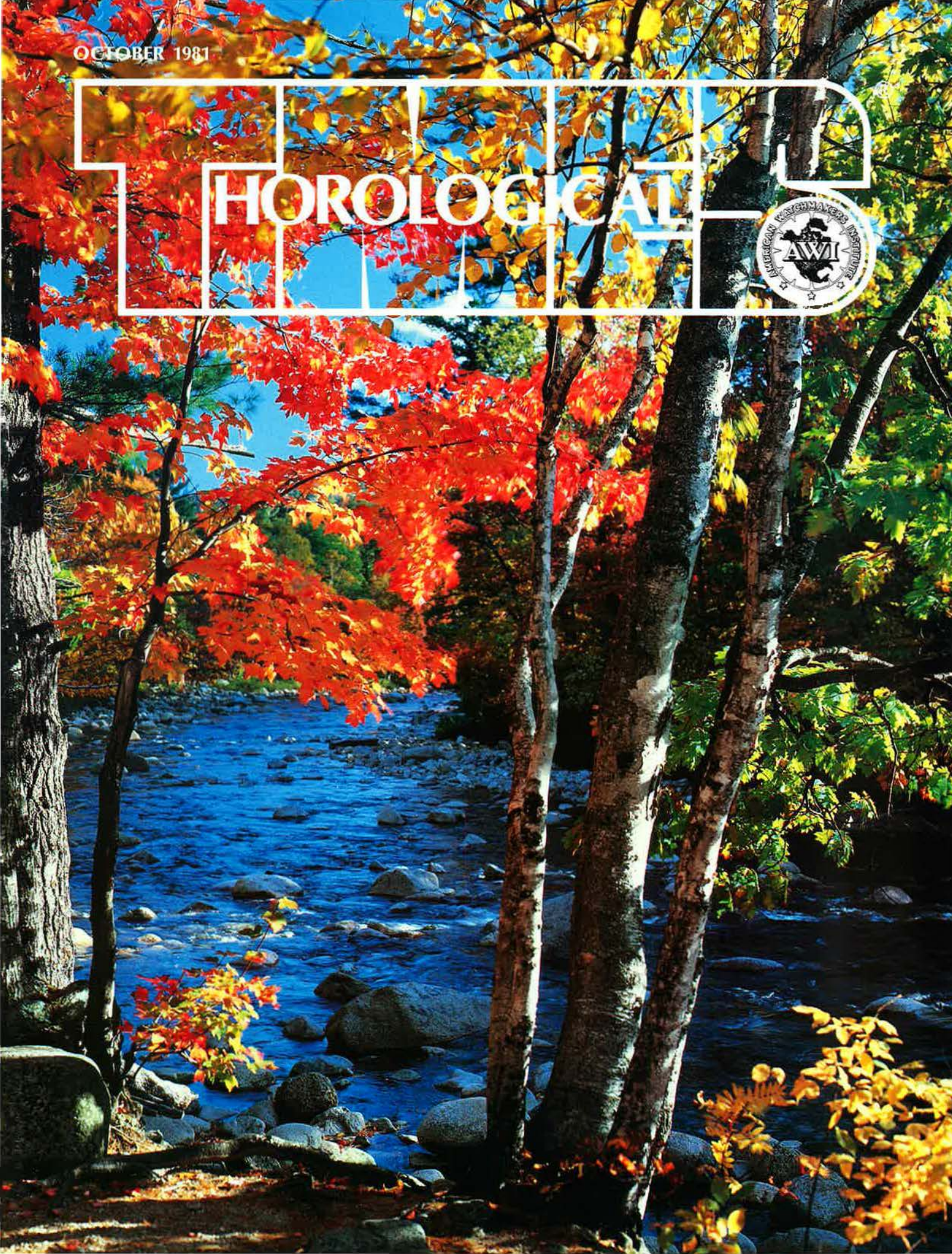
OCTOBER 1981

HOROLOGICAL



The Time is **NOW** *for* QUARTZ CLOCK MOVEMENTS!

SAVE On The THINLINE M88

QUARTZ CLOCK MOVEMENTS AT BALANCE WHEEL PRICES!

Actual Size

DIMENSIONS: 2-3/16 inches square x 5/8 inch thick. Center post diameter only 5/16 inch. The works can be enclosed within a case less than 3/4 inch thick.
ACCURACY: Within ±10 seconds per month.
BATTERY: Runs over a year on a standard "A" penlight battery, and much longer on the alkaline type.
SECOND HAND: If used, steps off the seconds at precise one-second intervals.

ONE YEAR GUARANTEE!

1-2 @ $8.00 ea.
3-9 @ $7.00 ea.
10-24 @ $5.75 ea.

25 @ $5.25 * each

M81A

Near Pure Accuracy! Proven Reliability!

Reduced in Size

- Accurate to ± 1 minute a year (59° F to 77° F)
- Movement size: 2-7/8 x 2-3/8 x 1-1/8 inches.
- Runs over a year on a standard "C" cell.

The M81A is a powerhouse! It converts the battery's electrical energy into torque to drive the hands more than twice as efficiently as a transistorized balance wheel movement. By any standard of comparison the M81A is the superlative movement.

Regular movement mounts on dials up to 7/16" thick. Also available with long center post to mount on slabs to 3/4" thick: Order No. M81A-LCP.

TWO YEAR GUARANTEE **25 @ $5.25 Each**

ALL THREE MOVEMENTS FEATURE:

- 4,194,304 Hz Quartz Crystal Oscillator
- Operational Range 14° F to 122° F
- Slide Switch, exact to the second setting

M81 M81A M88

Reduced in size

M81

Step Second Quartz Movement—Available with Long and Short Post—**2 YEAR GUARANTEE!**

25 @ $5.25 each

Low Prices **M81 and M81A**

1-2 @ $9.00 ea. **3-9 @ $7.50 ea.**
10-24 @ $5.75 ea.

Any Size 25 @ $5.25 ea.

* Prices Include Hour and Minute Hands, Nuts, Hangers. Add $.25 for second hands. Write for prices for larger quantities. Add $2.00 for shipping to 48 states.

VISA — On orders of $25.00 or More

MasterCard — On orders of $25.00 or More

NEW CATALOG NO. 181-B: Shows Quartz, Pendulum and Strike Movements, Hands, Dials, Numerals, etc. Cost—$1.00 or **FREE ON REQUEST WITH ORDER FOR MOVEMENTS.**

ORDER BLANK

___ M81 Movements @ $	$	
___ M81A Movements @ $	$	
___ M81A-LCP Movements @ $	$	
___ M88 Movements @ $	$	
___ Second Hands @ $.25	$	
___ Catalog No. 181-B	$	no/charge
___ Shipping and Handling	$	2.00
TOTAL	$	

Name _____

Address _____

City/State/Zip _____

Return to:
CAS-KER Co., P.O. Box 2347, Drawer A
Cincinnati, Ohio 45201

Cas-Ker Co.

P.O. BOX 2347
CINCINNATI, OHIO 45201
TEL: (513) 241-7075

IMPORTERS AND DISTRIBUTORS: *JEWELERS' AND CLOCKMAKERS' EQUIPMENT*

Prices Subject to Change Without Notice

VOLUME 5, NUMBER 10 OCTOBER 1981

HOROLOGICAL TIMES

Official Publication of the American Watchmakers Institute

HOROLOGICAL TIMES (ISSN0145-9546) is published monthly and copyrighted by the American Watchmakers Institute, 3700 Harrison Avenue, Cincinnati, Ohio 45211. Subscription, $30.00 per year, $4.00 per copy in the United States and $36.00 per year, $5.00 per copy outside the United States. Second class postage paid at Cincinnati, Ohio. POSTMASTER: Send address changes to HOROLOGICAL TIMES, P.O. Box 11011, Cincinnati, OH 45211.

Our Up-to-the-Minute Federal Agency: THE NATIONAL BUREAU OF STANDARDS– TIME AND FREQUENCY

22

More On LCD & LED PUSH BUTTON REPAIRS

36

16th-Century Style Foliot Clock

53

The Shoplifting Caper

56

DEPARTMENTS

HOROLOGICAL TIMES®

Executive and Editorial Offices

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

Harold J. Herman: *Editor*
Maury Norrell: *Managing Editor*
Virginia C. Montgomery: *Associate Editor*

LuAnn Martin: *Art Director*
Sue Scott: *Business Manager*

Mildred Howard: *Circulation Manager*
Margie M. Brater: *Circulation*

Technical Editors:

Otto Benesh
James H. Broughton
Fred S. Burckhardt
Steven G. Conover
Joe Crooks
Paul Fisk
Henry B. Fried
Orville R. Hagans
Ewell D. Hartman
Gerald G. Jaeger
Sean C. Monk
Robert A. Nelson
Archie B. Perkins
Marshall F. Richmond
Joseph Rugole
Leslie L. Smith
William O. Smith, Jr.
James L. Tigner
Marvin E. Whitney

AWI Officers

Joe Crooks: *President*
Marshall F. Richmond, CMW: *1st V.P.*
Joseph G. Baier, Ph.D., CMW: *2nd V.P.*
James H. Broughton, CEWS: *Secretary*
Marvin E. Whitney, CMW, CMC: *Treasurer*

AWI Directors:

Dorothy Aderman
Otto Benesh, CMC
Robert Bishop
Jay M. Foreman, Jr.
Orville R. Hagans, CMW, CMC, FAWI
Ewell D. Hartman, CMW
Gerald G. Jaeger, CMW, CEWS
Sean C. Monk, CMW
Robert A. Nelson, CMW, CEWS
Howard Opp, CEWS

Robert Allis, CEWS: *Affiliate Chapter Director*
Thomas Imai, CMW: *Research and Education Council Chairman*

Milton C. Stevens: *Executive Secretary*
Michael P. Danner: *Administrative Director*

FELLOWS OF THE AMERICAN WATCHMAKERS INSTITUTE

Editorial

Do step motor watches run longer than mechanical watches? Yes, on the average, provided a professional does the cell replacement with the proper tools, cell, and skill. The reason is that torque and frictions are brought to a minimum with the floating train. Only a slight increase in friction will occur when calendar mechanisms are advanced.

How much longer will the step motor perform as opposed to the mechanical? No one seems to know the average length of time, but there are some step motor watches over twelve years old that are running beautifully. We know that the mechanical will last about three years. If the jeweled mechanical slips completely from the sales picture, the watchmaker can expect a greater decline in the number of pieces crossing his bench.

At present, only one to two percent of watches needing service are step motor. So, with the decline of service of mechanicals and increased sales of quartz analog, some watchmakers are seeing lean times.

But enjoy yourself while you can, because when the quartz analog step motor watches begin to fail—and they will, as does everything on this earth—your long weekends and clear eyes will be gone forever.

On the Front

Our October cover features the brilliant Autumn foliage seen along New Hampshire's Swift River at this time of year. The Swift River—a briskly running stream deserving of its name—is located in the central part of the state, just south of White Mountain National Park.

Quality Clock Movements

425

Quartz Alarm
Ultra Thin

A most desirable feature coupled with quartz accuracy makes this a perfect choice for movement replacement. Two screws enable the movement to be easily fixed to any case. Alarm stopper, alarm hand setting knob, second setter, and battery compartment are conveniently located on the back. Runs over one year on a single AA size battery. Features electronic alarm and step second motion. Comes complete with four hands—hour, minute, second and alarm.

$8.75 In Quantity

1 or 2 @ $12.95—3 to 9 @ $11.75—10 to 24 @ $10.50—25 to 99 @ $9.75—100 @ $8.75.

475

Tiny Quartz

ALMOST AS SMALL AS A WATCH!

Weighing only 1.25 ounces, this Versatile Movement will carry a sweep second hand and run for over one year on a single "AA" cell—only 9/16" thick this compact unit can be fit into any type case or panel. A single center nut enables the movement to be easily fixed to a dial. The hand setting knob, seconds setter, and battery compartment are conveniently located on the back. Accurate to (±) 10 seconds per month.

$5.25 In Quantity

1 or 2 @ $8.50—3 to 9 @ $7.00—10 to 24 @ $6.50—25 to 99 @ $5.75—100 to 299 @ $5.25.

450 Quartz

$5.25 In Quantity

2 3/8" x 2 13/16" x 7/8"

Extreme accuracy is now available at very moderate cost for customers that demand precise time keeping. Quality features such as high quartz oscillation of 4.194304 MHz. Assures reliable time keeping as well as accuracy. The small dimensions are ideal for all jobs. Fully warranted for one year.

1 or 2 @ $8.50—3 to 9 @ $7.00—10 to 24 @ $6.50—25 to 99 @ $5.75—100 to 299 @ $5.25.

600 Quartz Insert Movement Complete W/Dial - Hands

Precise timekeeping is now available for the clock installation and replacement markets. These units are ready to install quickly and economically. Comes complete with brushed brass finished bezel-dial & hands. Available in 3"-3⅜" 4" diam.

1 or 2 @ $18.95 each
3 to 9 @ $16.95 each

650 Quartz Insert Movement Only

The same movement as used in the above insert complete. Runs on AA Penlite Cells. Can be installed 3 ways, friction, fixing screw or case screws. Only 2⅜" diameter for easy installation in wood, metal or ceramics.

1 or 2 @ $11.95 each
3 to 9 @ $10.95 each

500 Quartz Pendulum

$9.25 In Quantity

This compact unit can be fitted into any type of enclosure, case or panel. The pendulum does not affect quartz accuracy of one minute per year, so that various lengths of 8 to 14 inches may be used. Noise from movement is negligible, only ticking sound of pendulum can be heard.

1 or 2 @ $13.95—3 to 9 @ $12.75—10 to 24 @ $11.25—25 to 99 @ $10.25—100 to 299 @ $9.25.

575

Quartz Striking Pendulum

8¼" x 5⅝"

$22.00 In Quantity

This versatile and extremely accurate movement with its beautiful chime tones would be a welcome addition to any room. Can be used with or without pendulum. Comes complete with hands and pendulum.

- Chimes on half hour—Counts on hour
- Accurate to ± 10 seconds per month
- Runs for 2 years on 'D' alkaline cell
- Chimes can be silenced by pushing lever
- Dependable—Fully guaranteed for one year

1 or 2 @ $27.95—3 to 9 @ $25.95—10 to 24 @ $24.00—25 to 99 @ $22.00.

100 Electric Insert Movement Complete with Dial-Hands-Cord

3½"	4"	5½"
$5.70	**$5.95**	**$6.20**

A clock movement ready to incorporate into a case of your own design. A complete unit with dial and hands, covered by glass for dependability and ease of installation. Versatile because of a variety of mounting techniques.

DELIVERY FROM STOCK - PRICES INCLUDE HANDS - USE COUPON BELOW

PLEASE SEND MOVEMENTS AS LISTED PLUS $1.50 FOR DELIVERY.

_____ # 425 QUARTZ ALARM MOVEMENTS @ _____
_____ # 475 TINY QUARTZ MOVEMENTS @ _____
_____ # 450 QUARTZ MOVEMENTS @ _____
_____ # 600 # 650 @ _____
_____ # 500 QUARTZ PENDULUMS @ _____
_____ # 575 QUARTZ STRIKING PENDULUMS @ _____
_____ # 100 ELECTRIC MOVEMENTS @ _____

☐ Check Here for Free Booklet Listing Complete Line of Movements—Numerals—Hands
450-500 available in Reg. Post (to ⅜" thickness) and Long Post (to ¾" thick).

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Esslinger & Co.

P.O. BOX 43561 ST. PAUL, MN 55164
TOLL FREE-ORDERS ONLY-800-328-0205
INQUIRIES-INFORMATION-612-452-7180

THE GOOD OLD DAYS

When old timers talk about the "good old days" and how much better things were back then, it's hard for anyone who wasn't living then to refute the statement. However, glum as things may seem now, there is comfort in knowing that we're much better off than in the "good old days."

Let's go back to 1925 and compare how long a factory employee had to work to buy the same things, then and now.

One of the first items you'll probably think about is a "low priced" car. Today's typical factory worker can earn one in 30 weeks—working only five days a week, eight hours a day (1,200 hours). At $7.00 per hour, he could buy a $7,400.00 car. In 1925, working six days a week, twelve hours a day, at $2.00 per day, he would need to work 40 weeks to buy a $480.00 car. That's 2,880 hours—or over twice the working

Joe Crooks

hours—for the same type of family automobile.

Then, an electric sewing machine for the wife would have cost more than 100 working hours; today, it costs only 22 hours. A vacuum cleaner then would have cost 59½ hours; now, 13½ hours. A pound of coffee? Then, 48 minutes; now, 20 minutes. A pound of butter? Then, 57 minutes; now, only 14 minutes.

We think of milk as being unreasonably expensive today, yet it costs only ten working minutes today, compared with 31 then. And chicken? That costs eight minutes a pound today; it cost 39 minutes a pound in 1925!

So those who want the good old days can have them, along with prohibition, Al Capone-style gangsterism, Socialist bombings, dirt roads, dances like the Charleston, and songs like "Barney Google With The Goo-Goo-Googley Eyes" and "Yes, We Have No Bananas." Bad as things may seem today, you'd better believe that we've come a long, long way!

Oh, well. Those old timers may as well have their sweet dreams, because we will be giving the next generation the same old song and dance. What will coffee be then—$2.00 a cup? HT

Introducing the Watch Cleaning Machine of the '80s...

The New VC-101...

In 1976, our VC-10 revolutionized the watch cleaning procedure with its unique, fully automatic time and labor saving features.

Our new VC-101 offers even more innovations!

Although the VC-101 still operates and shuts off automatically, there's now an *override control* to turn-it-off at each stage of operation.

Two drying stages—featuring a *new hot air dryer,* in its own chamber, on its own timing control, enabling you to both clean and dry up to 20 watch movements in each chamber at the same time—This new auxiliary dryer is especially important for proper curing of all new watch lubricants and for proper drying of travel alarm and pocket watch movements.

New controls on its redesigned top panel, plus *internal lighting* for easy changing of liquids, and a *main power control switch.*

A second holder in addition to the original 20 watch movement holder and stand to accommodate four travel alarm clocks or pocket watches.

FREE DEMONSTRATION! Move your watch cleaning operation into the '80s! Your Portescap Vibrograf machine salesman will be happy to give you a complete demonstration in your place at no obligation. Easy payment terms and trade-in allowance available. Call, or write us now.

The VC-101—Once Again Portescap Shows You How To Clean-Up

VIBROGRAF MACHINE DIVISION
6 Ohio Drive, Lake Success, New York 11402
(516) 437-8700

Portescap U.S.

manufacturers of incabloc® and Vibrograf®

Our Readers Write

How Much Are We Worth?

About a year ago, a trade magazine ran a lengthy report about poor watch repair service from watch companies. Shortly thereafter, I responded that both jewelers and companies must suffer the consequences of slow service after exploiting the watchmaker for decades by offering him the lowest pay.

This prompted one of your writers in the July issue [Fred Burckhardt, "How Much Are You Worth?"] to pass the buck back to the watchmaker. He states, "Let's stop blaming everyone else for our own state of affairs. It's not your boss or the watch companies or the jewelers—the person in the mirror is the one to blame. Try putting a little more into it." This assessment of the watchmaker is yet another shameful slap on the face of our brow-beaten watchmakers.

Members of the trade, let us be honest with ourselves for once! The time has come to recognize the watchmaker for what he *is*, not for what he isn't. All watchmakers sit at the bench, burn their eyes out, and use the hands of a surgeon. Yet the average salary today in 1981 is still an incredible $200 a week. Sure, there are those who are more fortunate, but what about the trade as a whole?

The typical watchmaker works at the store and at his home 70 to 90 hours a week, makes a bare living, has no car and no family life. He has no time for bull sessions by so-called watchmaker associations that are actually run by company executives and distributors, where most meetings are sales talks for new tools and new machines. Do you ever hear a discussion about the plight of the watchmaker and what can be done to provide the repairer with a better livelihood?

As a watchmaker who is fortunate to be making an above-average living and as a member of several trade organizations, I know all too well what is still taking place in this day and age. Despite a critical shortage of watchmakers, conditions have not improved. I have come to the conclusion that it is a past watchmaker who turns out to be the biggest enemy of the still struggling one. This is an evolutionary process which leads the one-time-watchmaker-turned-jeweler to take his revenge on the present watchmaker. This understood, no matter how willingly and hard the watchmaker works, he, as a watchmaker, cannot acquire sympathy and monetary gains by putting "a little more into it." There has to be true reasoning to understand and appreciate the situation that exists today.

Jack Freedman
Brooklyn, New York

Fall Specials at EWING BROS!

JEWELERS' 4" CENTRIFICO CASTING MACHINE With Accessories

The Jewelers' 4" Machine will cast all flask sizes up to 3½" diameter by 4" high. The recommended crucible for this machine is the "Kerr Jewelers' 7 oz. Clay Crucible," which has a melt-capacity of 7 oz. gold. The Jewelers' 4" Centrifico Casting Machine is available with accessories (as illustrated) or without accessories (but supplied with 2C and 3C flask cradles). Shipping Weight: 20 lbs.

Item Nos. 09361 (complete)

$263.25

CENTRIFUGAL CASTING MACHINE ACCESSORIES

$4.70

J2 Flask
The J2 Flask is stainless steel and measures 1⅜" diameter by 2¼" high.
Item No. 09504

$6.35

J3 Flask
The J3 Flask is stainless steel and measures 2⅜" diameter by 2⅝" high.
Item No. 09505

$10.15

J4 Flask
The J4 Flask is stainless steel and measures 3⅜" diameter by 4" high.
Item No. 09506

$10.55

J5 Flask
The J5 Flask is stainless steel and measures 4" diameter by 5¾" high.
Item No. 11606

$3.30

T2 Sprue Base
is rubber and designed for use with the J2 Flask.
Item No. 13989

$3.30

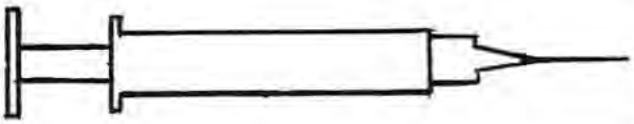
T3 Sprue Base
is rubber and designed for use with the J3 Flask.
Item No. 13950

$3.30

T4 Sprue Base
is rubber and designed for use with the J4 Flask.
Item No. 13247

$4.70

T5 Sprue Base
is rubber and designed for use with the J5 Flask.
Item No. 13250



14Kt. Yellow Paste Solder in Dispensing Applicator. No Flux Needed. Has a Very Low Melting Point. Ideal for Soldering Chains.

$19.95

10K	White & Yellow	One Dwt. $14.50	
14K	" "	18.50	Based on
18K	" "	27.00	$400 Gold
20K	" Hard	32.00	

Use Our TOLL FREE Phone Numbers!

No. 224—Silver Dollar Size
Sterling Each $3.30

Reg. $3.30 **SPECIAL! $2.19**

Save the C.O.D. fee

use VISA or MasterCard

EWING BROS.

P.O. Box 445, Tucker, Georgia 30084
Phone: (404) 938-0115 Atlanta

Toll Free Numbers:
In Georgia - 1-800-282-9220
Out of Georgia - 1-800-241-9081

By Archie B. Perkins, CMW, FNAWCC

The Modern Watchmakers Lathe ©1981

Part III

In continuing the discussion of the split wire chuck, there are some other important points to be mentioned. It is important to know that most of the lathe companies have made more than one size of lathe and that different sized chucks are needed.

Figure 1 shows some of the most popular sizes of chucks for watchmakers lathes. View A shows the 6mm diameter chuck which is used in the small Geneva pattern lathe, such as the Lorch and Wolf-Jahn. View B shows the Webster-Whitcomb (WW) chuck. This chuck has an 8mm body diameter and is the most popular standard chuck in use among watchmakers today. Many of the watchmakers lathes made since 1900 use this size and style of chuck. It has become one of the most standard chucks for watchmakers lathes. View C shows the Moseley 8mm No. 2 chuck with a conoidal-shaped head. This shape of chuck was used by Moseley in his No. 2 and No. 3 lathes. All other Moseley lathes use a chuck that has an angle on the head instead of the conoidal shape. This chuck has become a standard for watchmakers lathes. Other companies have made lathes that use the Moseley-style chuck. Some of the Moseley No. 2 chucks made in later years had a 20° angle head instead of the original conoidal shape. The Moseley No. 2 chuck is longer than the Webster-Whitcomb chuck, but it can be used in a Webster-Whitcomb lathe if it has an angular head and if a washer is placed on the draw-in spindle to allow for the extra length of the Moseley chuck.

View D of Figure 1 shows the Derbyshire Magnus chuck. This chuck has a 10mm body and is longer than the Moseley chuck. Another feature of this chuck is that the thread diameter is the same as the body diameter, which allows for a larger hole clear through. This increases the capacity of the chuck. This chuck has a coarse Buttress thread.

Figure 2 shows a drawing of a lathe chuck with its different dimensions. View A shows the diameter of the head; B is the diameter of the body; C is the diameter of the thread; D is the angle on the head; E is the total length less the curve; F is the largest hole clear through the chuck; G is the largest hole in the front end; and P is the pitch of the thread. This drawing is to be used with Table 1, which shows the different dimensions of chucks that are made to be used with the different makes of lathes. Table 1 should be useful to the watchmaker in determining a particular model of lathe by checking the measurements of the chucks that fit the lathe. Some lathes are not listed in the table. These would usually fall under one of the following sizes: Webster-Whitcomb, Moseley, or Derbyshire Magnus.

Many different items can be chucked in the lathe, and a variety of methods can be used to do this. One chuck that is very useful to the watchmaker is the crown chuck. Figure 3 shows a Levin crown chuck being used to chuck a wristwatch crown for altering the diameter of the pipe or to bore out the opening. This chuck is one of a set of 13 chucks. These chucks are made of nickel silver which is soft enough not to damage the knurling on the crown. The sizes of these chucks are 4.00mm, 4.20mm, 4.40mm, 4.60mm, 4.80mm, 5.00mm, 5.20mm, 5.40mm, 5.60mm, 5.80mm, 6.00mm, 6.20mm, and 6.40mm. The inside structure of these crown chucks is shown in Figure 4, View A.

