VA
15-17--Advanced Lathe--Alexandria, VA

JUNE 1992
13-14--Beginning Lathe--New York, NY
19-21--Advanced Lathe--New York, NY

❑

LONGINES-WITTNAUER ANNOUNCES HISTORY PROJECT



A major book project, *The History of the Longines-Wittnauer Watch Company*, has been announced by Reynald M. Swift, President of the Longines-Wittnauer Watch Company, New Rochelle, New York.

"The Longines-Wittnauer Watch Company," said Swift, "has a long and enviable history. And we want to put the complete story, from beginning to the present, between two covers." To make this a successful enterprise, Swift has commissioned Henry B. Fried to write a history about the company and its brands. In selecting Henry Fried, Swift noted "that Fried is the Dean of the watch industry. Few Have a greater knowledge of our industry, past and present . . . And, in my opinion, none are more qualified to do justice to one of the most fascinating stories in the watch business." Swift mentioned that in 1992 Longines will celebrate its 125th anniversary, and "Wittnauer follows with an almost equally venerable past."

The assignment is a two-year project. Comprehensive and generously illustrated, this definitive volume will be made available to Longines-Wittnauer jewelers.

❑

Mr. Fried is appealing to AWI members for any printed material on Longines-Wittnauer, including: founders, executives, sales force, technicians, and watchmakers. Also, technical printed material, advertisements, anecdotes, photographs, and any other type of material about Longines-Wittnauer will be most helpful. Full credit will be given. Please send your material to: **HENRY B. FRIED, c/o AWI CENTRAL, P.O. BOX 11011, CINCINNATI, OHIO 45211.**

Affiliate Chapter Column

Joseph L. Cerullo, CMW, CMC



AWI Gains Two New Affiliate Chapters

Let's begin by discussing what an affiliate chapter is according to our Constitution:

ARTICLE XIII - AFFILIATE CHAPTERS

Sec. 1 Affiliate Chapter membership shall be conferred upon organized horological groups after they have petitioned and met the requirements governing the formation and operation of such chapters as provided in the Bylaws.

Sec. 2 The Affiliate Chapter delegates at their annual meeting may select one chapter delegate to serve a one year term as a Director of the Institute. This person, upon approval of credentials by the Board of Directors, shall have full vote and voice, the same as the Director of the Institute who has been elected by the membership at large, provided that person is an active member of the Institute and has been in good standing at least one year prior to election to this post. this person shall be known as the Affiliate Chapter Director.

Now let's look at Article XII of the Bylaws:

ARTICLE XII - AFFILIATE CHAPTERS

Sec. 1 Any horological association, society or guild having at least fifteen members who are active members of the Institute shall be eligible to petition for status as an AWI Affiliate Chapter. To become affiliated:

(a) Such group shall file application for affiliation together with a copy of its constitution, bylaws, list of names and addresses of its members, and prescribed chapter fee, with the Executive Secretary.

(b) After approval of their constitution and bylaws by the Institute's Constitution and Bylaws Committee, the Executive Secretary of the Institute shall submit the application to the Institute's Board of Directors. An affirmative vote of the majority of the Board of Directors shall constitute approval of affiliation. The Executive Secretary shall notify such a group of the approval of its application, and issue a charter. That group shall then be an Affiliate Chapter of the American Watchmakers Institute.

(c) If any member of the Board of Directors casts a negative vote on an application for affiliation, such negative vote shall be accompanied by an explanation of the reason thereof. In the event the majority of the members of the Board of Directors fail to approve the affiliation, the applicant shall then be given an opportunity to meet the qualifications necessary for affiliation.

(d) If affiliation is denied by the Board of Directors, the Chapter fee shall be returned to the applicant.

Sec. 2 Delegates and alternates may be chosen by the Affiliate Chapters to attend the Institute's annual Affiliate Chapter meeting.

(a) Each Affiliate Chapter, regardless of size or location, shall be entitled one delegate who, upon presentation of written authorization by the Chapter, may attend the Affiliate Chapter meeting. This delegate, or an alternate serving in the delegate's capacity, shall have one vote during the Affiliate Chapter meeting. Delegates shall be active members of the Institute. Delegates are encouraged to attend open sessions of the Board of Directors; they will have no vote, but may enter into the discussion of issues.

