HOROLOGICAL™ TIMES

November 2004



American Watchmakers-Clockmakers Institute



Measures: 11" x 7" x 6"H

WOODEN WATCH CASE

#75.015 $27.95 ea.

Buy 2 @ $24.95 ea.

This 2 level, oak wood, watch display case features a glass top which reveals four rolled watches, while the pull-out drawer conceals three flat watches.

Pocket Watch DISPLAY DOME



#75.907 $5.95

This new, imported dome features a dark teakwood base with a high-gloss finish. Glass dome measures 3" x 4-1/4". Watch is held with a brass stem mounted in the base.

The "American Horologist"

The First Ever Collector Medallion Honoring the American Horologist.



#80.061 $16.95 *(Medallion Only)*

Watchmakers, jewelers and collectors alike will treasure these beautiful One Troy Ounce .999 Fine Silver "Proof-Like" Medallions. A portion of the proceeds will be donated to the **AWCI Scholarship Fund.**

#80.062 Medallion w/Mounting & Key Chain $22.50

#66-707 Sterling Silver Mounting..... $4.90

Best Selling Pocket Gifts

Cut-About Knives



Gift set with leather sheath. Full size Cut-About Knife

#AW020 $21.95



Stainless Steel Cut-About JR.

#AW025 $18.95

Made in USA

Money Clip Pocket Knives



• Knife
• File

#AW027 $5.95



• Knife
• File
• Scissors

#AW033 $9.95

Esslinger & Co.

1165 Medallion Drive • Saint Paul, MN 55120

81 Years Young – And Growing

national phone orders: 1-800-328-0205

local phone orders: 651-452-7180

fax orders (24 hrs): 1-800-548-9304

local fax: 651-452-4298

HOROLOGICAL™ TIMES

An Official Publication of the American Watchmakers-Clockmakers Institute

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

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

James E. Lubic, CMW: Executive Director & Education & Technical Director
Lucy Fuleki: Assistant Executive Director
Thomas J. Pack, CPA: Finance Director
Laurie Penman: Clock Instructor
Nancy L. Wellmann: Education Coordinator
Sharon McManus: Membership Coordinator
Mary Huff: Shipping Coordinator
Heather Weaver: Receptionist/Secretary
Jim Meyer: IT Director

***HOROLOGICAL TIMES* ADVISORY COMMITTEE**
James Sadilek: Chairman
Lloyd Lehn, CC
Chip Lim, CMW, CMC, CMEW
Robert D. Porter, CMW
Manuel Yazijian, CMW

AWCI OFFICERS
Jim Door: President
Dennis Warner: Vice President
Alice B. Carpenter, CMW, CMEW, FAWI: Secretary
Mark Butterworth: Treasurer

AWCI DIRECTORS
Mark Baker, CMW
Gerald Jaeger, CMW, CMC, CMEW, FAWI
James Sadilek
Manuel Jean Yazijian, CMW
James K. Zimmerman, CMW, CMC, CMEW
Glenn D. Gardner, CMW: Affiliate Chapter Director
Doug Thompson, CW, CEWT: Research & Education Council Director
Willem Van Kempen: Industry Advisory Board Director

IMMEDIATE PAST PRESIDENT
Jack Kurdzionak, CW

FELLOW
American Watchmakers-Clockmakers Institute

Robert F. Bishop	*Harold J. Herman
James H. Broughton	J.M. Huckabee
Fred S. Burckhardt	Gerald G. Jaeger
Alice B. Carpenter	Benjamin Matz
David A. Christianson	Robert A. Nelson
George Daniels	*Hamilton E. Pease
Wes Door	Archie B. Perkins
*Henry B. Fried	William O. Smith, Jr.
Josephine F. Hagans	Milton C. Stevens
*Orville R. Hagans	*Marvin E. Whitney
Ewell D. Hartman	

*Deceased

Reprinting and reproduction is prohibited without written permission from the American Watchmakers-Clockmakers Institute. Copyright ©2004 by the American Watchmakers-Clockmakers Institute.

HOROLOGICAL TIMES (ISSN0 145-9546) is published monthly and copyrighted by the American Watchmakers-Clockmakers Institute, 701 Enterprise Drive, Harrison, OH 45030-1696. Subscription price for the public is $79.00 per year ($6.50 per copy). Members subscription is $30.00 which is included with annual dues of $79.00. Periodicals postage paid at Harrison, OH 45030 and additional entries. POSTMASTER: Send address changes to *HOROLOGICAL TIMES*, 701 Enterprise Drive, Harrison, OH 45030-1696.

CONTENTS

VOLUME 28
NUMBER 11
NOVEMBER 2004

FEATURE ARTICLES

Seiko Kinetic Energy Supplier YT02A, By Chip Lim 8
The "School Watch" Three-Quarter Plate Bridge 18
By Ron Landberg
New Bushing System, Part 4 30
By Laurie Penman

COLUMNS

Rock Quarry, By Fred S. Burckhardt 12
The Modern German Clock Movement, By Mark Butterworth 14
Part 48, Replacing the Missing Pendulum
As A Clockmaker Turns, By J. M. Huckabee 22
Arbor Pivoting Simplified, Part 1

DEPARTMENTS

President's Message, By Jim Door 2
Executive Director's Message, By James E. Lubic 2
Questions & Answers, By David A. Christianson 4
Ask Huck, By J. M. Huckabee 6
From the Workshop, By Jack Kurdzionak 26
AWCI Material Search 29
Bulletin Board 35
Affiliate Chapter Report, By Glenn D. Gardner 36
AWCI New Members 39
Book Review, By Manuel Yazijian 40
Classified Advertising 44
Advertisers' Index 48
AWCI Employee Directory 48

EDUCATION

AWCI Home Study Course in Clock Repair 10
AWCI Pocket Watch Class Taught by Alice Carpenter 37
By Robert Porter

SPECIAL INTEREST

Seeking Candidates for AWCI Board of Directors 11
AWCI Directors' E-mail Address Directory 28
2004 Hong Kong Watch & Clock Fair 42
JA Publishes 2004 *Cost of Doing Business Survey* 43

COVER

This month's cover features the Seiko Kinetic Energy Supplier YT02A



President's Message

Jim Door

Even though we are not farmers we join in the celebrations of the Fall harvest. We join in taking time to reflect on those things we are thankful for. I am thankful for the wonderful staff we have at AWCI, for the friends I have made in my association in this organization, for the committed Board members and committee members who spend countless hours working for our benefit. I am thankful for you, the membership, for giving me an opportunity to serve you.

We are very fortunate to be able to do the work we are doing. In one of Jerry Faier's seminars, he asked in what other occupation could you pack up, move to another part of the country, set up shop, and have your services readily in demand. We are in demand.

As we reflect back on the past year, perhaps we may wish our income had been better, that we had used our time better. Let us not dwell on the past but learn from it. If we did not make the income we feel we deserved what do we do to change that? Do we need to improve repair skills, find more efficient ways of doing our work, learn new business skills, or maybe we are not pricing our work properly?

Each month we attempt to help you within the pages of this magazine and with the programs and member benefits we offer. Please take full advantage of these benefits. Let us know how we can improve these benefits. Your input is vital.



Executive Director's Message

James E. Lubic, CMW

This month I'd like to inform you of a project that we have been working on for quite some time and is beginning to come to fruition – that project is a Pricing Survey. Most associations conduct these surveys on a regular basis with their membership. These surveys have become a very valuable tool that members look forward to participating in as well as purchasing every 2 to 3 years.

First let me assure you that this survey will have nothing to do with price fixing. AWCI will not be suggesting any prices for any services whatsoever. This survey will do nothing more than report to you, our members, what prices were being charged around the country for specific jobs in the previous year. Since the survey must be a historical report we will send the survey out shortly after the first of the year. The answers to the questions that you give will be related to what you did in 2004, and not what you hope or plan to do for 2005. The report or survey will be divided into several sections. The first section will be a report of the questions as they relate on a national basis. There will be no right or wrong answers, only a report of the answers. For example, a question could be "How much do you charge to service an American-made 8-day, hour and half-hour striking clock, and how long does it take?" The answers that our members give will be reported to you as this is the lowest price that was reported, and X number of members reported this way. Next would be the highest price that was reported, and how many members reported that way. Next would be the average of what was reported, and how many members answered the question. This would also be done regarding the length of time taken to do the work. After the information is reported using the responses from the nation as the pool it will then be broken into 8 regions. The survey will also be divided into a section for clock repair and a section for watch repair.

This survey will not be a five-minute survey. The pilots that we have conducted show that it will take about 30 minutes to complete. Everyone who did a pilot survey also said that they thought it was worth taking the time to complete as the results would be very worthwhile to them individually and collectively for the membership.

It will be important to the success of this survey to have a very high number of members respond. When the data has been tabulated it will be made available to you at a reasonable price. The answers to the questions on the survey will only be seen by the company hired to tabulate the data and then destroyed, so don't be shy about answering the questions.

I wish you all a very happy Thanksgiving.

MORE MOVEMENT MADNESS!

SAVE 15%-30%

Be sure to ask about our New Movement Book. It's FREE!



ETA 280.002
Reg. $25.95
SALE $21.95

MIYOTA 1L12
Reg. $6.95
SALE $5.25



ETA 802.004
Reg. $5.95
SALE $4.95





MIYOTA 1M02
Reg. $6.95
SALE $5.25



ETA 901.005
Reg. $8.95
SALE $6.50

MIYOTA 1M12
Reg. $6.95
SALE $5.25



HATTORI PC10
Reg. $7.95
SALE $5.50





RONDA 315
Reg. $6.95
SALE $5.25



HATTORI VX11
Reg. $8.95
SALE $6.50

RONDA 751
Reg. $7.95
SALE $5.50



Sale ends November 30, 2004.
This sale cannot be combined with any other discounts.

ORDER TODAY! IN STOCK AND READY TO SHIP!

The Wm. S. McCaw Company
Since 1913
1722 Madison Avenue
Toledo, Ohio 43624

Phone: 419-243-3720
800-472-0200
800-537-0343
Fax: 419-243-0321
800-245-6481
mccawco@sbcglobal.net

Wholesale Watch Materials • Tools and Findings • Jewelry • Boxes

Questions & Answers

Question

I received from a customer two pocket watches. One of them is in a silver case, case number 13253 and has a "JM" stamp inside. It is a key wound watch, in a hunting case, and on dial has the name "Seriosa 23 Jewels". The other watch is a repeater 18 KYG case number 1856. It is key wound, Swiss made, no jewels and has a stamp on the inside of "NS" or "SN".

I was wondering if you would know when these watches were made, who made them and during what years and how much they are worth?

Daniel Nowak
Chicago, IL

Answer

French Style Verge Repeater

Your very beautiful gold watch was made in the late 18th century from a Swiss-made ebauche, or blank movement framework, and finished by a master watchmaker, probably in Geneva. The case and movement are a typical late eighteenth century French-style verge watch with a typical bridge type balance cock.

In verge watches, the early repeating mechanism was operated by a push-piece in the pendant of the case. Pressing in the push-pieces would wind up the repeating mechanism; which was then released, and struck the hours and quarter hours on a bell in the back of the case. Linking the push-piece and the mainspring arbor of the repeating train was steel chain passing over two pulleys.







The French word "cadrature" is the name given to the ingenious assemblage of levers, racks and springs placed under the dial and make the watch able to repeat the time on demand. Any mechanism placed under the dial is a cadrature: the calendar and moon phase are two examples of rather simple cadratures; the repeating mechanism is the most complex cadrature.

The invention of the repeater came to Switzerland from England and its production was concentrated in Geneva until the end of the 18th century when this important branch of watchmaking passed on into the Valley of Joux, where the watchmakers there still make a specialty of this complex kind of work.

Swiss Bar Movement

Your Swiss bar movement is classed as a Lepine Calibre N° V in which all of the bridges run in parallel. This is the final evolutionary calibre of a movement designed and developed by Jean-Antoine Lepine in 1764-65. These watches included many revolutionary innovations, the most unique being the replacement of the fusee with a going mainspring barrel. This made these movements much

(Continued on page 17.)



Get all wound up with these Deluxe Winders for Automatics

Super Quiet



Offer these to your discriminating watch customers to solve the running-down problem of their automatics.

Or as a display to attract attention to your watches for sale.



- Very Silent motors, OK for the bedroom
- All have various operational modes, bi-directional, or uni-directional
- Spring loaded self-adjusting watch holders come in 2 sizes, for gents or ladies watches
- All models include a dark blue cloth storage bag, and have a one year factory warranty.
- View window models have soft beige interior, security lock, & small storage area for cufflinks, etc.

Description	Color	Stock #	Jlrs. Cost	Sug. Retail
Round cylinder with metallic finish	Silver	**WTB1360SV**	**$ 85**	$ 165
DC powered by two C-cells	Black	**WTB1360BK**	**85**	165
Round cylinder of genuine leather, DC	Black	**WTB1360GLBK**	**99**	195
New Square cylinder of genuine leather	Black	**WTB1466GLBK**	**110**	215
with see-thru cover, DC or AC w/ optional adapter		**WTB1466DC**	**$13.95**	
Single, deluxe, enclosed,, with view window	Black	**WTB1452GLBK**	**$ 149**	$ 320
genuine leather, DC powered by two C-cells	Lt. Brown	**WTB1452GLBN**	**149**	320
Double, deluxe, enclosed, with view window,	Black	**WTB1448GLBK**	**210**	455
genuine leather, DC &/or AC adapter included	Lt. Brown	**WTB1448GLBN**	**210**	455
Triple, deluxe, enclosed, with view window,	Black	**WTB1500GLBK**	**295**	685
genuine leather, uses AC adapter included	Lt. Brown	**WTB1500GLBN**	**295**	685

please inquire for quantity pricing

For further information ask for color flyer DOC-WW04







Borel

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

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

Borel



J.M. Huckabee,
CMC, FAWI, FBHI

Ask Huck

Question

What is the best method of repair for American clocks with worn pinion rungs?

Answer

The "rungs" are called by many names: wires, staves, and several other terms are commonly used.

Many writers teach a variety of methods to replace these "wires." I've written several articles on that subject over the past 40 years. It seems that no one can agree on what may be called "best restoration."

I never try to obscure the fact that a repair has been made. However, I make the repairs such that I'm glad for my peers to critique the job.

The method I usually employ is to move the "driving wheel" about 1½ times its thickness on its arbor. Where conditions permit, this uses a "new position" on the pinion. The job is "quick and good," and preserves the original material of the movement.

Where the forgoing method is not possible, I replace the pinion wires. What may seem to be a difficult job is quite easy to accomplish. The AWCI book, *The Top 300 Trade Secrets of a Master Clockmaker*, shows a nice and easy method to replace the "wires." That method requires a small lathe; one of most any type is suitable.

Question

This American clock movement has "tracks" worn in the escapement anchor. How, or what is a suitable repair?

Answer

A new anchor, often called "the verge" probably will not be a drop-in fit. Even if its dimensions are as the original, the escape wheel teeth are also worn. An attempt to reshape the anchor may result in breaking the piece. Unless you are familiar with escapement theory, the job will turn out giving you a "liberal education" in escapement work.

I like to retain every piece of these priceless antiques that is possible. My first choice is to move the escape wheel on its arbor such that the wheel tracks a different position on the anchor surfaces. This preserves the wheel and anchor, and probably will function for a few dozen more years. Most of these old clocks are nearing, or more than a hundred years old.

I consider this type of repair to be excellent in results, and at the same time keeping all the components original to the clock.

I share the same ideas about dials, and other pieces: a "less than the best" dial on an antique is much more admired than a "new replacement dial."

NEED INFORMATION ON A PARTICULAR WATCH, CLOCK OR ITS MAKER?

The Henry B. Fried Library is considered to be one of the world's finest horological libraries. Hundreds of books are available for your use whether it be for finding information for yourself or a customer, doing research on a special subject, or just for enjoyable reading. Customers appreciate a person that can talk intelligently when answering their questions. Make use of the library, it will pay big dividends!

ANOTHER BENEFIT OF AWCI MEMBERSHIP

Livesay's Inc.

Tampa, Florida

Wholesale Jeweler & Watchmaker Supplies Since 1969

Phone Orders

(800) 476-2715

Toll Free 24 Hour FAX Orders

(800) 476-8016

Tampa (813)229-2715 Local Fax (813)221-8016

Email info@LivesaysInc.com

Your Headquarters For Batteries, Watch Material, Tools, Findings, Bands, Jewelry Boxes, Casting Supplies, Watch Movements, and Much, Much More. Catalogs Available.

Generic Crystals to fit Rolex

Super Sale!!



To fit 25-206-C (Ladies) $15.95

To fit 25-295-C $18.95

Rolex Movement Holders

Stock No.	Description
591.070	For 1570
591.072	For 2135
591.074	For 3035



Your Choice $14.95 each

Prices good thru November 30th, 2004

Note: Livesay's Inc. is in no way affiliated with Rolex or does Livesay's Inc. attempt to portray itself as a agent of Rolex. The parts and tools listed here are not manufactured by or for Rolex and do not carry any endorsement from Rolex, implied or otherwise.

Movement Specials

Super Sale!!