Figure 1

Figure 2

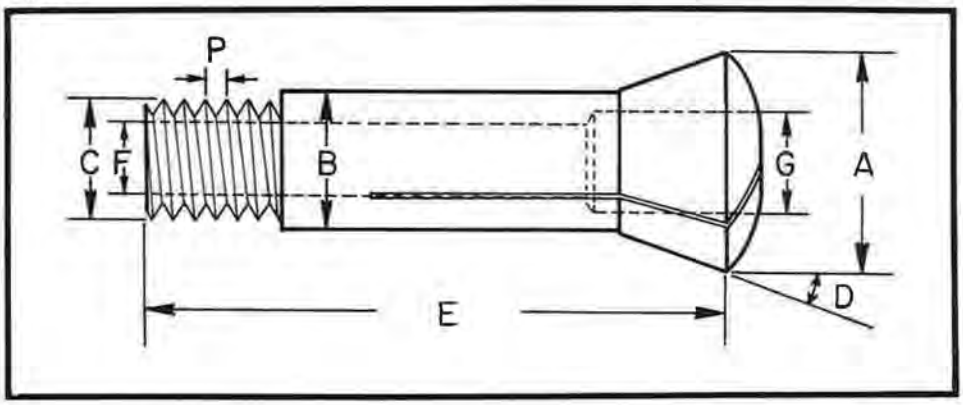


Table 1

Make	Model	A= Dia. of Head	B= Dia. of Body	C= Dia. of Thread	Threads per in. or cm	D= Angle of Head	E= Total Length Less Curve	F= Largest Hole Clear Through	G= Largest Hole in Front
Derbyshire	WW	.500"	.315"	.270"	40 TPI	20°	1.312"	.196"	.25"
Derbyshire	Large	.500"	.315"	.315"	14 TP cm	20°	1.312"	5.0mm	5mm
Derbyshire	Magnus	.562"	.394"	.390"	10 TP cm	15°	1.625"	8.0mm	8mm
Geneva	Small	.425"	.235"	.200"	36 TPI	20°	1.156"	3.50mm	4.70mm
Geneva	Large	.500"	.315"	.270"	40 TPI	20°	3.312"	.196"	.25"
Hopkins	No. 1	.435"	.229"	.187"	48 TPI	25°	1.031"	2.80mm	4.2mm
Hopkins	No. 2	.530"	.325"	.250"	36 TPI	25°	1.187"	4.40mm	6.5mm
Hopkins	No. 3	.460"	.260"	.220"	40 TPI	25°	1.000"	3.80mm	5mm
Hopkins	Nos. 3-4	.530"	.326"	.285"	40 TPI	25°	1.360"	5.20mm	6.5mm
Hopkins	No. 4	.850"	.605"	.545"	24 TPI	20°	2.437"	10.0mm	13mm
Hardinge	No. 1	.500"	.335"	.325"	40 TPI	15°	1.437"	.250"	.25"
Hardinge	No. 2	.625"	.450"	.445"	30 TPI	15°	1.812"	.343"	.34"
Hardinge	No. 3	.850"	.650"	.645"	26 TPI	12°	2.687"	.500"	.50"
Hardinge	No. 4	1.16"	.950"	.945"	20 TPI	10°	3.000"	.750"	.75"
Hardinge	No. 5	1.47"	1.25"	1.25"	20 TPI	10°	3.281"	1.00"	1"
Moseley	No. 1	.430"	.240"	.208"	48 TPI	25°	1.250"	3.8mm	4.7mm
Moseley	Nos. 1x2	.500"	.314"	.270"	40 TPI	20°	1.250"	5mm	6.5mm
Moseley	No. 2	.500"	.314"	.270"	40 TPI	Conoidal	1.562"	5mm	6.5mm
Moseley	No. 3	.600"	.400"	.350"	36 TPI	Conoidal	1.750"	6.5mm	7mm
Moseley	No. 3-15°	.625"	.400"	.350"	36 TPI	15°	1.844"	6.5mm	7mm
Moseley	No. 4	.875"	.590"	.490"	25 TPI	20°	2.312"	9.5mm	13mm
Rivett	No. 1	.500"	.300"	.265"	40 TPI	20°	1.250"	4.8mm	6mm
Rivett	No. 2 (new model)	.500"	.325"	.320"	40 TPI	15°	1.562"	5.95mm	6.35mm
Rivett	No. 3	.825"	.590"	.525"	26 TPI	20°	2.125"	10mm	13mm
Rivett	No. 4	1.03"	.750"	.665"	20 TPI	20°	2.750"	13mm	17mm
Rivett	No. 5	1.33"	1.06"	.945"	18 TPI	20°	3.437"	18.25mm	22mm
Stark	No. 1	.435"	.188"	.165"	48 TPI	22½°	1.108"	2.3mm	3.5mm
Stark	No. 2	.500"	.221"	.185"	48 TPI	22½°	1.250"	2.8mm	4.2mm
Stark	No. 3 (watchmaker)	.500"	.245"	.185"	48 TPI	20°	1.218"	2.8mm	4.5mm
Stark	C	.580"	.319"	.265"	40 TPI	22½°	1.562"	5.08mm	6.35mm
Stark	D	.625"	.355"	.305"	40 TPI	20°	1.750"	6.5mm	7mm
Stark	E	.500"	.300"	.270"	40 TPI	20°	1.250"	4.8mm	6mm
Stark	No. 3 Bench	.875"	.590"	.508"	26 TPI	20°	2.125"	10mm	13mm
Stark	No. 4 Bench	1.43"	.998"	.990"	20 TPI	15°	2.312"	25mm	25mm
Webster-Whitcomb	WW	.500"	.315"	.270"	40 TPI	20°	1.312"	5mm	6.5mm
Whitcomb	No. 1	.375"	.197"	.168"	.55mm = p	20°	.936"	2.5mm	3.6mm
Whitcomb	No. 1 Factory	.435"	.236"	.182"	.63mm = p	20°	1.093"	3.3mm	4.4mm
Whitcomb	No. 1½	.435"	.255"	.220"	.63mm = p	20°	1.140"	3.8mm	5mm
Whitcomb	No. 2 Factory	.560"	.355"	.278"	.71mm = p	20°	1.500"	5.5mm	7mm
Whitcomb	No. 2½	.750"	.473"	.370"	.85mm = p	20°	1.534"	7mm	9mm
Whitcomb	No. 3	.865"	.590"	.508"	1.mm = p	20°	2.125"	10mm	13mm
Whitcomb	No. 3 Large Thread	.865"	.590"	.587"	1.25mm = p	15°	2.187"	13mm	13mm
Whitcomb	No. 4	1.08"	.747"	.665"	1.25mm = p	15°	2.875"	13mm	17mm
Whitcomb	No. 4 Large Thread	1.08"	.747"	.745"	1.63mm = p	15°	2.875"	17mm	17mm

The depth of the seat in the chuck is just enough to allow the crown to be chucked so the edge of the crown is about flush with the end of the chuck. Figure 4, View B shows a crown chuck that is cut out larger and deeper for pocket watch crowns. These chucks were made in sets of 13 sizes, numbered as follows: 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120, and 125. The smallest size is No. 60 and the largest is No. 125.

Another type of pocket watch crown chuck is the Johanson sub chuck. A pocket watch crown is shown chucked in this sub chuck in Figure 5. There is a shank on the chuck that fits into a No. 50 split wire chuck. The structure of the Johanson sub crown chuck is shown in Figure 6, View A. Point "a" shows the body of the chuck; point "b" shows the shank of the chuck that fits a No. 50 split wire chuck; and point "c" shows one of the caps that screws onto the body of the chuck to retain the crown in the chuck. There are four caps with different sized openings for different sized crowns. These caps have a right-hand thread. Point "d" shows the adjustable center rod that has a left-hand thread. This rod can be adjusted in and out for setting the crown to the proper depth in the chuck so the cap will tighten the crown

(Continued on page 16)

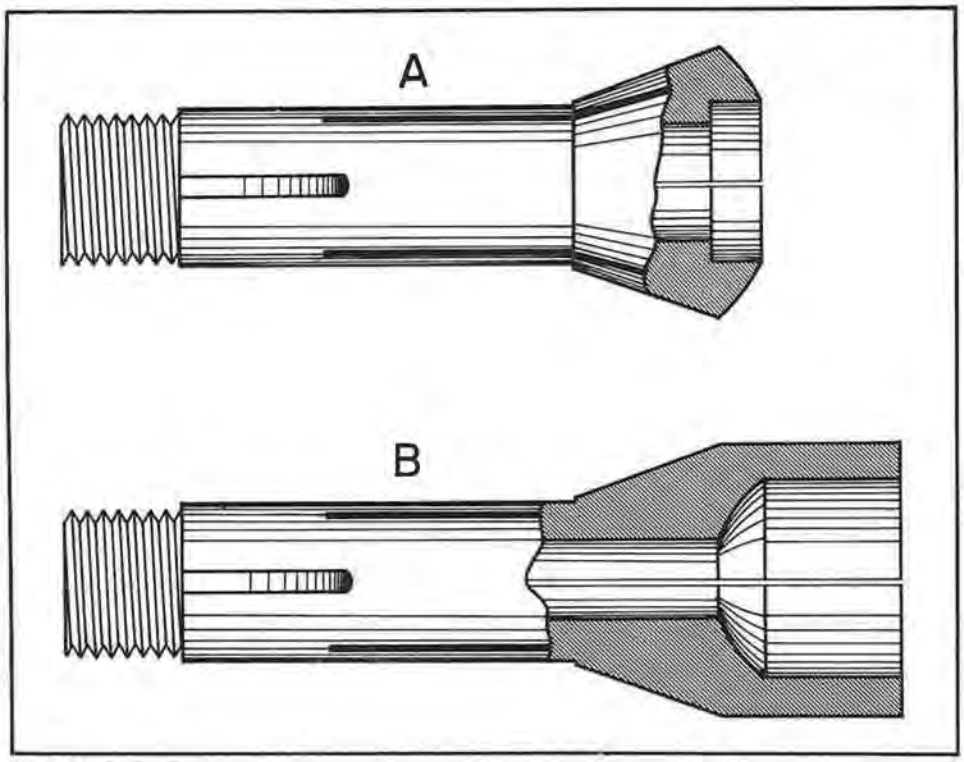
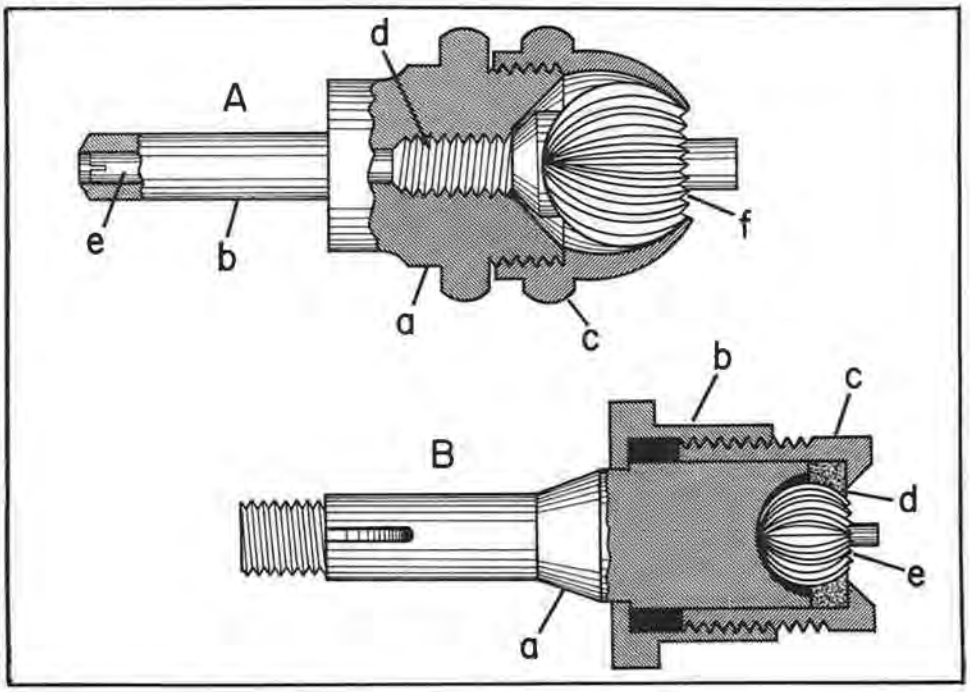


Figure 4

Figure 5

Figure 7

Figure 6



QUARTZ WATCH MODULE TESTER

"TEST ALL THE ELECTRICAL PARTS of a QUARTZ WATCH"

Analog And Digital

MODEL 800

TESTS FOR:

- **Excess Current — LED, LCD, and ANALOG**
- **Faulty Quartz Crystals**
- **Poor Battery Contact**
- **Broken Switch Contacts**
- **Integrated Circuit Problems**
- **Night Light Lamps**
- **Analog Motor Continuity**
- **LCD Open Segments**
- **LCD Displays**
- **Measure LCD Drive Voltage**
- **UP Converter Voltage**
- **Motor Impulses**

The Zantech Module Tester, Model 800, is not only an ammeter, it is a complete troubleshooting system designed especially for fast, accurate, quartz watch (LCD, LED, and ANALOG) troubleshooting. It is the most accurate and reliable electronic test system available. Model 800 is being used with great success by many Quartz Watch Companies and Service Centers throughout the world. When the Model 800 is used with its many accessories, no quartz watch will escape complete evaluation.

NEW FEATURES make Analog Quartz Testing Easy

Features: Automatic current range change (0 to 20 ua and 0 to 200 ma) with audio indicator — 1.55 volt 3.10 volt and 0 to 10 volt power supplies — Switch command probe — 100 meg ohm voltage probe — Voltage scales 0 to 2 and 0 to 10 — Quartz Substitute probe - 32 KHz and 786 KHz — Analog current pulse integrator — Analog voltage pulse integrator — Internal calibration check — Over current shutdown — Variable 34 Hz LCD display test voltage.

ZANTECH TECHNICIANS can give you expert instruction and technical advice by telephone!

Full one year service warranty, instruction book, mini hooks, BNC cable and switch cable included.

Price $850.00

ACCESSORIES

UNIVERSAL MODULE PROBE	Model 840	$195.00
BATTERY TESTER	Model 810	65.00
ALARM TESTER	Model 930	65.00

• AT ZANTECH, OUR BUSINESS IS BASED ON EXPERIENCE, QUALITY AND SERVICE. •

For further information regarding Model 800 — equipment, parts, training course, or placing order, write or call Zantech, Inc.

77 SHADY LANE • TRENTON, NEW JERSEY 08619 • 609 586-5088

ZANTECH® INC.

Made in USA

In the Spotlight© 1981
by Orville R. Hagans

From the Manuscript and Photo Library of Orville R. Hagans, CMW, CMC, FAWI, FBHI

Louis XIV Clock

The Louis XIV Clock is a one-of-a-kind masterpiece from the fabulous collection of the late Willis R. Michael. It is illustrated in the 5th and 6th editions of F. J. Britten's book, *Old Clocks and Watches & Their Makers.*

In the 6th edition, Britten gives a complete and detailed explanation of this clock. We quote:

"An interesting bracket clock, with complicated movements, in a case inlaid with white metal and brass Boulle work, dating from about 1690-1710. At the top of the dial plate is engraved the motto, *Nec pluribus im par*, the first two words preceding and the second two following a representation of the sun. At the foot of the dial plate is the inscription, *"Henricus Martinot, motum adjunxit. Pouilly Inventor Fecit Parisis."* Henry Martinot was Chief Clockmaker to Louis XIV, having lodgings in the Louvre, and on the pedestals of the two columns, which are prominent features of the dial plate, is the doubled initial of the King, L.L., interlaced and reversed, surmounted by a crown. This treatment, coupled with the fleur-de-lis ornament formed by the Boulle work of the case, led to the conclusion that the clock was made for Louis XIV, possibly for presentation to some distinguished person. The dial circle, supported by a figure of Saturn, shows hours and minutes, beside which appear, through seven openings within the circle, sunrise, sunset, the length of the day, the length of the night, the month of the year, and certain events of the year as they occur.

Above the center of the dial are eight tablets, and below the center, four more. These contain each the title of a month, with a number arranged in a peculiar way, thus: April 2; July 5; September 7; December 10; June 4; February 12; March 1; November 9. These are the eight upper ones. The four below, arranged in a cruciform frame, are August 6; May 3; January 11; and October 8. Underneath a fleur-de-lis, engraved over the words, *Premiers jours du mois*, points directly to the figure 8 of the month of October. On each side of the dial center is engraved an oval border within which, showing through curved slits, are: on the left, the age of the moon, and on the right, the days of

(Continued on page 41)

We Salute These New Members!

AGIUS, Oscar—Trenton, MI
ARNESON, Terri—Port Orchard, WA
BAGWELL, Gene L.—Florence, MS
BARTON, William E.—Great Falls, MT
BEHNKI, Greg—Anaheim, CA
BELCHIKOV, Gersh—Atlanta, GA
BELEW, Carlton E.—Columbia, TN
BENTLEY, James C.—Taylorsville, NC
BERG, Paul—Ft. Wayne, IN
BISHOP, K.T.—Arlington, VA
BOGGESS, William H.—Cincinnati, OH
BOYD, Milton—St. Paul, MN
BROCKMEYER, Wilfried—Southwick, MA
BROWN, Robert E.—Elkhorn, WI
BUMPAS, Larry—Oklahoma City, OK
CAPOTOSTO, John—Deer Park, NY
CARDWELL, Joseph P. Sr.—Urbanna, VA
CARPENTER, Timothy—Creve Coeur, MO
COLLINS, John—Redford, MI
CONNELLY, Edmund—Orland, CA
CURTISS, Charles W.—Newcomerstown, OH
CUSHER, Laurie—Hyde Park, NY
DAVISON, R. M.—Ellicott City, MD
DIDYOUNG, Eugene E.—Spokane, WA
ELAM, Michael A.—Assumption, IL
FALCON, Francisco Luis—Kansas City, MO
GORRELL, Daniel F.—Colorado Springs, CO
GRAY, Frank H.—Kansas City, KS
GUSTAFSON, Adolph A.—Iron Mountain, MI
GUTIERREZ, Roberto I.—El Paso, TX
HANSEN, Franz M.—E. Sebago, ME
HARRIS, John A.—Saugus, CA
HOLLENBACK, Mike—Springfield, CO
HOLOVAK, Charles—Wichita Falls, TX
HOVEY, Roy A.—Richmond, KY
JOHNSON, Clarence E.—Newport News, VA
JOHNSON, Dwight—Cincinnati, OH
JONES, Robert H.—Arlington, VT
JUHAS, Stefan—Mansfield, OH
KECHAJIAS, Jim—Idaho Falls, ID
KOEPPEN, Donald H.—Muncie, IN
KRELLER, Alvin—Narrowsburg, NY
KURTZ, W. L.—Grosse Pointe Woods, MI
LOEB, Alexander G.—Balboa, CA
LUCKIE, James V.—Newnan, GA
LUEDKE, Charles—Billings, MT
LYBARGER, Glen A.—Tipp City, OH
McFADDEN, David W.—Glenshaw, PA
McWHORTER, Kenneth P.—Cincinnati, OH
MARSTON, Stanton P.—Newburyport, MA
MAY, Roger E.—Los Angeles, CA
MAXEY, Clyde A.—Ft. Collins, CO
MEYER, Matthew P. N.—Fairfield, CT
MILLIKEN, Wayne—New Martinsville, WV
MURPHY, Mel—Brea, CA
NUTTING, H. Fred—Brea, CA
PONCE, Orlando—Agana, Guam
PORTER, C. T.—Avondale, LA
POWELL, Harvey W.—Riverside, CA
POWERS, Bob F. I.—Thousand Oaks, CA
RHORER, William E.—Lake Charles, LA
ROMANO, Joseph G.—Gretna, LA
SAKAYAN, Garabed—San Lius Obispo, CA
SHANNON, John J.—Malden, MA
SHIN, Jung Y.—Seattle, WA
SHOIKHET, Peter—Des Moines, IA
SHORTS, Randy L.—Erie, PA
SPRINKLE, Wardon W.—Sparks, NV
SPOSATO, Pasquale—Des Moines, IA
STERN, Irving—Brooklyn, NY
STEWART, William J.—Independence, KS
STOCKLI, Rudolf H.—Coral Springs, FL
STONE, Arnold R.—Billings, MT
STUYCK, Gerard B.—Essex Junction, VT
TALLEY, Robert C.—Yorba Linda, CA
TERRY, R. C.—Martinez, CA
THAYER, Craig—Mauston, WI
THEIS, Thomas L.—New Stanton, PA
TOLZMAN, Dennis—Ft. Smith, AZ
TRINH, Phung—Bloomington, MN
TURNER, John C.—Dunedin, FL
WAGNER, Bert L.—Northridge, CA
WALKER, Wayne J.—Natchitoches, LA
WALLACE, Emily—Washington, D.C.
WALLS, Carlos—New York, NY
WEBER, Mary J.—Morenci, MI
WERT, Ross—Park Ridge, IL
WESTPHAL, Douglas C.—Bradley, IL
WHITE, Joseph—Brockton, MA
WIENAND, Leonard P.—Pittsburgh, PA
WIERZBOWSKI, Ron E.—Trenton, NJ
WISE, Joseph L.—Fremont, OH
WORTHINGTON, Mark S.—Woodside, NY

THE ROCK QUARRY

By Fred S. Burckhardt

"Man was Born unto Trouble..."

After so many years, you might think a watchmaker would be able to sense trouble when it walked in the door. Not so—at least not with me. One particular time is etched on my brain and will stay there through eternity—not that I plan on being around that long. On the other hand, I don't plan on going anywhere, either.

Anyway, it all started on a very hot day last summer. A woman came in all dressed up in her Sunday best—shorts, which made her legs look like two bleached, elongated prunes, a "T" shirt, the message on which I dare not repeat, and a brand new pair of blue and white jogging sneakers. I guess she bought the sneakers to go with her hair which was also blue and white. Her hair would have been very pretty if she hadn't had it pulled back in a bun so tightly that her eyes were stretched back almost to her ears.

I asked her if I could be of any help. She said, "My watch doesn't wind right. It just keeps turning and turning. Maybe a wheel or mainspring broke."

I took the watch from her, noticing that it was a quartz analog. I said, "This type of watch doesn't have a mainspring or winding wheels. It's a battery-operated watch that needs no winding."

"No, you must be mistaken," she said. "My daughter gave it to me for my birthday several weeks ago and I've been winding it faithfully three times a day."

"No," I said. "You were just turning the crown but not actually winding the watch."

"What's a crown?"

"It's this little knob on the side."

"I thought that was a stem. When you fixed my other watch, you called it a stem and said it had to be replaced."

"I may have been looking at the crown at the time to see if it were in good condition. You see, there are two separate pieces: the stem and the crown. They screw together. Sometimes if the stem breaks or has to be replaced, the crown can be used again."

I thought that was a pretty fair explanation. Obviously, she didn't.

"Didn't you charge me for a crown?" she asked.

"No, not if I didn't replace it," I answered.

"Does this new watch have a stem, too?"

"Yes."

"Then how come I can't wind it?"

"As I explained before, there are no winding wheels in this watch because it doesn't have a mainspring to wind like your old watch had."

"Can you put one in so I can wind it?"

"No," I said through clenched teeth.

"I can't understand how I could wind it before and now all of a sudden it won't wind up."

"Because, like I told you before, you weren't winding your watch, you were just turning the crown. You can't wind this type of watch. It's not made to be wound."

Needless to say, I was getting a little upset.

"Well, if you can't wind it, what keeps it running?" she asked.

"A little battery keeps it running."

"If the battery goes bad, will I be able to wind it?"

For a minute, I thought she was putting me on. I didn't know whether to go along with her or get it over with by punching her out.

"It's a chain display. It's compact, attractive, and fits nicely on the counter, but in order to get a chain out, the whole insides have to be removed. We didn't know this when it came in. I ruined an ax, two power saw blades, and four screwdrivers trying to get it opened."

"No," I said. "You'll never be able to wind this watch. If you have it for a hundred years, you still will not be able to wind it. This watch will not wind. Believe me, I wouldn't lie to you!"

"Why does it have a stem if it won't wind?"

"So you can set the time," I answered.

By this time, I figured I'd better unload her, so I said, "Why don't you find out where your daughter bought the watch and take it there so they can explain how it works. We don't sell this particular brand so I'm not that familiar with it. I'm sure that wherever it was purchased, there will be people who will be able to answer any questions you may have."

"She got it from a friend in the wholesale business, but they only sell them. They don't do any repair or even know anything about them. I already called and they said to take it to a watchmaker. Do you know anybody else who could tell me why it won't wind?"

"Yes," I answered. "Call the factory. I'm sure they'll accept a collect call. It's their product and I'm sure they will be glad to speak with you about it."

This finally seemed to satisfy her. As she turned to leave, she said, "I wish you could have helped me. I like to bring all my repair work here."

I felt like saying, "We sell things here, too."

I waited for a minute, because I was sure she would tell me to have a nice day. I would have made mincemeat out of her!

The next customer wasn't anything to shout about either. She was looking for a watch band. Like most, she didn't want to pay much for it because her watch was old. She looked at every band on the display before she finally made a choice. I tried it on her wrist and said, "It looks like it will need five links out." She said, "Six would be better."

I took out six as per her request, and lo and behold (you'll never guess), it was too tight! So I put one back in and she said, "It's just right." Then she wanted to know if she could get a refund on the other five links!

It took about another twenty minutes to straighten the display. While we are on the subject of displays—and trouble—did you ever wonder about the people who design such plastic monstrosities? They must be related to the boss or they would have been fired.

I must admit, it is a challenge when a new one arrives. I remember once complaining about a display to a salesman, who said, "We have a brand new display that is trouble free!" I believed him.

Of course, every time you buy one of these new displays, you have to take the gross of bands that comes with it. Well, the trouble-free display arrived—partially assembled. The first customer pointed to one band, and believe it or not, I couldn't get it out of the display. I must admit, I'm not too swift with these mechanical devices, but this was a little ridiculous. The customer finally decided on another band.

When the salesman came prancing in a few weeks later, I told him what had happened. "No," he said. "You just weren't doing it right." After ten minutes of tyring to show me what I was doing wrong, he finally admitted, "It must be defective." I wonder how many thousands of other displays across the country have that same watchband still hanging in its original position? Before he left, I have him a little surprise. I shoved the display up his nose!

Another display had a side panel that was under spring tension. I think it was the same kind of spring used in bear traps. In order to open it, two people had to pry while the third quickly removed the article before the ones doing the prying weakened. Once the panel slipped while a sales girl was reaching inside. She lost three fingers, rights up to the knuckles.

There's one more that's a real winner. It's a chain display. It's compact, attractive, and fits nicely on the counter, but in order to get a chain out, the whole insides have to be removed. We didn't know this when it came in. I ruined an ax, two power saw blades, and four screwdrivers trying to get it opened. Luckily, it slipped off the counter, and when it hit the floor, the insides came sliding out.

Isn't it nice the way time flies when you're having fun?