(b) Affiliate Chapters may send as many alternates to the annual Affiliate Chapter meeting as they deem advisable, however, only the delegate shall have voting rights. Alternates shall be active members of the Institute. Alternates are encouraged to attend open sessions of the Board of Directors; they will have no note, but may enter into the discussion of issues.

(c) Directors of the Institute shall not serve in the capacity of a voting delegate with the exception of the delegate selected to be the Affiliate Chapter Director according to Article XIII, Sec.2, of the Constitution. Directors may serve as nonvoting representatives if so designated by their Affiliate Chapter.

(d) The Affiliate Chapters shall be responsible to arrange for the expenses of their delegates and alternates.

This year the American Watchmakers Institute added two new chapters, which brings our total number to 40. These two new chapters should be recognized.

Number 39 was the Georgia Watchmakers Association, which was just formed in January 1991. This group began with a few people who had an idea to hold an AWI bench course in their area. AWI provided a bench course on useful bench practices, presented by James Adams. At this bench course, which attracted 22 participants, they discussed setting up and organization, and with the help of Mr. Adams and AWI the Georgia group was born. They now have 37 members and have already attended an AWI affiliate chapter meeting this past June with Richard Roy as their delegate. The officers are as follows:

President	Bruce Hayes
Vice Pres.	Richard Roy
Secretary	Alan Vaughn
Treasurer	Richard Mazza

AWI's 40th affiliate chapter is the Indianapolis Horological Association, and their delegate is Ray Vance from Lawrence, Indiana. They became an affiliate chapter in the Fall of 1991 and consist of 87 members. At next year's Annual Meeting they will be sending their first delegate. Officers of this group are:

President	Bob Bradley
Vice President	Clarence Hood
Sec./Treasurer	Ray Vance

❑

Association News

ARIZONA

The Arizona Clockmakers & Watchmakers Guild held a meeting on October 15, 1991. Cliff Ellsworth presented a video titled "Selection and Installation of Watch Batteries." The video was produced by Zantech, Inc. It is a help to those who wish to expand their line of business to offer this service to their customers.

Plans are being made for the annual convention. It will be held May 16-17, 1992 at the Las Campanas Quality Inn in Cottonwood, AZ. Bob Macomber is convention chairman.

NEW JERSEY

The October meeting of the Watchmakers Association of New Jersey featured guest speaker, Dana Blackwell. His presentation was on the history and evolution of French and English clocks. The facts and features he presented were often accompanied by some anecdotes about the clocks that he has known or owns personally.

The officers and directors for 1992 are: Hans Weber, president; Joseph L. Cerullo, vice president; Bernard Stoeber, secretary; Alex Kast, treasurer; William Albrecht, Joseph Barbieri, Joseph Biancola, Emil Chessari, Henry Frystak, Charles Havens, Dan Klein, Henry Kalmus, Helmut Knehr, Brian Murphy, Paul Richter, Art Smetana, John Sokol, Peter Spahr, Bernard Stoeber, Adolph Stonitsch and Michael Wilken, directors. ❑

NORTH CENTRAL TECHNICAL CONCLAVE

APRIL 30, MAY 1 & 2, 1992

The North Central Technical Conclave will be held in Madison, Wisconson. A planning committee representing AWI Central, The Central Illinois Watchmakers Association, The Minnesota Watch & Clockmakers Association, and The Wisconsin Horological Society have developed the North Central Technical Conclave. The Conclave will be held in Madison, WI on April 30 - May 2, 1992. Individuals in the North Central states will be able to select from the following educational opportunities:

- Advanced Quartz Watch Repair
- Advanced Clock Repair
- ETA Quartz Chronograph
- Modern Chime Clocks
- Crystal Fitting
- Mechanical Chronographs
- Management for Watch/Clockmakers
- Atmos Clock Repair
- Cuckoo Clock Repair
- Hairspring Vibrating
- Jewelry Repair
- Clockmakers Lathe
- Clock Repair Techniques
- Perpetual Calendars/Modern Watches

Also, a Saturday Seminar will feature presentations from industry leaders.

Contact any of the sponsoring associations or AWI Central for a brochure giving complete details and registration information. **AWI Central, P.O. Box 11011, 3700 Harrison Avenue, Cincinnati, OH 45211.** ❑

BOOK REVIEW

COMTOISE CLOCKS, THE MORBIER, THE MOREZ by Jean Moreau and Francis Maitzner. Translated and published by Alan Seymour, FNAWCC, 10847 Billpoint Bluff NE, Bainbridge Island, WA 98110. Hard covers, 8"x11", 450 pages, over 494 B&W photos, 22 color plates and 463 drawings. @ $110.00 postpaid.