Mfg.	ETA	ETA	ETA	ETA
Caliber	901.005	976.001	805.114	956.414
Size	5-1/2x6-3/4	5-1/2x6-3/4 (2hds)	11-1/2 (SS D)	8-3/4
Each	$7.95	$44.95	$5.95	$18.95

Mfg.	Miyota	Miyota	Hattori	Hattori
Caliber	6M12	5R21	PC21	VX11
Size	10-1/2	3-1/2x6	6-3/4x8 (SS)	5-1/2x6-3/4 (SS)
Each	$8.95	$17.70	$3.95	$7.95

Mfg.	ISA	ISA	ISA	ISA
Caliber	125	127	369	1198/12
Size	5-1/2x7-3/4	7-3/4	6-3/4x8 (SS)	11-1/2
Each	$52.95	$55.95	$5.50	$5.75

Mfg.	Ronda	Ronda	Ronda	Ronda
Caliber	315	753	751SP	751E
Size	11-1/2	5-1/2x6-3/4	5-1/2x6-3/4	5-1/2x6-3/4
Each	$5.95	$7.95	$6.95	$11.00

Mfg.	Seiko	Seiko	Seiko	Seiko
Caliber	1E20	1F20	2E20	7N43
Features	2 Hand	2 Hand	2 Hand	3 Hand
Each	$32.95	$19.95	$28.00	$18.95

Seiko Kinetic® Energy Supplier YT02A

Chip Lim, CMW, CMC, CMEW
Photos by Chip Lim

Whether it is the "144 square-inch world" that some readers may call home (J. E. Coleman), a high visibility corner of a point-of-sale counter, or a strategic spot on a watch owner's dresser top, the Seiko Kinetic Energy Supplier (SKES) YT02A is a practical and eminently useful accessory for the 1M, 3M, 4M, 5J, 5M, 7L and 9T-series calibres. The popularity and proliferation of watches with rechargeable power sources ("think green") has brought forth a necessary revision in thinking with regards to keeping the timepieces 'wound' off wrist. Since these watches should *not* be placed on conventional rotary mechanical winders so as not to exceed the duty cycle of the generator and charging circuit, the SKES fulfills the need for a non-mechanical 'winding' device. The YT02A provides an external, electronic means to reenergize a variety of Kinetic calibres in two modes: a thirty minute charge (in practice five to thirty minutes, model dependent) sufficient to restore one-second step motor operation, and a three and a half hour full charge option (twenty minutes to three and a half hours).

Available from all the usual Seiko sources, at first glance the SKES with its low, unassuming 135 (d) x 125 (w) X 32 (h) mm profile might be mistaken for a coffee mug warmer. An execution in functional simplicity, many users will have unpacked the unit, plugged it into the AC mains and initiated a charge cycle in little more time than it takes to unfold the copiously illustrated, over-sized bilingual (English and Spanish in the U.S.A.) instruction



Figure 1. Seiko Kinetic Energy Supplier YT02A.



Figure 2. Left hand view.

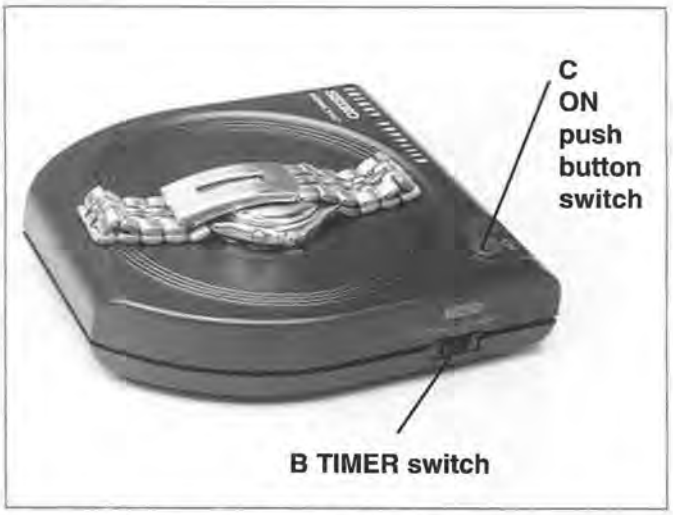


Figure 3. Right hand view. Watch in charging position.

sheet. An external 100-240 Volt, 50/60 Hertz (Hz) AC adapter plugs into the left hand ***DC IN*** jack (A) and provides the nine volt DC operating voltage. Maximum power consumption is rated at thirteen Volt-Amperes (VA). The ***TIMER*** slide switch (B) on the upper right hand corner selects the one of the previously mentioned charging times. After the calibre of the watch is verified, it is placed fully cased, dial side down, with crown orientation as appropriate on the color-coded ***CHARGING PAD*** (Figure 4). It is unnecessary to remove the watchband. This not only saves time, especially during an initial evaluation or estimate, it also serves to steady the watch in position on the pad. The ***ON*** push button (C) initiates and illuminates red during the charge cycle. It extinguishes when the SKES automatically shuts off at the end of the charging time. Speaking of which, if the ON button is pressed a subsequent time after a charge cycle has begun, the timer will reset, and the full interval starts over. It may seem like a somewhat Draconian measure, but should it be necessary to manually terminate the charging process early, simply disconnect the power cord.

Veteran Kinetic watch technicians will recall that the pulse output of the permanent magnetic generator may fluctuate, a function of the amount and duration of oscillating weight rotation. In contrast, the internal 1000 Hz SKES oscillator develops an even, constant amplitude square wave (Figure 5) which drives a bipolar output coil (Figure 6) that inductively couples the energy to the generator coil in the watch under charge. Under normal operating conditions this resonant "hum" is audible and should not be a cause for concern. Functionally, the oscillator substitutes for the rotor and stator assembly in producing the "raw" generator voltage without moving parts. The rest of the watch circuitry operates in the usual manner. For information only, an internal, non-user replaceable



Figure 4. Charging pad.

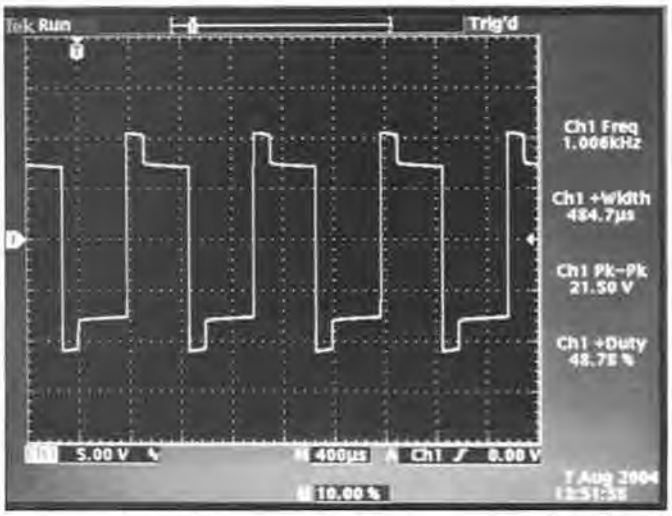


Figure 5. Pulse generator output waveform.



Figure 6. Pulse generator output coil.

fuse protects the unit from catastrophic output circuit overloads (visible next to the output coil).

As techies will point out, maximum contact area between coils—indirectly indicated by the movement series on the charging pad by crown alignment, will optimize charging efficiency and provide the greatest amount of magnetic flux transfer or transformer action. In addition, a forming or pre-charge pulse on the leading edge of the square wave further improves energy transfer and helps offset losses and inefficiencies introduced by hysteresis, the air dielectric and the physical separation between the coils. For these reasons, the actual waveform at the watch generator coil terminals will be less defined. On the other hand, you *trekkies* are probably more than ready to explain the nuances of flux capacitors...

Like many electronic devices operated in confined enclosures, heat is a byproduct. Combined with the factors discussed above, watches charged on the YT02A are no exception. After reenergizing a number of serviceable but fully discharged 5M-series watches for thirty minutes, the average ending temperature of the exhibition back was thirty-five degrees Celsius/ninety-five degrees Fahrenheit. Similar watches charged for the full three and a half hours finished with a typical temperature of thirty-eight degrees Celsius/100° Fahrenheit. Readers who deal with "live" customers may wish to keep this in mind.

With over 500,000 Kinetic watches sold to date and the sales continuing to grow, the YT02A continues the Seiko tradition of designing and producing technologically innovative tools and test equipment for the horologist. Save room on the bench for a SKES and save your wrist. *"Live long and prosper..."*



AWCI Home Study Course in Clock Repair

Based on the original correspondence course written and administered by Laurie Penman, AWCI's resident clock instructor, this course is constructed to provide information and instruction in a manner that is immediately useful in both learning and practicing clock repair. The course contains 16 lessons. At the completion of each lesson you will receive comments and suggestions from Laurie Penman, and a pass or fail grade. Those who achieve a pass grade in each section will receive a certificate of completion. Mr. Penman will be available to answer questions or offer suggestions to each student.

The AWCI Home Study Course in Clock Repair package contains all the material and information necessary to successfully learn the fundamentals of clock repair, including *The Clock Repairer's Handbook* by Laurie Penman and a one-year subscription to Steven G. Conover's monthly publication, *Clockmaker's Newsletter*. Course participants will be invited to attend a 2-day meeting at AWI to confer with Mr. Penman and meet other students.



AWCI Members - $750

Non-members - $830

Contact Nancy Wellmann, AWCI Education Coordinator
E-mail: nwellmann@awi-net.org
Phone Toll Free 1-866-367-2924 ext. 303 or (513) 367-9800

SEEKING CANDIDATES FOR THE AWCI BOARD OF DIRECTORS

The committee involved with securing candidates to run for the AWCI Board of Directors is seeking recommendations from the membership. If you plan to suggest a possible candidate, please send that individual's name and background to: Nominations for Board of Directors Committee, AWCI, 701 Enterprise Drive, Harrison, Ohio 45030-1696.

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

Recommendations must be received before December 31, 2004 to be considered for the 2005 election.

A special offer from Twin City Supply & Energizer



Free Flashlight

with the purchase of 300 watch cells!

One per customer
While supplies last

YES! We have Genuine Omega Watch Material!

YES! We do Crystal fits!

Twin City Supply
www.twincitysupply.net

2230 Edgewood Avenue South
Minneapolis, MN 55426-2823

Phone: 952.545.2725 Fax: 952.545.4715 • USA: 800.328.6009 Fax: 800.328.6001

11/04 H



Rock Quarry

Fred S. Burckhardt, FAWI

I always enjoy reading trade magazines. I get at least eight or ten a month. What amazes me the most are the new watch companies that seem to be coming out of nowhere. I say nowhere; maybe they have been around for a while, but not in the United States. Many of them are from Switzerland. Sometimes it seems there are more watch companies than there are Swiss people.

We all know that just about anybody can start a watch company without too much trouble. Buy a few movements and a few cases, have your name put on the dial and you are in business. Of course, it is more complicated than that. Choosing the right name is very important. For example, where would Patek be without Philippe or Vacheron without Constantin? What about Jaeger without LeCoultre? Would you know who Rolex was without Oyster?

You can see just how important names are. One company couldn't decide on a name so they call themselves Guess. I don't know about you but I don't have the time to spare guessing what the company's name is. Some names are very popular. For example, Pulsar, this name started with one company and then after a couple more attempts finally ended up as the name of a line with another company.

I've always liked the name of the Concord Delirium. Maybe it's because all my clocks aren't wound so I fit in with the name. Another of my favorites is Audemars Piguet—a name with a lot of class. On the other hand, take the name Swatch. Let's face it, not too thrilling but after millions sold who can argue with it.

Some watches have names that are difficult to pronounce correctly. How do you pronounce Rado, is it Rahdo or Raydo? Tissot, is it Teesoh or Tissott? Heuer, is it Hoyer or Huyer? Breitling, is it Brightling or Brettling? Cyma, is it Sighma or Seemah. Raymond Weil, is it While or Wheel? We can go on like this for days, but let's look at the most popular name of all, easy to spell, and only one way to pronounce, and has been around for years and will still be around after many of the others are gone, none other than the world famous MICKEY MOUSE!!!

YOUR EDUCATION DIDN'T END ON THE LAST DAY OF SCHOOL!

IT CONTINUED WHEN YOU JOINED AWCI

For many professional watchmakers and clockmakers,
AWCI is the after-school training offering courses that allow members
to keep abreast of the latest information and trends.
Through these educational offerings, AWCI fills the gap in technical education.

ANOTHER BENEFIT OF AWCI MEMBERSHIP!

The

American Watch Guild

announces

the creation of the



International Watch Collectors Society

The **Society** will provide its members with the following

- Calendar of major watch sales & auctions.
  Antiquorum, Christie's, Phillips & Sotheby's
  The previews of upcoming auctions.
  Reports: photographs, prices and auction results.
- Announcements from significant watch firms of new releases and limited editions.
- Information about emerging new master watchmakers and their creations
- Establishment of regional chapters where the collectors can meet and have guest speakers from noteworthy watchmaking factories.
- Question and Answer service by Stewart Unger, noted watch authority & author.
- Annual meeting at the Concours d'Elegance at the summer Jewelers of America Show held at the Javits Center in New York.
- A book club.
- Plus Free Booklets: *How to Buy a Watch (and its Functions)*
  The Care and Service of Timepieces
  Where to Find the World's Finest Watches
  How to Detect a Counterfeit Watch

Membership	1 year - $65	2 years - $120	6 Issues of Collectors Corner per year Invitation to the Concours d'Elegance
Master Collector	1 year - $120	2 years - $220	the above plus: 10% discount from the Book Club Rebate coupons from Manufacturers

Membership Application Name_____ Phone_____

Address_____ City_____ State_____ Zip:_____

Make check payable to: **International Watch Collectors Society, LLC**

244 Madison Ave., #258 New York, NY 10016 • Fax: 516-374-5060



Mark Butterworth

The Modern German Clock Movement

Part 48

Replacing the Missing Pendulum

It is not rare for a pendulum to end up missing after a moving experience. This most often occurs with grandfather clocks as the pendulum is usually packed separate from the clock in its own box. Back in May of 2002, Part 24 in the *HT* dealt with the basic facts in which pendulum length stamped on a movement was not consistent among different manufacturers as well as the fact that the pendulum length described in some catalogues is shown (incorrectly) from the hand shaft to the rating nut or center of the bob for the benefit of clock builders.

In this article the hope is to provide both practical information on determining the proper pendulum and sources for pendulum replacement. It is important to recognize that in pendulum replacement it is not only the length of the pendulum that is important, but also the diameter of the pendulum bob. This is not so much an issue with mantle or wall clocks as the bob diameter is usually much smaller than the width of the case. But with grandfather clocks, quite often the size of the bob along with the distance required for its motion does take up most of the case width.

Table 1 is supplied by Kieninger for its common KSU unit, but the results apply generally. The left table is the bob diameter in mm and the right is the width of the swing in mm. (25.4 mm = 1 inch) The top line in the table shows that for a bob with 270 mm diameter (10.5 inches) the total space taken by the swing of the pendulum is 355 mm (divide 355 mm by 25.4 to get 14 inches). Note that this is the space taken by the bob swing itself. Most of the movements coming from the factory have an automatic beat adjustment feature that requires that the bob be drawn to one side a distance farther than its normal swing width to set the beat properly. Although there is no firm rule to determine case width, when working with grandfather clocks, I would recommend adding 3 inches for this adjustment. Keep in mind that any margin is divided by 2 to get 1.5 inches for each side. As a result the total case width required for this bob is 14 inches for the bob swing + 3 inches to set the beat or 17 inches. Working backwards with an empty clock case to find maximum bob size allowed would be the width of the case less 3 inches for beat set less approximately 4 inches for total swing of the bob center itself. **In other words, the maximum bob diameter allowed is the case width minus 7 inches**. As an example a 12-inch wide case will allow a 5-inch bob diameter.

To arrive at the length of the pendulum needed, there are several options. Hopefully, the movement we are working with is marked on the rear plate. The Hermle and Kieninger movements are generally marked in cm and pendulums are available from a number of supply houses including:
Black Forest Imports (800) 824-0900
Empire (800) 333-8463
Merritt's (800) 345-4101
S. LaRose (888) 752-7673

Table 1. Courtesy Kieninger Clock Co.

Pendulum Length	Bob	Pendulum Swing
116 cm Lyre	270	355
116 cm Lyre	165	260
116 cm Hole	165	270
100 cm Lyre	200	280
100 cm Hole	165	250
93 cm Lyre	165	250
93 cm Hole	165	255

Table 2. Actual pendulum length tip to tip in inches as a function of the Hermle rated length in cm. Courtesy Black Forest Imports.

Article	Movement Pendulum Length	Actual Pendulum Length	Disk Diameter
Lyre Pendulum Straight Rods	66 cm	23"	115 mm = 4.5"
	75 cm	25.5"	115 mm = 4.5"
	85 cm	30"	165 mm = 6.5"
	94 cm	35"	140 mm = 5.5"
	94 cm	35"	165 mm = 6.5"
	94 cm	35.5"	220 mm = 8.5"
	114 cm	42.5"	165 mm = 6.5"
	114 cm	43.5"	220 mm = 8.5"
Lyre Pendulum	114 cm	43.5"	270 mm = 10.5"
	114 cm	43.5"	270 mm = 10.5"
	114 cm	43.5"	270 mm = 10.5"
Pendulum with Disk Metal Rod Complete	11 cm	2"	37 mm = 1.5"
	16.5 cm	2¾"	43 mm = 1.75"
	18 cm	4½"	43 mm = 1.75"
	21 cm	3½"	43 mm = 1.75"
	21 cm	3½"	55 mm = 2"
	23 cm	5⅛"	43 mm = 1.75"
	23 cm	5⅛"	70 mm = 2.75"
	25 cm	4"	55 mm = 2"
	26 cm	4¾"	63 mm = 2.5"
	26.5 cm	4¾"	55 mm = 2"
	27 cm	5¾"	55 mm = 2"
	27 cm	5¾"	70 mm = 2.75"
	27 cm	6¼"	80 mm = 3.25"
	29 cm	5½"	55 mm = 2"
Polished or Brushed Disk	31 cm	6½"	55 mm = 2"
	31 cm	6¾"	70 mm = 2.75"
	31 cm	7"	80 mm = 3"
	34 cm	8½"	70 mm = 2.75"
	38 cm	9"	70 mm = 2.75"
	43 cm	11⅛"	80 mm = 3"
	45 cm	11¾"	70 mm = 2.75"
	45 cm	11¾"	80 mm = 3"
	48 cm	12"	70 mm = 2.75"
	48 cm	12"	80 mm = 3.25"
	55 cm	17"	80 mm = 3"
	55 cm	19½"	140 mm = 5.5"
	66 cm	22"	80 mm = 3"
	75 cm	23½"	70 mm = 2.75"
	75 cm	23½"	80 mm = 3"
	85 cm	29"	70 mm = 2.75"

Table 2 is supplied courtesy Black Forest Imports and shows the tip-to-tip length in inches for a missing pendulum matched against the Hermle cm pendulum length number. As an example a movement marked 38 cm will require a pendulum of about 9 inches tip to tip. Note that this length is approximate and varies according to whether it is wood stick or lyre, and according to the bob diameter. It also gives a rough result for Jauch, which is usually measured from the hand shaft. As a result, if one has a Jauch movement and it states a pendulum length of 43 cm, a closer figure would be to use 45 cm to match the missing pendulum.