(Continued from page 10)

in the chuck. Point "e" is the end of the center rod which has a screwdriver slot in its end so it can be screwed in or out for proper adjustment, and point "f" shows a pocket watch crown chucked in the crown chuck.

Figure 7 shows another style of crown chuck with a crown chucked up in it. This is the Scholer crown chuck. The construction of this chuck is shown in Figure 6, View B. Point "a" shows the lathe chuck which has a hollow cut in its end for the crown "e" to rest in. The chuck has a shoulder for the knurled threaded band "b" to rest against. Band "c" is threaded into band "b." The retaining washer "d" is caused to tighten against the crown as band "b" is turned, causing the retaining washer to be brought against the crown. A key pin in the chuck runs in a key way in band "c," keeping it from turning when band "b" is turned. Four different retaining washers come with this crown chuck to fit different sized crowns.

One of the most useful chuck styles that the watchmaker can own is the wheel chuck. Figure 8 shows a wheel chuck being used to hold a watch wheel in preparation for polishing the pivot on the pinion. In this case, a wheel chuck had to be used to hold the wheel because there was not enough of the pinion extending from the wheel to chuck in a wire chuck. Wheel chucks usually come in sets of five. There are three different sets available. One set is for wristwatches; another set of larger sizes is for pocket watches. There is also a set of extra large sizes for clocks.

Figure 9, View A shows the construction of a wheel chuck. Usually, each chuck has nine different steps that are evenly graduated in diameter. The diameter of the head of wristwatch wheel chucks is 1/2 in. to 5/8 in. The diameter of the head of pocket watch wheel chucks is 1 in., and 1 3/4 in. diameters are for clock wheel chucks.

Refer to Table 2 for the relative sizes of Levin and Derbyshire wheel chucks. The relative sizes of wristwatch, pocket watch, and clock wheel chucks are shown in the table, as well as the diameter of the largest step, the diameter of the smallest step in each chuck, and the difference between the diameters of each of the steps.

Figure 9, View B shows the construction of an external step chuck—sometimes called a ring chuck. This chuck is very useful when a ring or disc that has a hole in it needs to be chucked inside its hole so the outside of the item can be altered. Unlike the wheel chuck that is closed when it is tightened in the lathe

Figure 8

Figure 10

(Continued on page 20)

Table 2

WHEEL CHUCKS

Number of Chuck	Largest Step	Smallest Step	Graduation Between Steps
	DERBYSHIRE POCKET WATCH SIZES		
1	21.4mm	5.4mm	2.00mm
2	21.8mm	5.8mm	2.00mm
3	22.2mm	6.2mm	2.00mm
4	22.6mm	6.6mm	2.00mm
5	23.0mm	7.0mm	2.00mm
	DERBYSHIRE CLOCK SIZES		
6	39.4mm	23.4mm	2.00mm
7	39.8mm	23.8mm	2.00mm
8	40.2mm	24.2mm	2.00mm
9	40.6mm	24.6mm	2.00mm
10	41.0mm	25.0mm	2.00mm
	LEVIN WRISTWATCH SIZES		
1	.555"	.235"	.040"
2	.547"	.277"	.040"
3	.539"	.219"	.040"
4	.531"	.211"	.040"
5	.523"	.203"	.040"
	LEVIN POCKET WATCH SIZES		
1	.930"	.290"	.080"
2	.914"	.274"	.080"
3	.898"	.258"	.080"
4	.882"	.242"	.080"
5	.866"	.226"	.080"
	LEVIN CLOCK SIZES		
1	1.650"	1.010"	.080"
2	1.634"	.994"	.080"
3	1.618"	.978"	.080"
4	1.602"	.962"	.080"
5	1.586"	.946"	.080"

Maxell watch batteries. Tools you can trust.

You, the watchmaker, can build a strong, reliable battery replacement business with Maxell watch batteries. You know how important steady business is these days.

Maxell batteries are designed for your needs. They're labeled for watches and packaged in strips for your convenience. They give you a quality, trouble-free product you can stand behind. Maxell is a principal battery supplier for many of the world's largest watch manufacturers.

We offer you advantages others simply don't. Like our unique dual seal that eliminates any chance of problems with our silver-oxide batteries. Some manufacturers offer a single-seal battery. That may be good enough for others, but not for Maxell and you.

There are Maxell batteries for every watch you're likely to service. You can count on Maxell to bring you the batteries you'll need as this vital part of your business continues to grow.

We believe you are the only person capable of properly changing a battery. We promote this policy in our literature and educational materials. We think you should be using the tools that work best for you. Call us for the name of the Maxell battery distributors in your area.

maxell®

Tools of the trade.

Maxell Corporation of America, 60 Oxford Drive, Moonachie, N.J. 07074, (201) 440-8020

Questions and Answers / Henry B. Fried

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

Julien LeRoy

Q Please send information on the Julien LeRoy pocket watch pictured here. It is in a silver case, No. 18, with the name engraved on the plate.

I believe the watch to date from before 1759. Was the watch made for someone in particular? How many Julien LeRoy watches were made? I own this watch and it is running. Please send the names of any collectors who might be interested.

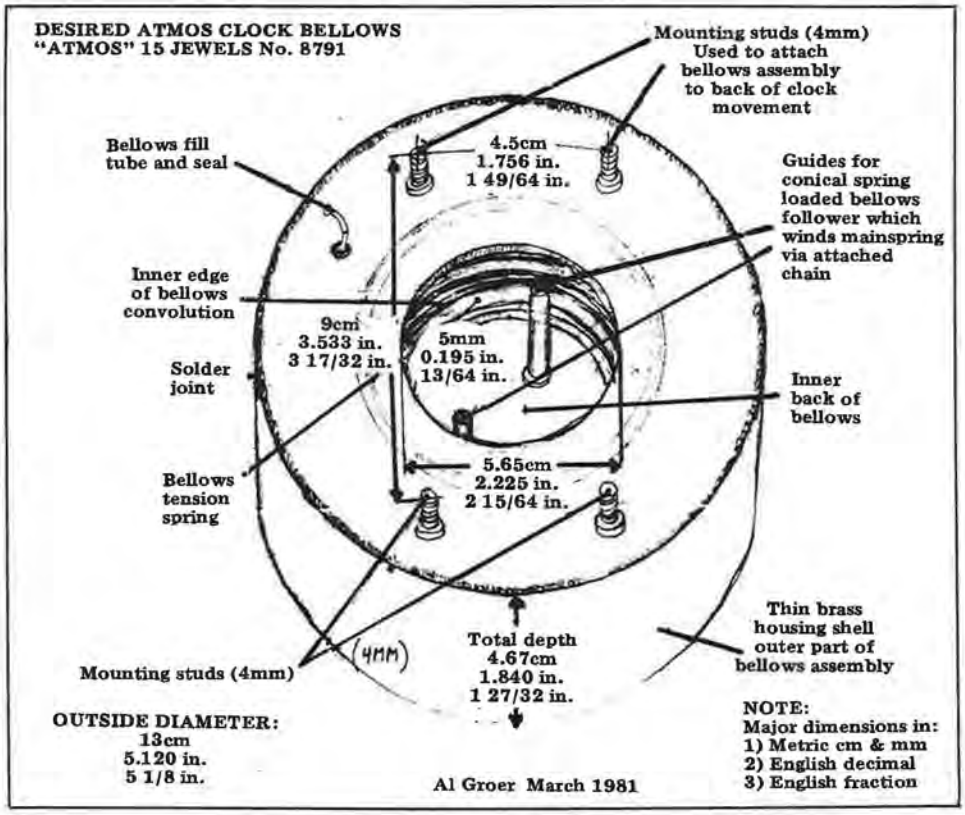
Luin Potter
Wood River, Illinois

A *Your watch is of a later period than 1759—say at least thirty to forty years later. Julien LeRoy was noted also for nice, enamel-cased watches. He was a very reputable maker and was one of a family of court watchmakers—some with the same name. Other Julien LeRoy watches are dated into the 1820's. The LeRoys made thousands of watches for the public and only a very few for royalty. Yours was evidently made for the general public as its quality is not superior.*

As for sending names of specific collectors, it would be pointless as there are 34,000 collector/members of the National Association of Watch and Clock Collectors.

Q I have in for repair an Atmos clock with a bellows of the type shown in the attached sketch. The whole unit, brass shell and all, as shown, is in itself a bellows. It does not contain the usual familiar removable bellows unit. The soldered movable parts of the bellows had developed a separation at one point. I have managed to successfully repair this separation. I filled the bellows with air to compress the bellows tension spring to the point where it should expand and contract within the limits of the winding mechanism travel to wind the clock. The air does not seem to cause

(Continued on page 41)



Borel GROUP

for the best in watch and clock repair tools

BERGEON

Swiss Made Quality Tools

Borel GROUP

WATER PROOF TESTER

Air Pressure system testing of up to 3 atmospheres.

B5555
$218.00

Indispensible to test water resistance of a watch.

Watch can be tested under normal condition of wear.

Allows complete visibility under operation.

MASTER WP CASE OPENER

For opening and closing water resistant watch cases.

Includes pair of jaws for cases with Square notches, straight edges, with holes, curved edges, Rolex-Oyster, & Aquastar
Four pairs of reversible case holding jaws, 9-22 mm. Complete with wood mounting platform.

B5700Z **$180.00**

Special set of Rolex case holders for above

B5538 **$64.20**

MAINSPRING WINDING TOOL

for Arming and Disarming Mainsprings

Chuck holder with rubber sure grip handle. 24 numbered chucks with winding keys from 1.75 to 7.50 mm, in steps of .25 mm. In wooden case; 1 special winding chuck for alarm clock and 1 removeable handle.

B2301
$115.05

Easy to use instructions included for disarming or winding mainsprings.

CLOCK BUSHING TOOL

A precise tool allows bushing of plates from 50 to 220mm and pillar height of 70mm.
Complete set in wooden box with:

2 plate holders arms and chucks
3 driving punches
broach with hand wheel
centering bit
undrilled stake
3 drilled stake
2 centering stakes
10 reamers
2 chamfering tools
4 pivot cutters
Jacobs chuck

With set of bushings 1-60
B6200/5488
$387.50

B6200
$367

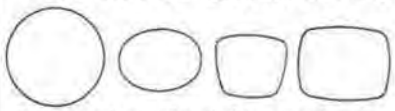
CRYSTAL AND CASE CLOSING TOOL

Complete press for fitting unbreakable crystals with or without tension ring. Also can be used for closing case backs and bezels. Includes: 12 reversible upper stakes, 9 convex lower stakes, 9 lower reversible stakes, and one universal lower base.
All arranged on wood platform

B5500A
$154.55
(as shown)

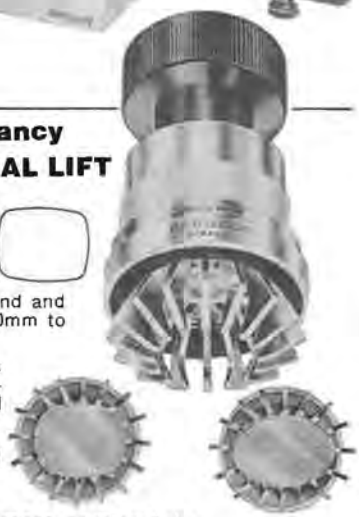
B5500C
(Reduced set)
$94.00

NEW — Round & Fancy UNIVERSAL CRYSTAL LIFT



For removing unbreakable round and fancy shaped crystals from 10mm to 45mm, without tension ring.

Removes and inserts crystals easily without removing movement. Complete with crystal heighth platform.



B6400 **$46.60**

Write or call for brochure of Bergeon tools and equipment, or microfiche of complete 1400 page Bergeon reference books for $5.

Toll-Free Phone Order Service
1-800-821-5686
In Missouri 1-800-892-5818

Borel GROUP

BOREL GROUP, 1110 Grand, Kansas City, Mo. 64106

DISTRIBUTION CENTERS IN:
CLEVELAND KANSAS CITY LOS ANGELES MIAMI OAKLAND

TECHNICALLY WATCHES
(Continued from page 16)

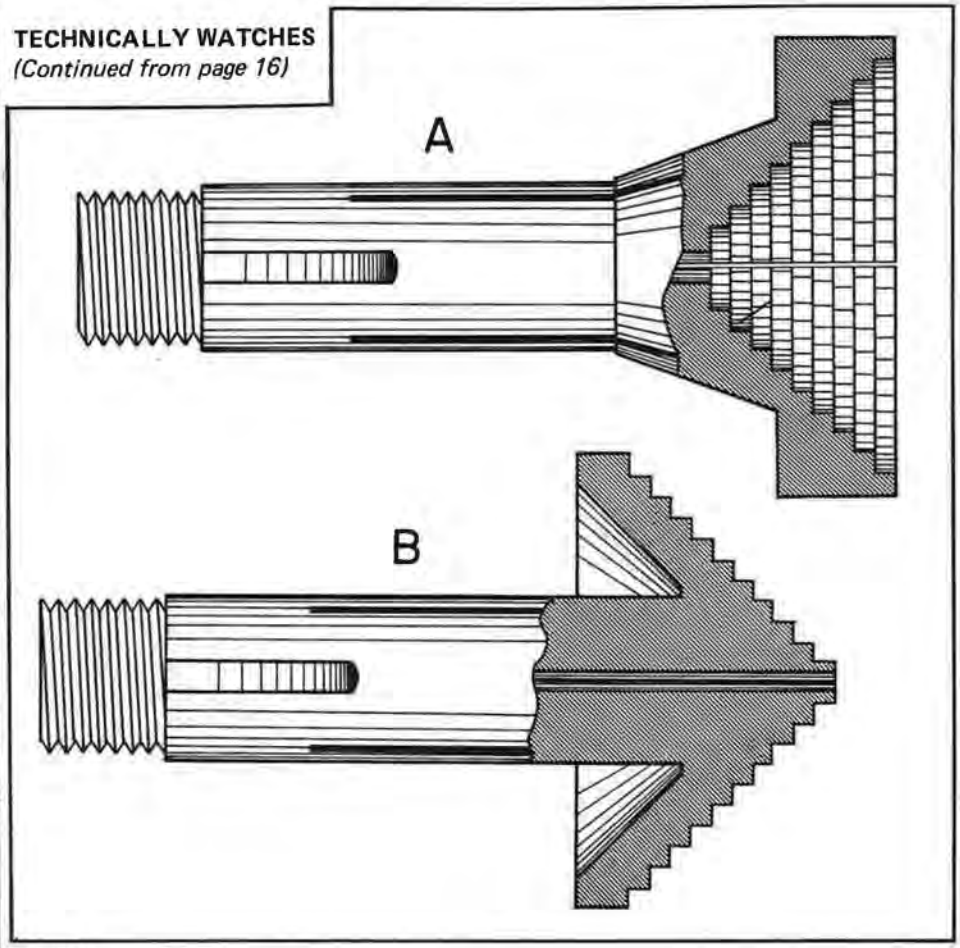


Figure 9

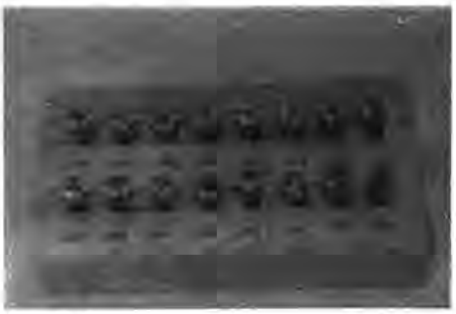


Figure 11

spindle, the ring chuck is opened when it is tightened in the spindle. The spreading action takes place when the conical sink in the back of the chuck is forced against the outside chamfered end of the lathe spindle. These chucks usually come in sets of five. The steps are graduated, similar to the wheel chuck.

Another useful chuck, especially if the watchmaker repairs old pocket watches, is the jewel chuck. Figure 10 shows one of these chucks. They usually come in sets from 1.4mm to 3.0mm in .1mm increments. Another type of jewel chuck is the jewel sub chuck that fits into a No. 50 wire chuck. A set of these is shown in Figure 11. They are made in sets of 8 or 16 chucks. The sizes run from .045 in. to .120 in. hole sizes, graduated .005 in. between sizes. The sub chucks shown in Figure 11 have adjustable
(Continued on page 35)

MAKE A CLEAN SWEEP THIS FALL!!

EMPIRE CLOCK, INC.

METAL CLEANER AND POLISH

Cleans — Waxes — Protects — Polishes, makes all metals shine better than new . . . A polishing paste for aluminum, silver, brass, chrome or any metal.

Stock number 472-50-082 $5.95 — 1 lb. can.

KOTTON KLENSER

For cleaning bright metals such as Copper, Brass, Stainless Steel and Chrome.

	Stock No.
Heavy Duty Kotton Klenser	470-50-853
Lemon Oil Beeswax Polish	470-50-852

KOTTON KLENSER TO CLEAN WOOD

	Stock No.
Regular Kotton Klenser	470-50-850
Protective Wood Feeder	470-50-851
Lemon Oil Beeswax	470-50-852

$4.00

The one-stop source for all of your clock repair needs!

TOLL-FREE ORDER NUMBER
1-800-328-9620
MINNESOTA CUSTOMERS MAY CALL COLLECT AT
612/487-2885

Empire Clock, Inc.
1295 Rice Street
St. Paul, Minnesota 55117

THE SHIP'S CHRONOMETER © 1981

By Marvin E. Whitney, CMC, CMW, FAWI

National Bureau of Standards — Time and Frequency

For some time now, we have traced and discussed the history and development of the ship's chronometer. The need for accurate and dependable time is crucial today, just as it was over two hundred years ago, the difference being the degree. Navigation, whether on the sea, in the air, or in outer space, evolves around mathematical calculations based on precise time, as do many other scientific and technological endeavors.

Devising a timekeeper that would determine longitude at sea within one-half degree, or slightly less than two minutes, without getting "seasick" was truly a challenging task. The challenge was such that a number of governments offered sizable monetary rewards for anyone who could devise a method of determining longitude. Phillip III of Spain in 1598 was first to offer such an award, and shortly thereafter many other nations followed suit. The most noteworthy offer, no doubt, was the act passed in 1714 by the British Parliament which provided a reward of £20,000 for any method of determining longitude within thirty seconds. Lesser amounts of money were offered for greater errors. The Board of Longitude was created to carry out provisions of the act, and during the 114 years that the Board was in operation, it disbursed over £100,000 to various aspirants. As we recall, John Harrison was the first to achieve success and, for his lifetime's effort, was awarded the £20,000, less the stipends granted while he was working on his first three timekeepers. Thus, Harrison's chronometer and those of his predecessors' permitted seafaring men to travel the world over without fear of not knowing where they were or where they were going. The chronometer had opened the door to many new geographical frontiers.

Scientists, in their search to unravel and better understand the laws of nature, have always regarded time as a key ingredient. In Einstein's universe, time was regarded as the fourth dimension. To be able to describe an event, Einstein claimed that four items were necessary; namely, the three spacial dimensions (length, breadth, and thickness) and the fourth, time. With the advancement of science and technology in today's world, a challenge equal to that placed on horologists 200 years ago was placed on our horological engineers and scientists. If it had not been for the development of very precise time systems, our space program never would have gotten "off the ground." The data obtained from the world observatories on the orbited movement of the earth is no longer accurate enough to satisfy today's scientific and technological needs.

Scientific research involves the use of instruments which can measure thousandths, ten-thousandths, and millionths of a second; in fact, in researching the physical properties of certain forms of matter, the use of nano-seconds or billionths of a second is now required. See Figure 1. The famous regulators of Le Roy, Molyneux and Riefler, which were the precision timekeepers for observatories for so many years, have now given way to a new breed of oscillators: quartz

	Prefix	Definition	Example
Less Than 1	Milli	One Thousandth	Millisecond (ms) = One Thousandth of a Second
	Micro	One Millionth	Microsecond (us) = One Millionth of a Second
	Nano	One Billionth	Nanosecond (ns) = One Billionth of a Second
	Pico	One Trillionth	Picosecond (ps) = One Trillionth of a Second
More Than 1	Kilo	One Thousand	Kilohertz (kHz) = One Thousand Hertz (cycles per second)
	Mega	One Million	Megahertz (MHz) = One Million Hertz
	Giga	One Billion	Gigahertz (GHz) = One Billion Hertz
	Tera	One Trillion	Terahertz (THz) = One Trillion Hertz

Figure 1. We read of such things as Megahertz and Milliseconds. What do they mean? The above table explains the meaning of such terms. (Courtesy of the National Bureau of Standards)

crystals, molecules of ammonia, atoms of cesium, and rubidium and hydrogen maser.

The word *maser* is an acronym for "microwave amplification by stimulated emmission of radiation." We in the horological field are well aware that any object that swings or oscillates within a definite period or frequency can become the basis for a timekeeping device. The device that will produce a "periodic event," e.g., the swing of a pendulum or oscillation of an atom, is called the resonator. The resonator in the hydrogen maser is the hydrogen atom which has an atomic resonance frequency of 1,420,405,752 Hz. It has the highest "Q" factor of any of the resonators presently in use, even cesium. The "Q" value is the term used to measure the number of swings or oscillations a resonator makes after receiving its initial push. A pendulum clock may have a "Q" of 200, whereas atomic clocks may have "Q's" in the millions.

By timing a maser beam, scientists have been able to measure the levelness of the moon's surface within inches. The electronic brain of the computer depends on an internal timing device capable of synchronizing the logic sequence at a rate often exceeding a million operations per second. Launching and controlling a satellite or spacecraft requires very precise timing. An error of just a tiny fraction of a second is sufficient to cause a satellite to miss its orbit or target by thousands of miles.

Although the ship's chronometer has certainly been responsible for many of the world's great achievements and should always be revered for its contributions to the advancement of mankind, let us now turn our attention to the atomic clock which tells time with almost absolute precision. Atomic clocks are not really clocks as we perceive them, i.e., "telling the time," for they do not have hands, dials, gear trains, etc. They are actually time standards, used for checking conventional timepieces, controlling radio time signals, navigational systems, and secondary clocks.

History informs us that the measurement of time down through the ages has been accomplished by many different means. Records indicate that undoubtedly the first timepiece was the sundial. In 725 B.C., the Bible records in Kings II, 20:11, "And Isaiah, the prophet cried unto the Lord, and he brought the shadow ten degrees backward, by which it had gone down in the dial of Ahaz." So, what is time?—the shadow on a dial, the running of the sand, the tick of a clock or watch, the vibrations of a sliver of quartz, the oscillations of an atom—day and night, weeks, months, years, centuries.

In today's scientific world, one of the most important measurements is the passage of time. Until recently, when England and the United States joined ranks with the other countries and adopted the metric system, there were two generally accepted systems of measurements; they were the English gravitational system and the metric system. The basic measuring units of the two systems for length, mass, force, etc., were different except for the unit of time: The basic unit of time for both systems was the second; since all countries have now gone metric, the second still remains untouched as the basic unit.

Up until 1967, when the second was re-defined, the second was referred to as a mean solar second which was 1/86,400 of a mean solar day; a mean solar day being the average time interval of the sun at its meridian (highest elevation or noon) on successive days throughout the year. We define the mean solar day as the average because the solar day varies slightly during the year. Actually, the sun passes the meridian exactly at noon only four times a year. Hence, the length of the solar day varies because the earth's rotational speed is not constant. Although the time of the earth's rotation is the basis for our time, records show that through the years, it speeds up and slows down. Despite these periodic gains and losses, the earth's great universal clock which controls our daily lives is gradually slowing down. Astronomers have detected this trend by studying old eclipse records dating back to Babylonian time, and, more recently, by studying evidence provided by the atomic clock.

By using the length of the present day, our astronomers have been able to calculate very precisely when and where past eclipses have taken place. Although these calculations do not agree with the astronomical observations made by the ancient Egyptian and Babylonian astronomers, when the premise that the length of the day is becoming longer because the earth is slowing down is taken into consideration, present calculations and ancient observations do agree.

Even though man has devised a system of timing his actions by the sun, the very accurate determination of time is done by observing the transit of fixed stars. Fixed stars are those stars in which such vast distances separate them from the earth that their real motion is not perceptible to us and thus, they appear fixed. Stars do indeed move in space, but, because the distances are so great, their relative motions do not become apparent for centuries.

The importance of accurate time to the navigator, since it indicates to him the position of the various celestial bodies relative to meridians on the earth, has certainly been alluded to in this series. The primary celestial reference bodies to the navigator are the sun, stars, and the moon. The moon is the only satellite bright enough to be of any value to the navigator. However, the satellites of Jupiter were used at one time to determine Greenwich mean time and, hence, longitude. Observation of the disappearance of Jupiter's moons as they were eclipsed by their planet was first proposed for land use by Galileo. However, this method was not practical at sea since it required the use of a high powered telescope, nearly twenty feet long. To keep such a lengthy telescope zeroed in on a celestial body while the ship pitched and rolled with the seas would have been virtually an impossible task.

The mean solar day is 3 minutes, 55.91 seconds longer than the sidereal (star time) day which is the time required for the earth to make a revolution. Thus, there are 365.2422 solar days in a year vs. 366.2422 sidereal days. Hence, the earth rotates 366,2422 times with reference to a star, while rotating only 365.2422 times with reference to the sun. This one difference is due to the fact that the earth does not rotate in a perfect circular orbit and also tends to wobble while spinning on its own axis. Therefore, when a star reaches the same meridian, as it did on the day before, the sun has not quite reached that same meridian. Thus, if our

reference point is the sun, the time interval between successive transits of the sun across the meridian gives us solar time; should a star be used, the time interval between successive transits of a star across the meridian gives us sidereal time.

The National Bureau of Standards, which comes under the direction of the United States Department of Commerce, has been charged by Congress to carry out the following: "The custody, maintenance, and development of the national standards of measurements and the provisions of means and methods for making measurements consistant with those standards, including the comparison of standards used in scientific investigations, engineering, manufacturing, commerce, and educational institutions, with the standards adopted or recognized by the Government."

The Time and Frequency Division, located in Boulder, Colorado, is that arm of the National Bureau of Standards responsible for carrying out the above functions as they relate to time and frequency. Utility companies, radio and television stations, scientific institutions, research and develpment agencies, as well as navigators of ships, planes, and spacecraft depend heavily on precise time and frequency information. In order to compare and regulate their own timing equipment, these users must have a constant and reliable source of time, the standards of which must by recognized nationally and internationally. Since 1923, the National Bureau of Standards has been providing this standard to America's users.