This book provides the student of Morbier clocks with a holistic approach to the study of a very unique French clock. This is the first English edition of this book. However, it is a translation of the fifth French printing of this text. At first glance due to the fine quality of paper used in printing, one might mistake this text for a coffee table book. However, once the book is viewed with a critical eye, it becomes apparent the wealth of technical and historical material that the authors provide. This book would be invaluable to anyone restoring a Morbier clock. The authors are noted authorities on the restoration of antique clocks. Francis Maitzner was a fifth generation clockmaker, and Jean Moreau is the Director of the School of Horology at Dreux, France.

The translator Lawrence "Alan" Seymour is a Fellow of the National Association of Watch and Clock Collectors (NAWCC) . He is considered a subject matter expert on the Morbier clock. His interests date back to 1932 when he worked as a clockmaker while attending college. While working for UNESCO in France, he saw his first Morbier and has since been totally enchanted with this very unique clock.

The text of Jean Moreau's book is arranged in three parts. Part One deals with the historic aspect of the Morbier clock and the clock industry within the Comte Region of France (Franche-Comte). Parts Two and Three are concerned with the technical aspect of the repair and restoration of the Morbier.

In Part One, Mr. Moreau explains the historical events that led to the development of the Morbier clock with its novel and unique approach to clock design. The author points out that this clock is unique and different from other French clocks, as well as German and English clocks. Today the authors point out the only clocks made in the Comte Region of France can be considered true Morbier clocks.

Also in Part One the author points out that clockmaking in the Comte Region dates from the mid-15th century. The first Morbier clock was made about 1675 by the Mayet brothers. The authors explain in great detail and with over 160 photos the evolution of this style of clock. They also present how the introduction of this uniquely different style of clock established a regional pride within the people which allowed further innovations to appear in the basic Morbier clock.

Part One also includes an extensive section on clock identification. The author shows in photos and copies of original sales data various features useful in clock identification and dating. These features include: escapements, cases, pendulums, hands, dials, cast frontons (face decorations), and pressed frontons. The accompanying text provides the reader with a more in-depth description of the various identification features. The Morbier clock has a novel strike train arrangement which allows the clock to repeat the hour strike about 2 to 3 minutes after the hour. This is another identification feature. The author provides an excellent overview of the evolution of the various strike trains used.

Parts Two and Three deal in great detail with the technical aspects of several movements plus their operation and aspects of their restoration. The authors use excellent photos and very detailed drawings to describe the various aspects and sequences in the operations of the various escapements and strike trains utilized in the Morbier clock. The drawings are clearly labeled and the accompanying text makes it easy to understand the workings of this clock. The author provides step-by-step procedures on disassembly, cleaning, restoration, and assembly of selected movements. Clear explanations are given on how to adjust the escapements' strike trains and components of the more complicated clocks such as the perpetual calendar versions and the Grande Sonnerie types.

In Part Three there is also a section devoted to the description of modern copies of the Morbier clocks. Some of these modern clocks are made in the Comte Region of France, but the authors point out several others that are made outside France.

In the Appendix there is a list of clockmakers from Franche-Comte and a very unique combination Index/Glossary.

This book is quite expensive at $110.00. However, if you want a well-written text on the Morbier clock, I suggest contacting Mr. Seymour. The technical aspects of this book are top-flight.

Jerry M. Fugich

❑

AWI Material Search Network

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

AA3 United States Watch Co., 0 size, Serial #839594, ratchet wheel.

AA6 Columbus King, 18 size, full plate, double roller, pallet fork.

AA7 Longines-Wittnauer, 14 ligne, Serial #1731386, yoke spring or detent spring.





If you can supply any of these items, please contact: ***AWI Material Search Network, AWI Central, P.O. Box 11011, Cincinnati, OH 45211; Fax (513) 661-3131.*** ❑

New Products

BULOVA'S CONTEMPORARY MARBLE DESK CLOCK

Bulova debuts the "ASTRID," an elegant desk clock crafted of white marble and designed for today's contemporary lifestyle.