This table can also be helpful if the movement is not marked at all. There are several options:

1. Make an educated guess. If one is working with a wall or mantle clock, one can assume that the pendulum is going to come fairly close to the bottom of the case or level of the glass (if painted, stenciled, etc.) where it will look good. Hang a pendulum bob with wire from the leader or pendulum hanger and make adjustments until it is about the right length and then make up a real pendulum.

2. While the clock is disassembled for overhaul, calculate the beat rate. On the modern German units with a minute wheel (the 3rd wheel) on the minute shaft the beat rate can be calculated as follows:

bph = # teeth (3rd wheel x 4th wheel x escape wheel) x 2 divided by the # pinion leaves (4th wheel x escape wheel).

If there is a 5th wheel, that would be added to the equation in the same way.

Once the beat rate is determined, use the Hermle beat rate chart (courtesy Franz Hermle & Sohn), Table 3 to find the corresponding cm # and then go to Table 2 to find the proper pendulum. Realize the results are approximate for non-Hermle units, but it is a good starting point.

3. The beat rate can be measured with any clock timer. Start with the minute hand on the hour position, put a very short bob on the movement, and let the timer count the number of ticks until the minute hand gets to the next hour. The Microset Timer makes the job somewhat easier using its optical sensor.

HERMLE • KIENINGER • URGOS
H. HERR • REGULA
from
Butterworth Clocks, Inc.
Why repair when you can replace?
THE LARGEST MOVEMENT SUPPLY IN THE WORLD
FREE PRICE LIST:
Call toll free: 1-800-258-5418
5300 59th Ave. W • Muscatine, IA 52761
E-mail: bci@muscanet.com • Web: www.butterworthclocks.com
SAME DAY SHIPPING • TWO-YEAR WARRANTY
Mark Butterworth

Movement Model Number					Pendulum Length in cm	Number of Beats Per Hour
141 151 241 351 1051 451	1151 461 1161 781 791	341	131 261 771	471 1171		
x					11	12046
	x				11	12030
x					12	11765
x					15	10697
x					16.5	10062
			x		18	9720
x					21	8892
			x		21	8880
x					23	8245
			x		23	8160
x					25	7936
	x		x		25	7920
x					26.5	7722
x					27	8022
x					29	7818
x					31	7546
			x		31	7560
x					32	7371
			x		32.5	7080
	x				33.5	7050
x					34	6844
	x				35	6750
			x		35	6720
x					38	6669
			x		39	6360
x					43	6274
x					45	6113
	x				45	6111
			x		45	6120
x					48	5791
x					52	5557
x					55	5286
			x		55	5280
x					66	4809
x					75	4549
x					85	4246
x				x	94	3960
x				x	100	3840
x				x	114	3600

Table 3. This table can be used with timing instruments that measure the number of beats the clock movement produces in one hour.

4. Jeff Hamilton, an AWCI member, has published a *Clockmaker's Beat Handbook*, which includes the beat rates of many units, antique and modern, and one might get lucky. This is available from supply houses as well as from Jeff directly.

5. If one is working with Urgos grandfather units, they are usually marked with a UW #. Butterworth Clocks has developed a conversion chart which converts that number into the new standardized UW # which also has the accompanying cm #. This can be found on the website on-line catalogue at www.butterworthclocks.com or from the company's printed catalogue. Urgos pendulums are not generally supplied by the material houses, but there is a firm that will custom make them: Clocks Unlimited (NC) at (888) 266-8458. This firm also supplies Hermle and Kieninger pendulums and can custom make those for most other manufacturers if the beat rate is known. It is important to realize that pendulums require tops that correspond to the leader or pendulum hanger of the particular manufacturer of the movement. They do not interchange.

It is my hope that the above information gives you the resources necessary in the hunt to find your missing pendulum.

Final thought: *"The future belongs to those who believe in the beauty of their dreams."—Eleanor Roosevelt*

Questions & Answers

(Continued from page 4.)





thinner than any other movement before them.

This 5th version of the movement was used from 1850 to the introduction of stem winding in ordinary watches around 1870. These ebauches or rough movements were provided to watch finishers by specialized ebauche factories in both France and Switzerland. The largest of these factories was Japy Feres, near Besancon, France, near the Swiss border. In 1861, for example, Japy produced 640,000 watch ebauches of which 80% were sold to finishers in Switzerland. Large numbers were also produced in Switzerland itself for finishing in Swiss shops.

References

Chapiro, Adolphe. "Jean-Antoine Lepine and his Works", *NAWCC Bulletin #259*, April 1989. Columbia, PA.

Chapiro, Adolphe. "The Answer Box: Evolution of Bridge Movements", *NAWCC Bulletin*, August 1992, pp. 451-453. Columbia, PA.

David Christianson, CMW, CMEW, FAWI, Technical Editor

Question

Could you tell me if you can identify this clock?

Wilber Hammack
Moores Hill, IN

Answer

Your photos show a chain-driven floor clock movement made by the Kienzle-Urenfabriken of Schwenninger, Germany. Kienzle Clock factory was founded in about 1787 by Johannes Schlenker. The patent numbers on the right of the back movement plate show reference to two technological inventions (one somewhere around 1915 and one somewhere around 1923). The third number references a design that was registered around 1920.

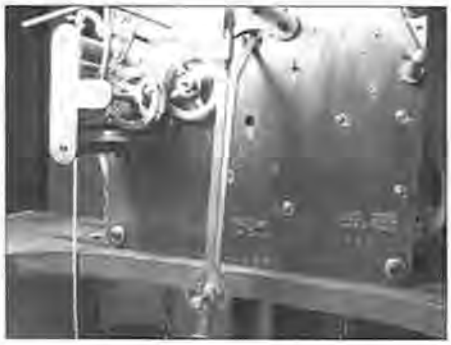
Mr. D. K. Stevenson in his article "German Patent Letter Clues," explains the DRP and DRGM patent designation (*NAWCC Bulletin*, Vol.42/5, Whole #328, October 2000). For those of us who do not care to research the original patents, Mr. Stevenson gives us a patent-numbers-by-years table for both designations. But he is careful to point out that these tables are not a perfect correlation between patent numbers and year: they are a guide, often within a year or two, but sometimes within a few years. But the lists certainly help place your clock within a certain era, at least. Keep in mind that we're talking here of patent dates, not manufacturing dates. Your clock could have been manufactured under these patents for quite a number of years after the actual patent dates.

Mr. Karl Kochmann, in his book, *Clock and Watch Trademark Index: European Origin*, shows your Kienzle trademark as having been registered by Kienzle in the 1920s. So, with the approximate patent dates and the trademark registration, it is fair to say that your clock movement was manufactured under patent protections issued in the 1920s.

The number "115" under the patent numbers refers to a movement plate code; and the number under the







Kienzle logo in the center of the plate is the serial number of the movement.

Our own Dr. Matt Clark might be able to give you more specific information about the patents, if you are interested; and our own Mark Butterworth might be able to narrow down the manufacture date, but undoubtedly your movement was made between 1925 and the early 1930s when Germany shut down domestic clock production and began to include clock factories and their materials in the build-up of her war machine.

David Christianson, CMW, CMEW, FAWI, Technical Editor



Ron Landberg

The "School Watch" Three-Quarter Plate Bridge

In the March 2003 issue of Horological Times *there was an article about the "School Watch" of the Lititz Watch Technicum. Over the next several months there will be several articles by Ron Landberg about his "School Watch" project. Ron Landberg is a WOSTEP certified watchmaker from the first graduating class of the Lititz Watch Technicum. Ron currently works as a watchmaker in a jewelry store in Las Vegas, and plans to make custom watches.*

The first of these articles will focus on a three-quarter plate bridge and balance cock fabrication for the Unitas/ETA 6497. The second article will show the dial creation from raw material stage, to hand engraved, enameled final product. The final article will concentrate on the machined hands for the watch.

Many of the other functional parts were hand fabricated for the watch as well, but with no artistic freedom due to their functional requirements. The "School Watch" project was invaluable in refining the skills a watchmaker uses every day in watch repair. The project also gave Ron a deep appreciation for all the variables and tolerances involved in the design and construction of every timepiece.

When considering all the processes necessary to make a finished bridge the numerous variables can seem overwhelming. Breaking down the project to smaller steps can make the project more manageable.

When a school watch is being derived from an existing caliber movement many of the parts made cannot be custom designed without making numerous modifications to other parts. Examples of these parts include the set lever, yoke, and set lever spring.

The bridges of the movement can be made quite unique without affecting the functional aspect of their design. It is necessary to maintain certain functional aspects such as the depthing between gears, and the material removed from the underside of the bridges for gear clearance. The bridge look or design can be quite personal, and made more or less challenging depending on the design. A ¾ plate bridge is complicated because the number of gears under one bridge increases the number of operations necessary to create the bridge. Each of these variables increases the chance of error, and the necessity of starting over.

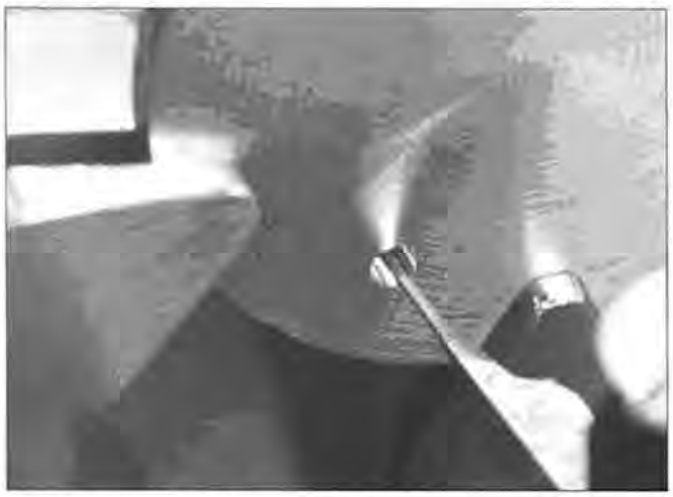
When making a bridge the first step is to determine a preliminary outside shape for the bridge, and its functions. Excess material should be left to facilitate easy clamping during the machining operations. Marking and drilling the holes for the bridge placement screws is the next step. It is important to note the primary function of these screws is to hold the bridges down. After the screw holes have been drilled they can be centered on the lathe, and the recess for the screw head can be turned out.

The recess for the screw head should be deep enough so the screw head is recessed slightly lower than the surface of the finished bridge. The recess should then be slightly countersunk for the finished appearance.

The next step is to drill holes for the bridge placement pins. Once these holes are drilled, and their correct location is verified, pins are friction-fit in place. These pins maintain



Drilling a hole for the bridge placement pin.



Turning a hole for the screw head.

the bridge's lateral position against the mainplate. These pins should fit the holes on the mainplate with no side shake, but no binding as well. When the bridge is placed on the mainplate there should be no lateral shake. The bridge should be easy to put in place and remove to minimize the chance of breaking the pivots on the gears the bridge is holding in place. Once these factors are resolved the pins can be cut to the correct length, slightly recessed from the front of the mainplate, with the tips rounded for a nice finished look.

The next step is to drill pilot holes for the jewel holes. Once the pilot hole is drilled it is centered and turned to the correct size to friction fit the appropriate jewel, approximately .05 mm smaller than the outer jewel diameter. It is extremely important these holes are in line with the jewel hole in the mainplate to prevent excess friction, or binding in the gear train. Centering can be accomplished with an optical centering device or a wobble stick.

Besides all the variables being considered in the making of the bridge, it is also necessary to contemplate

Ω OMEGA

Genuine Omega Bracelet Pins and Tubes

In easy to use assortments with detailed charts
Have what you need when you need it

Ω OMEGA

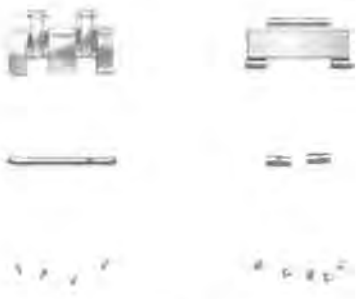


NO. 128C Constellation



NO. 128D De Ville and Dynamic

NO. 128S Seamaster and Speedmaster





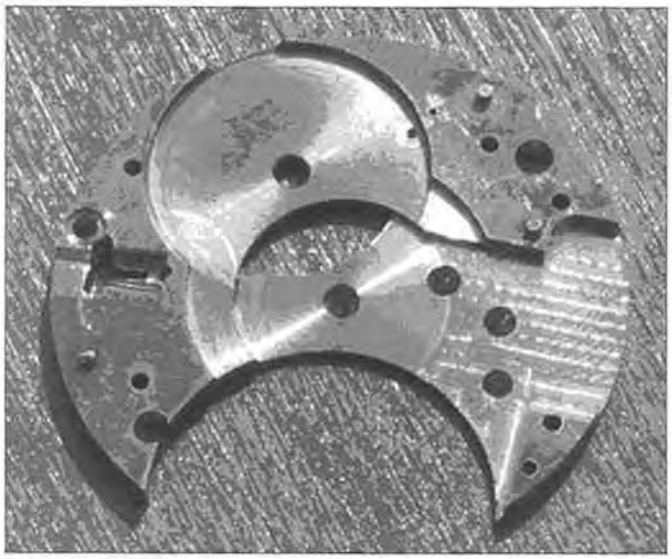
Complete system contains:
Links, Pins, Tubes and Screws
for most stainless steel models

NO. 130S

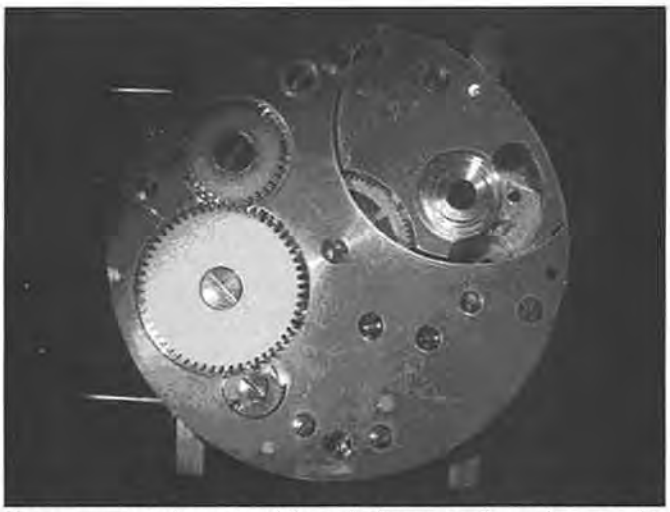
These kits and other Genuine Omega Materials
are available from your local watch material supply house
For the one nearest you phone 800-621-6296

The Newall Manufacturing Company Chicago, IL

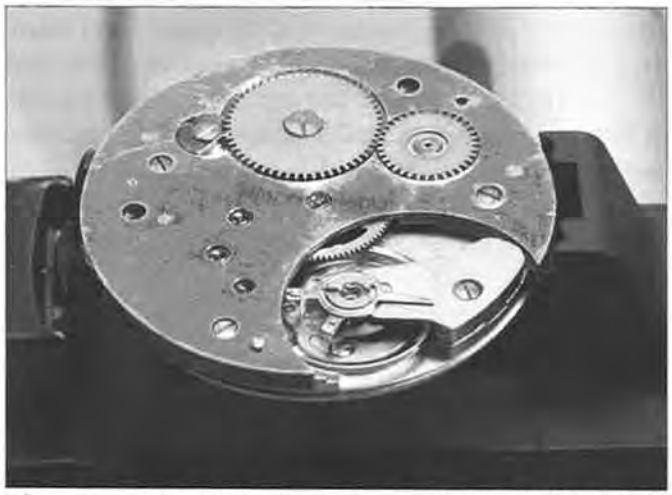
Supplying watch material distributors for 95 years.



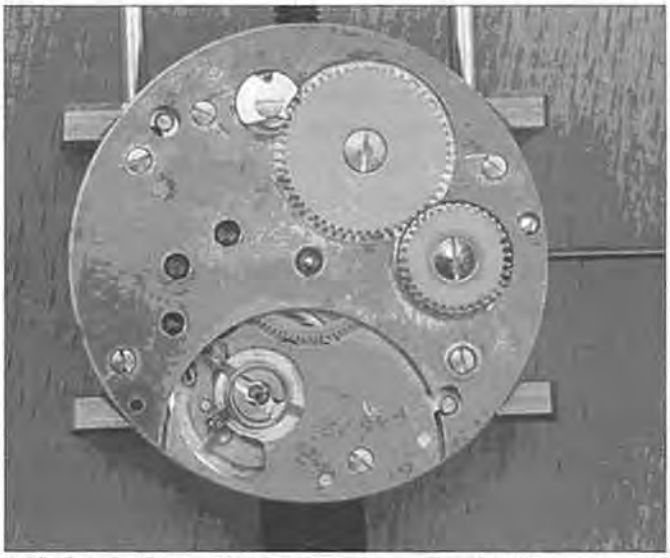
Underside of ¾ plate after milling and turning train wheel recess.



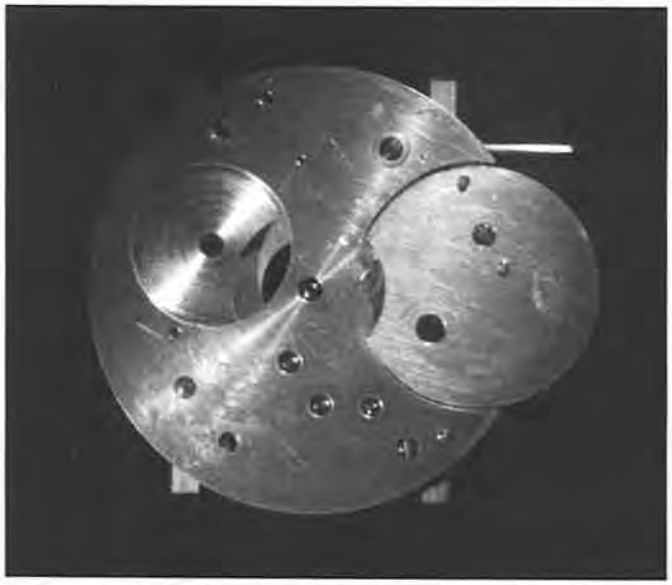
Excess material removed from balance cock, and recess for regulator turned.