Not only is the Time and Frequency Division responsible for the distrubution of these standards, but also for developing new and improved methods of dissemination. The Bureau is not only involved in our space and defense programs, but in coordinating international time and frequency activities, and in providing world-wide navigational and communication services and time and frequency calibration services to industrial and scientific consumers. Of course, it also provides very accurate time to thousands of individual users. Presently, these services are available from stations WWV and WWVB in Ft. Collins, Colorado, and from WWVH in Kauai, Hawaii.

We have seen from previous writings that the United States Naval Observatory played an important role in the dissemination of time, and no doubt many may have thought of it as the sole source. However, both agencies share equal billing in this undertaking since they complement each other in the dissemination of time and frequency information.

The mission of the United States Naval Observatory, in reference to time, is to: "Make such observations of celestial bodies, natural and artificial, derive and publish such data as will afford to United States vessels and aircraft as well as to all availing themselves thereof, means for safe navigation, including the provision of accurate time." Dr. Winkler of the Naval Observatory Time Service Division states, "The practical application of this mission is for the Naval Observatory to serve as the operational reference for the official United States time of day as opposed to responsibilities for the unit of time and frequency in National Bureau of Standards." In other words, the Naval Observatory is responsible for the United States' contribution to the astronomical part of Coordinated Universal Time, while the National Bureau of Standards is responsible for the accuracy part of atomic time or the length of the second.

To carry out the Naval Observatory's responsibilities, observations are made with specially designed telescopes known as photographic zenith tubes (PZ Tubes). The PZ Tube is a very sophisticated instrument which occupies a fixed vertical position, unlike the transit instrument, and is completely automatic. One telescope is located at Washington, D.C., and another at Richmond, Florida. As a star crosses the meridian, it is photographed, and the time of transit is automatically recorded. By measuring the position of the star image on the photograph on successive overhead passages, the earth's rotation can be monitored and astronomical time (UT) can be calculated.

The Naval Observatory, and likewise the National Bureau of Standards, operates a large bank of atomic clocks as the basis for extremely accurate and uniform atomic time. It also transports portable atomic clocks worldwide for time dissemination and synchronization. Thus, it can be seen that both of these agencies play a very important role in determining and disseminating time, a dimension which we so often take for granted.

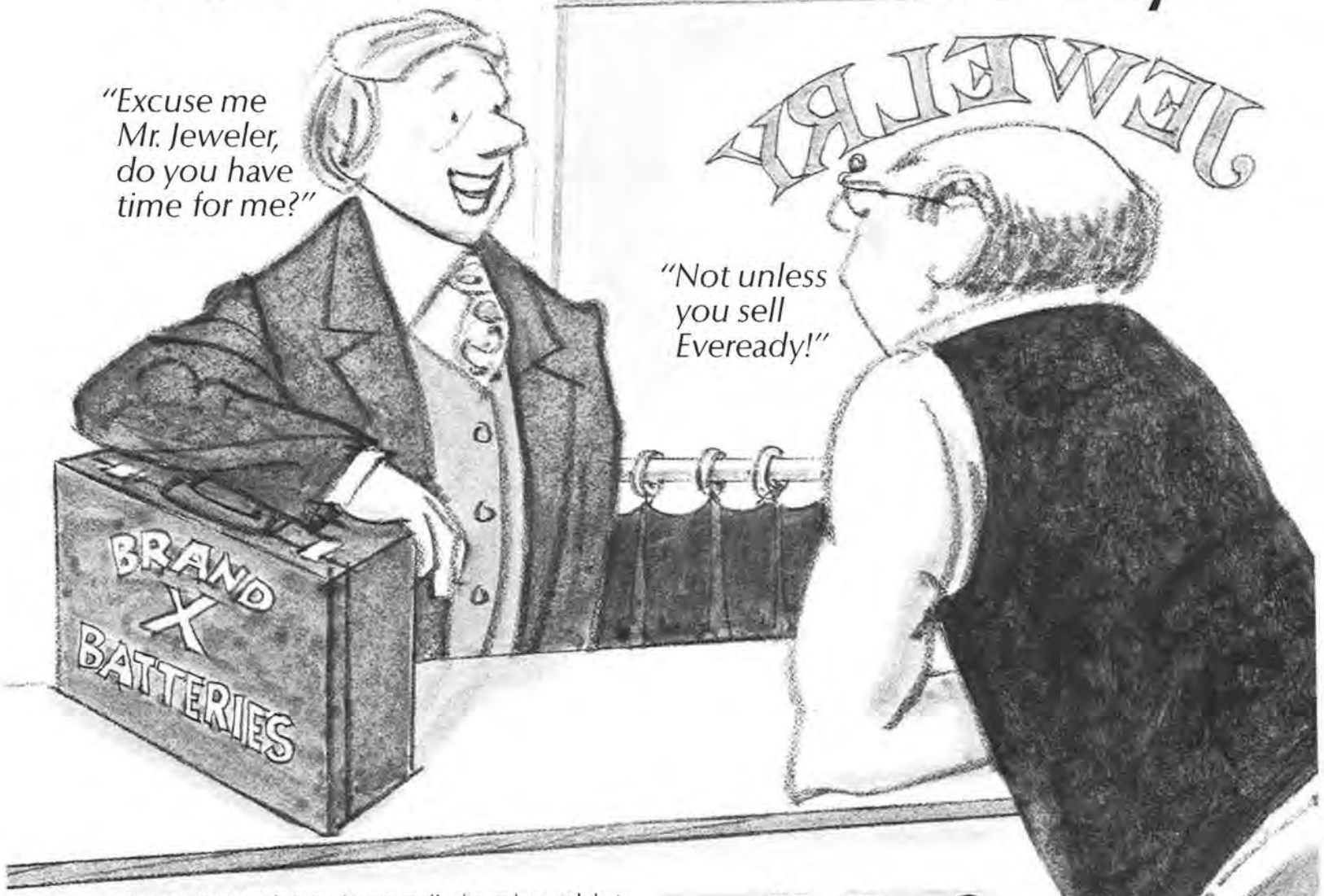
In our discussion, we referred to the commitment these two agencies have to national and international propagation of time. Who then is responsible for the international coordination of time and frequency activities?

In order to coordinate all of these time activities,

(Continued on page 52)

"Eveready" Miniature Battery Report.

You don't have to give other watch batteries the time of day.



"Eveready" Watch Batteries are really the only watch batteries you'll ever need. After all, "Eveready" was the first to manufacture watch batteries. And today, "Eveready" is the leading worldwide supplier of batteries to watch manufacturers and the jewelry industry.

"Eveready" makes an extensive line of watch batteries, including Silver, 1.5 volt Lithium and Mercury types. And even though we make hundreds of thousands every day, no battery leaves our factory before it's aged, voltage tested and visually inspected.

And "Eveready" continues to be a pioneer in watch battery development: new super-thin batteries for fashionable thin line watches...Lithium Batteries that keep the cost down and the quality up. And you can be sure more and more new ideas will be coming soon.

So, you see, "Eveready" Watch Batteries are the only watch batteries you'll ever need. Therefore, next time somebody tries to sell you anything but our watch batteries...tell him, in a nice way, that you've only got time for "Eveready."

Follow the leader... "Eveready."

UNION CARBIDE

"Eveready" is a registered trade mark of Union Carbide Corp.

THE PICKLE BARREL

By Marshall F. Richmond, CMW

Saddle and Harness Silver Repair

Ornamental silver on saddles and harnesses for show horses is quite popular, but like almost anything else, it requires maintenance. To add further to the revenue of the jewelry repair shop, this type of repair can be offered, and it will bring in as many dollars for the same amount of effort as will jewelry repair. As there are not many craftsmen with the knowledge and experience to make these repairs, I have found much of this work showing up in my shop now that the word has gotten around that I can make these repairs. Many of the jobs that I have encountered have been cobbled by a previous repairman who obviously put in more than enough effort to make a good-quality, durable repair, had he only possessed the knowledge and experience necessary in order to work with these metals. In previous articles, I have explained the working of silver, nickle silver, and stainless steel, using silver solder. I hope that many of you watchmaker/jewelry repairmen have by now had enough practice and experience to add this to your available services.

There are three common types of fasteners used to secure these metal ornaments to saddles, bridles, martingales, and harnesses. They are: 1) Screw back. See Figure 1, A; 2) Wood screw. See Figure 1, B; 3) Meral bar to slide over leather straps. See Figure 1, C. These ornaments are made in many shapes: round, square, scallop, rectangular, diamond, sunburst, and even some odd shapes to fit in special places. Most are hand-engraved with flower, leaf, sunburst, scroll, or other ornamental designs dreamed up by artistic hand engravers. Some saddles are so highly decorated with silver ornaments that they cost many thousands of dollars; others are decorated with nickel silver, stainless steel, or brass, which are much less expensive but still make the saddles very valuable pieces of property. All these metals can be hard soldered with easy-flow silver solder, using the proper flux for the metal involved. Bear in mind that damage can be done to the metal or the finish if excessive heat is used; however, these repairs must be made with hard solder, as soft solder joints will not stand the stress to which these ornaments are subjected. Most of the articles that I encounter have been previously repaired with soft solder. Therefore, the first problem is to remove the soft solder, as hard solder will not flow or make a good bond between the two metals.

To remove the soft solder, first the metal is heated until the soft solder flows (becomes liquid). While the article is still hot, it is wiped with a damp cloth or piece of paper tissue which leaves it with a micro-film of soft solder that can then be removed by filing or scraping if this will not damage the parent metal. If there is danger of damaging a finish, the film can be removed by buffing, using a coarse abrasive such as tripoli.

I will now start with a specific repair and give step-by-step instructions on how to make it. Let's assume the article to be repaired is a round silver ornament with a screw back fastener, and that the back, which has been previously soft soldered, has become separated from the ornament. The first step is to remove the soft solder. Hold the screw back in the heavy duty tweezers, dip it in borax and alcohol, and burn this off, leaving a protective coating of borax; then heat the screw back and wipe away the excess soft solder. With an abrasive or steel mill bur in the flex shaft tool, grind the base of the screw back to bare metal. Then grind a place on the back of the ornament where the screw back is to be attached, being careful to confine the ground spot to the diameter of the screw back. Place this on the asbestos pad, face down, and heat and flux just the spot where the screw back will set on the ornament. See Figure 1, A, point a. Grasp the screw back by the tube with the heavy duty tweezers (with the screw removed), heat and flux, and then place a small chip of fluxed silver solder where fluxed. Apply heat until the solder flows enough to completely cover the base of the screw back. Place this solder down in the ornament that is on the asbestos pad; then apply heat with the torch, playing the heat around the screw back so that the ornament and back will come simultaneously to the temperature at which the solder will flow. When the sodler flows, immediately dip in pickling solution.

In this situation, if too much heat is applied to the screw back, the solder will flow on the screw back only and will not flow onto the ornament. Usually the screw back is brass which is a lesser conductor of heat than silver and can melt even before enough heat reaches the silver ornament. However, by moving the flame around the back, both pieces can be heated evenly. After pickling, inspect the joint and make sure solder has flowed all around the outside edge of the screw back base. See Figure 1, A, points a and b; the heavy black ring shows the solder joint.

If the ornament is brass or nickel silver, exactly the same procedure is used in making this repair, but if the ornament is stainless steel, a different type of flux is used.

Flouron® or Batterns® flux are fine for silver, brass, or nickel silver, but for steel, stainless steel, or any ferrous metal, Aircosil® or a similar flux is a must to make the solder flow.

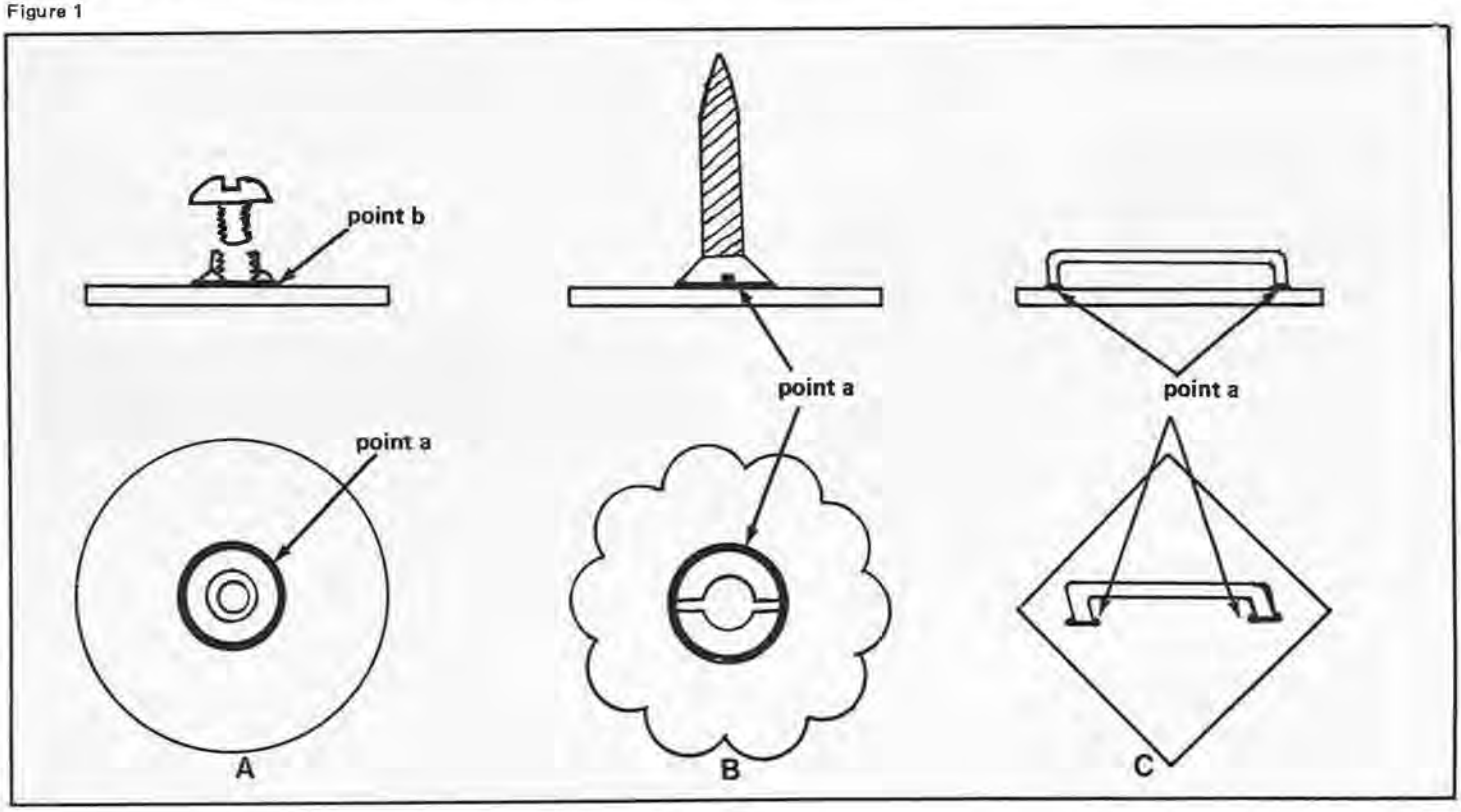
After the repair is complete, finishing consists of removing any oxides or residues. This can be done by pickling, but if the ornament was not dipped in pickle when hot, it can be boiled in pickling solution for a few seconds. If the only residue which needs to be removed is the protective coating of borax, it can be dissolved by boiling in water. If the ornament is stainless steel, do not use an acid pickle, but simply boil in water; sulphuric acid will dissolve steel, so pickling may cause pits in the finish, and if the item is left in the pickling solution too long, these pits may not polish out.

Polishing is done the same as polishing jewelry. I usually start out by using a bronze brush wheel on the polishing motor; then I move to tripoli on a bristle wheel and cotton buffs, finishing with rouge on a cotton buff. Final cleaning can be done in an ultrasonic tank or by hand brushing, using a commercial cleaning solvent or just a mixture of soap and ammonia.

Ornaments that are fastened with wood screws usually use a steel wood screw with a flat head. These can be purchased at most hardware stores and are silver soldered in the center of the underside of the ornament. If for some reason they have broken off, they can be replaced with flat-head wood screws. The replacement can be slightly larger than the original which will make it fit tighter. If the solder joint has separated, the old screw can still be used if it is in good condition. To remove the head of the broken screw, first dip the ornament in alcohol and borax and burn this off. Heat the ornament until the hard solder melts and lift off the head of the broken screw with a pair of tweezers. The residue of borax is a protective coating which will protect the finish from oxidizing when the metal is subjected to the amount of heat needed to make the repair. After the old head is removed, the surface can be cleaned by filing or grinding the spot where it was seated, removing all the old solder. Place the ornament on an asbestos pad; heat until the flux sizzles when applied with a flux brush, but be careful to flux only the area to be covered by the screw head. Grasp the screw by the threads in the heavy-duty tweezers and clean and flux the surface to be soldered to the ornament. Place a small piece of fluxed silver solder on this prepared surface and apply heat with the torch until the solder flows, completely covering the screw head. While still holding the screw in the heavy duty tweezers, place it in the proper position for soldering and apply heat with the torch, playing the heat on the ornament around the screw until both the screw and ornament reach the temperature of flow at the same time. The solder will flow from the screw to the ornament, making a solid bond when cooled. See Figure 1, B, point a. Inspect the perimeter of the screw head, and if the solder shows in a ring around it, the solder joint should be good. As a steel screw is used, be sure to use the proper type of flux. The cleaning can be done by boiling in water, then polishing; final cleaning is the same as for the screw-back ornament repair. See Figure 1, B.

The third type of fastener (See Figure 1, C) is a metal bar or rod that is bent on the ends and silver soldered to the ornament. This piece slides over leather straps and is apt to break in either of the solder joints or anywhere along the bar.

Figure 1



Sometimes silver soldering the break will make a satisfactory repair, but if the bar shows signs of being weak, it is best to replace it. When replacing a bar, first measure the space between the bar and the ornament through which the leather strap must slide so that you can duplicate this when the new bar is installed. Dip the ornament in borax and alcohol, burning the alcohol off and leaving a protective coating of borax. Heat until the solder melts and remove the bar or pieces. Clean the points where the ends were soldered on by filing or grinding away the old solder. Take a piece of brass or nickel silver wire of the proper diameter and bend the ends to form a right angle. The proper length and height should be determined by the thickness of the leather over which the piece must slide. As you will probably not have the leather, the old bar must be used as a pattern. The length can be determined by the previous solder joints and the height should have been measured before the old bar was removed. When the replacement bar has been made and checked for fit on the ornament, place the ornament face down on the asbestos pad and heat and flux the spots where the two ends of the bar are to be soldered on. Grasp the bar in the center with the heavy duty tweezers, heat the ends, flux, and apply a small piece of fluxed silver solder on each end. With the torch, heat until the solder flows on each end, forming a ball. Place this in position on the ornament, and hold it in place with the heavy duty tweezers or the third-hand tool if you prefer. Moving the flame of the torch on each side of the bar, heat until both the bar and the ornament reach the temperature of flow at the same time. The solder should flow from the bar to the ornament, making a good solder joint on each end. See Figure 1, C, point a. Finishing is done in the same manner as with the other repairs: by pickling or boiling in water, then polishing, and finally cleaning in an ultrasonic tank or brushing in a soap and ammonia solution.

There are alternate methods for almost any step in this repair process—such as using end cutters or side cutters for faster removal of broken pieces—but the steps outlined above work for me. Like any repair jobs, these requires ingenuity and common sense, so almost any repair that crosses your bench can be made if given proper thought and application of your knowledge and experience.

Installing these ornaments or removing them from the saddles or harnesses is not your responsibility. I cannot recall any piece brought to me for repair that had not first been removed.

Charges for these repairs should be made at rates comparable to what would be charged for jewelry repairs. Considering that people have large investments in saddles, bridles, harnesses, etc., they are usually more than glad to pay your usual rates. Most of these customers greatly appreciate finding someone capable of repairing their ornaments and restoring them to their original condition.

In the next article we will discuss pearl and bead stringing.

Bench Tips / Joe Crooks

A LITTLE GOES A LONG WAY

This clock cleaning tip comes to us from Mr. Dave Sander, 1310 Broadway, Cape Girardeau, Missouri 63701.

I would like to share a timely tip with all clockmakers who clean their clocks ultrasonically. I have been using ultrasonics for six years, and in this length of time, I have developed a system that works very well for me.

I put my cleaning and rinsing solutions in four one-gallon gasoline cans. I cut the top out of each can and mark the cans Cleaner No. 1, Rinse No. 1; and Cleaner No. 2, Rinse No. 2. This way, I use the old cleaner and rinse to get all the old dirt and grease off the movements. Then the Cleaner No. 2 and Rinse No. 2 are the new and fresh solutions which really makes the movement clean and shiny. With this method, one doesn't have to pour the solutions in and drain the solutions out of the unit each time; you just put a little water in the bottom of the unit and away you go.

I hope this tip will be of help to my fellow clockmakers.

Thanks for your tip, Dave. I assume that you dry the clock parts after Rinse No. 1, so the Cleaner No. 2 is not contaminated by the first rinse.

The good part of your tip is that with a small ultrasonic tank, a large clock plate can be submerged in a small amount of cleaner or rinse in a one-gallon can with no part of the plate out of the solution. (It should be noted that the one-gallon can is placed in the ultrasonic tank with enough water to cover the bottom of the can.) Although your method may be somewhat controversial, it is worth printing.

Send your tips to: Jingle Joe, 265 North Main St., Mooresville, North Carolina 28115.

SALES TALK

By Wes Door, CMW

THE SHOWCASE BARRIER

Being behind the showcase, or as the expression goes, "working behind the counter," emphasizes our role as guardians of the merchandise. Our customers will certainly recognize us as the merchants; however, it seems as though we should be recognizable enough, just being dressed in neat clothes and having nice mannerisms and the ability to convey our thoughts in a knowledgeable manner.

Then why have showcases? Obviously, we do need a place to store our merchandise, and it's nice if our customers can view a certain quantity of our goods. This is especially encouraging to impulse buyers who constitute a vast number of our sales.

Some businesses do a higher volume of business than we do and without any showcases. Our friendly banker is a case in point. He sits behind a desk and allows us to sit down also as we discuss our business across an unobtrusive piece of furniture. We feel that he can truly see our point of view, although sometimes his answers to our money-borrowing requests may indicate otherwise. Certainly there are areas of his bank that are guarded–by pretty tellers behind windows–but the old-fashioned bars have been removed.

Likewise, in our quest to "keep up with the bankers," we could improve our selling conditions. Maybe we could modernize just one of our showcases by sawing off the legs, or whatever is necessary to lower its height, and, of course, by placing comfortable chairs in front of it for our customers to use. We might add a wall around this sit-down showcase and call this our "gem room" or "diamond room." This might encourage our customers to spend more of their "bank rolls" with us.

As you may have noticed, I have talked both *against* the showcase and *for* it. However, before you type-case me as a polititian, I must admit to a more meaningful purpose, which is to explain two words that can make the difference between a "sale" and a "no sale." These words are FEATURES and BENEFITS. We tell customers the features, but they only buy the benefits.

From behind the showcase we can explain an item's features, but we must make our customers feel that we are on their side of the counter when we explain the benefits. Benefits are what the features DO for our customers.

Have you ever heard a salesperson rattle on and on in a very knowledgeable way, really doing an excellent job of explaining all important features, but then lose the sale because he or she was unable to relate those features as benefits? It is nice for the customer to know that a particular watch is quartz and that it is the newest thing, etc., but unless we tell our customer what all of this means to him or her, then all is lost.

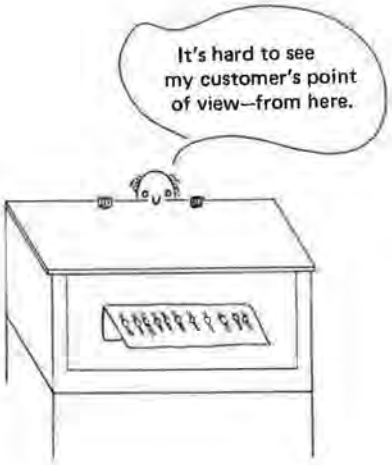
We might say, "Yes, this is a quartz watch. It has a tiny quartz crystal vibrating over 32,000 times a second, which means the watch can be adjusted to run within a minute a year. Its power is a small battery, so even if you take your new quartz watch off and set it on your dresser for several days, it will still be on time."

As another example, suppose we are showing a diamond. The features of the diamond are its color, clarity, size, and cut–but without explaining how these features will benefit our customer, we do not have a sale. We must be careful not to dwell on the features, but reserve most of the selling time to explain benefits. Surprisingly enough, the more we know, the harder it is to be humble and give our customer small doses.

We must remember that most people have a limited amount of time to spend with us. Sometimes it seems as though they have double parked and want to rush in and make a purchase before getting a ticket.

I remember one customer who sat down in my "diamond room" and noticed my G.I.A. diploma on

SALES TALK



the wall. He remarked, "I see you are a GEOLOGIST." (I don't know why the word "gemologist" is so hard for many customers to pronounce correctly.) Anyway, I answered, "Yes, I am a Graduate Gemologist." Two minutes later, I was closing a nice sale, with very few words said about features and just a few words about the benefits. Actually, he knew the major benefit—now he could get engaged.

We might even want to adopt the adage "the fewer words the better." A friend of mine did. He was working in an appliance store and he noticed a lady looking at a new stove. He walked over to her and said, "We can deliver this to you this afternoon. Will that be alright?" Can you guess what the lady said? No, you guessed wrong. She said that yes, that would be fine.

I'm sure that even my friend would not advocate using just twelve words to open, discuss, and close ALL sales, but it does just about prove that in selling, nothing is impossible. This lady must have already realized the good FEATURES of the stove, and must also have known how it would BENEFIT her. The fact that it could be delivered "this afternoon" was all she needed to hear.