Its hexagon shape accentuates a unique diagonal-cut top which houses its quartz movement. Gilt Roman numerals and stick hour markers circled by a solid brass bezel ring give the "Astrid" a look of elegant versatility.



The model shown above is B7866 and has a suggested retail price of $99.95. Dimensions are 4"H x 2-3/8"W x 2"D.

For more information, contact **Clock Division, BULOVA CORP., One Bulova Ave., Woodside, NY 11377; (718) 204-3300.**

1991 MONTRES ET BIJOUX GENEVE EXHIBITION

A half century after its foundation, the Montres et Bijoux Geneve Exhibition has come full circle. First staged in 1942 in honor of the two thousandth anniversary of the foundation of the city of Geneva, it had brought together the city's most distinguished watch and jewelry houses to exhibit their finest achievements. Later on, during the sixties, the Montres et Bijoux Association focused exclusively on watch and jewelry fashions, asking its members to exhibit only designs never publicly shown before. For 30 years, the Exhibition's autumn show was acknowledged as the source of all new trends in these crafts and industries, its designs particularly influencing wristwatch styles.

Today more than ever, upmarket products display marked differences with standard wares, be it only because of the craftwork from which they benefit--the only way to endow a watch or a piece of jewelry with a truly distinctive and often strongly 'personal' aspect. Yet this renewed emphasis on luxury craft techniques has also brought about a gradual return to generally more classic styles, but without in any way curbing creativity.

For its 1991 exhibition (October 16-20, 1991) in Rome, Montres et Bijoux Geneve has found a magnificent venue, the famed Palazzo Lancellotti, a stone's throw from the well-known Piazza Navona. This year the exhibition displayed a broad selection of its member's current production alongside its most recent and spectacular achievements. The results were dazzling.

Nearly five hundred precious models were shown this year in the showcases of the Swiss houses. They bear the names of 12 of Switzerland's leading watch and jewelry firms, and were installed in a dozen spacious reception rooms of Rome's impressive, 16th century Palazzo Lancellotti.

Every conceivable specialty was represented--chronographs, perpetual calendars, minute repeaters, tourbillons, multiple time-zone models, openworked skeleton movements, time equations, power-reserve indicators, ultra-slim designs, and more. Some of them combine two or more such complex mechanisms; others use the beauty of the movement itself as a decorative element.



Patek Philippe's "Dome" clocks each display a unique decor composed of opaque and translucid cloisonne enamels. The partition strips are crafted from fine gold, each model being covered with anything from 18 to 20 meters of gold wire. Ever since its foundation in 1839, Patek Philippe has sought to perpetuate in this way the art of Geneva enamelling, both cloisonne and miniature. The company thus continues to honor and sustain the trade's seven basic crafts: watchmaker, designer, jeweler, gemsetter, engraver, enameller, and chainsmith. For more information: ***Patek Philippe, 10 Rockefeller Plaza, New York, NY 10020; (212) 581-0870.***



Combining the best of design research and horological technology, this Concord "Saratoga perpetual" model is composed of a satin-finished, eight-sided solid yellow gold block featuring eight burnished decorative elements. Its water-resistant case protects a self-winding movement with perpetual calendar providing until the year 2099 the hours, minutes, seconds, day, date, month, moon phases, and leap years. It comes with a gold bracelet made up of 25 gold components linked together by tiny tubes and screws, also in gold. Contact: ***Concord Watch Corp., 125 Chubb Ave., Lyndhurst, NJ 07071; (201) 460-4800.***



This highly original design features a water-resistant, solid 18K white and yellow gold case, whose waffle pattern "Clou de Paris" engine-turned dial displays a double minute track and Roman numerals. A pair of subdials respectively positioned at 6 and at 9 o'clock display the seconds and the date. The watch has a self-winding mechanical movement and alligator strap. ***Corum Watches, North American Watch Corp., 650 5th Ave., New York, NY 10019; (212) 397-7800.***



Presented for the first time in 1991, this patented Breguet design's self-winding movement features a perpetual calendar, a perpetual time equation, and a power reserve indicator. It shows precisely the degree of accuracy to the sun's position relative to time. Choice of 18K yellow, white, or pink gold, or in PT 950 platinum. Contact: ***Breguet, 18 E. 48th, 8th Floor, New York, NY 10017; (212) 223-0099.***

Classified Ads

REGULATIONS AND RATES

Ads are payable in advance $.60 per word, $.70 per word in **bold type.** Classified display ads are $25.00 per column inch, 2-1/4" wide. Ads are not commissionable or discountable. The publisher reserves the right to edit all copy. Price lists of services will not be accepted. Confidential ads are $4.00 additional for postage and handling. The first of the month is issue date. Copy must be received 30 days in advance (e.g. June issue closes for copy on May 1st).