Above is a picture with all components in place before finishing, or the addition of the balance cock.



A ¾ plate bridge, and balance cock completed with components in place for testing prior to finishing.



Balance cock in place with positioning screw and pins in place, and jewel hole cut.



Bridges back from J.C. Randell, Master engraver.



Finished bridges with components in place, before casing.



Movement with dial and hands before casing.

how to best hold the work piece for machining and the best way to machine the work piece to achieve the desired removal of material.

Once the jewel hole has been completed the material between the bridge and mainplate can be removed either by turning or milling. If the bridge being made is only going to hold one gear, like an escape wheel bridge, the jewel can be set, and it can now be put in place on the mainplate with the gear in place to check the results.

If the bridge is going to hold other gears in place the above processes of drilling jewel holes, turning to size and removing the material between the bridge and mainplate must be repeated for each gear.

In the case of a ¾ plate bridge or a barrel bridge additional variables complicate these processes. The recesses for the ratchet wheel and crown wheel must be taken into consideration. The depthing between the crown wheel and winding pinion is affected by the thickness of the material of the bridge, and the material of the bridge between the mainspring barrel and ratchet wheel is quite thin. It is also necessary to make cut outs for the winding pinion and the sliding pinion.

The processes followed to make the bridges are followed again to make the balance cock. An additional machining process is necessary to leave a small ring of material for the regulator to fit around when the cap jewel assembly is pressed into place. The thicknesses are especially important when making the balance cock in order to maintain the correct end shake of the balance.

Once a functional test has been performed the bridges can be prepared for finishing. Finishing includes the surface finish, counter sinking the jewel and screw holes, engraving and plating.

In order to hold the bridges in place for engraving a jig is made to hold the bridges in the same position as the mainplate. The sequence of steps for finishing is: 1. Surface finish, 2. Engraving, 3. Counter sinks, and finishing edges, 4. Plating.



REINTRODUCING OUR NEW "CLASSIC" BB PRESS

IDEAL FOR INSERTING MINERAL WATCH CRYSTALS AND FOR CLOSING CASE BACKS AND BEZEL RINGS

FEATURES
- Heavy Enough for Bench Use
- Steel Handle Ensures Plier-Grip Extension for Pressure Control
- Convenient Spring Return Action
- Large Triangle Knob for a Deeper Thrust and Larger Size Fixtures

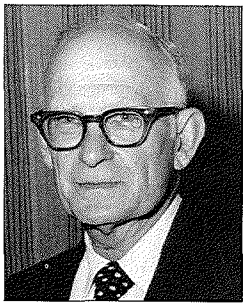
BUY THE BB 505 FOR CLOSING CASE BACKS

NEW LOWER PRICES

Contact your watch material distributor for more information.

BB505	Press plus BB508 (8 straight /reversible wall fixtures)	BB507	Set of 2 larger straight wall fixtures
BB 502	Press alone	BB509	Set of 8 ladies size straight wall fixtures
BB502B	Press plus BB504 (10 tapered and 3 flat fixtures)	BB510	Set of 4 extra large straight wall fixtures
BB506	Set of 2 supplementary (32.0 mm/34.0 mm) flat fixtures	BB610	Combination of BB Press plus all above fixtures

AMERICAN PERFIT CRYSTAL CORP. 520 EIGHTH AVE. NYC. NY 10018



As A Clockmaker Turns

Arbor Repivoting Simplified
Part 1

J.M. Huckabee,
CMC, FAWI, FBHI

Introduction

This will be a 3-part series on repivoting the arbor of a small clock.

In our trade, a broken pivot is, or seems to be, the most dreaded type of clock repair. Many books discuss the job, but most are not treated with the fine art of the job.

Repivoting is not a difficult task, neither is it time costly. With tools at hand, I can do the job in this series in a half hour.

Special tools are needed and all are lathe accessory tools. They are simple and can be constructed, or purchased. I mostly use shop-built tools.

The movement in Figure 1 is a student practice movement. I'll demonstrate pivot work on each end of the escape wheel arbor, and on one end of the escapement anchor. This will be an example of the most difficult cases.

The Tools and Process

We need a true live cup center to support the job. The brass rod is drilled and cut as a cup center to support the arbor. Study Figures 2, 3, and 4. Observe Figure 4. The drill bit of Figure 3 was larger than the pivot of Figure 4. Therefore, perfect alignment with the lathe collet is unnecessary.

The steady rest of Figure 5 is a suitable tool. Note that axial alignment is not required. And, a simple shop-built steady rest is a suitable tool. The one of Figure 6 is an excellent choice for the job. I will use the tool of Figure 7 for this work. It was also shop-built, looks nice, but no real functional advantage over the previous tools.

From Figure 8, we will drive the work with a "masking tape coupling." This is simple, time-efficient, and excellent in operation. Our job will be to debur the arbor end, locate center, and drill the arbor. This view is ready for our masking tape coupling. Compare illustrations 8 and 9.

Study Figure 10. Compare this to previous illustrations, and note that our arbor is not in perfect alignment with the lathe spindle axis. Our selection of work methods is such that perfect axial alignment is not required.

Debur the arbor end. I use a slow speed disc of abrasive paper to refinish the

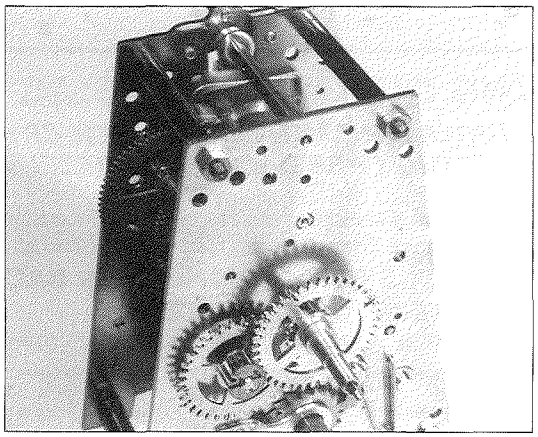


Figure 1. Several pivots of this movement will be deliberately broken and repivoted in this series.

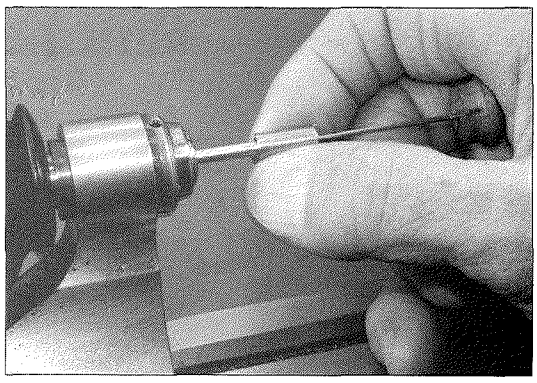


Figure 2. The magic center finder spots center in a piece of brass rod.

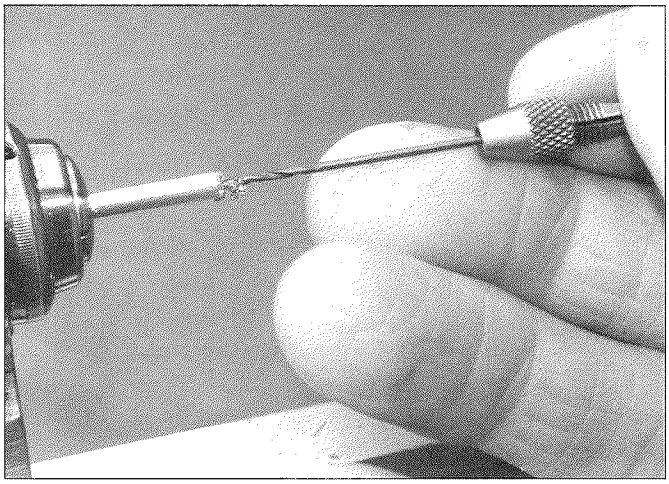


Figure 3. Drill about a quarter-inch deep. Support bit on a fingertip. Cut a cup center.

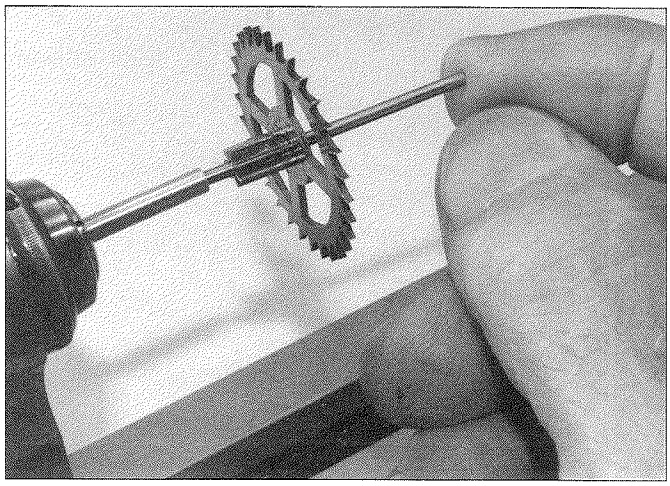


Figure 4. The brass rod now has a cup center. Arbor is supported on its shoulder cone.

arbor end. Use the magic center locater to spot arbor center, and drill your hole about 6 pivot diameters deep. Note the process in Figure 11.

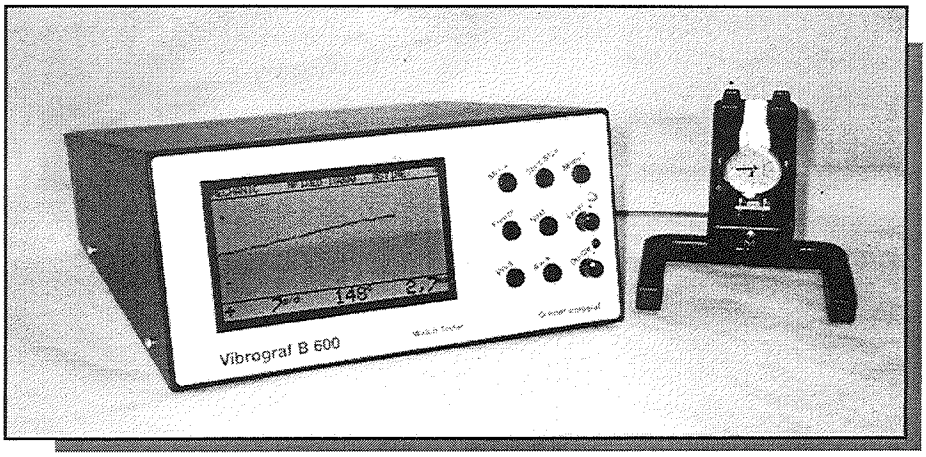
The Drilling Operation

Let us discuss drilling. Many find drilling a very difficult task, yet it is such a simple process. Here are some suggestions.

We will drill about 6-bit diameter deep. First: Test with a fine-cut file; if it cuts, the material will drill with ease. If the arbor is too hard, it must be annealed.

I never hold the bit in a tailstock chuck. Hand-hold the bit in a small lightweight pin vise. Hold the bit lightly so it can slip in the vise jaws in event of a hang up. Use a round pin vise, hold lightly and let it spin in your fingers if the bit binds in its hole. Rest the bit on a fingertip

Vibrograf® – B-600



NEW

- Mechanical Watch Rate Recorder
- Graph Trace on Large Fluorescent Screen
- Numerical Displayed Data
- Amplitude and Scope Function

Trade In Your Old Machine Today

VIBROGRAF USA CORP.

504 Cherry Lane • Floral Park NY 11001 • (516) 437-8700 • FAX (516) 437-8708 • www.vibrografusa.com

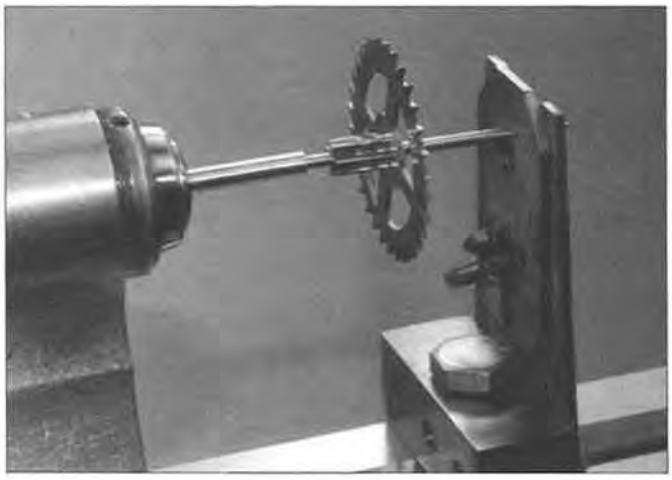


Figure 5. A shop-built steady rest arbor is not required to be in perfect alignment.

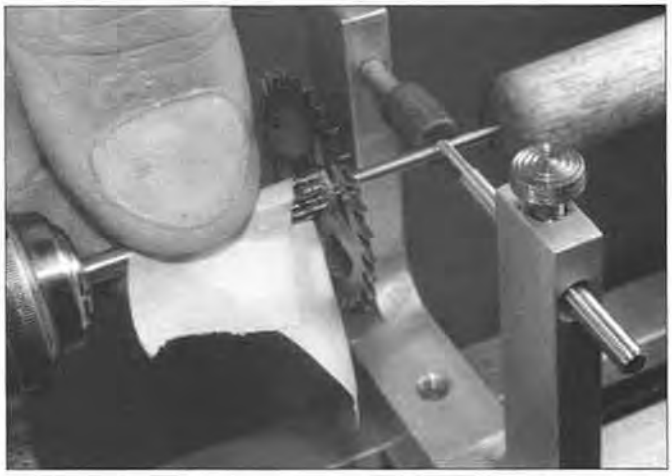


Figure 8. Hold the arbor leftward and pinch a fold of masking tape in place.

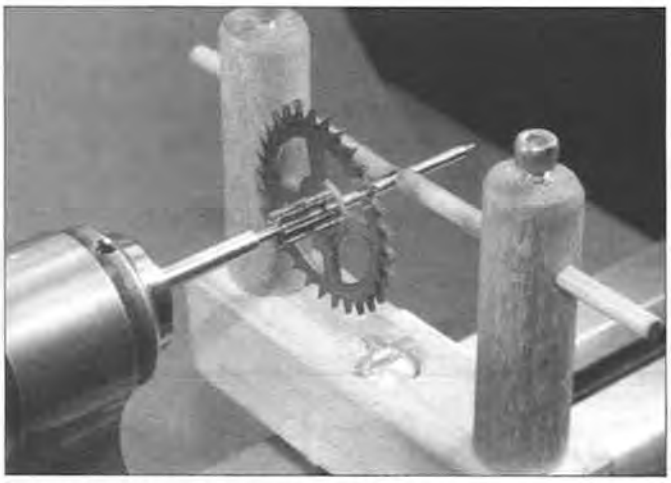


Figure 6. A simple and fully functional steady rest is ideal for repivoting work.

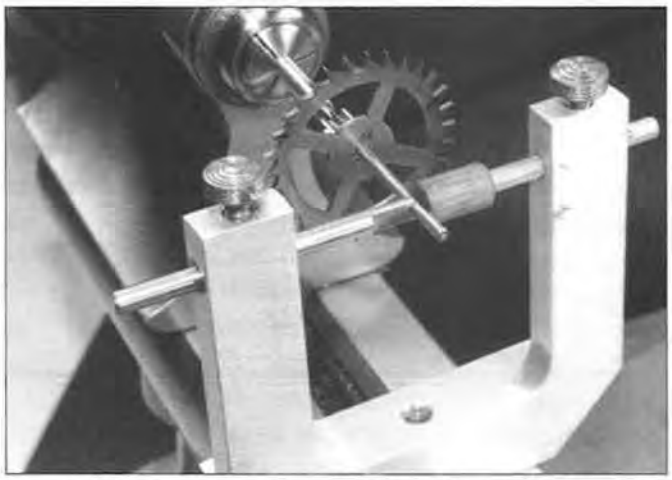


Figure 9. We will repivot the near end of this arbor. A masking tape coupling will be the driver.

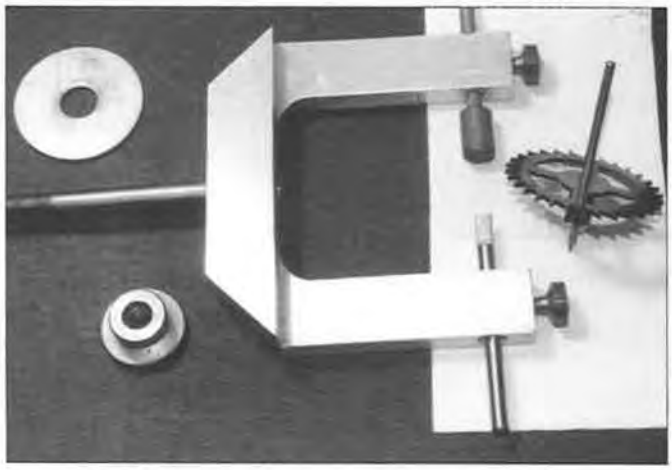


Figure 7. This steady rest will be used to repivot the upper end of this arbor.

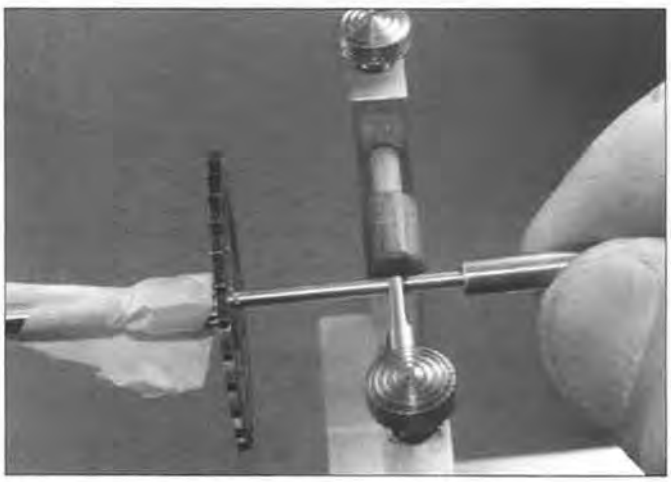


Figure 10. The magic center finder locates our drilling center.