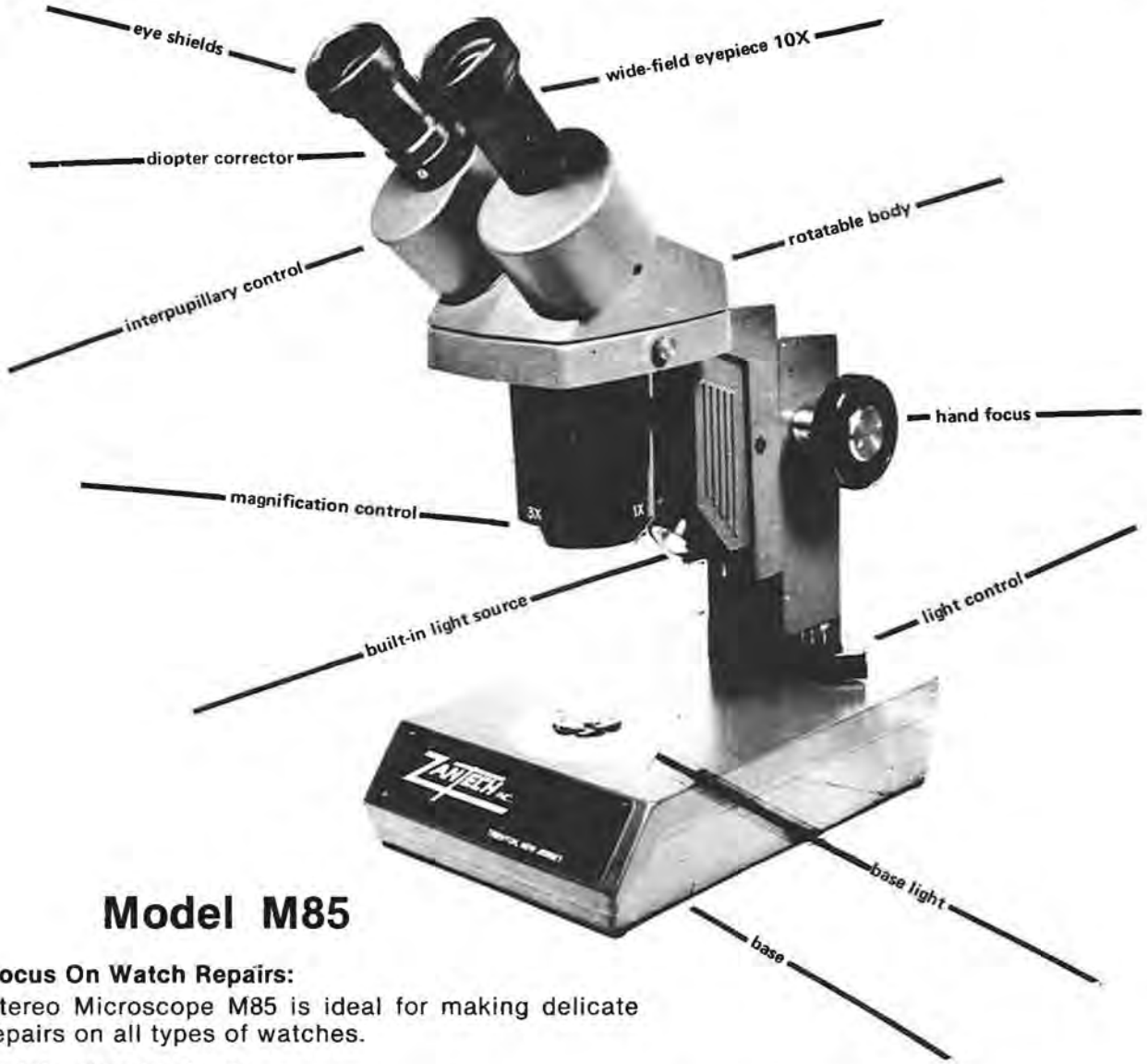
My only question is, how did he make a sale without a showcase? Oh, well . . .

So as we stand behind our showcases, let's explain the features of our merchandise. However, let's pretend we are on the same side of the counter as the customer when we explain the benefits, since being on the opposite side of the showcase may give the erroneous impression that we cannot see the customer's point of view.

Remember, telling features without the follow-through benefits is like the expression, "Heap big smoke but no fire." So let's not get fired, but get fired-up and not let the showcase be a barrier. Then our customers will buy now.

Buy now,
Wes

STEREO MICROSCOPE
10X AND 30X MAGNIFICATION



Model M85

Focus On Watch Repairs:
Stereo Microscope M85 is ideal for making delicate repairs on all types of watches.

Outstanding Features:
• Large working distance, 3 inch • Inclined stereo body, rotatable 360° • Diopter correction on left eyepiece tube • Interpupillary control internally geared • Parfocal from high to low power • Magnification 10X and 30X • Compatible prism (not mirror) optical system • Flat, crisp image always erect • Wide-field eyepiece W10X locked into eyepiece tube but removable for cleaning • Impeccable performance through coated optics assures better resolution • Built-in light source. top and bottom • Eye shields, spare bulbs, wrench and dust cover included

Price $379.00

REPLACEMENT PARTS: Spare bulbs - $2.50; Eye shields - $4.50; Wrench - $2.50; Dust cover - $5.00

Quick credit to accounts well-rated by Dun & Bradstreet or Jewelers Board of Trade.

Name _____

Firm _____

Address _____

City/State/Zip _____

MARSHALL-SWARTCHILD

2040 Milwaukee Ave., Chicago, IL 60647 – 312/278-2300
109 North Akard, Dallas, TX 75201 – 214/741-1454
1212 Main St., Houston, TX 77001 – 713/759-9009
657 Mission St., San Francisco, CA 94105 – 415/421-2153
1425 Fourth Ave., Seattle, WA 98101 – 206/682-6158

TOLL-FREE PHONE ORDERS (except–sorry!– Alaska and Hawaii)–9 till 4 C. D. T., WEEKDAYS.
ILLINOIS: 800/972-3776.
OTHER STATES:800/621-4767
OR MAIL ORDER TO P.O. BOX 726, CHICAGO, IL 60690.

to MEASURE... to CUT... to MANIPULATE... to FASTEN..

PLASTIC DIAL CALIPER

No. 518433

Perfect for measuring module diameters and button sizes. Includes plastic case
☐and instructions.....$15.00

#1001 CARVING KNIFE

Surgically sharp, includes 4 interchangeable blades that fit into aluminum handle. Ideal for relocating switch contacts.
☐ $4.90

☐ **NYLON TWEEZER No. 53781 $1.00**

☐ **NON-MAGNETIC TWEEZER No. 3**
No. IN 978/3 $2.80

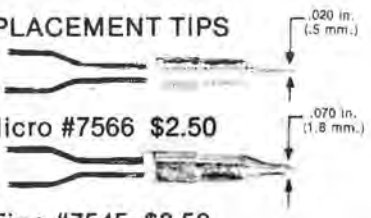
☐ **NON-MAGNETIC TWEEZER No. 5**
No. IN 980/5 $2.80

WAHL
CORDLESS SOLDERING IRON

NEW "QUICK CHARGE"
SOLDERING IRON
Recharges completely
in 3 to 4 hours

☐Model 7700 $31.50

REPLACEMENT TIPS



☐Micro #7566 $2.50

☐Fine #7545 $2.50

WIRE CUTTING PLIERS

No. 5298692

4 inch full flush diagonals for cutting small wires
☐and quartz crystal leads.....$12.95

CONDUCTIVE EPOXY

Wire-bond conductive epoxy .001 is a two part silver filled, electrically conductive epoxy which hardens at room temperature in a few hours after mixing. Its very high electrical conductivity and putty-like properties make it suitable for repairing fine broken wires such as the integrated circuit wire-bonds of a solid state watch, the coil and motor wires of electronic watches and any other broken wire or solder joint, small or large.

☐ Complete Kit $19.95
☐ A & B Epoxy Refills 14.95

TOLL-FREE PHONE ORDERS
(except—sorry!— Alaska and Hawaii)—9 till 4 C. D. T., WEEKDAYS.
ILLINOIS: 800/972-3776.
OTHER STATES:800/621-4767
OR MAIL ORDER TO P.O. BOX 726, CHICAGO, IL 60690.

MARSHALL-SWARTCHILD

2040 Milwaukee Ave., Chicago, IL 60647 – 312/278-2300
109 North Akard, Dallas, TX 75201 – 214/741-1454
1212 Main St., Houston, TX 77001 – 713/759-9009
657 Mission St., San Francisco, CA 94105 – 415/421-2153
1425 Fourth Ave., Seattle, WA 98101 – 206/682-6158

Quick credit to accounts well-rated by Dun & Bradstreet or Jewelers Board of Trade.

Name _____

Firm _____

Address _____

City/State/Zip _____

Is This Any Way To Treat A Crucial Ally?

The retail jeweler is recognized by almost every serious watch manufacturer as "a crucial ally" in the watch business. But how many times have these scenes been repeated in jewelry stores across the nation?

A red-faced jeweler stands embarrassed before a customer while trying to set a solid state watch which came without proper setting instructions.

A chagrined store owner tries to explain to a customer why the tiny electronic component required to restore his watch to service will cost 80% of the original purchase price of the entire watch.

An angered customer learns that a plastic substitute crystal is all that is available to fit her solid gold, high-fashion watch which is less than six months old.

The entire repair department labors several hours to replace a crystal in a $200 watch, only to look on in dismay as a hairline crack appears down the center. The cause? Failure of the manufacturer to provide instructions on how to properly replace the crystal.

I would venture a guess that everyone reading this article who is involved with servicing watches has experienced most, if not all, of these situations more than once. Why should this be?

It probably happens because the retail jeweler has been intimidated to the point where he feels that he is only a small entity in the watch business with little or no clout, and that he had better not make waves. After all, just five years ago, the Silicon Valley boys teamed up with Texas and flexed their bulging muscles in the face of the jeweler, telling him that they were only interested in SELLING watches—to hell with spare parts and after-sale service. The watch-selling jeweler has read reports which indicate that his share of the market has shrunk to the point where he now sells a little more than 25% of the total number of watches sold in this country; the lion's share is sold by non-jewelry outlets. This is true, and too often the jeweler accepts his fate lest he lose that 25% of the market, too.

At the Jewelers of America 1981 New York Trade Show and Convention held this past July, an important JA symposium, "Watches . . . A Billion Dollar Market: Are You Getting Your Share?" shed a new light on just how much clout the jeweler has in the fast-changing watch market. Panelist Joe Thompson, Senior Editor of *Jewelers Circular Keystone*, acknowledged that the retail jeweler does sell just a little more than 25% of all the watches sold in the United States (27.7%). Mr. Thompson hastened to point out that the average price of a watch sold by a jeweler in 1980 was $135. The statistics compiled by Mr. Thompson reveal that the total dollar volume of the American watch market in 1980 was $4 billion. Surprisingly, the statistics show that watches sold by jewelers amounted to half the total, or $2 billion. Therefore, although jewelers are selling fewer pieces, they are still selling the cream off the top—that is, the more stable, more profitable end of the market. Thus the jeweler accounts for 50% of the total dollar volume in the U.S. watch market.

Mr. Stephen Rose, advertising expert, pointed out that watch companies will spend $55,000,000 this year to advertise watches, while the rest of the entire jewelry industry will spend only $30,000,000 to promote all other jewelry items combined. It would seem to me that an indsutry which is willing to spend $55,000,000 in one year to gain the favorable attention of the consumer would see the value in making a greater investment and effort in the area of keeping the consumer's confidence; after the consumer has contributed to the $4 billion pie, he should be assured that adequate after-sale service will be available. Surely watch manufacturers realize that individuals purchase more than one watch in a lifetime.

We hope that the U.S. jeweler, who is selling over half of the dollar volume in the watch market, will awaken to the fact that he does have CLOUT! Jewelers should use that clout to gain assurances from the watch companies that more will be done to insure that the all-too-frequent scenes described at the beginning of this article will be alleviated. This can only be done by making sure that technical literature, repair procedures, and parts are distributed simultaneously with the marketing of a particular watch and movement calibre.

Many AWI members are part of that group of jewelers who account for the $2 billion segment of the watch market; others are employed directly or indirectly by them. AWI and its membership would welcome the opportunity to work with the Jewelers Association to seek a better environment for the after-sale servicing of watches. HTJES

(Continued from page 20)

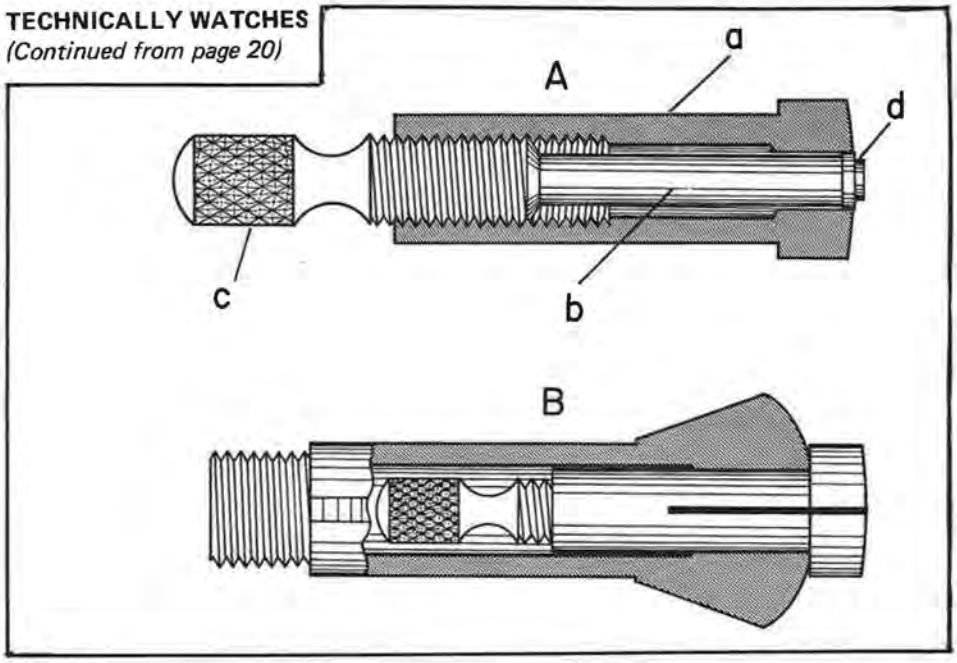


Figure 12

threaded rods going through the chucks to be used to adjust the depthing of the jewel setting in the chuck. Figure 12, View A shows the construction of these chucks. Point "a" shows the body of the sub chuck; point "b" is the adjustable rod; "c" is the knob used to adjust the depthing; and "d" is a jewel setting chucked in the chuck.

View B of Figure 12 shows the jewel sub chuck fitted to a wire chuck. Since the sub chuck is split like a wire chuck, when the wire chuck is tightened on the sub chuck, it will close up on the jewel setting.

Our discussion of the modern watchmakers lathe will continue next month.

Repairing And Replacing Watchcase Push Buttons ©1981

Part II

By Louis A. Zanoni

I would like to thank Henry B. Fried for all of his help in designing the Zantech-Fried Button Press and for preparing the sketches for this article.

Last month, we determined the primary cause of push button failure to be dirt and contamination, with a secondary cause being physical damage. Since most button malfunctions are caused by dirt and grime buildup in the moving portion of the button, it is important to remove the button from the case in order to clean it properly. Because exact replacement buttons are not always available, it is important not to damage the button when removing it.

Henry B. Fried and Louis A. Zanoni have designed and developed a unique button remover and adjustment tool known as the Zantech-Fried Button Press, Model 440. See Figure 1. The following is the procedure required to successfully remove and insert buttons using this tool. These same basic principles could also apply to other types of button removal tools.

Preparation:

When the faulty button has been identified, examine the module side of the button very carefully with a 10X eye loupe or microscope. Be sure it is a press-fit type—most are. See Figure 2, A. If the plunger (the moving part) of the button can be disassembled by removing a "C" ring from the end (See Figure 3), it is not necessary to use a button press to remove it. This type can be removed by sliding the "C" off the end of the plunger and pulling out the plunger.

Tip:

"C" rings are under spring tension when on the plunger. When removing them, be careful not to lose them. One method of preventing loss of these rings is to stretch a piece of thin, clear plastic over the case opening and push a tweezer or screwdriver through the clear plastic to remove the "C" ring. When the "C" ring slips off the plunger, it will stay in the case.

Selecting a hollow tip driver:

When it has been determined that the faulty button is a press-fit type, select a hollow driver tip that fits over the permanent retaining ring and the plunger. See Figure 4. *Be sure the hollow end of the driver tip presses only on the barrel.* Do not press on the plunger of the button, the retaining ring, or the case wall. *Select a driver tip which fits the button.*

Symmetrical or non-symmetrical cases:

Decide whether the pressure should be on the inside of the case (See Figure 5) or on the outside (See Figure 6). Use inside pressure on round cases when the buttons point toward the center of the case. See Figure 5. Use outside pressure (See Figure 6) for removing buttons which do not point toward the center, or when removing buttons from irregularly shaped cases.

Driver tip position:

Place the appropriate driver tip in the socket of the sliding jaw. See Figure 7 for inside pressure or Figure 8 for outside pressure.

Tool adjustment:

For inside pressure, screw the jaws of the press together so that the spring tension of the sliding jaw will hold the tool in position against the inside case wall. The hollow tip driver should be on the barrel of the button while the threaded jaw is against the opposite case wall.

Button removal—Symmetrical cases:

When the driver tip is properly in place and the threaded jaw is firmly against the opposite wall of the case (See Figure 5), rotate the knurled nut to apply a moderate amount of pressure to the button barrel. *Before applying final pressure to the button, inspect the driver tip under a microscope or jewelers loupe to be sure it is making contact only*

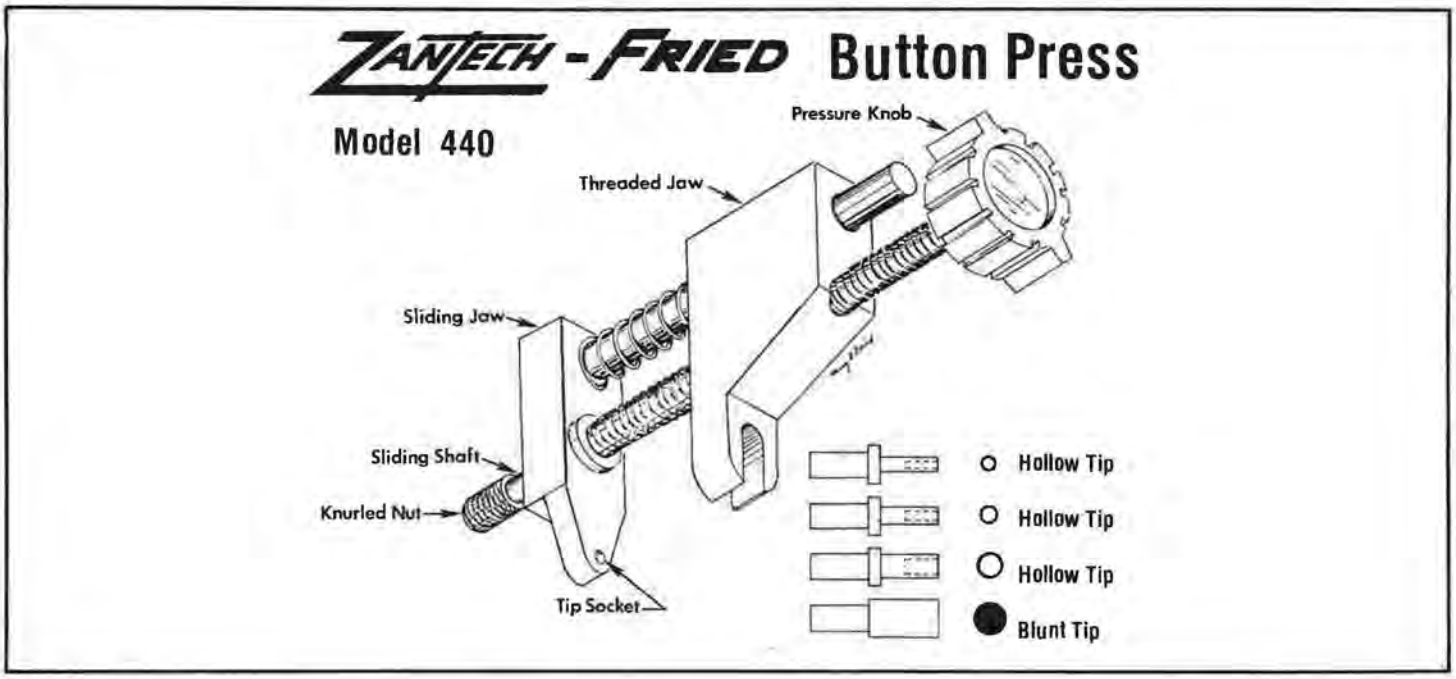


Figure 1

with the barrel and not with the plunger or the case wall. See Figure 4. When the tip is in its proper position, apply final pressure by rotating the pressure knob until the button falls out. To avoid damage to the driver tip, retract the threaded jaw before removing the tool.

Button removal—Non-symmetrical cases:

Place the appropriate hollow tip driver in the socket of the sliding jaw. See Figure 8. Adjust the jaw opening to the approximate size. See Figure 6. Slide the hollow tip driver over the end of the button and screw the jaws together so that the threaded jaw is pressing on the outside of the case while the hollow tip driver is pressing on the barrel of the button. See Figure 4. Screw the jaws together until the button falls out.

Cleaning the button:

In order to properly clean a contaminated button, it must be removed from the case. Once the contaminated button has been separated from the case, a variety of methods can be used to clean it. The method we found most economical and efficient is a diluted solution of ammoniated detergent in an ultrasonic tank for five to ten minutes. Although we have found it necessary at times to use a solvent cleaner similar to the L&R clock cleaner, the Zantech case and bracelet cleaner (Micro Clean) is a very effective cleaning agent for most types of contaminated buttons.

Ultrasonic vibrations are necessary to dislodge the contamination from within the spring mechanism. Soaking or jet steam cannot dislodge the contamination under the head as well as can good ultrasonic vibrations. It is necessary on occasion to physically dislodge large amounts of contamination by pressing and releasing the button a number of times between ultrasonic cleanings.

A thorough rinsing is also necessary to remove any traces of the detergent. Be sure to press and release the button a number of times to remove the detergent from the inner portion of the button. When it has been completely rinsed, it must be thoroughly dried. A paper towel works fine, and it can be used to wick out any remaining water within the mechanism. *If all of the water is not removed, the spring inside the button may rust.*

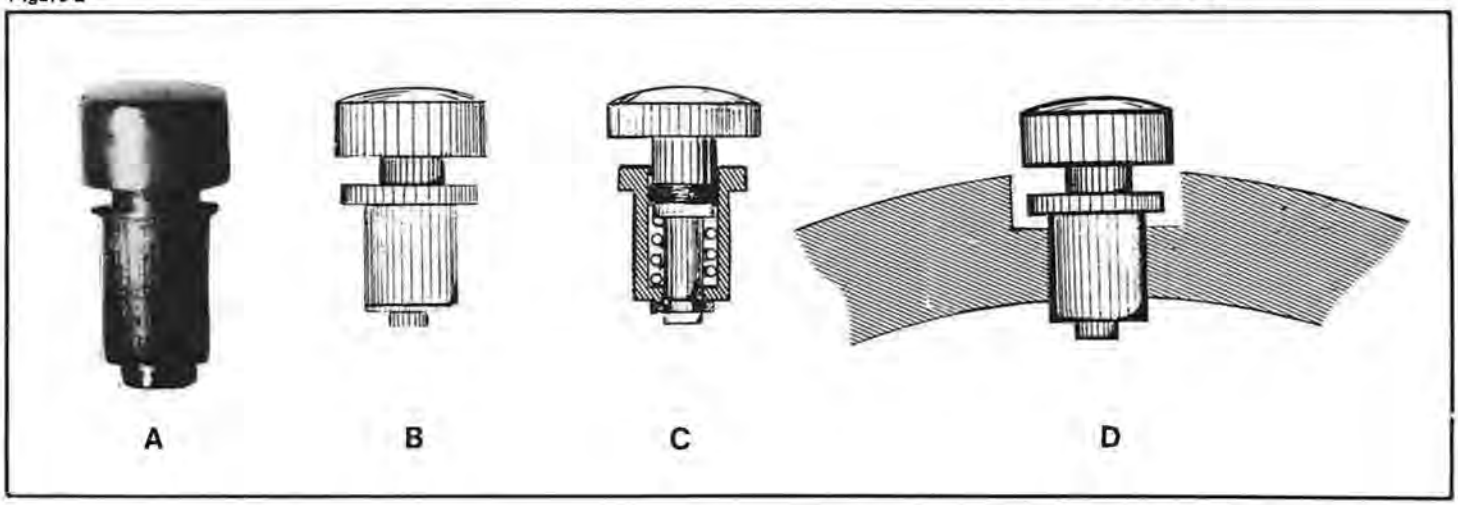
Note: Be sure to clean the case and especially the button cavity of the case before reinstalling the cleaned button.

Replacing buttons:

After the original button has been thoroughly cleaned or when replacing a new button, merely locate it in the case by hand and gently press it into position. When it is properly positioned, press it firmly into the case wall

(Continued on page 39)

Figure 2



Scholastically Speaking/Thomas H. Imai

"Hickory Dickory Dock, The Mouse Ran Up the Clock"

This year's Research and Education Council leader is Thomas H. Imai, CMW. Mr. Imai is a watchmaker, educator, and retailer who was raised in Alisal, Calfornia, a small town in the foothills of the Gablian Range near Salinas. He is a graduate of the Alisal schools, Hartnell College, Spokane Vocational and Technical School, Spokane Community College, and La Verne College in Horological Science. He served in the U.S. Army in the Middle East, Africa, and Europe. He is presently an instructor at Spokane Community College and lives in Spokane with his wife Shizu Akai and daughter Diane Rae. In his spare time, he enjoys the fly fishing and big game hunting offered by the natural wilderness of the Northwest.

The Research and Education Council "spacecraft" could be compared to a big wristwatch—a quartz computer watch. There is an integrated circuit (IC chip), a decoder, coil, energy (from solar), logic controls (to adjust the speed), display panels, and lights for reading at night.

As we look through the window of this REC spacecraft down to earth below, eager faces can be seen looking upward to the craft. Who are they? They are Annelle, Leslie, Ranae, David, Tina, Mike, Jason, Tom, and many more. These are the younger ones who are entering horology schools to fill the empty chairs of many retiring watchmakers.

"It's Later Than You Think"

Horology instructors, where are you? The REC needs you. The council is now in the process of setting up technical and hands-on seminars for June 1982. With your input, plans are being readied for optional training that may be available at night sessions for Certified Electronic Watch Repair Service people. These night sessions will be interesting to those who may want to take the CEWS later on. Horology instructors of your schools must get in contact with their supervisors.

Some schools are sending instructors to the REC, and other schools would like to, but the schools' hands are tied, so to speak. In order to untie this situation, the instructors must contact their local guilds, state associations, or better yet, get in touch with their Watch Repair Advisory Committee. The people composing the Advisory Committees and State Association Committees are from the watchmaking industry and know the problems instructors face in this era of mechanical and quartz technology explosions.

This meeting should be held as soon as possible, for the horology schools would like to adjust their budgets and change their quartz curriculums, among other things. However, without support from the allied industry, change is almost impossible for the colleges.