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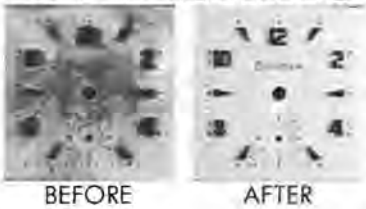
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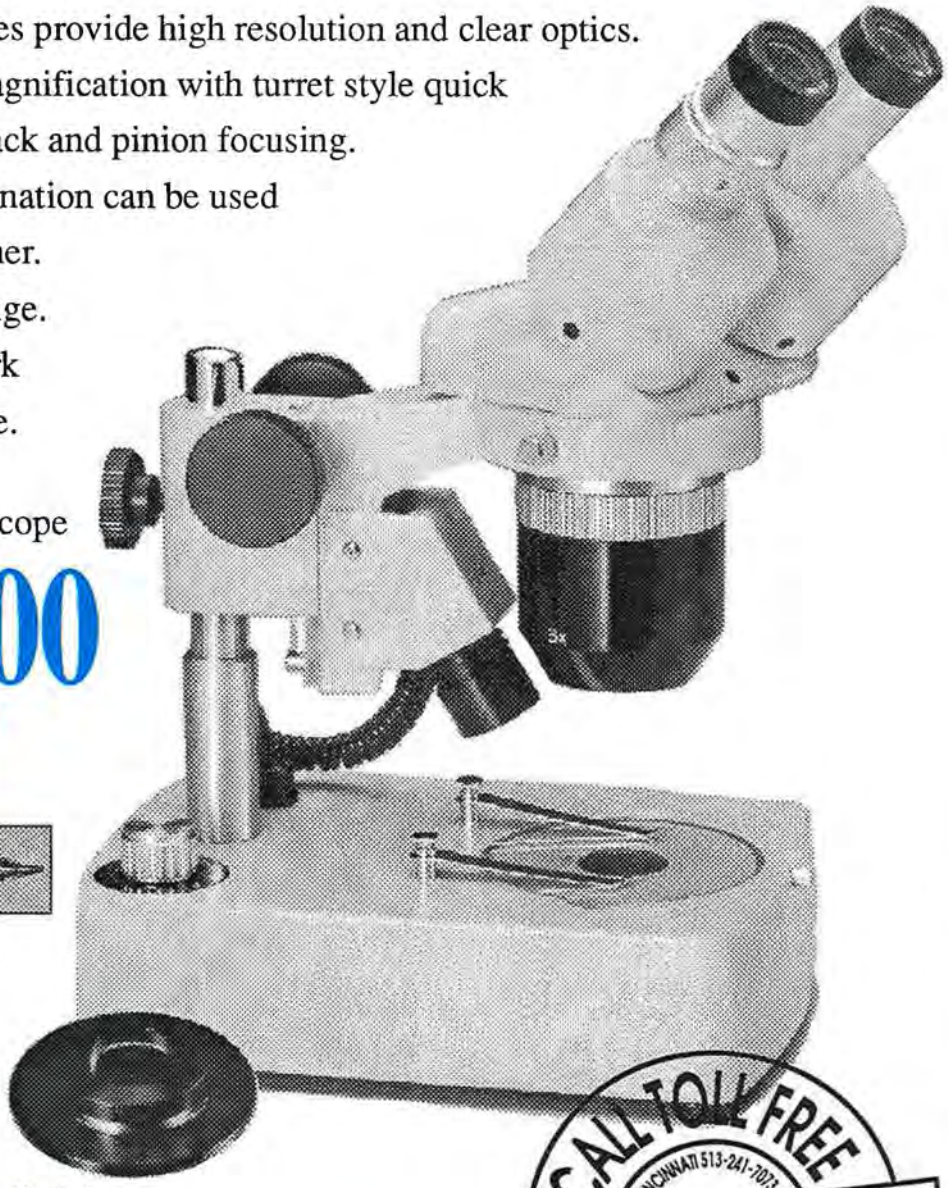
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