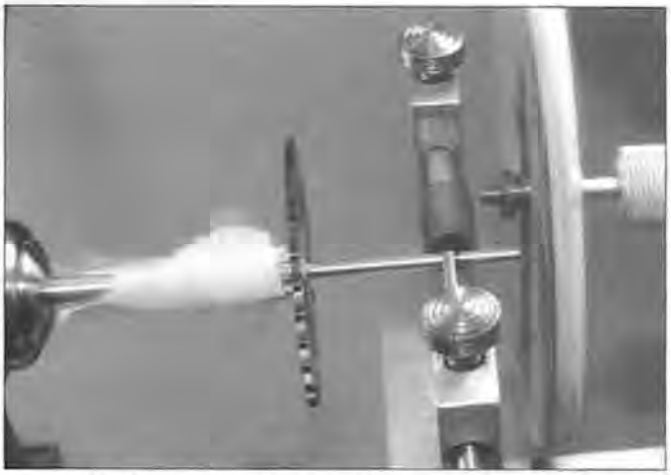


Figure 11. Touch the arbor tip with a fine abrasive before and after drilling.

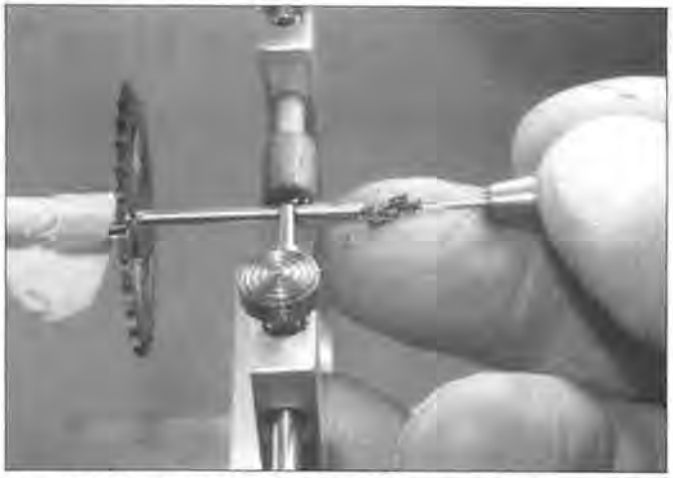


Figure 12. Support the drill bit on a fingertip. Lube and clean chips often.

so you can detect cutting progress, use lubricant, and clean out the cuttings often. Look at the cuttings in Figure 12.

Use light drilling pressure. If the bit does not cut, sharpen it promptly. Hold the bit deep in a pin vise, held with cutting end up and give it a stroke or two with a small, fine stone slip. Stroke away from the cutting edge. The bit in Figure 12 can be sharpened in less than one minute. There is little reason that resharpened bits are not equal-to-new in cutting ability.

A broken bit in an arbor is absolute disaster, and the careful worker rarely ever breaks his bits.

Forward

This is a 3-part series that will teach the ease of an often dreaded job. Keep this article for reference to the next two articles.

SUPER WATCH MATERIAL HOUSE SINCE 1972

FERRELL & CO., INC.

635 Hill Street, #204 Los Angeles, CA 90014

Orders 1-800-523-7534

Information & Inquiries (213) 627-6031

Fax (213) 236-0755

E-mail: ferrellandco@aol.com



TAG Heuer Bezel Inserts
To Fit 980.020R
Blue Silver or Black Silver
$24.99



OMEGA Bezel Inserts
To Fit Seamaster
Blue Silver or Black Silver
$24.99



TAG Heuer Push Buttons
To Fit
Case CG1100 & CA1212
(generic)
$33.00 each

CALL FOR OUR COMPLETE MOVEMENT & BATTERY PRICE LIST

FERRELL & CO. IS NOT AUTHORIZED BY OMEGA or TAG HEUER



Jack Kurdzionak, CW

From the Workshop

You Are Invited

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

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

A Gradoscope, How Does It Work, and Who Needs One Anyway?

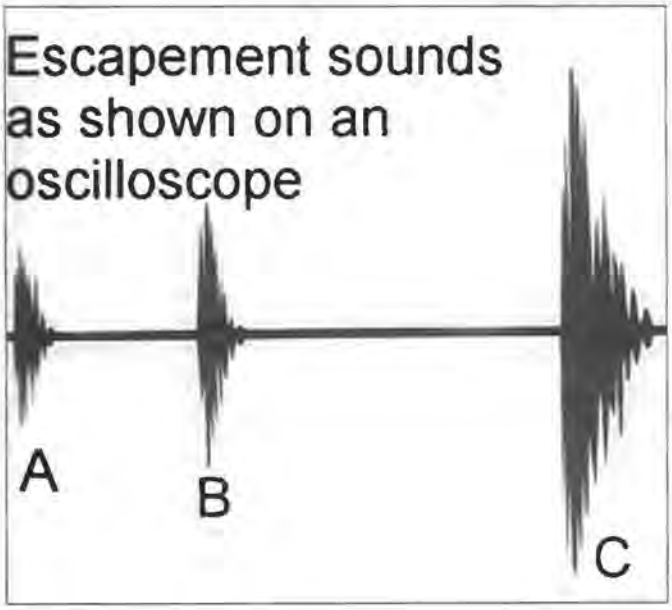
A gradoscope is a testing instrument for watches that graphically and/or digitally displays the amplitude of the balance wheel of a running watch movement in degrees of arc. Early model gradoscopes were sold as stand alone units to accompany watch rate recorders. Today they are just one component of the multifunction watch rate analyzers sold by various manufacturers.

An early watch rate recorder was very similar to a public address system. It utilized a microphone to pick up the escapement sounds in a watch and amplified them so they could be heard with a set of earphones or a small loudspeaker. In addition it recorded the sounds on a moving piece of paper as a graph; displaying the rate and beat error of the watch being tested. The watchmaker interpreted the rate by observing the slope of the graph on the paper. The beat error was estimated by reading the quality of the graph line. For a watch in beat, the time interval between the tick and the tock (entry pallet lock and exit pallet lock) of the escapement is equal. The lines on the graph made by the two sounds are superimposed upon each other, which makes the graph appear as a single line. An out of beat watch has unequal times between tick and tock and the readout will have two lines. The beat error was estimated by observing the separation between the graph lines. Hence, as the beat error increased, the line separation increased proportionately.

Watch rate recorders have changed a lot in the past fifty years. Integrated circuits have replaced the primitive circuitry found in older devices. The LCD displays are now both graphical and digital. The internal time standard is now measured in mega-hertz by a quartz crystal instead of the low frequency of a mechanical tuning fork. Microphones are now automatic and printer attachments are available to make a permanent record of the tests performed. One thing that has not changed is the functions of the escapement being tested by the instrument. Lever escapements make the same set of sounds they did in the nineteenth century. Now, we have the capability to listen to them and interpret them more accurately than ever before.

The microphone listens to the escapement sounds and the circuitry selects the two sounds required to operate the gradoscope function. (Please see the accompanying sketch of these sounds as shown on an oscilloscope) The first sound (A) is the roller jewel striking the pallet fork, the second (B) is the unlocking of the pallet stone and the third (C) is when lock takes place on the opposite stone. The interval

between the first and third sound provides the information for the instrument to display amplitude. The number of degrees the balance moves from the time the roller jewel strikes the pallet fork until the escape wheel locks on the opposite pallet stone (A to C) is the lift angle of the escapement. The briefer the time between these two sounds, the greater the amplitude of the balance wheel. Consider an 18,000 beat train. Over a wide range of amplitude, the balance vibrates five times per second. At an amplitude of 300 degrees, the balance moves at a greater speed to cover that many degrees in the same amount of time as a balance with amplitude of 150 degrees. Therefore, the time interval between points A and C is smaller at high balance speeds than at low balance speeds. The gradoscope records this time interval and displays it on the screen as the amplitude.



If the twentieth century watchmaker was able to function successfully without a gradoscope, why does the twenty-first century watchmaker need one? Last century's watchmaker repaired watches that were generally equipped with two arm balance wheels vibrating at 18,000 beats per hour. The watchmaker with a practiced eye could accurately observe the amplitude of those balances. The amplitude of three and four armed balance wheels, vibrating at the much higher speeds common today, is more difficult to accurately estimate by mere observation with your loupe. Too little or too much amplitude in any position indicates trouble. The balance must have adequate amplitude as well as a close rate for the watch to perform to its full capability. Dependable watch performance requires sufficient balance amplitude.

KRYSWORKS, Inc.

CALL TOLL FREE 1-866-792-5797

M-F 9:00-5:00 EST S 9:00-1:00 EST

UPGRADING FROM MINERAL CRYSTALS TO SAPPHIRE HAS NEVER BEEN EASIER.

SAPPHIRES, MINERALS, DATE MAGNIFIERS, BATTERIES AND MORE!!! PLEASE CALL FOR OUR FREE CATALOG.



ROLEX* FITTING SAPPHIRES

Guaranteed to meet original manufactuer specfication!!!

Item Number	Rolex* Model	Price Per Size
CSR295C	295/C	$25.50
CSR246C	248/C	$29.50
CSR206C	206/C	$22.50

$20 OFF

With a $200 or more order
Offer not valid for battery orders
Offer valid until December 15 2004

Free Ground Shipping

With a $[illegible] order
Offer valid until December 31 2004

SAPPHIRE CRYSTALS

- Vast size selection.
- Strict quality control.
- Sizes fitting **Omega, Tag Huer, Raymond Weil, Gucci** and more*.

AVAILABLE THICKNESS (mm):
0.6, 0.7, 0.8, 0.9, 1.0, 1.2, 1.5, 1.8, 2.0, 2.25, 2.5, 3.0

Thickness	Diameter	Shape	Price Per Size
0.6	18.0 - 25.0	Flat	$15.50
1.0	14.0 - 31.0	Flat	Starts at $6.00
2.0	19.5 - 32.0	Flat	$22.00
0.9	24.0 - 32.0	Dome	$29.50

MORE SIZES AVAILABLE!! CALL FOR FURTHER DETAIL.

MINERAL CRYSTALS

- Available in FLAT and DOME.
- Up to 42mm in diameter.
- Call for wholesale prices.

AVAILABLE THICKNESS (mm):
0.7, 0.8, 0.9, 1.0, 1.2, 1.5, 1.8, 2.0, 2.25, 2.5, 3.0



CRYSTAL PACKAGES

- Up to 40% in savings.
- Complete all-in-one inventory solution.
- Over 20 packages to choose from.

* Krysworks Inc. is not authorized by or affiliated with Rolex, Omega, Tag Huer, Raymond Weil or Gucci.

Finally, watchmakers are repairing watches for which their customers have a much higher level of expectation than they did in the past. Consumers will no longer accept chronometer rated watches that are not operating at their peak performance. They have spent a large amount of money purchasing these fine watches and will pay a commensurate amount to have them ***properly serviced***. The resurgence of the mechanical watch market means future job security for the knowledgeable watchmaker whose shop is properly equipped with up-to-date tools and equipment to service these modern mechanical pieces. A gradoscope is required equipment for the twenty-first century watchmaker.

Bibliography: *The Theory of Horology*, Swiss Federation of Technical Colleges & WOSTEP, no date. *Basic Training*, Witschi Electronic Ltd., 2003.

Jack Kurdzionak

Mainspring Common Sense

In most instances when a watch mainspring has to be replaced, the watchmaker can go to his Bestfit catalog and look up the proper size spring to install in the watch. The task becomes more complicated if the watch manufacturer is unknown or if there are no specifications for width, strength, or length in any available mainspring catalog. In this situation, the usual procedure is to measure the old spring's dimensions and attempt to duplicate them in a replacement spring. Sometimes this yields a satisfactory result and other times it does not. There can be no assurance that the existing old spring was the correct size for the watch. Replacing that spring with another of the same size may only duplicate an old error.

A new spring can be selected by applying some understanding of watch engineering. Mainspring strength can usually be determined by measuring the large diameter of the barrel arbor. That is the part around which the mainspring winds. Try it yourself with any watch you have and you will find that the mainspring's strength is always between 1/28 and 1/32 of the arbor's diameter. For watches with a low jewel count, 1/28 will be appropriate while for a highly jeweled watch, 1/32 will yield good results. A good micrometer, accurate to 1/100 mm is a must to do this job properly. If the barrel arbor measures 5.65 mm, the correct mainspring strength will fall between 0.175 mm and 0.19 mm. A good place to begin would be to try a mainspring with strength of 0.18 mm.

The height of the barrel less the thickness of the barrel bottom, the barrel cover, and a 0.10 mm allowance for clearance will give the correct height. A barrel with an overall height of 2.80 mm, a bottom thickness of 0.3 mm, a cover thickness of 0.2 mm will need a mainspring that is no wider than 2.20 mm. Finally, the correct mainspring length will fill half of the available space in the barrel with the arbor installed. Although this is a difficult measurement to obtain with the customary tools available at the bench, the experienced eye can accurately gauge the appropriate length of an installed mainspring.

Jack Kurdzionak

Broken Pivot Removal

I received a suggestion from a watchmaker about the best way to remove a broken escape wheel pivot stuck in its jewel. Pushing it out with pegwood failed, as did trying to make it stick to a piece of Rodico. Vibrating it in an ultrasonic watch cleaner and touching it with a magnetized needle did not work either. This pivot was mushroomed in the jewel and would not pass through the jewel hole. In this case, the jewel was an easily removed friction jewel that was pushed out of the bridge with a jewelling tool. The jewel with the stuck pivot was immersed in white vinegar for a day or so. The vinegar corroded the steel pivot until its remains could be removed from the jewel hole. The jewel was washed with baking soda to neutralize the acid, and then it was rinsed in water, dried, and re-installed in the bridge.

Jack Kurdzionak

AWCI Directors' E-mail Address Directory

Director	AWCI E-mail Address
Jim Door: President	jdoor@awi-net.org
Dennis Warner: Vice President	dwarner@awi-net.org
Alice Carpenter: Secretary	acarpenter@awi-net.org
Mark Butterworth: Treasurer	mbutterworth@awi-net.org
Mark Baker	mbaker@awi-net.org
Gerald Jaeger	gjaeger@awi-net.org
James Sadilek	jsadilek@awi-net.org
Manuel Yazijian	myazijian@awi-net.org
James Zimmerman	jzimmerman@awi-net.org
Glenn D. Gardner: Affiliate Chapter Director	ggardner@awi-net.org
Doug Thompson: REC Director	dthompson@awi-net.org
Willem Van Kempen: IAB Director	wvankempen@awi-net.org

AWCI Material Search

EDITOR'S NOTE: If you can supply any of the items listed here, please send details to the AWCI Material Search. **Do not send the items to AWCI.** Members requesting these items will be advised of their availability, and will contact you directly.

1V1 Elgin 18 size *up/down indicator* (#2823), *wind up gear, wind up arbor, second intermediate wheel and pinion, indicator wheel, indicator wheel bridge with stud, indicator hand* (#2894), and *18 size dial*

1V2 Waltham Vanguard Serial #34500701, 23 jewel, 16 size, *escape wheel c/c*

1V4 Waltham 17 jewel, PS Bartlett 1892, 18 size, *pallet arbor - single roller* (#1701)

1V6 Pierce 160/22, 16 ligne, *balance wheel* or *complete balance* (#721/?) or *movement complete*

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

The American Watchmakers-Clockmakers Institute maintains this unique member service to assist professionals in replacing hard-to-find parts for vintage timepieces. There is a fee of $10.00 for each search.

The AWCI Material Search first contacts several dozen material houses and outlets on behalf of the member to determine if the missing part is available from any commercial source in the United States or Canada. If the part cannot be found, the search will be listed in the *Horological Times*.

706 S. Hill St., #580
Los Angeles, CA 90014

SMITH SUPPLY HOUSE
LOS ANGELES

Tel: (213) 622-1687
Fax: (213) 488-0922

Watch Materials, Supplies & Tools

Watch Battery Distributor

LOOKING FOR OMEGA PARTS?

DON'T WORRY
WE HAVE THEM AND CAN SUPPLY THEM!



SPEEDMASTER BRACELET
#022ST1171
$89.75



SPEEDMASTER
PROFESSIONAL BEZEL
$69.75



SPEEDMASTER CASE BACK
THE FIRST WATCH
TO LAND ON THE MOON
$99.75

VISA

YOUR SUPPLIER OF SPARE PARTS FOR ALL BRANDS OF
MECHANICAL AND QUARTZ WATCHES, CLOCKS AND ALARMS

JIDA CALL TOLL FREE (800) 23-SMITH

AWCI



Laurie Penman

New Bushing System

Part 4
Using the Tools

The system and tools described in these articles are the subject of five-day classes at Harrison or by local Bench Course, Using the Center Lathe for Clockmaking Tools #1, *during which most of the tools can be made and used. The class is intended to provide instruction and experience in the use of the center lathe and other workshop tools. Please contact Nancy Wellmann at (866) 367-2924, ext. 303. This new system of bushing was designed by Laurie Penman and developed at the AWCI in Harrison.*

The first operation is the marking of a circle that is concentric to the remains of the original hole. The means of achieving this is precisely the same as that used in positioning the hole for drilling the bush diameter; it is a long tapered "finder" that slips into the hole and registers on the original part of the periphery. It sounds exactly the same method as is used in the Bergeon tool, but there the finder is a cone with an included angle of ninety degrees and more. The finder used in this system has an included angle of nine degrees, which allows a much more reliable location on the remains of the original hole (Figure 15).

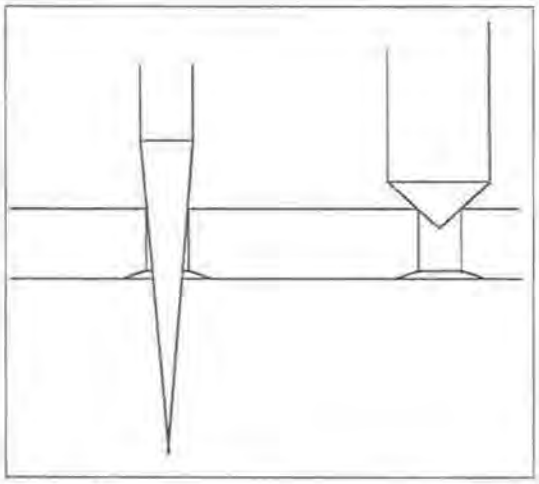


Figure 15

Please note that if the hole is damaged as a result of anything other than wear, it probably will not have any original periphery left. If a previous repairer has punched or filed the hole, the only solution to the problem of finding the original center is to use a depthing tool.