The field of horology is getting more and more intense, with new electronics and new inventions being introduced all the time. The main bulk of the educational training rests on the shoulders of the REC educators. These educators are from all over the U.S. and Canada and many more come from other countries. The horology teacher is the lifeline of the American watchmaker and the American watchmaking industry.

At the present time, the REC Chairman is on the American Watchmakers Institute Board of Directors. The chairman of REC has, at present, no vote at the meeting as a director. Since the educators are such an important part of AWI, the REC Chairman intends to propose at the June 1982 meeting a change in the by-laws, stating that the Chairman of REC should have a vote.

"The Clock Struck One,
The Mouse Ran Down,
Hickory Dickory Dock" THE END

"Since the educators are such an important part of AWI, the REC Chairman intends to propose at the June 1982 meeting a change in the by-laws, stating that the Chairman of REC should have a vote."

(Continued from page 37)

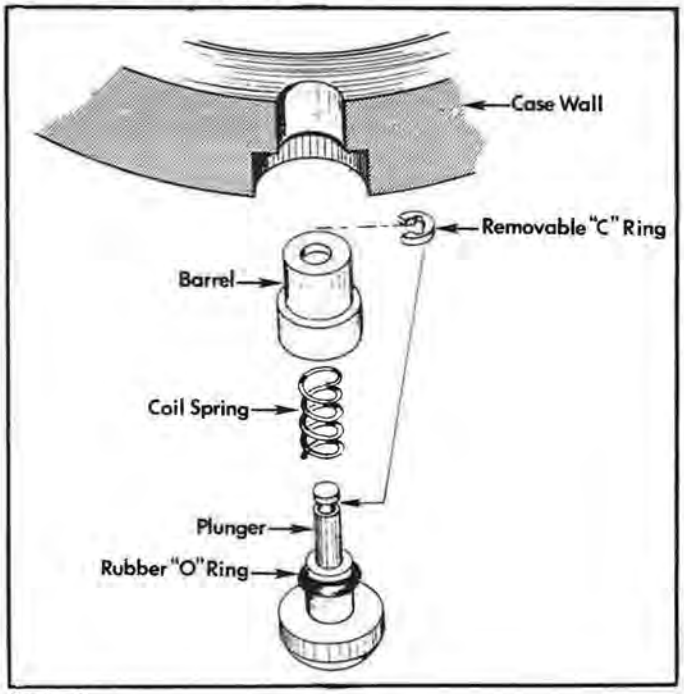


Figure 3

by pressing it against the edge of a table or work bench. Normally, two-handed pressure is enough to firmly seat the button. When it is necessary to press the button deeper into the case, the button press should be used along with the blunt tip driver. *Do not apply pressure with the button press until the button is properly seated.* See Figure 9.

Button depth adjustment:

The barrels of most press-fit buttons are slightly tapered so that they can be firmly fitted and positioned into the case wall. The button barrel diameter and the hole in the case should be precisely matched so that the button will be properly positioned when pressed into the case.

Button depth is very critical to the proper operation of the watch. If the button is in too far, it will make contact to the module continuously. If it is not in far enough, it will never make contact with the module. Therefore, it is occasionally necessary to make minor adjustments to the depth of a button. To push a button further into the case, place the blunt tip driver on the inside of the tip socket. See Figure 9. Position the blunt driver tip on the head of the button and press it to the desired depth by turning the knob. Each complete revolution of the knob moves the threaded jaw .9mm, or .035 inches.

CAUTION: Excess pressure on the button will damage the case, especially a thin-walled case.

When a button is pressed too far into a case, minor adjustments can be made by pushing the button partly out, using the same procedure required to remove a button. Keep in mind that one complete revolution of the knob moves the threaded jaw .9mm, or .035 inches.

(Continued on page 43)

AWI Bench Courses 1981

	PROGRAMS	INSTRUCTORS
A	Basic Electricity & Use of Meters	Jaeger
B	Citizen Quartz Certification	Carpenter
C (a)	Citizen LCD Multi-Alarm	Broughton
C (b)	ESA/ETA Quartz Analog	Broughton
D (a)	Seiko 4300 Ladies' Quartz Analog	Smith
D (b)	Seiko LCD Chronograph/Alarm	Smith
D (c)	Seiko 0903A Men's Quartz Analog	Smith
E	Intro. to Solid State Watch Repair	Nelson
F (a)	Fundamentals of Solid State Watch Repair	Opp
F (b)	ESA LCD Chronograph	Opp
G	ESA Digital/Analog	Biederman
H	Clock Restoration	Benesh
I	Introduction to Striking Clocks	Baier

OCTOBER

4	A	Columbia, MO	Jaeger
31	H	Syracuse, NY	Benesh

NOVEMBER

1	A	Denver, CO	Jaeger
1	H	Syracuse, NY	Benesh
22	C (a)	Perrysburg, OH	Broughton

I AM INTERESTED IN YOUR BENCH COURSE TO BE PRESENTED ON _____ AT _____. PLEASE SEND ME MORE INFORMATION.

NAME: _____

ADDRESS: _____

CITY, STATE, ZIP: _____

QUESTIONS AND ANSWERS

(Continued from page 18)

the bellows to expand and contract enough to wind the clock with normal temperature changes, which leads me to ask the following questions: 1) Was this bellows originally filled with something other than air? If so, what was used? 2) Is it possible or feasible to fit the other type of replacement bellows unit into the outer shell of this one to effect a practical and good repair?

Please find SASE enclosed. I will look forward to hearing from you.

Alfred E. Groer
Boothwyn, Pennsylvania

A In that I am a Director of AWI and my firm, House of Clocks in Los Angeles, is the authorized factory service center for Atmos, your letter has been referred to me for reply.

In answer to your first question, the Atmos aneroid tanks are filled with ethyl chloride. The procedure you followed in repairing the tank is practical. If you wish to fill the tank with ethyl chloride, you may find that the unit will then work properly. To speed up your testing, I would suggest that you place the filled aneroid tank in the refrigerator and then remove it after a short period of time. This will quickly show you if the tank is functioning properly.

If the tank still fails to work, it will then be necessary for you to forward the unit to Longines-Wittnauer, attention Morris Barax, 145 Huguenot Street, New Rochelle, NY 10810. The type of aneroid tank you have is one of the earliest models (further substantiated by the extremely low serial number of the clock). This type was never intended to be repaired in a normal fashion. Longines will then assemble a useable tank for you.

Should it be necessary to send the unit to Longines, please include a copy of this memo for their reference.

Hoping the above will be of help to you.

Jay M. Foreman, Jr.

IN THE SPOTLIGHT

(Continued from page 12)

the month; the title of each day, engraved on the plate in each case; and on the right, allegorical figures to represent the days.

The shafts of the columns already referred to are slit, and each has a pointer which travels from top to bottom during the space of one year. On the plate, beside the left-hand column, at equal distances, are enumerated the months of the year, and on the corresponding space at the other side are the following twelve annual notes: *Nombre d'or, Cicle Solaire, Epacte, Indication romaine, Lettre dominicale, Jour de cendres, Pasques, Rogations, Ascencion, Pentecoste, Feste Dieu, Premier Dimanche des Aduents.* Below the figure of Saturn are two apertures, and an inscription underneath denotes the purpose to be to indicate the eclipse of the sun and moon.

Pouilly seems to have been a man especially ingenious in devising calendars and the like. He is referred to in the Paris Directory for 1691 as "Le Sieur Pouilly, of Rue Dauphine, mathematical instrument maker and seller of a peculiar calendar." In 1692, there is mentioned in connection with him an invention relating to the compass and an extraordinary microscope.

Another scientific instrument maker (*ingenieur*), the Sieur Haye, collaborated with Martinot in the production of a movable sphere which was presented to the King in 1701. Henry Martinot died at Fontainebleau in 1725 at the age of seventy-nine." TIMES

We Salute These Museum Donors

(Continued from last month)

HOKE, Mr. Wayne N, Poulsbo, WA: (cont.) Ingersoll "Junior" p/w, 16s, No. 81582296, metal case, ca. 1932. Hamilton movt. No. 1857099, 17j, dial and hands, ca. 1921. Waltham o/f movt. No. 13138906, 18s, 15j, dial & hands in orig. factory case, ca. 1904. Waltham "Riverside" o/f movt. No. 20084778, dial & hands, ca. 1914. Hampden "General Stark" h/c movt. No. 1361846, 17s, lever set, dial & hands, ca. 1890. Waltham car clock, movt. No. 24709285, black dial & case, ca. 1924. Elgin aircraft clock, Spec. No. 94-27970, black case, luminous dial & hands. Rockford o/f movt. No. 685119, 16s, 15j, dial & hands, ca. 1907 in South Bend shipping case. English watch movt., E. Parry, Llandilo, ca. 1880, 19½ lignes, 15j, fusee, key wind/set, Ryley & Son, Liverpool, fusee movt. No. 4552, ca. 1840. M. I. Tobias & Co., Lord St., Liverpool, fusee movt. No. 21843, 17½ lignes, ca. 1830. Robert Roskell, Liverpool, fusee movt. No. 37112, 16 lignes, ca. 1830. Stewart Dawson & Co., Liverpool, movt. No. 42509, 16 lignes, enamel dial, ca. 1880. Jewel openers, orig. box; jewel burrs, wood holder, orig. box; Poising tools, American & German; cone shape burrs for stone setting, wood holder, orig. box; chrome plated steel counter shaft; steel wheel holders for polishing balance wheels; G.S. crystal hand press, attachments, orig. box; Standard unbreakable crystal tool with attachments, lot of assorted hand tools; lot of pocket watch movts., misc. watch parts, watch plates, incomplete watch movts; 12 new (old models) wrist watches; lot of pocket and wrist watch cases. Swiss cylinder watch, 10½ lignes, red gold case, fancy dial.

JAEGER, Mrs. Glendoris S., Sheboygan, WI: Bulova Accu-Quartz wrist watch, Cal. 242, step motor, base metal bezel, s/s case back, No. 3694, & band.

JENSSEN, Sigvald T., Jr., Washington, DC: Clock closing hole punches in box; watch closing hole punches in box; broach handle; pivot drill stock & drills in box. Prototype timing device used in early rocket launchings. Designed and built by Sigvald T. Jenssen, Sr., Framed "Certified Watchmaker" certificate given by H.I.A. to Sigvald T. Jenssen, Sr., March 5, 1929.

JOHNSON, Clay W., Jr., O'Neill, NE: Phinney-Walker/Semca double dial 8-day alarm clock, 7j movt., brass carriage type case, ca. 1950.

JOHNSON, Donald, Rapid City, SD: Swiss pocket watch, 52mm, 15j, lever esc., o/f nickel case, marked "Argentan." Debor Anti-Magnetique on dial.

KERCKHOFF, E., Avon Park, FL: French type quarter repeater movt. with virgule escapement. Signed on cuvette: Marc Hen(ri), Brousson a Neuwied. Ca. 1800.

KILB, William, Kilb & Co., Milwaukee, WI: Junghans Pendulum Clock, German, mounted on bronzed metal figure, 8-day spring wind movt., ca. 1900.

KLINE, Fred, Alexandria, LA: Given in memory of his grandfather, F. W. Kline: Brass & steel Jacot pivot burnishing lathe with attachment in orig. box. Given in memory of his father, C. L. Kline: S. I. Tobias & Co., New York, ca. 1829. Movt. by S. I. Tobias, Liverpool, fusee movt. No. 4401, 17 lignes, 11j, lever esc., key wind/set. Given in memory of his uncle Leo Kline – Longines p/w movement, 17 lignes, 17j, lever esc., key wind/set, dial. Swiss o/f movt., 18 lignes, 8j, cylinder esc., dial.

L & R MANUFACTURING CO., Kearny, NJ: T-28 Ultrasonic Cleaner with accessories and chemicals. Donated to Museum Workshop "in the name of Henry B. Fried for his dedication and contributions to the American watchmaker."

LEWIS, William R., Jasonville, IN: Hamilton electric wrist watch, Ca. 500A, 14K gold case and band, Hamilton electric wrist watch, Cal. 505, stainless steel case and band.

(Continued next month)

(Continued from page 39)

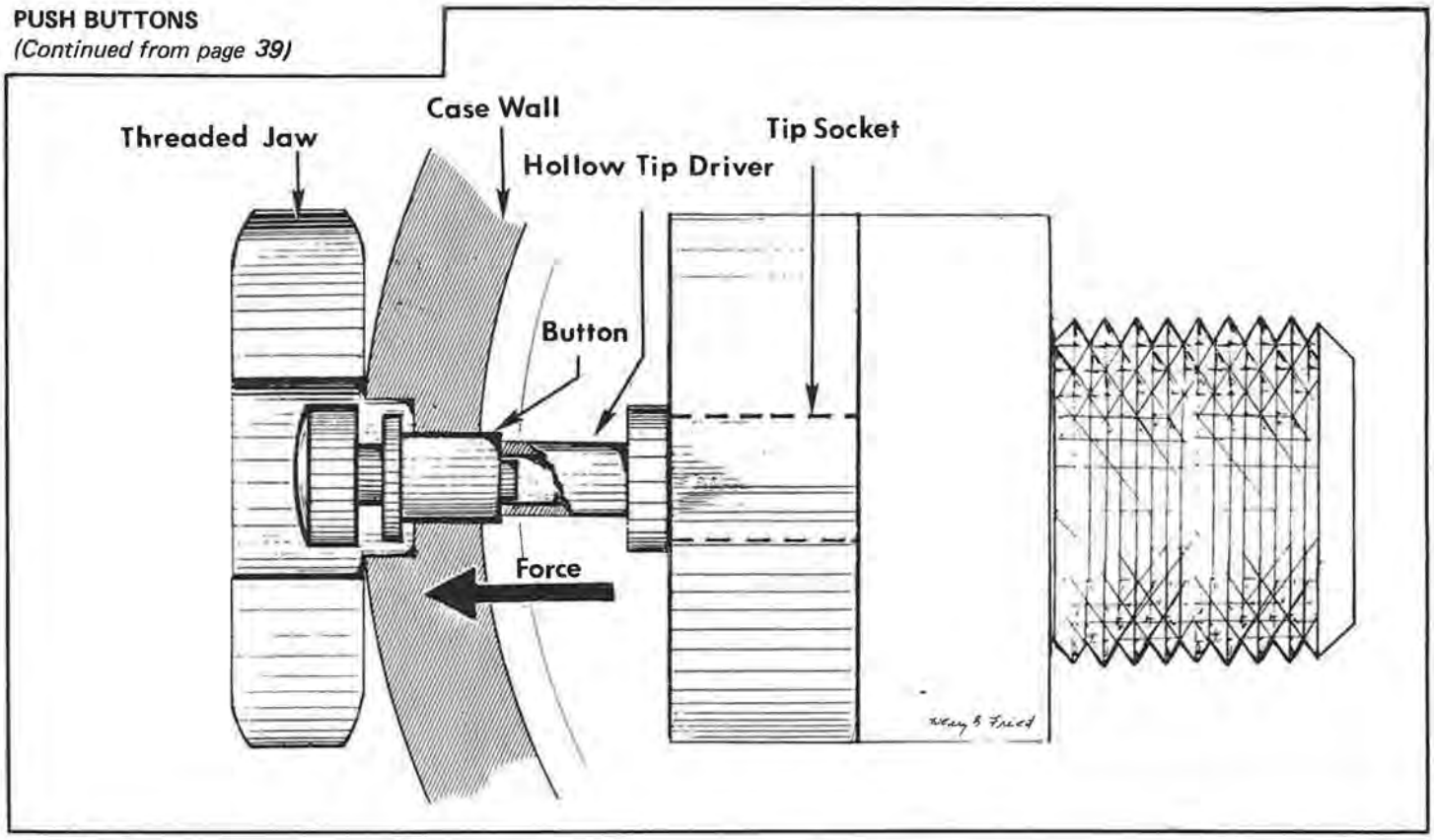


Figure 4

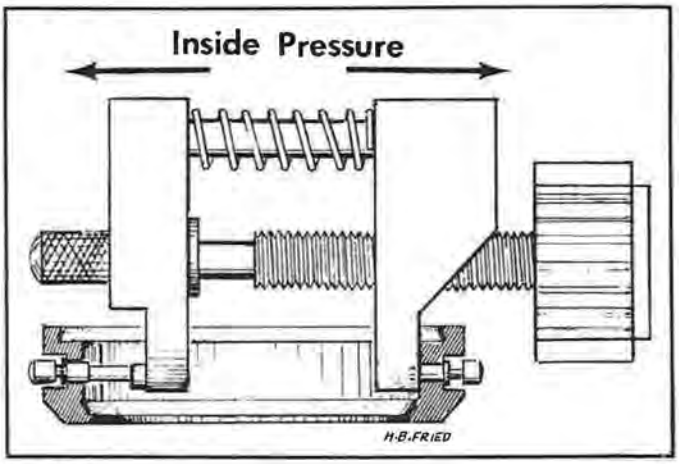


Figure 5

LUBRICATING BUTTONS:

All types of buttons require some sort of lubricant because the cleaning process has a tendency to remove the original lubricant. Therefore, it is necessary to relubricate the buttons before placing them back into service.

Buttons of the **C clip** type can be easily lubricated with winding grease or silicon grease. The grease can be applied to the "O" ring prior to reassembling. The same can be done for the **springless** type of button.

The **self-contained** type of button requires special handling because it is a sealed unit. For proper lubrication, proceed as follows:

1. Fit the button into the case. Do not oil it until it is firmly and properly in place.
2. When the button is permanently in position in the case, extend the plunger into the case by pressing the button.
3. Place a small drop of heavy duty clock oil on the part of the button that will be retracted into the case when you

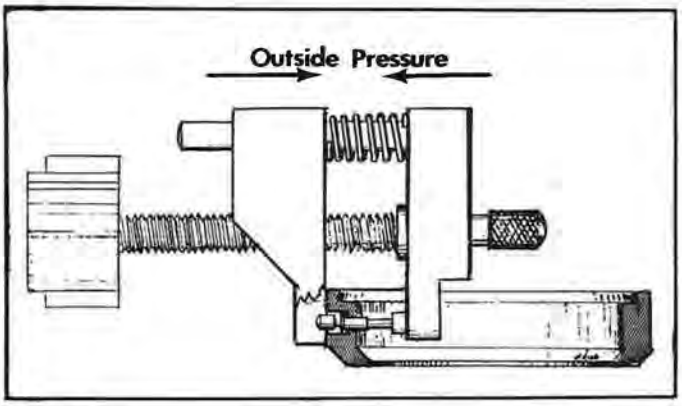


Figure 6

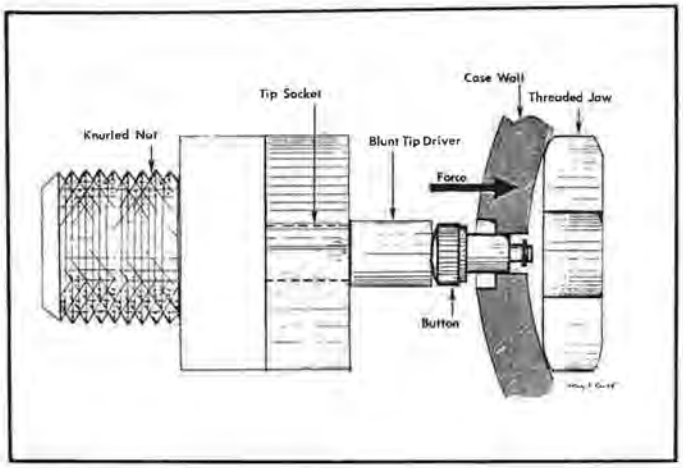


Figure 9

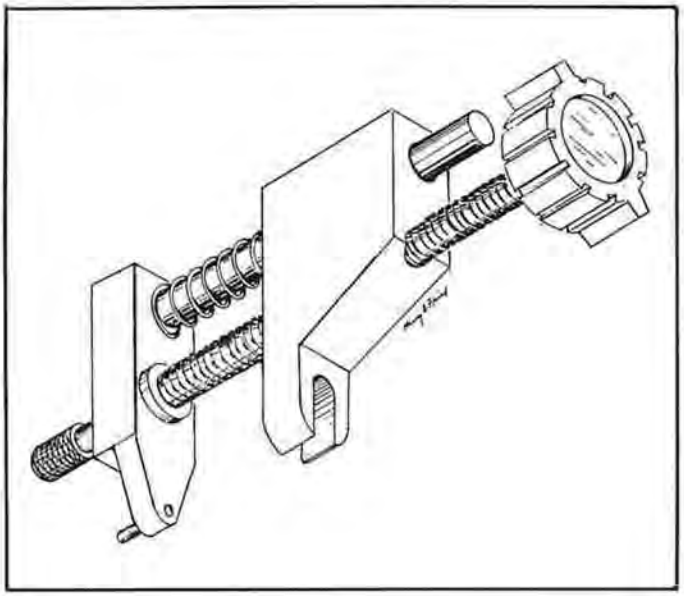


Figure 7

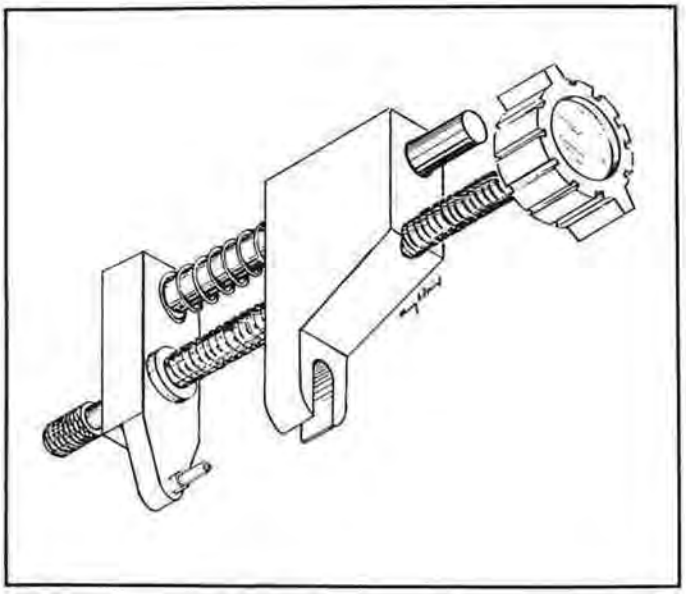


Figure 8

release the button. To evenly disperse the oil, press and release the button many times.

4. Remove any oil that may interfere with the electrical contacts of the switch.

BUTTON FITTING METHODS:

When the original button is beyond repair and the exact button replacement is not available, it is occasionally necessary to modify the case, the module, or the button to achieve a proper fit.

Large Case Holes:

When the hole in the case wall is too large, a number

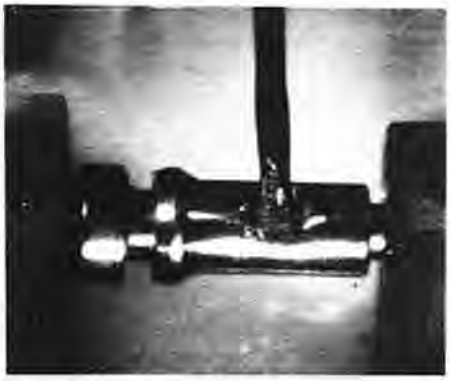


Figure 10

Figure 11

Figure 12

of solutions are possible. Depending on the difference in size between the case and the button, one or more of the following solutions may be applicable:

1. Raise burrs on the barrel of the button by rolling the button between a file and the workbench. See Figure 10.
2. Decrease the case hole size by deforming the inside wall of the case next to the button hole. One method would be to make center punch marks adjacent to the hole. See Figure 11.
3. Use a small amount of Super Glue (or similar glue) on one side of the barrel of the button to cement it in place. Since the button must make electrical contact with the case, be careful not to insulate the entire button from the case with the cement. See Figure 12.
4. Add tin-lead solder to the barrel of the button. Tin-lead solder will automatically conform to the shape of the hole when it is pressed into the hole. This is a favorite method. Contrary to common belief, the "O" ring is not damaged by soldering. See Figure 13.
5. A very large hole can be accommodated by epoxying the button in the hole with a thick paste, strong bonding epoxy. After the epoxy has firmly cured, electrical conductivity to the case can be achieved by painting a stripe of electrically conductive paint or epoxy from the edge of the barrel to the case wall. See Figure 14.

Note: When deciding which approach to use, keep in mind that most buttons must make electrical contact to the case.

Small Case Holes:

Whenever it is necessary to increase the hole size in the case to accommodate a new button, extreme care is necessary. The hole size must be very precise for a proper fit; therefore, the slightest increase in hole size will cause a mismatch.

Figure 13

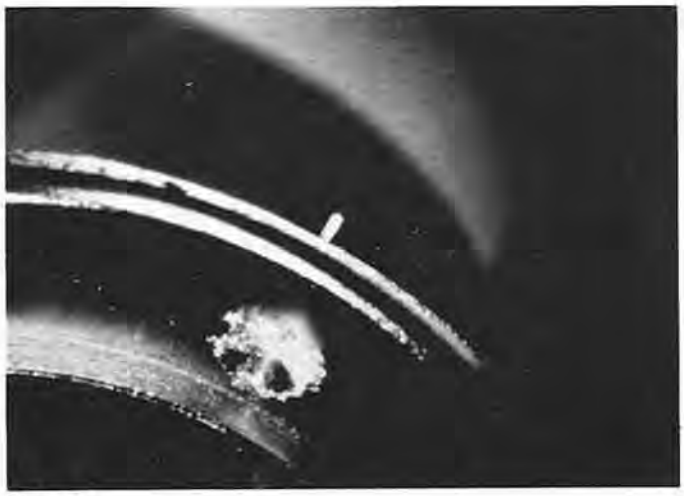


Figure 14

The best method by which to achieve a good fit is to increase the hole size very slowly with a tapered reamer. See Figure 15. It is necessary to try fitting the button periodically during the reaming process until it is properly seated.

Two types of tapered reamers are available: the five-sided clock broach type (assorted sets are available from most clock material supply companies), and the high-speed steel type. The clock broaches are useful on brass cases. They are not suitable for cutting stainless steel cases. To enlarge a case hole in stainless steel, it is necessary to use high-speed steel tapered reamers. See Figure 16. These are available from tool supply companies or your local watch material distributor.

Figure 15

CONCLUSION:

Watches with buttons are here to stay, and as long as they are used by humans, they will become damaged. It is our job to service watches; therefore, the ability to service a button is an important part of the watch service business.