Insert the finder of the marking tool (Figure 16) into the worn hole. Working on the inside surface of the plate is best, the position and the marking will not be affected by the oil cup or chamfer. Press down on the top of the tool and rotate. The finder is located and a circle drawn on the metal by twisting the tool.



Figure 16



Figure 17

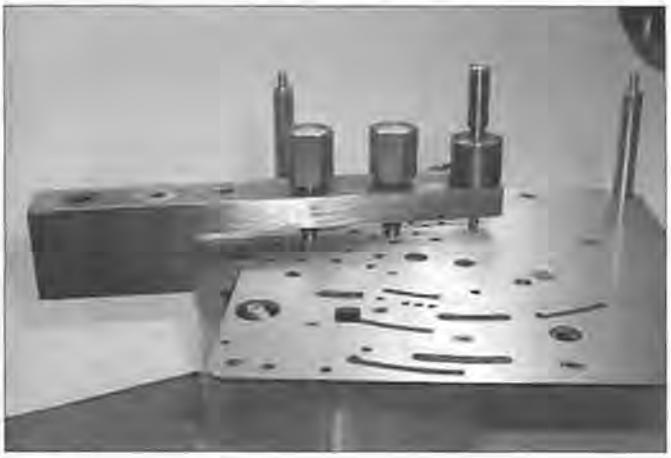


Figure 18



Figure 19

Figure 17 shows the result, the circle may not be perfect (You can see that the scratch mark has double about the five o'clock position.), but this does not present a problem. The eye can still judge very accurately where the original center was.

Now that we have marked the center of the original hole we can go ahead with drilling out the hole ready for a bush or plug to be inserted. If we make any error the marking will inform us of it and we can put matters right without going to the complication of depthing the gears.

It does not really matter on which side the drilling is made, but it may be a little safer to drill from the inside, where the oil cups cannot interfere with the action of the drill. Slide the plate into the throat of the bushing jig and drop the finder down into the hole that is to be bushed (the finder is located in the large steel piece at the

OTTO JULES
FREI&BOREL

126 Second St., Oakland Ca. 94607

Phone 800-772-3456
Fax 800-900-3734
E-Mail info@ofrei.com

QUALITY WATCH & JEWELRY SUPPLIES
FOR GENERATIONS
SINCE 1930

Visit our Web Site
Shop On-Line for over 8,000 items

Address http://www.ofrei.com Go

Request a Horological Parts & Supplies Catalog Today



Watch Repair Tools, Parts and Supplies



Bergeon
5500C
Case & Crystal Press
Reg.$159.00
Sale $144.00



Moebuis 9010
Synt-A-Lube
Reg. $16.50
Sale $12.98

The Best Tools from the Best Companies.
We will work with you to supply you with hard to find tools and supplies.





Just a sample selection of the items on Sale this month. Visit our web site or contact us for a complete list.

Orders Desk 1-800-772-3456 Tech & Info 510-832-0355 Fax 1-800-900-3734



Figure 20



Figure 21



Figure 22

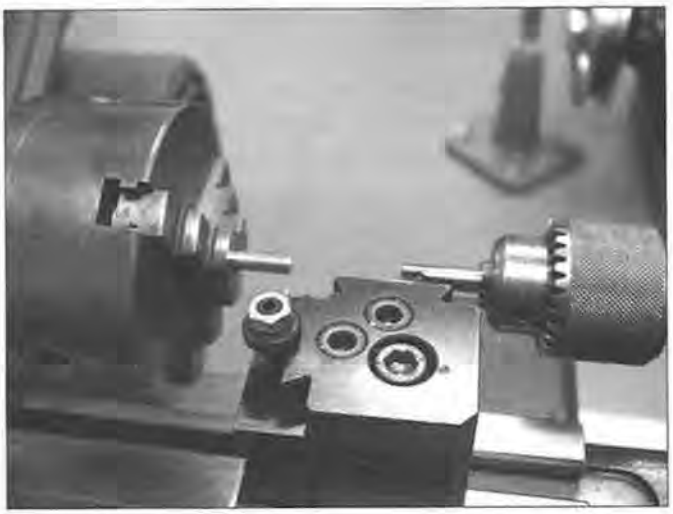


Figure 23

end of the jig in Figure 18). Gently screw the brass locking screws until the plate is held loosely, check that the finder is truly locating in the hole and tighten the screws by hand. There is no need for a spanner that will make marks on the inside of the plate.

The rather poor close-up shot in Figure 19 shows the finder locating truly on the unworn part of the original hole and the worn part protruding to the right. The marking circle can be seen clearly.

Now that the jig has located the original center of the hole to be bushed (or plugged) and the plate is locked in position, the whole thing may be taken to the drilling machine. Set the jig and plate on the drilling table, packing it with parallel pieces of metal so that nothing on the outside of the plate interferes with the table beneath. This will also ensure that when the drill bit is used it will not pass through the plate and damage the drilling table.

Remove the finder and put the drill bit in its place. This drill is a two-fluted bit of tungsten carbide. The drills are not made in a great variety of lengths and, in all probability, the chuck will have to grip the last half inch or so of the stock in order to have enough length to run through the drill bush and make a clean hole in the plate. Figure 20 shows the drill bit in position in the jig and in Figure 21 the jig is on the drilling table with the bit grasped in the drill chuck.

The whole assembly has been clamped to the table by a clamp that does not shift the work as it locks down; accurate location is assisted by the fact that the drill bit has been located in the drilling bush and the drill chuck, before using the clamp. The mark that can be seen on the stock of the bit is the depth that the drill bit may be set into the chuck and still pierce the plate completely.

Even if the hole is badly worn this type of drill should not "kick," but cut smoothly into the metal

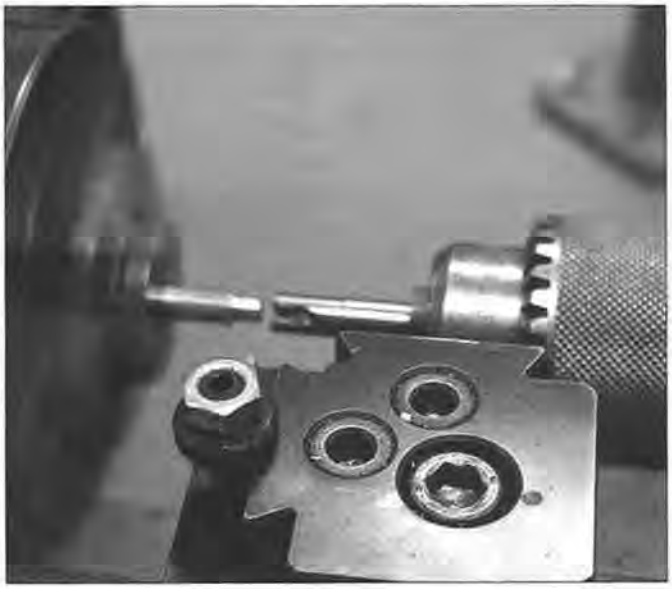


Figure 24

without any great force used on the feed lever. When the job is done remove the jig from the table and undo the locking screws holding the plate. The hole should have a smooth interior and show a slight amount of metal thrown up as burr or fraze on both sides of the plate. Do not remove this burr it will protect the edges of the hole when the bush or plug is inserted. If you remove the burr, the edge or mouth of the hole will round over slightly when the bush is driven in and leave a discernible ring around the entrance when the plate is cleaned up after completion of the bushing process.

A bush needs to be made now. The tool shown in Figure 22 and detailed in last month's article ("New Bushing System, Part 3"), is a hollow mill with a centering bit spring loaded within its body.



Figure 25

S. LaRose, Inc.

The largest and the leading wholesale supplier of horological parts, tools, and supplies in the world!



ADVANCED WATCH BACK CLOSER
Heavy Duty
063049 .....$149.00 ea.

ELGIN O/S SCREWS
034001-02 .....$14.65 dz.



LADIES SWEEP SECONDS HANDS
100 assorted
01-8021Y - yellow .....$4.95 asst.
01-8021N - nickel .....$4.95 asst.

CLOCK STAKING SET
061102 .....$39.95 set





WALTHAM BALANCE
034001-01 .....$39.95 ea.

PALLET STONES FOR 37 SIZE WALTHAM
039305 .....$11.45 set



Tools • Books and Supplies
Clock Material • Crystal Fitting Service
American/Swiss Watch Material
Mainspring Fitting Service • Clock/Watch Movements
Name Brand Grandfather Clocks

Customer Service Center open 7am - 6pm M- F, 8:30am - 12:30pm Sat., to better serve you!

3223 Yanceyville St. Greensboro, N.C. 27405
Phone: 1-888-752-7673 • Fax: 1-800-537-4513 • www.slarose.com



Figure 26

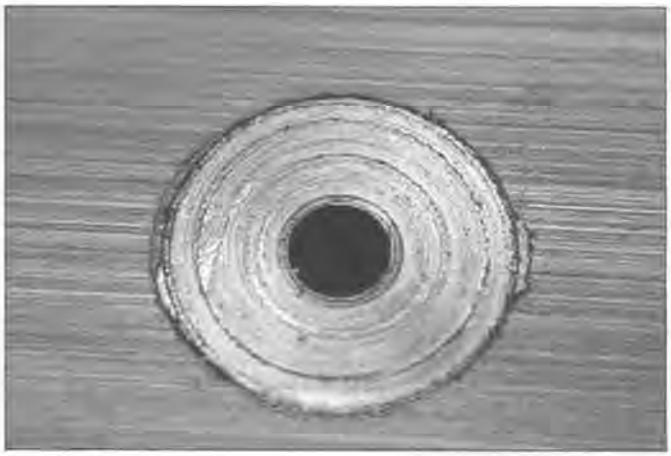


Figure 27

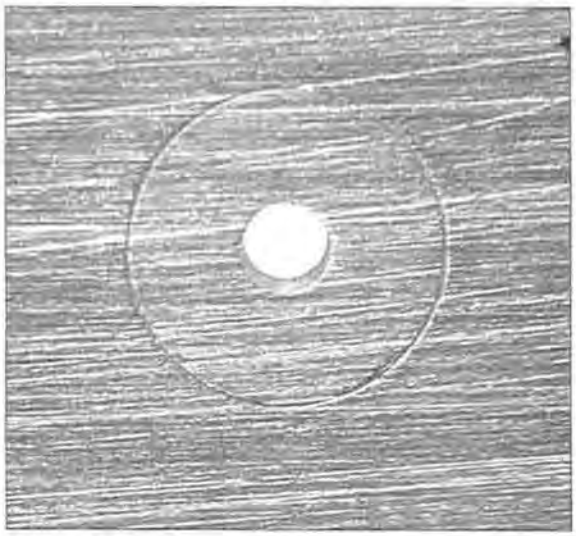


Figure 28

There are three cutting blades on this particular one, because it produced a sturdier tool and I was able to use a milling machine to cut the flutes. However, if you have to cut them by hand, four flutes are much more convenient. Each blade cuts on the end face, there is a bore inside which becomes greater by about 0.015" after about a sixteenth of an inch. As a consequence when the tool is put into the tailstock chuck (Figure 23), a piece of brass rod a little larger in diameter (a sixteenth or so), placed in the lathe chuck and the two brought together when the chuck is spinning, the tool will produce a short length of a fixed diameter—the diameter of its inside bore.

The diameter of the brass plug is not precisely the same as the inside of the hollow mill of course, there is a certain amount lost to rubbing as the tool cuts. This hollow mill has been sized to make a plug 0.003" to 0.004" larger in diameter than the hole that has been drilled in the plate (Figure 24). It will therefore be a force fit in the plate. The spring-loaded point, which is a triangular pyramid in form, makes a dimple that is dead center. This locates the pivot drill when the plug has been installed in the plate. Note that the diameter of the turned plug will vary slightly according to the speed of feeding the tool over the brass rod. The rate of cutting should not feel too robust, just a nice easy turning feed.

The brass that has been turned by the hollow mill is now parted off the rod and will be a few thousandths of an inch longer than the thickness of the plate; 0.010" is usually sufficient to ensure that it protrudes on both sides and can be filed flush without scratching the surface of the plate (Figure 25).

The plug is inserted with another simple tool (Figure 26), which is basically a flat-ended punch sliding in a brass tube. The bore of the tube is larger than the plug that has been machined and is slipped over it in use. The punch is held down on the plug and by sliding the tube about, the plug can be located in the mouth of the hole drilled in the plate.

A light tap with a one-pound hammer drives it into the hole. To ensure that it protrudes from the bottom slightly, the plate is rested on hard wood. The end of the punch is polished so that it does not mark the plate. Figure 27 shows the plug after being forced home and after having the pivot hole drilled, notice the fraze or burr around the periphery. The bush will be practically invisible when it is filed flush with the plate using a properly prepared file and then polished with emery paper. A properly prepared file is one that has had the teeth polished away from the first inch of its length and all four edges polished too. This makes it difficult to scratch the surface of the plate. But it must be kept clean, of course, and the surface scanned between strokes. Although the mark of the bush outside diameter is clear in this photograph, it is hard to see in real life.

BULLETIN BOARD

NEW REQUESTS

Pocket Watch Crowns
Robert Mohr, Manhattan, KS, is looking for a source for pocket watch crowns for 18 size pocket watches (9.75 mm opening, 10.50 mm diameter), any tap or color.

Levin's Pivot Polisher & Straightener
George Davis, Richland, WA, is looking for a copy of the parts list and user manual for Levin's pivot polisher & straightener Cat.# P500.

ITEMS STILL NEEDED

Swartchild Friction Jewel Assortment #49004JF
David Pierce, Gambier, OH, is seeking a copy of a chart for the Swartchild friction jewel assortment #49004JF.

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

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

Case Openers



L-G "OPENALL" WATERPROOF CASE WRENCH

Designed to open Rolex Oyster® cases. The six tempered rings will fit every existing size and because they are precision-made to interlock, they will not slip. The built-in adjustable case holder fits all size watches. The L-G "Openall" can also be used in conjunction with the L-G wrench. Ring sizes are 18.5, 20.2, 22.5, 26.5, 28.3 and 29.5mm.

CWR-650.00 Openall Case Wrench.....$69.25
CWR-655.00 Openall Case Wrench w/ Base $77.30



L-G MASTER CASE OPENER

Opens all sizes and shapes of waterproof cases. Comes with four sets of pins for case backs with notches, holes, knurled or polygon. Because of the L-G patented closing system, backs can be unscrewed without being scratched. Pins and accessories also available. 5-1/2" in length. USA made.

CWR-600.00.....$44.95

New Location
Primrose Supplies Inc.
1450 S. Main St. • Salt Lake City, UT • 84115
877-296-1025 • Fax: 877-296-1038
www.info@primrosesupplies.com



New – New – New
Insurance for Your Watch & Clock Inventory!

AWCI has partnered with Intercorp, Inc., to offer a Horologics Insurance Program for Dealers and Collectors .

- *Coverage for your inventory on premises or stored in a bank vault, at shows and expositions, and in transit.*
- *State-of-the-art online program (www.shipandinsure.com) provides coverage for package shipments via Federal Express, United Parcel, and the Postal Service. Discounts on shipping rates up to 40% when you use FedEx.*

No two dealers or collectors are alike, so coverage can be tailored to your specific needs.

For more information, call Intercorp at 800.640.7601, or download the application form from the AWCI web site at www.awi-net.org.

intercorp INC.
Insurance Program Managers

1438-F West Main Street, Ephrata, PA 17522-1345 • Phone: 717.721.3500 • Fax: 717.721.3515



Glenn D. Gardner, CMW

Affiliate Chapter Report

Watchmaking has evolved tremendously over the last 35 years. The basic repair has even changed. Early after I started watch repair in 1969, the rage was how many you could do using the new Duo-Lube or One Step. You had to produce more repairs at less profit so thus the need for speed. This did not stop the high-grade watches being done differently because you could receive more money for those types of repairs. The repairs, like life, have come a full swing around. Now high quality watch repair is of a premium. The companies are requiring it, as is the consumer.

In my learning process over the years, I don't know how I would have survived without my father, also a watchmaker, and other fellow watchmakers I have met through the years. My association with the local Madison Area Watchmakers Guild, Wisconsin Horological Society, and AWCI played a vital role in my education. The point I am making is that less than 10% of AWCI members are affiliated with a chapter in their area. I believe that before the Chronometer Club a good percentage of AWCI members didn't have contact with other watchmakers in their areas. Books are great for learning but I feel there is no better place to get first-hand knowledge and experience than from another who has been where you are coming from. I realize in many areas the distance has a lot to do with traveling to meetings. Thus the Chronometer Club was formed. One of the successes of the Chronometer Club has been the e-mail group. AWCImatters has also accomplished that. With the new website at AWCI, each chapter will be able to communicate with other chapters more easily. You should belong to AWCImatters if you want to keep up with what's happening in your organization. Lately affiliate chapters are posting their convention information as to when, where and what programs they are making available on AWCImatters.

I was just appointed membership chairman and I hope to enlist all the affiliate chapters to push hard on getting their members to join AWCI. With all of your help in getting the word out about all the new benefits AWCI has, we can reach more people to convince them that they need to be a member.

I am getting more newsletters and next month I will tell you what's happening in some of the groups. Contact Donna Baas at dbaas@awi-net.org if you would like to put pictures and an article about your meeting in the *Horological Times*.

SUPPORT YOUR LOCAL AFFILIATE CHAPTER

For information on forming a new chapter, call 1-866-367-2924, ext. 304

AWCI Pocket Watch Class St. Louis, MO

Robert Porter, CMW

AWCI instructor Alice Carpenter presented a two-day class on servicing pocket watches to an enthusiastic group in the Hazelwood Civic Center located in St. Louis, county, Missouri on May 7th & 8th, 2004. The participants were taught how to disassemble, clean, repair, lubricate, and time American pocket watches.



Standing, left to right: Dwayne Peters, Alice Carpenter, Gene Bertram, Terry Biegert, John Buehrer, and Mark Woodson. Sitting: Paul Crnic, and Jeffrey Smith.



Gene Bertram, Terry Biegert, and Dwayne Peters.



Overview of the activity at the bench.



Alice Carpenter demonstrates a repair procedure to Terry Biegert.

American Watchmakers-Clockmakers Institute

is now offering to members Health & Benefits Solution Programs

Utilize the buying power of AWCI

- Health Insurance-Individual & Group
- Long-Term Care Insurance-up to 15% Savings
- Life Insurance-up to 30% Savings
- Disability Income
- Critical Illness
- Cancer Policy & Accident Policy

Plans not available in all states. Plans may vary by state.

Receive enhanced insurance benefits for yourself, your family, or your employees (both full and part-time)!

Contact us now for a free consultation:

AWCI Health & Benefit Solutions Programs

6319 W. 110th Street Overland Park, KS 66211

call us at **888-450-3040** or **913-341-2868**

or visit us at **www.associationpros.com** Search 'AWI'

or email us at **help @associationpros.com**

AWCI Member Websites

- **Have you always wanted a website for your business, or are you unhappy with your current website?**
- **Do you feel that your business needs more exposure to your customers?**
- **Do you want a website, but don't know where to start, and assume it would be a costly venture?**
- **Do you just not have the time to mess with it?**

Go to

awci.companysitecreator.com

AWCI and Companysitecreator have worked together to offer an opportunity to all members!

It literally takes just a few minutes to build your new site in 5 simple steps from start to finish.

Two packages are offered ($8.95 per month or $18.95 per month), and you are able to see your site before you decide to purchase.

New Members

Alabama
Mullendore, Donna—Oxford, AL*

Arizona
Gref, Tom—Tucson, AZ*

California
Chau Yuan—El Monte, CA*

Florida
Leitao, Julian—Tampa, FL

Georgia
Jae Yung Oh—Savannah, GA*

Hawaii
Hijiri Hirai, Jerry—Kahului, HI*

Idaho
Vasquez, Margaret—Coeur D Alene, ID

Illinois
Taylor, Donil—Aurora, IL

Indiana
Pursel, Dennis B.—Munster, IN

Michigan
Stopczy, David—Warren, MI

Nevada
Ward, Randolph—Las Vegas, NV

New Jersey
Hickey, John—Bergenfield, NJ

North Carolina
Gallino, Alberto J.—Raleigh, NC

Ohio
Pirrmann, Chris—Cincinnati, OH*

Oklahoma
Shelnut, Russell L.—Okmulgee, OK

Pennsylvania
De Lucca, Kenneth P.—Millersville, PA
Forman, Bruce R.—Bethlehem, PA*

Washington
Morales, Jonathan—Lacey, WA
Schultz, John—Seattle, WA

***AWCI welcomes back these individuals who have chosen to re-instate their membership.**



CHRONOS
IF YOU LOVE WATCHES, YOU'LL LOVE CHRONOS

❑ $22.50 – One Year
❑ $42.00 – Two Years
❑ $60.00 – Three Years
Foreign subscribers add $10 per year. (U.S. Funds drawn from U.S. bank only)
❑ Check or money order enclosed
❑ Charge my Visa or MasterCard
Card No. _____
Exp. Date _____
Signature _____
Phone _____
Name _____
Address _____
City _____ State _____
Zip _____ Country _____
Company Name _____
Type of Business _____

Chronos Magazine is published 6 times per year for the connoisseur of luxury timepieces. Each issue presents the finest watches and clocks of today as well as exploring premier vintage collections.



WCR
Watch & Clock Review
THE INDUSTRRY'S MOST-USED PUBLICATION

❑ $19.50 – One Year
❑ $35.00 – Two Years
❑ $50.00 – Three Years
Foreign subscribers add $10 per year. (U.S. Funds drawn from U.S. bank only)
❑ Check or money order enclosed
❑ Charge my Visa or MasterCard
Card No. _____
Exp. Date _____
Signature _____
Phone _____
Name _____
Address _____
City _____ State _____
Zip _____ Country _____
Company Name _____
Type of Business _____

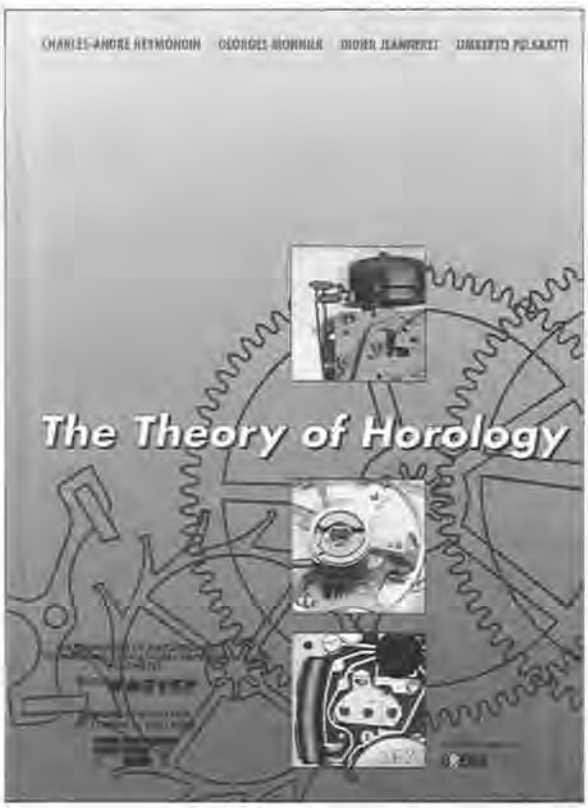
Watch & Clock Review is published 10 times per year and is the industry's most-used publication–the only one in North America devoted to watches and clocks. Get the one convenient source of industry news features including eight annual directory issues.

SEND TO : SUBSCRIPTION DEPARTMENT 2403 CHAMPA ST. DENVER, CO 80205 CALL US AT 303.296.1600

Book Review

Manuel Yazijian, CMW

Editor's Note: This book review was first printed in the August 2002 issue of Horological Times. *It is reprinted this month to announce the availability of a limited number of copies of* The Theory of Horology *through AWCI. Please see the ad on page 41.)*



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

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

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

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

The book commences with the beginnings of time measurement from the Stonehenge era, the use of stars and planets as reference points all the way to our present day horological complications. *Theory of Horology* contains examples and line drawings of simple mechanical wristwatches to self-winding, tourbillions, perpetual calendars, moon phases, and repeaters, to French, German, Swiss striking and Atmos clocks. It also explains in detail most of the well-known types of escapements for watches and clocks. It describes among many others, watch jewel manufacturing, electroplating of movement parts, different types of watchcases, and the effects of bodily salts on bracelet rivets. It reminded me of our science books from my school days in 1980s with all the colorful diagrams, using clear wording.

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

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

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

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

The Theory of Horology

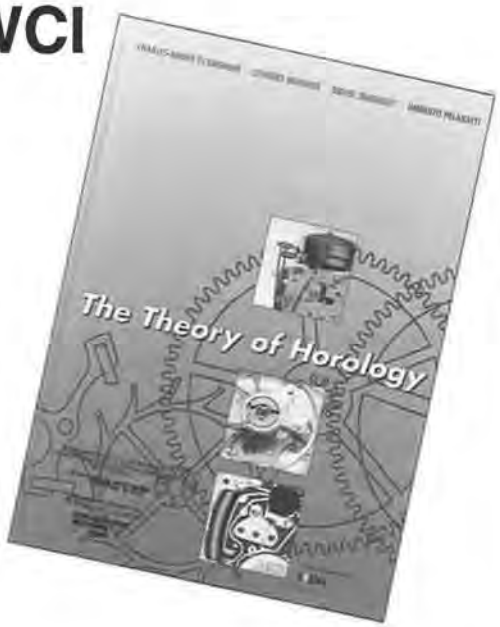
NOW AVAILABLE FROM AWCI

Limited number of copies available

Place your order now!

Call 1-866-367-2924 ext. 301
or e-mail: hweaver@awi-net.org

Retail: $149.95
AWCI Members: $134.95





Payment processing tailored to your needs,
a partnership with AWCI,
and reduced rates just for members.

And you thought your timepieces were reliable.

First National Merchant Solutions can provide your business with an affordable way to accept credit and debit payments, convert checks to instant cash, and receive payments over the internet. Just some of the ways we can help you grow your business...find out more today.

800-354-3988 **www.membersales.com/awci-net**

AWCI

First National
Merchant Solutions

2004 Hong Kong Watch & Clock Fair

Buyers increased almost 10% at this year's Hong Kong Watch & Clock Fair 2004, held September 1- 5, and industry players expect a promising market outlook for the year ahead. The fair attracted a total of 16,584 buyers from 102 countries and regions, up 9.56% from the previous year.

According to the fair organizer, the Hong Kong Trade Development Council (TDC), 6,733 buyers came from outside Hong Kong, an increase of 14.7% over last year. Buyers also placed more orders with extra quantities.

Independently audited by the Society of the Voluntary Control of Fair and Exhibition Statistics of Germany (FKM), buyer attendance of the five-day event was as follows:

- From Hong Kong – 9,851, up 6.3%
- From the Chinese mainland – 1,964, a 31.9% growth
- From Europe – 1,018, a 13.1% increase
- From the US - 506, up 5.0%
- Top 10 visiting countries/regions (excluding Hong Kong) were the Chinese mainland, Japan, US, Taiwan, Korea, India, Malaysia, Thailand, Singapore and Germany.

TDC commissioned Oracle, an independent market research company, to conduct a survey on market trends during the fair period. A total of 410 exhibitors and 703 buyers participated in the survey.

Compared with last year, both exhibitors and buyers were more optimistic about general market prospects. Some 65% of exhibitors and 58% of buyers believed that the fourth quarter would be better or slightly better than that of 2003. In last year's survey, the figures were 44% and 48% respectively.

Half of the exhibitors and buyers anticipated the Chinese mainland would have the biggest growth rate in the retail market (about 20%), followed by Western Europe (16%) and the US (15%).



Guest of honor, Secretary for Commerce, Industry and Technology, Mr. John Tsang (center), accompanied by TDC Executive Director, Mr. Fred Lam (right), touring around the fairground and showing interest in a collection of stylish watches offered by a local exhibitor (left).

Major findings of the survey:

- 65% of exhibitors and 64% of buyers expect a better market outlook in 2005
- Buyers expect a shorter product lifecycle for watches (average 9 months) than clocks (average 14 months)
- Among buyers who source branded timepieces, 68% of them are sourcing Hong Kong brands or considering to do so. They found Hong Kong brands are value for money, with high product quality and good design.
- 55% of the buyers have placed more orders and 51% of them said quantity per order was higher in 2004 as compared to 2003.

Jointly organized by the Trade Development Council, the Hong Kong Watch Manufacturers Association Limited and the Federation of Hong Kong Watch Trades and Industries Limited, the next fair is scheduled for September 7-11, 2005 at the Hong Kong Exhibition and Convention Center.

JA Publishes 2004 *Cost of Doing Business Survey*

Jewelers of America (JA) recently released the 2004 edition of its *Cost of Doing Business Survey,* co-produced with *Professional Jeweler* magazine. The survey found that JA members increased their annual sales in 2003, a turnaround from the flat sales numbers of the two previous years.

The survey's respondents overall reported an increase of 4.4% in sales in 2003. Chain stores benefited with the largest growth, a 10% jump in sales from the year before. However, sales also surged for independent high-end and independent mid-range retailers, with 6.7% and 4.1% respectively. JA members who categorize themselves as designer/artist/custom stores experienced a slight 1.5% bump in sales for the year. This marks the first time since 2000 that overall respondents enjoyed sales growth, and the first time since 1999 that respondents in all four survey categories reported growth.

"We are delighted that JA members are now enjoying sales growth after hanging tough for two years during the economic downturn," says JA President and CEO Matthew A. Runci.

In 2003, the median profitability of survey respondents rose to 4.5%, up from 4.2% the preceding year; designer/artist/custom stores led the way with 11.7%. However, gross margins fell slightly from 49% in 2002 to 48.8% in 2003. Independent mid-range retailers had the highest gross margins with 50.1%, followed by chain stores with 49.2%.

Of those surveyed, 57% said they use the Internet as part of their overall business strategy, compared to 47% who said the same thing in 2002. The increase came mainly from jewelry retailers who are using the Internet strictly for promotional purposes. The number of jewelers using the Internet for both promotion and e-commerce transactions remained relatively steady at 19% of overall respondents. Twenty-two percent of all those surveyed said they have not yet incorporated the Internet into their business plan, but will do so in the near future.

The *Cost of Doing Business Survey,* which looks at many key performance measures and includes an informative "how to" section to help readers interpret and best utilize the statistics, allows retail jewelers to evaluate and compare their stores' financial performances to others in the industry. By reading and analyzing the report's comprehensive financial information, retail jewelers can better understand the state of the jewelry industry and put that knowledge to use in running their businesses.



The new 2004 edition of the study, featuring financial data compiled from 2003, is now available for purchase. The *Cost of Doing Business Survey* is available to JA members for $19.95, and to non-members for $125. The survey can be ordered by calling Jewelers of America at 800-223-0673 or by visiting JA online at www.jewelers.org.

CLOCKS
The International Magazine for Clock Collectors & Restorers



REPAIR
RESTORATION
CLOCKMAKING
LAURIE
PENMAN
... and much much more

All this every month at a bargain price for AWI members: $65 (normal price $79) for the first year's subscription. Just fill in the form below and send it, along with a US$ check made out to 'Splat Publishing Ltd', to Clocks Magazine, Elizabeth House, Royal Elizabeth Yard, Dalmeny EH29 9EN, UK. Tel/fax: 044 131 331 3200. Email: subscriptions@clocksmagazine.com.

First name ..... Last name ..... AWI № .....

Address .....

.....

..... Zipcode ..... Country .....

Telephone № ..... Email address .....@.....

Classified Advertising

Regulations & Rates

Ads are payable in advance 90¢ per word, $1.00 per word in **bold** type. Classified display ads are $40.00 per column inch, 2¼" wide. Ads are not commissionable or discountable. The publisher may, at the publisher's sole discretion and for any reason and without notice, decline to publish or republish any ad, in which case any fees submitted or paid for such ads shall be returned or rebated to the advertiser. The publisher reserves the right to edit all copy. Price lists of services will not be accepted. Confidential ads are $10.00 additional for postage and handling. The first of the month is issue date. Copy must be received 30 days in advance (January issue closes for copy on December 1st).

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

TRADESMAN

POCKET WATCH & MARINE CHRONOMETER REPAIR
General repair and restoration of antique and complicated watches. Custom parts fabrication including staffs, verge staffs, stems, levers, and springs. Located in Massachusetts. Matt Henning, CW (413) 549-1950; www.henningwatches.com

DIAL REFINISHING



BEFORE AFTER

Quartz Conversions
Diamond Dial Conversions
Emblem & Name Personalization

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

WATCH WHEEL REPIVOTING
Parts custom made. Philip Stoller, CW
(602) 293-3165, pstoller@mailstation.com

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

WATCH REPAIR
Most brands. 30 years experience. Fast turnaround. Central State Watch Services, 4820 W. 24th St., Lawrence, KS 66047 (785) 749-4632, sevenstar80@hotmail.com

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

VERGE & LEVER FUSEE RESTORATIONS
40 Years Experience
Barry J. Carter
(250) 216-0791
bcarter@vergeworks.net

Rolex Certified Watchmaker
30 years experience. Genuine materials. Vintage Rolex service. Also repair & restoration of repeaters, fusee, all pocket watches, chronometers, complications, Atmos clock service, replating cases in 40 microns gold, convert to rose gold color, any case. G C A La Precision, 3830 Parkland Dr., Fairfax, VA 22033; Telephone: 703-627-4054; Fax: 703-352-8077; Safe Registered Mail; E-mail: alaverolex@aol.com

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

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

VINTAGE POCKET WATCH RESTORATION. Twenty-eight years experience, guarantee, free estimates. The Escapement, P.O. Box 522, Pooler, GA 31322; (912) 330-0866

CUT YOUR OWN WATCH GASKETS
Never order another useless assortment. Seal screw backs and snap backs while your customer waits. Visit our web site: dandsgasketcutter.com or e-mail: timeout24@juno.com for more information or call 713-661-6909. We also repair all types of watches & clocks.

MORGAN PIVOT POLISHER
POLISH PIVOTS IN AS LITTLE AS 5-7 SEC.
FITS SHERLINE, MOST WATCHMAKERS & ENGINE LATHES
MORGAN CLOCK CO.
800-805-2220 9-5 CST
MORGANPIVOTPOLISHER.COM



ATMOS
Service & Repair
• 2-year Warranty on Labor & Parts
Fast Turnaround • Best Price • Best Bet
CLOCKMASTER, INC.
2537 S. Brentwood St. Louis, MO 63144
(314) 968-1010
Toll Free 800-837-1545

ELECTRONIC INSTRUMENT SERVICE
We are Factory Authorized Service for:
• **VIBROGRAF & PORTESCAP**
• **TICK-O-PRINT & L&R**
We service all makes of ultrasonics, all makes of watch rate recorders, and related equipment. 25 years experience.
190 Deepstone Drive San Rafael, CA 94903
Used Equipment Bought & Sold
VISA **For Information** MasterCard
(415) 453-9266

ATMOS by Jaeger-LeCoultre
Completely overhauled with the longest labor warranty on the planet!
Five years on all labor!
Mike's Clock Clinic
Established in 1982 & devoted exclusively to the Atmos since 1990.
I also overhaul 400-day clocks.
Please call **877-286-6762**
http://www.atmos-man.com/atmos.html

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

DENNIS KAYE
108 Corgy Drive • Cary, NC 27513
888-363-9510
Porcelain Dial Restoration
Watch • Pocket Watch • Clock
Platform Escapement Repair
Atmos Parts & Service
400-Day Clock Repair
Kundo Coil/Electric Clock Service
Prompt Reliable Service . . . Guaranteed
Call Us or Visit dialrepair.com

TRADE WATCH REPAIR
Free Estimates - Fast Service - Call 214-551-9227 or E-mail: watchmakermike@aol.com Also need old jewel lever watches and watchmaker tools.