Once the technique has been learned, you will discover that it requires more time to read about how to replace a button than it does to replace one! This is profitable business—so don't let it get away. TIMES

Figure 16

CHAPTER 102 AWI/NAWCC HOLDS MEETING

AWI Chapter 102 of NAWCC held a meeting on August 7 in Colorado Springs, Colorado, at the Antlers Hotel during the Rocky Mountain Regional. The meeting took place in the ballroom before, during, and after the banquet, sponsored by Orville R. Hagans, FAWI, FNAWCC, Chapter President, and Josephine F. Hagans, FAWI, Secretary-Treasurer, in celebration of the "Silver Anniversary of Daphene and Archie Perkins, CMW, FNAWCC" of Denver, Colorado. There were 18 Chapter 102 members present for the event. TIMES

Book Review

The Warner Collector's Guide to American Clocks. Anita Schorsch. Warner Books, Inc., New York. 256 pages, 5¼ x 8 in., 500 illustrations, 50 in color.

The advertising cover for this book states, "For the beginning or advanced collector—a *visual* identification guide to clocks. Organized by type and keyed to color photographs, over 500 different clocks are classified and described by maker, age, decoration, dimensions, materials, and movement. Approximate value is given for each."

This is a convenient reference guide, readily carried because of its small size, yet it is comprehensive in scope. The clocks are categorized in some 50 chapters; included are several parts, such as Tall Case Clocks, Wall Clocks, and Bracket Clocks. An extensive historical introduction includes a "Color Key to American Clocks" which illustrates 50 clocks, broadly representative of the major categories of clocks. The remaining clocks are listed in brief paragraphs, with references back to this "Color Key."

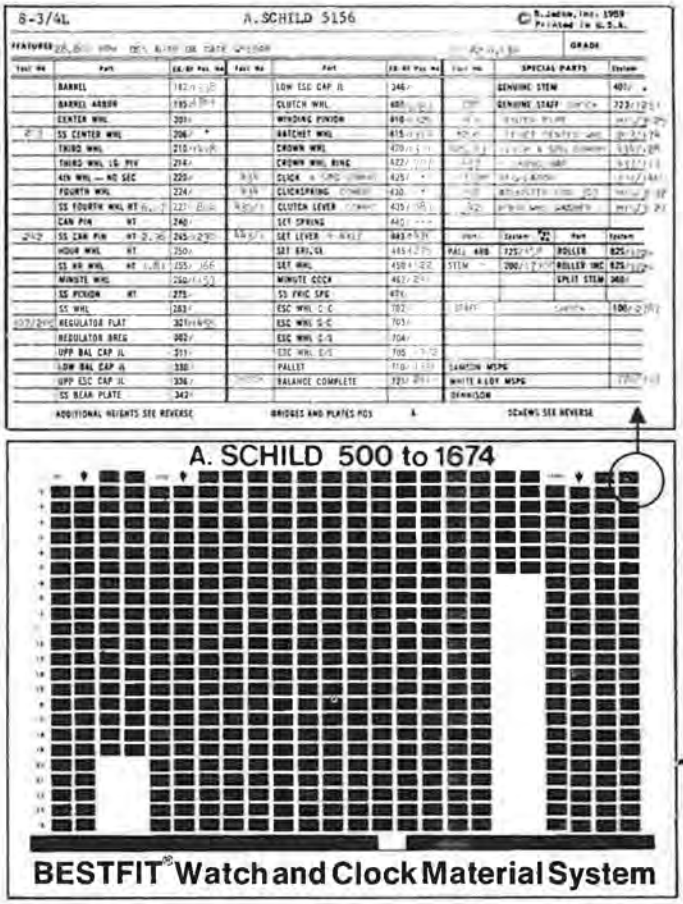
The sources of all clocks are recognized; the numerous individuals from whom assistance and advice was sought, and those who supplied photographs, form a substantial group of outstanding authorities among America's horologists. An index of makers, designers, and distributors of the clocks included in this book comprises the last section.

This is a commendable addition to the library of the serious collector. While the ranges of value given as the "price guides" with each clock are very broad, they do have some use in a field where changes are often astronomical.

Joseph G. Baier, Ph.D., CMW

Metric Madness by J. W. Batchelder

Refuting the idea that the metric system is scientific, precise, or convenient, this interesting new book suggests that it is out-moded, resented in many countries, and that the cost of conversion would be disastrous. It contends that the Imperial System is much better suited to the United States, and that the metric system is a failure in many countries, having been instituted by the government but spurned by the people. Myths about the metric system are questioned, and examples are given where industrial and social metric usage has caused nothing but costly confusion. 245 pages, 5½ x 8½ in., hard-bound, priced at $12.95.



BESTFIT® Watch and Clock Material System

Special Message to the American Watchmaker

***111-111A WATCH PARTS CATALOGS NOW REPLACED**

Computer generated micro filming has enabled Bestfit to transfer information from the 111-111A Watch Parts Catalog and 50 years of other accumulated research and record keeping for over 8,500 watch calibres to a handful of 4 x 6 inch film sheets.

THE BESTFIT® MICROFICHE WATCH AND CLOCK MATERIAL INFORMATION SYSTEM

The most complete cataloging of watch and clock parts ever compiled in one reference system.

***NOW AVAILABLE TO YOU—THE WATCHMAKER:**

A. All this information can now be at your fingertips and is the exact same information and display used by your regular watch material wholesaler. It contains both Ebauches and non-Eubauches watch part information.

B. For easy identification of complicated movements, many illustrations, including calendars, automatics, chronographs, timers, electronics have been referenced to the parts information.

C. By assigning a unique number to each part, complete interchangeability is built into the system to eliminate duplication of stock. Because the wholesaler's stock is already arranged by these numbers, you can order parts by universally understood numbers and get your orders filled quickly and accurately without describing the part.

D. Necessity of sending samples will be kept to a minimum.

E. Updating of your system at reasonable cost to you will be made at the same time as we make new information available to our own and your wholesalers' systems.

F. You will be able to use the Bestfit Viewer for other suppliers' fiche, if as expected they begin to use this type of information presentation.

Note: PRINTED CATALOGS LIKE THE 111-111A WILL BE DISCONTINUED BY BESTFIT.

Because of the ease of updating and adding new information, the Bestfit Micro Fiche Watch and Clock Information System will replace all catalogs and other supplementary information currently published by Bestfit.

As a modern watchmaker you need a continuing source of information, and you cannot afford anything but the best—The Bestfit Micro Fiche Watch and Clock Material Information System—available for immediate delivery.

300 MF	**$450.00**

Order from your regular Watch Material Supply House or directly from B. Jadow and Sons, Inc., 53 West 23rd St. N.Y., N.Y. 10010

Affiliate Chapter Column/Robert Allis

Thoughts On Chapter Improvement

In last month's column, I printed a letter from one of our younger members, giving his point of view and asking for your comments. As of now, I have not had time to receive any replies, but I am sure looking forward to them. In the meantime, I would like to bring out a few thoughts of my own on how to help the young watchmaker become a solid member of our organization.

We have been the dominating people in watch repair for so many years that I think we sometimes lose sight of the fact that we are not going to be here forever. We must welcome the young watchmaker of the future into our midst and help him in whatever way we can.

For instance, when you attend a meeting or seminar and one or more of these young persons is in attendance, do you go up to him (or her) and introduce yourself and try to help him feel at home—or do you renew acquaintances with your old cronies whom you have known for years? It is so easy to do the latter, and yet I have heard the comment that we have our own cliques and that no one else is welcome. I know that this is not true, but put yourself in the role of the stranger attending a meeting for the first time and try to understand how he must feel about it. It is so easy to get into a corner with your old pals and swap a few stories about work, but next time you attend some watchmakers' function, make a concerted effort to engage a new face in the conversation. You just might be surprised to learn that these young people of today are a very wonderful bunch.

You had better start getting some youthful involvement if your chapter is like most that I know. I feel that I am an average American watchmaker, but I am fast approaching another birthday and can no longer classify myself as middle-aged (unless I live to be 120 years old.)

After you have interested a young watchmaker in your organization, give him some responsibilities. This will make him feel like a solid member and he will respond in kind. This all applies not only to the younger person, but also to the person who has been a member for years but has never asked to contribute. Some people will never volunteer (a holdover from their days in the service), but ask them to do something and they will do a superlative job.

Also, while on the subject of ways to improve a chapter, let us not forget the distaff side: our lovely wives. Try doing something that will include them, such as a social get-together on the evening before a meeting or seminar. If they enjoy it, they are likely to want you to attend chapter activities and become more active.

These are a few of my thoughts on how to make your chapter a more productive and instructive organization, but then, I have missed perhaps the most important thing of all. LISTEN! Listen to what your members are trying to tell you about their wants and needs. You may be surprised to hear some of the same things you've just read in this article—merely stated in a different way.

...from all around the ASSOCIATION...

PENNSYLVANIA

The Delaware Valley Watchmakers Guild's June meeting was attended by thirty members. It was the last meeting before the summer recess. A Pennsylvania State Trooper was the guest speaker, and he provided much pertinent and interesting information.

On August 16, 1981, the Delaware Guild had its annual picnic. About forty people enjoyed the beautiful weather, the excellent facilities, and the delicious chicken.

The Central Watchmakers Guild held its first meeting of the 1981-1982 season on September 10th in Manheim, Pennsylvania. Mr. John F. Gelson, Executive Vice-President of the Hamilton Watch Company, was featured on the evening's program.

Congratulations are offered to Central Guild member Bob Sener who was elected to AWI's Research and Education Council. Bob also serves on the Central Watchmakers Guild's program committee.

. . . if you're not doing it . . .

. . . You Should Be . . .

using your AWI casemark!

The Keystone Guild began its 1981-1982 season on September 15th. The program was "Liquid Crystals, How They Work," by Henry Fried.

The Allegheny Guild held its summer picnic on August 23rd. A very special thanks is extended to Marie and Bill Cornfield for their professional musical entertainment.

The Allegheny Guild resumed its monthly meetings on September 8th. The first program of the year featured the internationally known clock repairman, Frederick Jauch. He presented a slide-and-lecture program on the most artistic, unique, and rare clocks that have been repaired by him in the past.

YOU CAN MAKE MORE PROFIT . . .

If you keep up to date on the newest techniques in watch and clockmaking.

$ $ $

Plan *NOW* to attend AWI Bench Courses when they visit your area!

Saving your *Horological Times*? Well, if you are . . .

. . . we have the answer to protecting and organizing your magazines. Our leather-look binder holds 12 issues (one volume). End the frustration of searching for back issues or trying to remember technical details that you just *know* you've read. If you are interested in organization, send a check or money order in the amount of $8.95 to: HT Binders, P.O. Box 11011, Cincinnati, Ohio 45211.

Allow 3 weeks for handling and delivery.

Support the

AWI - ELM TRUST

Scholarship Program

by

Sending your old

watch batteries

to the

AMERICAN WATCHMAKERS INSTITUTE

(Continued from page 24)

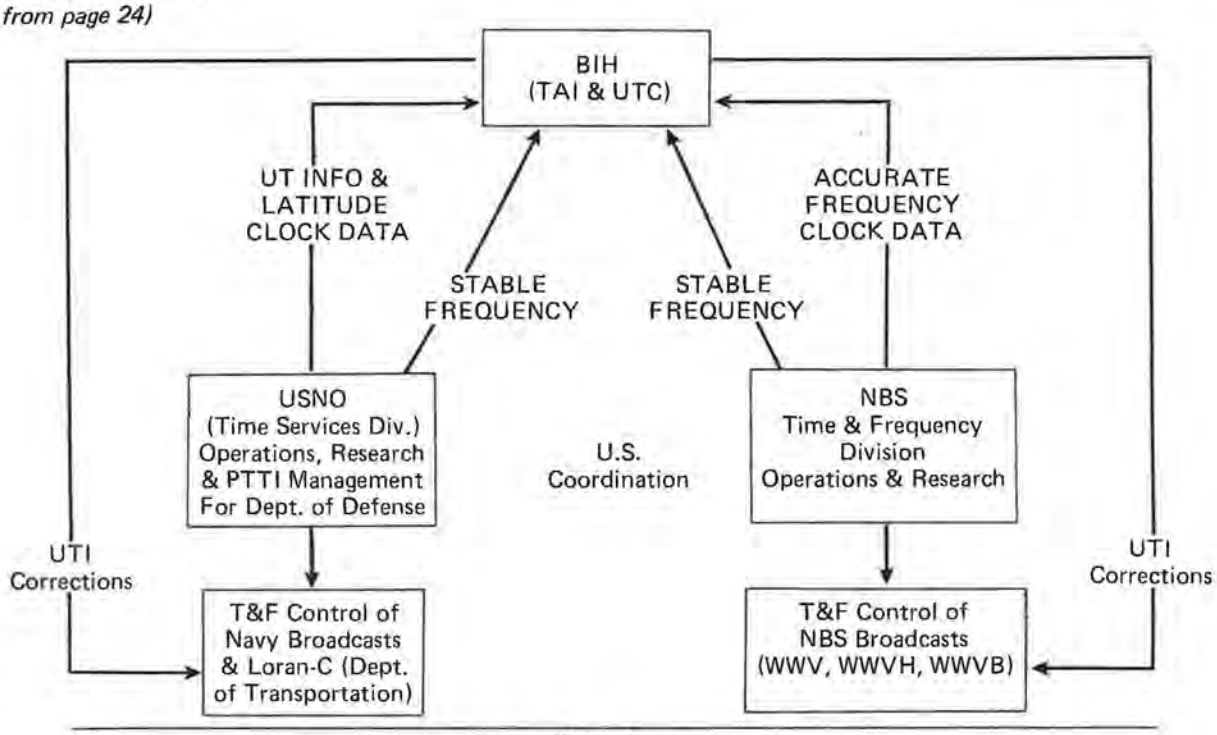


Figure 2

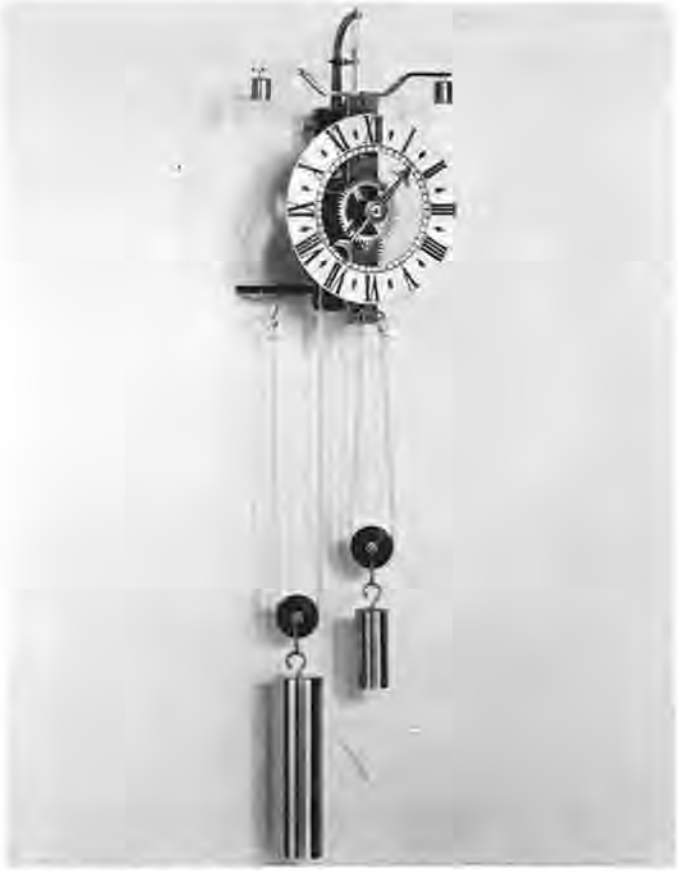
seventy-three countries joined together and established the *Bureau International de l'Heures* (BIH) in Paris, France. The contributing countries agreed upon two basic international scales—International Atomic Time (TAI) and Coordinated Universal Time (UTC). The International Time Bureau establishes atomic time by collecting and evaluating time data from a number of the world's time laboratories' and observatories' cesium atomic clocks. Coordinated Universal Time is derived from international atomic time by the International Time Bureau, but it is adjusted by using astronomical data submitted by the world's observatories. Thus, the time determined by the Time Bureau is the average of all those participating countries. See Figure 2.

Coordinated Universal Time, by international agreement, must agree with the UTC time scale by the International Time Bureau to within ± one millisecond. Thus, by using the International Time Bureau's clock as the agreed-upon standard, the uniform world time systems differ from one country to another by only a few millionths of a second. So whether you get your time from the PTB in Germany, JJY in Japan, CHU in Canada, or MSF in England, it will differ from that which you receive here in the United States from WWV or WWVH by no more than a microsecond. All standard time and frequency stations broadcasting Coordinated Universal Time use the Greenwich or zero meridian as the reference point.

Because of variations in the earth's rotational speed,

16th Century Foliot Clock

By ROBERT M. OAKLEY



(Cord shortened for photo purposes. Photos courtesy—Brasher-Rucker.)

Mr. Henry B. Fried's excellent review of an excellent book, John Wilding's *How to Make a Simple 16th Century Style Clock* appeared in the June 1980 issue of *Horological Times*. This raised the question of whether it might be possible to make this clock using an older model Unimat. For the benefit of the thousands of owners of the old Unimat lathe (previous to the current model "3"), the answer is affirmative.

I constructed this clock during the winter from the series of magazine articles on which Wilding's book is based. An old Unimat SL1000 was used. I have no reason to suspect that the clock so constructed is in any way inferior to one made on the later model lathe. Some of the set-ups are different, and some imaginative resourcefulness is beneficial. Of course, it is also helpful if one has some knack of translating English into American.

The dial was secured from the maker in England, as recommended in the text. Otherwise, the materials used were purchased in this country. The thread specifications were changed to accommodate U.S. taps and dies.

This clock differs from the "series" or "book" clock

---

solar time and atomic time, which are relatively invariable, get out of step and, from time to time, must by synchronized. To solve this problem an international agreement was reached in 1972 to add to or possibly subtract a single second, called a "leap second" from Coordinated Universal Time so the Coordinated Universal Time and solar time, (technically called UTI) would differ no more than 9/10 of a second. The *Bureau International de l'Heure* in France is responsible for notifying all nations when such a change is to be made.

Traditionally, the leap second is added or subtracted from the last minute of the year in December or the last minute in June. Every year from its inception in 1972 through 1979, we have added a leap second at the end of December. In 1972, we also set our clocks back one second in June as was done at midnight just this past June 30, 1981. Hence, by adding two seconds in 1972, this became known as the longest year in modern times. However, in 1980, we did not add a leap second at all. In order to keep our clocks in step with the sun, another second must be added in June 1982, but none will have to be added on New Year's Eve of 1981. Thus, our calendar is kept in step with the seasons by using the leap year and our clocks in step with the sun by using leap seconds.

Next month we will continue our discussion of standard time and frequency.

in Wilding's writings in a few respects:

1. It was made on an old Unimat SL, rather than the current model Unimat 3 which Wilding used.
2. The thread specifications were changed to accommodate U.S. taps and dies.
3. The fasteners, such as screws, nuts, pins, etc., were hand-crafted; that is, were turned out on a one-at-a-time basis, using the same equipment as was used to produce the other parts.
4. All the material, with the exception of the dial, was purchased in this country. The dial was procured from the same fine small shop in England which turned out the one for the "series" clock.
5. Wilding offered two versions of weight pulley designs. This is a third, and the components are shown in the dismantled view in the movement photo. I do not consider it either more or less appropriate than the original. They were made this way to facilitate dismantling.

This is definitely not a project for a couple of weekend afternoons, but the lack of a current model Unimat should not deter a real enthusiast. TMIS

Don't Fall For The

By JOSEPH

"The truly innocent and the petty shoplifters shed tears and pleaded for their innocence . . . . Pros were a different story. Their actions were worthy of Academy Awards.

A customer browsing in your business establishment takes a small item from a shelf and examines it, but instead of putting it back on the shelf, shoves it into a pocket. If the person were a true shoplifter, this act was very clumsy, for your wall mirrors would readily show this act of concealment.

What do you do?

You or a salesperson can play "innocent" and ask the customer if he fully understands how the product works, its uses, etc. In this way, you let the customer know that his act was observed.

An alternative is to wait until the person comes to the checkout register and see if the item is produced for ring-up. If the pilfered item is not produced, you or a cashier can still be polite and ask if the concealed item was "overlooked." Perhaps you've had so many losses due to shoplifting that in anger you simply make an accusation and ask the person to wait while you call the police.

When the police arrive on the scene, it is customary that they ask the accused shoplifter if he has a receipt for the product concealed on his person. At this point, the accused person may produce a receipt for the product with the explanation that he bought it yesterday or earlier in the day and was simply exchanging a slightly "soiled" item for a "fresh" one.

Question: Did you use force and restrain the person? Did you make derogatory remarks that could be construed as slander? Did you commit false arrest simply by detaining the person and not letting the person leave your premises?

Another ploy is for the accused not to produce the receipt and allow himself to be placed under arrest. At the trial, his astute lawyer produces the receipt with the explanation that it was misplaced at home.

The prosecutor has no choice but to ask the presiding judge to dismiss the charges on the grounds of insufficient evidence of a crime having been committed.

Now the tables are turned in both situations. Where your accused shoplifter did produce a receipt, the object was to bait you into using "restraining" or "excessive force" in which case you'll be at the receiving end of a lawsuit.

It is likely that you have some form of *umbrella insurance* that covers this situation, and usually the insurance company will settle out of court. The ploy usually works, but the perpetrator has to be careful not to use the same name inasmuch as insurance companies are wise to these phony lawsuits and run names and addresses through computers to catch persons who make a business of this practice.

Those whom you have arrested and who manage to get the case dismissed (as in the second example) are real

Shoplifting Caper

ARKIN, M.B.A.

They wailed, faked fainting, and became hysterical. The ace they held was that they did not commit an act of shoplifting. For defaming their character . . . they sued in six or seven figure lawsuits."

pros; they usually work with what are known as shyster lawyers—those with low moral and ethical standards.

Larger business firms, especially discount houses and department stores, used to be hit regularly with suits for false arrest. When a person was caught shoplifting, he was usually asked to come to a special office, and the person who did the asking flashed a *special police* or *private police* badge.

The truly innocent and the petty shoplifters shed tears and pleaded for their innocence. Some stores made it a practice to make a complete report and asked those whom they felt were not really shoplifters to sign waivers releasing the store from all liability. The guilty too were sometimes let off with a lecture and warning (juveniles were reported to parents), and they, too, were asked to sign releases from liability forms.

Pros were a different story. Their actions were worthy of Academy Awards. They wailed, faked fainting, and became hysterical. The ace they held was that they did not commit an act of shoplifting. For defaming their character, forcing them to go to an interrogation room, and for the accompanying emotional distress, they sued in six or seven figure lawsuits.

The situation became so bad that many major cities had to revise their laws with respect to shoplifting. Some cities made provisions that shoplifting could not be charged until the suspect left the premises.

You can be the victim of a set-up. Only you can tell if the loss of an item of nominal value is worth the potential risk of a lawsuit.

You don't have to look the other way when you see a person obviously stealing from you. However, you can follow the advice given at the very beginning of this article. Keep cool—ask polite questions which will indicate to the shoplifter that you know what he is up to. This can be an effective deterrent.

Signs proclaiming that shoplifting is a criminal offense will deter the person who has never committed a prior act, and will perhaps deter the occasional shoplifter, but they will only add fuel to the desire of the real pro to try to steal from you. The con-astist will also be all the more eager to set you up as a pigeon for a false arrest suit.

A final word of advice: Be alert. Spend money on mirrors and on real or simulated surveillance cameras.

Laws with respect to shoplifting vary from state to state, as do the laws regarding lawsuits for false arrest. After reading this article, check with your attorney for the laws applicable to your state or city. TIMES

TELL-SWISS NEEDLE FILES INTRODUCED IN U.S.

Making their first appearance in U.S. jewelers' supply houses are the Tell-Swiss brand of jewelers' needle files. Tell-Swiss precision files are the lowest-priced needle files of this quality. They are actually priced at 50% less than some precision files of lesser quality. U.S. sales are handled exclusively by Hammel, Riglander & Co., Inc., New York City, which sells only to jewelers' supply houses.

The 5 1/2" long, chrome alloy steel needle files are made in two cuts: No. 2 (fine) and No. 4 (very fine), and in 12 shapes. Sets are available containing all 12, or 6 of the most popular shapes. Both sets include a sturdy, black and yellow vinyl pouch. Individual files are also available.

The 12-piece set is priced at $17.34, and suggested list for the 6-piece set is $8.80. Individual files may be purchased at $1.55 each. Tell-Swiss files provide jewelry craftsmen with an unusual savings opportunity on Swiss needle files.

Tell-Swiss brand needle files are currently stocked by many jewelers' supply houses. For more information, write to Hammel, Riglander & Co., Inc., P.O. Box 222, New York, NY 10014.

Tell-Swiss Needle Files

L&R'S 1981 JEWELRY CLEANING CATALOG

James Lazarus, President of L&R Manufacturing Company, a world leader in ultrasonic cleaning systems and chemicals, recently announced that the new four-color jewelry cleaning products catalog is available to all the friends and customers of L&R. This year's catalog, L&R's first full-color catalog, features the complete line of world-renown products, accessories, and solutions, including detailed photographs and technical data. Mr. Lazarus stated, "Not only are we ready to expedite shipments, but we also invite our friends to inquire about the new facilities brochure, 'L&R, The Whole Picture' which shows the story of how L&R became a leader in the field."

Send for the catalog and brochure to: L&R Manufacturing Co., 577 Elm St., Kearny, NJ 07032. Phone: (201) 991-5330.

L & R 1981 Jewelry Cleaning Catalog

MAXELL CORP. ANNOUNCES HIGHER-CAPACITY BATTERIES

Maxell Corporation of America is proud to announce the introduction of higher-capacity silver oxide watch batteries. The new cells are designed to produce capacities previously obtained only by using a divalent system. Maxell has developed a process using a monovalent system to increase cell capacity. Benefits of this breakthrough will be reflected in battery service life.

As an example of this new battery service life, the service capacity of Maxell model No. SR41SW will increase from 38 to 45 (rated capacity at 6200 load cut-off voltage 1.2V at 200C).

For more information, contact Maxell Corporation at 60

Oxford Dr., Moonachie, NJ 07074 or phone (201) 440-8020.

THE DAY-NITE TOOL KIT

Built-in twin lights in the unique power torque handle make the Day-Nite Tool Kit perfect for dimly lighted, hard-to-see, or emergency repair jobs. It has 18 sockets, two screwdriver blades, and 1/4" drive-socket adaptor in a sturdy, snap-lock carrying case.

The kit is available for only $29.95 plus $3.60 postage and handling (California residents add 6% sales tax), from Katzden Gallery, Dept. GA-09, Box 906, 14911 Gwenchris Court, Paramount, CA 90723. Call toll-free 800-421-2414 for VISA or MasterCard orders. In California, call 213-630-0383.

The Day-Nite Tool from Katzden Gallery

NEW MAGNETIC BUR HOLDER AVAILABLE

A bench-top magnetic bur holder is now available from ACRO Products Corp., a Chicago-based metal products manufacturer that has been in business for 35 years.

The bur holder will enable dentists, dental technicians, and jewelry manufacturers to conveniently organize their burs so that all are in easy reach and on constant display.

The holder is constructed of stainless steel, with two magnetic strips. The base has four non-slip rubber feet. The top platform has five 9/32" holes for storage of burs with large shanks. The overall size of the bur holder is 6" x 3 1/4" x 3 1/4".

New bench-top magnetic bur holder from ACRO Products Corp.

Since it is not permanently attached to the bench, the holder may be used at different work stations as necessary. At the end of the work day, it may be locked in a storage drawer for security.

The stainless steel magnetic bur holder may be purchased directly from: ACRO Products Corp., 5000 S. Halsted St., Chicago, IL 60609. Phone: (312) 568-2100. Please send check for $7.25 for each unit desired. The manufacturer agrees to pay shipping and handling charges.

NEW FILM AVAILABLE: "APPRAISALS & THE PROFESSIONAL JEWELER"

"Appraisals and the Professional Jeweler," a 20-minute, full-color film, is available for rental and/or purchase from the Gemological Institute of America.

Produced by Gem Media, the creative services division of GIA, the feature film offers jewelers an entertaining and yet thoroughly educational feature movie on jewelry appraisal and what it can mean to the professional jeweler. Through illustrating common errors and proper safeguards, "Appraisals & The Professional Jeweler" shows the jeweler the take-in procedures which secure customer confidence, increase business, and prevent potential legal problems.

The film, co-written by GIA Retail Management Supervisor H. David Morrow and prominent Los Angeles jeweler Cos Altobelli, is considered unique among the educational materials available to the jewelry industry.

Rental fee for the film is $75 for two days, $95 for one week. Purchase price is $350 for videotape (3/4 inch, Batamax, VHS formats available) and $450 for 16mm format.

Orders and inquiries should be directed to: Gem Media, 1660 Stewart St., Santa Monica, CA 90404 or telephone (213) 829-2991.

UPDATED JEWELERS' IMAGE MANUAL

Jewelers of America's Jewelers Image Manual, initially introduced two years ago, has been updated to include information on JA's consumer program. The newly revised edition was introduced at JA's July Trade Show in New York City.

The manual includes basic how to's on all phases of advertising, publicity, promotion, and community relations for a jewelry store operation. Special segments are devoted to: local newspaper, radio and television advertising; direct mail; and store promotions. The new segment offers easy-to-follow guidelines and aids that enable a JA member to tie in with JA's consumer program and thereby be identified with a national program.

Cost of the manual for members is $15.00; for non-members, $20.00. Orders should be sent—with payment—to Alan Leopold at the JA office.

The address is Rockefeller Center, 1271 Avenue of the Americas, New York, New York 10020. Phone is (212) 489-0023.

NEW, INEXPENSIVE BENCH LAMP FROM SWEST

Swest, Inc. is now offering a "floating" type lamp for workbenches, desks, etc. which is dramatically less expensive than the standard bench lamps currently offered by most suppliers, including Swest. This lamp features a 34 in. adjustable arm for easy positioning, is easily clamped to the work surface, and is UL approved. It uses an ordinary 60 watt incandescent bulb (not supplied).

For price and order form, contact Swest, Inc., 10803 Composite Drive, Dallas, TX 75220, and Swest, Inc., 1725 Victory Blvd., Glendale, CA 91201.

New bench lamp from Swest

NEW JOINT VENTURE TO MARKET ETERNA WATCHES IN U.S.

Eterna S.A. announced a new marketing pattern for their precision watch line in the United States during the recent Jewelers of America trade show in New York City.

Eterna, the Swiss subsidiary of the ASUAG Group (General Corporation of Swiss Horological Industries Ltd., the world's largest manufacturer of products for the watch industry), has appointed the Swiss Horological Corporation of America (Swiss Horological) in Long Island City, New York, as its exclusive distributor for all of the U.S. with the exception of the Virgin Islands.

Swiss Horological Corporation will be headed by Theodore E. Lisnow as chairman. The new organization will be a subsidiary of Lisnow & Weis Co., Inc. (L & W) which Lisnow also serves as president. L & W has been in the business of manufacturing high quality diamond and gold watch cases and bracelets for more than 25 years. The affiliation of Swiss Horological with L & W will enable Eterna to supply unique, high-styled watch models to U.S. retailers and ship directly from the Long Island plant.

Jay D. Lisnow, executive vice-president of L & W, will act as president of Swiss Horological. Edward F. Blanchard, formerly vice-president of sales and distribution at Movado Time Corporation, will be executive vice-president. Blanchard stated, "Simply, we will distribute fine quality watches to the U.S. market at competitive prices. Our primary targets are the fine jewelry stores and fine jewelry departments of department stores around the country." He also stated the Swiss Horological Corp. has major media advertising planned for the Fall and Christmas season. A strong co-op program will be part of the campaign.

Key executives of Eterna S.A. and The Swiss Horological Corp. of America are pictured as they announced their joint venture. Peter P. Morf, president of Eterna S.A., center, is flanked by Theodore E. Lisnow, left, and Jay D. Lisnow of Swiss Horological.

Eterna has been producing precision watches for more than a century. In 1980, the company joined the ranks of some of Europe's most distinguished companies when it received the "Triomphe" grand prize of European excellence, which is awarded to firms whose activities contribute to the worldwide prestige and influence of Europe. The U.S. collection will be priced to retail from $250 to $35,000 and will feature ETA Swiss Quartz Analog movements.

"We look forward to a long and successful relationship with L & W," said Peter P. Morf, president of Eterna, S.A. "We have looked at entering the U.S. market for quite some time. Now we are confident that we can successfully bring the very best in Swiss and American jewelry and watch technology, design, and marketing expertise into this market."

JEWELERS ADMIRE BULOVA'S NEW STYLES

Hundreds of jewelers visiting Bulova's exhibit saw the company's new fall introductions for the first time. Bulova management found near unanimity among retailers that the massive restyling effort had paid off handsomely in revitalizing the Bulova and Caravelle lines. 75 new styles were presented in the Bulova line and 70 new models in the Caravelle line. Among them are 75 quartz watches under $100.00.

There was great interest in the heralded exhibit of Accutron Swiss, seen for the first time in the U.S. The new collection will be on Jewelers' shelves this fall and comprises some 120 models priced from $200.00 up.

THREE FIRMS HONORED FOR MARKETING EXCELLENCE

Bulova Watch Company, Wideband Jewelry Corporation, and the Hammond Company were honored during a reception at the recent JA trade show as winners in the third annual Marketing Excellence Award competition sponsored by "Modern Jeweler" magazine.

Bulova and Wideband became the first co-winners in the manufacturer category as judges decided both companies deserved recognition for their programs

to help retail jewelers to do a better selling job at the store level.

Bulova's program was designed to counter changes in distribution that came about through the technological revolution in watches and the marketing of them.

Wideband was cited for its comprehensive marketing program, complete with specific promotions geared to items in strong demand and popularity.

STACEY WOOD PROMOTED TO MUSEUM DIRECTOR

At the recent meeting of the National Council of the National Association of Watch and Clock Collectors (NAWCC) held in Detroit, Stacey B. C. Wood, Jr. of Lancaster, Pennsylvania was promoted to Museum Director, the newly approved senior managerial position of the NAWCC Museum. Mr. Wood was originally employed by the Association as Headquarters Administrator and Museum Curator in 1976. He continues to serve as Headquarters Administrator in addition to his new position.

The National Association of Watch and Clock Collectors, Inc. is a non-profit scientific and educational organization dedicated to the preservation of horological data and material for posterity. Its museum at 514 Poplar Street in Columbia, Lancaster County, Pennsylvania is open to the public Monday through Saturday. For further information call (717) 684-8261.

HUGH G. GLENN NAMED PRESIDENT OF OMEGA, U.S.A.

Hugh G. Glenn has been appointed president of the Omega Watch Corporation, U.S.A., the American affiliate of the Omega Watch Company of Bienne, Switzerland.

Mr. Glenn succeeds Robert N. Wilken, who served as president of the Omega American affiliate for the past year and a half.

Mr. Glenn, who spent ten years with Omega in various managerial capacities, is rejoining the firm after a ten month interval during which he served as vice-president of marketing, of Baume & Mercier, Swiss watchmakers.

Mr. Glenn, 38, brings to Omega a sixteen-year career in the watch and jewelry industry. He began his career with Bailey, Banks and Biddle Jewelers of Philadelphia in 1965, moving to New York one and a half years later to join the Zale Corporation's New York office. In 1970 he began his association with Omega, culminating in the post of vice-president of sales, the position he held when he left the firm in 1980.

A native of Texas, Mr. Glenn is a graduate of North Texas State University.

Hugh G. Glenn, President of Omega Watch Corp., U.S.A.

NEW OFFICERS FOR THE AMERICAN WATCH ASSOCIATION

The American Watch Association announced recently that Laurence Grunstein, executive vice-president of North American Watch Corporation, was elected second vice-president. He formerly was treasurer of the association.

Lawrence F. Codraro, vice-president, secretary and general counsel of Bulova Watch Company, Inc., was elected treasurer of the association.

The changes are the result of the resignation of the previous second vice-president, Setsuo Kasahara, president of Citizen Watch Company of America, Inc., who returned to Citizen's headquarters in Japan.

The American Watch Association represents U.S. companies engaged in the manufacture, assembly, or importation of watches, watch movements, and watch related products for sale in the United States and world markets.

BULOVA SAYS NEW LEGISLATION A BOON TO JEWELERS

Bernard Dwortzan, Bulova's Director of Presentation and Incentive Sales, hailed legislation passed in early August that enhances the tax incentives for employers who give their employees special service awards, such as watches, clocks, and jewelry. The amendment increases from $100 to $400 the deduction employers can take for awards given to employees under Section 247 (b) (1) (c) of the Internal Revenue Code. Newly eligible for deductions are recognitions for productivity, in addition to length of service awards and safety achievement awards. Under certain conditions, the legislation permits employers to claim a full deduction for awards in excess of $400.

Dwortzan also points out that the market for 25-year awards is healthy, as the labor force between 1955 and 1960 rose from 50 to 54 million people. He reminds jewelers that clocks constitute increasingly popular awards. A Bulova study shows that where clocks are included in a program, employees choose them over other products offered. The most frequently chosen clocks are wood or brass mantel styles.

"We have played an active role behind the scenes in getting this legislation passed," says Mr. Dwortzan, "and it has taken years of effort. It should be a real boon to alert jewelers."

SEIKO NAMES KRIETE MANAGER OF CLOCK DIVISION

Charles Kriete has been named manager of Seiko's clock division, it was announced recently by Mort Gershman, Executive Vice-President of Seiko Time Corporation.

Mr. Kriete, previously manager of national account sales for both watches and clocks, will now devote his full time to the planning and development of all phases of Seiko's rapidly expanding quartz clock business. He will report directly to Mr. Gershman.

In his new post, Kriete will have a broad range of responsibilities in sales, merchandising, advertising, administration, and service.

Larry Lich, who until recently had occupied dual positions as general manager of national accounts and manager of clock sales, will retain his position as general manager of national accounts. He will concentrate on watch and clock sales to those accounts, which represent a significant and growing share of Seiko's business.

Charles Kriete, manager of Seiko's Clock Division.

Classified Ads

Regulations and Rates

Ads are payable in advance $.40 per word, $.50 per word in bold type. Ads are not commissionable or discountable. The publisher reserves the right to edit all copy. Price lists of services will not be accepted. Confidential ads are $4.00 additional for postage and handling. The first of the month is issue date. Copy must be received 30 days in advance.

Horological Times, P.O. Box 11011, Cincinnati, OH 45211. (513) 661-3838

Tradesman

CLOCK WHEEL AND PINION CUTTING Fast Service–Write for free brochure and price list. Fendleys, 2535 Himes St., Irving, TX 75060.

DIGITAL WATCH REPAIR SPECIALIST, LED and LCD. Tuxedo Electric, Tuxedo Square, Tuxedo NY 10987. Phone: (914) 351-5678.

WATCH REPAIR FOR THE TRADE: Mechanical watches only. Ultrasonic cleaning, electronic timing. All work guaranteed. Price list on request. Howard W. Carnahan, P.O. Box 307, Greenville, OH. Phone: (513) 548-4382.

Quartz watch repair exclusively for the trade, wholesale only. LED, LCD and Analog. Robert B. Linder, 52827 Riverside Road, P.O. Box 253, Index, WA 98256. Phone: (206) 793-1933.

Pearl and Bead Restringing. All types. Fast service. Jean A. Gruenig, P.O. Box 12007, 1279 Inglis Ave., Columbus, Ohio 43212.

Clock repair material and tools. Manufacture of clock springs, dials, escape wheels, verge kits, weights, all types of brass and steel stock and custom made parts. Catalog postpaid $2.00; Tani Engineering, Box 338, Atwater, Ohio 44201. (216) 947-2268.

CLOCK SERVICES wheels, gears, barrels, retoothing, repivoting, mainspring winding, bushing, jeweling. Send sample for estimate. Roy H. Neigel CMC, 21837 Woodbury, Cupertino, CA 95014. Phone (408) 253-4927.

TRADE WATCH REPAIR. Guaranteed quality work. Two watchmakers–Certified Master and Swiss trained. Send SASE for price list of our fast service. The Regulator Time Company, 121 South Third Street, Manhattan, KS 66502. (913) 776-6977.

Superior Tweezer Resharpening. $2.50 each, including return first class postage. Minimum of three tweezers. Advance payment required. Harvey C. Watkins, CMW, P.O. Box 1738, 1204 West Cason Street, Plant City, FL 33566.

CLOCK WHEEL AND PINION CUTTING, repivoting, retoothing, escapement work. J.C. Van Dyke, CMW, CMC, CMBHI, 1039 Rt. 163, Oakdale, CT 06370.

DIAL REFINISHING, CRYSTAL FITTING & WATCH REPAIR. 48-hour services on Dial Refinishing & Crystal Fitting. Finest quality. Quantity works welcome. Send your works to: Kirk Dial & Crystal Co., 625-4th & Pike Bldg. Seattle, WA 98101.

WATCH REPAIR FOR THE TRADE: ACCUTRON, STEP-MOTOR QUARTZ, DIGITAL ANALOG & MECHANICAL. The Watch-Repair Shop, 2616 Kendall Ave., Madison, WI 53705. 1-608-231-3606.

Help Wanted

Two watchmakers wanted, experienced, quality production man and apprentice; or "Snow Bird" who wants to work Sept. 1 - June 1. Hot, arid climate. Watch Hospital, Yuma, AZ 85364. Phone: 602-783-9371.

Situations Wanted

Watchmaker: Bulova School Graduate. Write for resume. Richard Mazza, 29 No. Main, Niles, OH 44446.

Wanted To Buy

STERLING FLATWARE STOCKS–New or used needed. Call us before you sell for scrap. Also wanted: silver, diamonds, gold scrap, coins and coin collections. Call or write: Mr. Neff, HT, WFN Enterprises, 2300 Henderson Mill Rd., N.E., Suite 318, Atlanta, GA 30345. Ph. 404/938-0744.

MARINE CHRONOMETERS WANTED, any condition. J. P. Connor & Co., 629 Tanglewood Lane, Devon, Pennsylvania 19333.

NOTICE!
NEW CLASSIFIED AD RATES

Due to our rising costs, a rate increase for classified advertising has gone into effect as of September 1, 1981. The new rate is $.40 per word, $.50 per word in bold type. This applies to all classified ads except those presently on contract, which will be protected until their expiration dates.

IMMEDIATE CASH PAID!! Old Mine and Old European cut diamonds. Especially needed: Stones over 1 carat. Ship with phone number for highest offer, or call Mr. Neff, (404) 938-0744. W. F. N. Enterprises, Inc., HT, 2300 Henderson Mill Rd., NE, Suite 318, Atlanta, GA 30345.

IMMEDIATE CASH PAID for Gold, Silver, Platinum, any form! Jewelry scrap, filings, gold filled, sterling! Immediate top dollar cash offer return mail! Satisfaction guaranteed. Ship insured/registered mail to: American Metals Co., St. Andrews Branch, P.O. Box 30009H, Charleston, SC 29407.

For Sale

ESEMBL-O-GRAF LIBRARY in 28 volumes, Pittsburgh, 1955. Chronograph repairing is made easy by step-by-step procedure. Each small step of removing and replacing each part and making adjustments is clearly illustrated. No concentrated study is necessary. $200.00. Write EOG, P.O. Box 11011, Cincinnati, Ohio 45211.

RETIRING – Clock Shoppe – Southern California, Hi Desert – Elite Store – Heavy Repairs – Good Inventory – Excellent Lease – (714) 365-9676 days; (714) 365-9363 evenings and Sundays.

Pocket watches: Hamilton and Illinois Railroads, Early American, Patek-Philippe, Howards, and a nice selection of ladies' hunters. Write for dealers prices. P.M. Time Service, 7651 Lowell Blvd., DR 5, Westminster, Colorado. 80030-4599. (303-429-0716) Always buying and trading. Some parts, dials, cases, etc. available. Send SASE for free list.

Metal Cutting Lathes, Bench Mills, Drillpresses, Unimats (accessories also), Maximats, Sherline, Machinex, the new Maximat Super Eleven. Lathe Catalog, $1.00. Precision tools inch or metric, aluminum, brass, steel, all shapes, miniature screws, taps, drills, saws, collets. Tool Catalog, $1.00. Campbell Tools, 2100 Selma Road, Springfield, Ohio 45505. Phone (513) 322-8562.

Retired watchmaker selling 40-year accumulation of Swiss-American material, tools, equipment. Send large SASE for complete lists. Warren Liken, P.O. Box 86, Wheaton, Missouri 64874.

STEP HIGH ROUND CRYSTALS, 22 to 32 in 1/2 sizes at $2 per dz. Write FLORO DISTRIBUTOR, 12-08 151 Place, Whitestone, NY 11357.

American pocket watches, movement, cases, material and tools for sale. Write for list. **Want to buy watchmakers tools, American pocket watches, related items.** Dashto Horological Services, 5349 Basilica Circles, Virginia Beach, VA 23464. (804) 420-2631.

QUARTZ BATTERY CLOCK MOVEMENTS: Regular or Mini: $7.95 each, 3 for $22.65, 6 for $42.90. Hands included. $2.00 handling. CALDAK TIME, Box 3181, Camarillo, CA 93010.

U.S. HEADQUARTERS FOR ALL SCHATZ PARTS. PARTS FOR THE NEW 400-DAY ELECTRONICS. ALSO FOR KUNDO ELECTRONIC. GREENHILL CLOCK SERVICE, P.O. BOX 172, SANTEE, CA 92071.

FOR SALE-SMALL JEWELRY STORE. Ideal opportunity for watchmaker, located for 15 years in shopping center, next door to large beauty and barber shop. Three jewelry cases, three cleaning machines, Tick A Print Timer, large polish machine, two watchbenches, Speidel and Kreisler bands, ass't jewelry, office desk, and filing cabinet. Under $10,000. Very low rent, near high schools, lots of repairs. Illness. Contact: Buell M. Spanhook, 1034 Duquesne Dr., Tucson, Arizona 85710. Phone: 1-602-747-1219.

Portescap Vibrograf M-80 quartz timer, features LED display and new microphone, excellent condition. The price is $950 or the best offer. Basinger's Jewelers, 140 N. Main St., Lima, OH 45802.

Flourishing clock shop on the East Coast. Established 1939. Owner retiring. Contact Bill Shelton, 806 Harrington Ave., Norfolk, VA 23517 (804) 625-5752.

For Sale–Timing Machines, Watchmaster Timers, Vibrograf Timers. Factory rebuilt. All machines guaranteed. Terms available. Also available Ultrasonic Watch Cleaning Machines. Write Vibrograf sales representative Robert Swensgard, 2630–A Jett Hill Road, New Richmond, Ohio 45157. Or phone (513) 553-2113. Territory: Southern Indiana, Kentucky, Michigan, Ohio, Tennessee, and West Virginia.

Miscellaneous

Digital Watch Service Training. Zantech, Inc. offers training and instruments for servicing all types of digital watches. Course includes diagnosis of watch malfunctions and repair methods, including techniques in wire bond repairs using silver epoxy. Louis A. Zanoni, Zantech, Inc., 77 Shady Lane, Trenton, NJ 08619. (609) 586-5088.

Dates To Remember

OCTOBER

3-4—Maryland Gem Shows, Washington D.C.; Westpark Hotel, Tyson's Corner, VA

4-6—Orlando Gift Show; Howard Johnson's Florida Center, Orlando, FL

4-7—Philadelphia Gift and Jewelry Show; Holiday Inn, City Line, Philadelphia, PA

7-11—Jeweltime 81; Shangri-la Hotel, Singapore

10-12—Pennsylvania Jewelers Association Annual Convention; Pocono Hershey Resort, White Haven, PA

11-13—St. Louis Gift and Jewelry Show; Cervantes Convention Center, St. Louis, MO

17-18—Illinois Watchmakers Convention; Townhouse Motel North, Morton, IL

24-25—Florida State Watchmakers Association Convention; The International Inn, Orlando, FL

NOVEMBER

7—Watchmakers Association of New Jersey Annual Dinner Dance; Royal Hawaiian Palms, Lyndhurst, NJ

JANUARY 1982

16-18—Jewelers International Showcase; Convention Center, Miami Beach, FL

31-Feb. 3—SJTA Atlanta Jewelry Show; Hyatt Regency Hotel, Atlanta, GA

31-Feb. 3—Memphis Gift & Jewelry Show; Cook Convention Center, Memphis, TN

31-Feb. 3—Tampa Gift, Jewelry & Housewares Show; Curtis Hixon Convention Hall, Tampa, FL

FEBRUARY 1982

6-14—GLDA Tucson Gem Show; Marriott Hotel, Tucson, AZ

7-10—Jewelers of America International Jewelry Trade Show and Conference; New York Hilton and Sheraton Centre Hotels, New York, NY

13-16—Inhorgenta '82, Jewelry, Watch, Precious Stone, and Silverware Trade Fair; Munich

14-16—New Orleans Gift & Jewelry Show; Rivergate Convention Hall, New Orleans, LA

21-23—Dallas Market Center Spring Jewelry and Gift Show; Anatole Hotel and Market Hall, Dallas, TX

The 2nd Edition of the

Watch and Clockmakers' Buyer's Guide

is being published.

If you have a SPECIALITY SERVICE or PRODUCT and wish to be listed, please contact:

AWI Central
3700 Harrison Ave.
P.O. Box 11011
Cincinnati, OH 45211

Please do so before October 20, 1981.

Advertisers Index

The best way to keep up with what's happening is through the company that's making it happen.

Everything you need–technical information, special equipment, parts and materials– is available to you.

1. The Seiko Technical Library: Six volumes containing everything about repairing watches. For mechanical watches, it's all-inclusive, and designed to put all the facts at your fingertips. In a time-saving, easy-to-use format. Includes a Technical Guide to all basic Seiko movements, a Watch Parts Catalog, a Parts Interchangeability List and a Casing Parts List. For quartz information, there is a sampling of Analog and Digital Quartz Technical Guides as well as the current quartz casing catalog.

2. The Seiko Microfiche System. Saves you time, space and money, too. By storing the equivalent of 425 8½" x 11" catalog pages on one 3" x 5" grid. Every grid titled and alpha-numerically indexed for easy reference accessibility. Making important technical data and previously unavailable information readily accessible and easily stored in a minimal space area.

3. The New Seiko Quartz Tester. QT-99. A revolutionary timing rate measuring instrument, utilizing a sophisticated microcomputer system. Measures the timing rate for quartz crystal, tuning fork and jeweled-lever watches and clocks. The rate is digitally displayed when the timepiece is placed on the microphone. It's also the only quartz tester that accurately measures the timing of Seiko Caliber 99 watches (Twin Quartz). Simple and ideal for after-sales servicing of just about every kind of watch or clock, and a powerful tool for promoting the sales of superbly accurate Seiko Quartz watches and clocks.

4. The Seiko Bracelet Replacement Screw Assortment Kit. STC-144. An efficient and dependable way to save time and money while you perform simple bracelet repairs on your own premises. Includes an assortment of the most popular screws and an illustrated Case Numbering Chart. Packed in a sturdy compact leatherette case with 52 clear unbreakable bottles. Available through authorized Seiko Material Distributors.

5. A Full Line Of Seiko Parts And Batteries. To help you perform the basic maintenance and repairs that keep your customers happy, and keep extra sales coming in. Available through authorized Seiko Material Distributors.

You can keep your service operation as up-to-date as the Seiko timepieces you sell and service. For more information on how to order, mail in the coupon below.

SEIKO

HT-10-81

Seiko Material and Information Distribution Center
555 West 57th Street
New York, New York 10019

Please send me more information on the subjects indicated. I want to keep up with what's happening. Check desired information:

—Technical Library
—Microfiche System
—Quartz Tester
—Contact your Material Distributor for kits, parts and batteries.

Name_____

Title_____

Store Name_____

Address_____

City_____ State_____ Zip_____

Citizen unwraps a quartz timer that does it all for under $1200.*

You could spend around $3000 for a digital display multi-function rate measuring instrument.

But it isn't necessary.

The Citizen CQT-101 can measure not only quartz watches (analog and digital) but also tuning fork and balance wheel watches with all the accuracy you need.

Its measuring range is from 0.01 second a day to ±399 seconds per day.

To monitor various types of watches and clocks, you simply change the microphone.

The CQT-101 is the only quartz timing instrument you'll ever need.

And even when it's not helping you build your service business, its attractive, professional look makes it in an effective in-store promotional display.

Pay $2000 or $3000 for a timer? Ridiculous. Now that Citizen's CQT-101 is here.

Place your order with your material house or directly to Citizen Watch Company. For more information, write: Citizen Watch Co. of America, Inc., Service Headquarters, 12140 W. Olympic Blvd., Los Angeles, CA 90064. Tel.: (213) 826-6541.

CITIZEN

We sell **with** you, not through you.

*Suggested retail. Price does not include shipping and microphone for mechanical watches. Sales tax additional in California.