EXPERIENCED WATCHMAKERS
In business since 1936. Trade watch repair shop located in Scranton, PA. We also carry a wide variety of watch material, tools and supplies. Call for a price list. (570) 342-9442 or check out our vintage watches at www.empirewatch.net

CLOCK GEARS, BARRELS and **PINIONS** made from your sample, **ARBORS** re-pivoted, teeth replaced in gears or barrels. All work guaranteed, fair prices fast turn around. Call Mike Loebbaka, 86 Mullens Lane, Saugerties, NY 12477; Phone: 800-411-4542, tictoc@oldandnew.com

ARTICLES FOR SALE

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

Clockmaking & Modelmaking Books, Videos & DVDs by W. R. Smith, 8049 Camberley Drive, Powell, TN 37849. Phone 865-947-9671; E-mail: WRSmith2@aol.com

ASSORTED WATCH PARTS FOR SALE
Can e-mail or snail mail 22 page list. Inquire at: WatchPartsOnly@aol.com

Regula and H. Herr cuckoo movements. Complete selection. Also factory stopper new Hermle, Urgos, and Kieninger at 60% OFF our regular wholesale prices. Call Butterworth 1-800-258-5418.

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



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

National Clock Shop Directory
FREE LISTING
Findclockshops.com **FindClockRepair.com**
clockshopdirectory.com
~ Clock Shops ~ Factory Authorized Service Centers ~

eckcells
Your battery connection, and more...
379 Main Street
Stoneham, MA 02180

REPAIR KIT FOR THE ETA 976.001
- Contains 50 assorted genuine ETA spare parts for servicing this movement
- Circuit, stems, insulators, all wheels, screws, cells, etc. supplied in a refillable, partitioned container. Refills available

Separately, these parts would cost more than $200
YOUR COST FOR COMPLETE KIT...$65!
(800) 514-1270
Terry Kurdzionak, member AWCI

WITSCHI Q-TEST 6000
Used very little, excellent condition. (602) 293-3165

SHERLINE PRODUCTS
Free catalogs upon request
Limited Supply on Hand
of Accessories at Old Prices
Starrett Collets Now Available
ANTIQUE CLOCKWORKS, LTD.
P.O. Box 201, Loretto, MN 55357
Toll Free 877-643-7698
E-mail: info@AntiqueClockworksLtd.com
www.AntiqueClockworksLtd.com

Watch Repair Tools & Supplies
Clock Repair Tools & Supplies...
for American and European clocks of all types!
Horological Repair and Refernce Books
Browse through our inventory and order on-line 24-hours a day! ...
www.merritts.com
Our full color, 193 page #2004 Catalog of repair supplies, tools and books is now available. Call or write for a copy today! ...$3.00 postpd.
MERRITT'S CLOCK & WATCH REPAIR SUPPLY DEPARTMENT
1860 Weavertown Rd,
Douglassville, PA 19518
610-689-9541 FAX: 610-689-0587

www.eternaltools.com
New website!
Free shipping and buy in $US

FULLY WARRANTEED
Watch Timers & Cleaners



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

Rolex movements early models; Dynatron ESA movement Y29154 UC ATO, new condition; English fusee pocket watch chains; obsolete Swiss movements all calibers; Valjoux Chrono 7750 new movements; English Rutheram pocket watch parts; Swiss automatic movements all calibers; ST 69.21 movements (cheap); balance completes for most Swiss calibers. Fax or Call Precision Watch Co. Ltd. Auckland, New Zealand Fax: 011 649 827 5709 or PH: 011 649 827 5709.

TEC Specialties
Fine dials and labels



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

ARTICLES FOR SALE

DASHTO INC./TOM MISTER
PO Box 61894
Virginia Beach, VA 23466
http://www.dashto.com
Huge and everchanging selection
Used and new horological items
Sold by internet list only
TOOLS/EQUIPMENT
MATERIAL ASSTS/PARTS
POCKET/WRISTWATCHES
WATCH MOVEMENTS
WATCH CASES & DIALS
WATCH BRACELETS/BUCKLES
MUCH MORE
WE BUY & TRADE ALSO
tom@dashto.com
http://dashto.org

BUSINESS FOR SALE

Well respected clock shop, near Princeton, NJ and Bucks Cty, PA area for sale. Includes investment grade rental property, shop & classically appointed, 15-year-old, 2-bedroom, one level home. Hardwood floors, cathedral ceiling, and fireplace. Adjacent to Delaware & Raritan canal, Washington Crossing State Park and overlooking Delaware River. $849.900, excluding inventory & tools. Call Sarah Major @ Weidel Realtors 609-737-1500.

SITUATIONS WANTED

25-year professional watchmaker seeking employment. Experience includes Cartier and Chelsea Clocks. Please reply to: *Horological Times*, Box SW404, 701 Enterprise Drive, Harrison, OH 45030.

WANTED TO BUY

ATTENTION RETIRED WATCHMAKERS
Call us before you sell your parts, tools, and watches. We have helped over 130 watchmakers in the last six years to dispose of their accumulations. When you're really ready to sell, we're ready to buy! Phone (727) 327-3306. Ask for Jeff or Nancy. E-mail: jeffnancy@watchfinder.com

WE BUY WATCHES
Rolex, Patek, Cartier, LeCoultre, Vacheron, Breitling, Audemars, Tudor and others. Modern or Vintage. **Doug Giard, 586-774-3684**

Hamilton Military Stop Watch Serial No. 1876.42, Manufacturers No. 37297, Model 23, 2 piece roller. Gruen 275 balance complete. Fax or Call Precision Watch Co. Ltd. Auckland, New Zealand Fax: 011 649 827 5709 or PH: 011 649 827 5709.

WANTED WATCH BOXES
Buy - Sell - Trade
We want most major brands. Also buying high-end jewelry brand boxes. **Doug Giard, 586-774-3684**

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

$$WANTED ANYTHING$$
Rolex - Cartier - Patek - Breitling
Panerai - Le Coultre
Vacheron - AP - Etc.
Watches, Boxes, Dials, Links, Parts, Bands, Movements, Crystals, Bezels, Crowns, Clocks, Signs, Posters, Catalogs, Instruction Books, Polish Cloths, Wallets, Hats, Shirts, Promo Items, ANYTHING! **Doug Giard, 586-774-3684**

Chronograph movements, cases, dials, parts and watches. Paying: Valjoux 72 - $200.00; Venus 178 - $150.00; Longines 13ZN - $350.00; Valjoux 69 - $350.00; also Rolex 620 NA - $350.00. Dean Sarnelle, 25 W Beverley St., Staunton, VA 24401; 1-866-877-8164.

We pay up to 97% of market for karat gold scrap (any amount)! Also, buy filings, gold fill, sweeps, silver, platinum! Immediate 24-hour payment return mail! Ship insured/registered mail to: AMERICAN METALS COMPANY, 253 King St., Dept. HT, Charleston, SC 29401. Established 1960. Phone (843) 722-2073.

Collector seeks Early American watches, movements and dials by the following firms: C Fasoldt, GP Reed, Mozart, US Marion, Empire City, Royal Gold American, Cornell, California, Newark, Western, JG Hall, Nashua, Pitkin, New York Springfield, DD Palmer, Freeport, MS Smith, Hoyt, Allison, San Jose, Otay, KW Howard, Von der Heydt.... I will even buy accumulations - please contact Desmond Lundy, e-mail fermenthaus@shaw.ca



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

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

SERIOUS NATIONAL DEALER
$$$ BUYING WATCHES $$$
- Any old steel Rolex, regardless of condition
- Rolex parts - dials, bands, movements, crowns, buckles
- Steel Milgauss, Daytona — Pay $8500 - $20,000
- Submariner, GMT, Explorer — Pay $1000 - $3500
- UNCLAIMED REPAIRS - Anything

THE PRICES WE NOW PAY HAVE NEVER BEEN HIGHER
DON MEYER
VINTAGE TIMEPIECES WORLDWIDE
12900 Preston Rd. #715, Dallas, TX 75230
Phone Anytime: 972-392-4281, 1-800-833-3159
Fax: 972-392-4283 E-mail: donmeyer@hotmail.com

WE BUY ENTIRE WATCH COLLECTIONS
Call Toll Free
1-800-426-2344
203-366-2500



Ron Fried, President
"I look forward to giving you honest and reliable service."

SPECIALTY METALS REFINING COMPANY, INC.
1915 Black Rock Turnpike
Fairfield, CT 06430

Members:
Better Business Bureau
Jewelers Board of Trade

229 Consecutive Ads



BOOKS FOR SALE



Practical Clock Escapements By Laurie Penman

This book deals in detail with the five escapements that are most commonly used in domestic clocks: crown wheel and verge, recoil anchor, Graham deadbeat, Brocot and platform escapements. Other types of escapements are also covered. With over 400 line drawings, the reader is taken step-by-step through the various operations when making or repairing escapements, with recommendations on the materials and tools to be used.

Retail: $44.95 AWCI Members: $40.46



Timepieces - Masters of Chronometry By David Christianson, CMW, CMEW, FAWI

Timepieces relates the history of clocks and how the pursuit of an ever-better clock has had a remarkable influence on scientific and technological developments. The 800-year journey to a perfect clock involved the greatest thinkers, scientists and mechanical geniuses, including those who improved the accuracy of mechanical clocks to such a degree that sailors could successfully determine longitude. That advance alone resulted in an explosion of travel, commerce and political expansion that forever changed the world map. Lavishly, illustrated, *Timepieces* is also a superior collection of photographs and artworks—historical and contemporary—that have never before been brought together in one presentation. It is a sophisticated yet accessible book that will appeal to amateur historians, clock enthusiasts and those simply curious about the keeping of time throughout history.

Retail: $24.95 AWCI Members: $22.46



The Watch Repairer's Manual By Henry B. Fried, CMW, CMC, FAWI, FBHI

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

Retail: $35.00 AWCI Members: $31.50

PLACE YOUR ORDER TODAY!
Call AWCI 1-866-367-2924 ext. 301 or visit the AWCI website www.awi-net.org

UNITED STATES POSTAL SERVICE

Statement of Ownership, Management, and Circulation
(Required by 39 USC 3685)

1. Publication Title	2. Publication Number	3. Filing Date
Horological Times	1 4 5 - 9 5 4 6	September 27, 2004
4. Issue Frequency	5. Number of Issues Published Annually	6. Annual Subscription Price
Monthly	12	$74.00

7. Complete Mailing Address of Known Office of Publication (Not printer): 701 Enterprise Drive, Harrison, OH 45030-1696 — Contact Person: Donna Baas; Telephone: 513-367-9800

8. Complete Mailing Address of Headquarters or General Business Office of Publisher (Not printer): Same as Item 7

9. Full Names and Complete Mailing Addresses of Publisher, Editor, and Managing Editor (Do not leave blank)

Publisher (Name and complete mailing address): American Watchmakers-Clockmakers Institute, 701 Enterprise Drive, Harrison, OH 45030-1696

Editor (Name and complete mailing address): Donna K. Baas, 701 Enterprise Drive, Harrison, OH 45030-1696

Managing Editor (Name and complete mailing address): Donna K. Baas, 701 Enterprise Drive, Harrison, OH 45030-1696

10. Owner (Do not leave blank. If the publication is owned by a corporation, give the name and address of the corporation immediately followed by the names and addresses of all stockholders owning or holding 1 percent or more of the total amount of stock. If not owned by a corporation, give the names and addresses of the individual owners. If owned by a partnership or other unincorporated firm, give its name and address as well as those of each individual owner. If the publication is published by a nonprofit organization, give its name and address.)

Full Name	Complete Mailing Address
American Watchmakers-Clockmakers Institute	701 Enterprise Drive, Harrison, OH 45030-1696

11. Known Bondholders, Mortgagees, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages, or Other Securities. If none, check box → ☒ None

Full Name	Complete Mailing Address

12. Tax Status (For completion by nonprofit organizations authorized to mail at special rates) (Check one)
The purpose, function, and nonprofit status of this organization and the exempt status for federal income tax purposes:
☒ Has Not Changed During Preceding 12 Months
☐ Has Changed During Preceding 12 Months (Publisher must submit explanation of change with this statement)

PS Form 3526, September 1998 (See instructions on Reverse)

13. Publication Title: Horological Times	14. Issue Date for Circulation Data Below: September 2004	
15. Extent and Nature of Circulation	Average No. Copies Each Issue During Preceding 12 Months	Actual No. Copies of Single Issue Published Nearest to Filing Date
a. Total Number of Copies (Net press run)	4333	4200
b. Paid and/or Requested Circulation — (1) Sales Through Dealers and Carriers, Street Vendors, and Counter Sales (Not Mailed)	0	0
b. Paid and/or Requested Circulation — (2) Paid or Requested Mail Subscriptions (Include advertiser's proof copies and exchange copies)	3916	3775
c. Total Paid and/or Requested Circulation (Sum of 15b(1) and 15b(2))	3916	3775
d. Free Distribution by Mail (Samples, complimentary, and other free)	150	150
e. Free Distribution Outside the Mail (Carriers or other means)	0	0
f. Total Free Distribution (Sum of 15d and 15e)	150	150
g. Total Distribution (Sum of 15c and 15f)	4066	3925
h. Copies not Distributed — (1) Office Use, Leftovers, Spoiled	267	275
h. Copies not Distributed — (2) Returns from News Agents	0	0
i. Total (Sum of 15g, 15h(1), and 15h(2))	4333	4200
Percent Paid and/or Requested Circulation (15c / 15g x 100)	96%	96%

16. Publication of Statement of Ownership
☐ Publication required. Will be printed in the November 2004 issue of this publication.
☐ Publication not required.

17. Signature and Title of Editor, Publisher, Business Manager, or Owner: Donna K. Baas — Date: September 27, 2004

I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including multiple damages and civil penalties).

Instructions to Publishers

1. Complete and file one copy of this form with your postmaster annually on or before October 1. Keep a copy of the completed form for your records.
2. In cases where the stockholder or security holder is a trustee, include in items 10 and 11 the name of the person or corporation for whom the trustee is acting. Also include the names and addresses of individuals who are stockholders who own or hold 1 percent or more of the total amount of bonds, mortgages, or other securities of the publishing corporation. In item 11, if none, check the box. Use blank sheets if more space is required.
3. Be sure to furnish all circulation information called for in item 15. Free circulation must be shown in items 15d, e, and f.
4. If the publication had second-class authorization as a general or requester publication, this Statement of Ownership, Management, and Circulation must be published; it must be printed in any issue in October or, if the publication is not published during October, the first issue printed after October.
5. In item 16, indicate the date of the issue in which this Statement of Ownership will be published.
6. Item 17 must be signed.

Failure to file or publish a statement of ownership may lead to suspension of periodicals authorization.

PS Form 3526, September 1998 (Reverse)

Advertisers' Index

American Perfit Crystal Corp. 21
(212) 246-8292

Borel & Co., Jules 5
(816) 421-6110

Butterworth Clocks, Inc. 15
(800) 258-5418

Cas-Ker Co. ..... inside back cover
(513) 674-7700

Chronos/WCR 39
(303) 296-1600

Clocks 43
011 01 31 228 6638

Esslinger & Co. ..... inside front cover
(651) 452-7180

Ferrell & Company 25
(213) 627-6031

Frei & Borel 31
(510) 832-0355

International Watch Collectors Society 13
(516) 374-5060

Krysworks, Inc. 27
(718) 353-5835

S. LaRose, Inc. 33
(336) 621-1936

Livesay's, Inc. 7
(813) 229-2715

Maxell Corp. ..... back cover
(201) 794-5900

McCaw Co., William S. 3
(419) 243-3720

Newall Manufacturing Company 19
(800) 621-6296

Primrose Supplies, Inc. 35
(801) 485-3908

Smith Supply House 29
(213) 622-1687

Twin City Supply 11
(952) 545-2725

Vibrograf U.S.A. Corp. 23
(516) 437-8700

AWCI Employee Directory

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

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

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

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

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

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

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

Heather Weaver
Receptionist/Secretary
1-866-367-2924 ext. 301
hweaver@awi-net.org

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

Jim Meyer
IT Director
1-866-367-2924 ext. 323
jmeyer@awi-net.org

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

Keep your repairs in perfect order with these essentials



The Bestfit Watch and Jewelry Repair Record Book

- Room for 2000 entries.
- Name and address of owner.
- Tag and record number.
- Dates received, repaired and delivered.
- Received by and delivered to.
- Complete description of case, case no., movement no. and markings.
- Repairs made with charges and special information.
- Facts are arranged for easy, fast and accurate entry as they occur.
- Wide spaces between lines and for each category of information.
- Each line is a complete transaction.
- These records should be kept for at least three years.
- Hard cover, 142 pages.

621.01135 ..... $18.75

Printed Tags with Claim Checks

Tags feature tear-off claim checks, which can be imprinted with your name and address. Both parts are numbered clearly. Sold in boxes of 1000. Call for imprinting charges. Minimum imprint quantity is 5000. Allow 4 to 6 weeks for delivery. White Claim Check Tags $2\frac{7}{8}$" x $2\frac{3}{8}$"

Stock Number	Claim Numbers
611.251	0001 to 1000
611.252	1001 to 2000
611.253	2001 to 3000
611.254	3001 to 4000
611.255	4001 to 5000
611.256	5001 to 6000
611.257	6001 to 7000
611.258	7001 to 8000
611.259	8001 to 9000
611.260	9001 to 10000

Tags ..... $36.15 per 1000

Triple Duty Repair Envelopes

Each numbered envelope has two detachable stubs; one for the customer and the other for filing. Standard kraft paper. Envelope measures $5\frac{3}{4}$" x $3\frac{1}{8}$" and is packed 1,000 to a box. Box weight 8 lbs. Available with custom 3-line imprint (minimum 5,000). Call for details.

Stock Number	Claim Numbers
611.151	0001 to 1000
611.152	1001 to 2000
611.153	2001 to 3000
611.154	3001 to 4000
611.155	4001 to 5000
611.156	5001 to 6000
611.157	6001 to 7000
611.158	7001 to 8000
611.159	8001 to 9000
611.160	9001 to 10000

Envelopes ..... $35.00 per 1000



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

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

MasterCard VISA



THOSE WHO PUT

THEIR NAME

ON THE OUTSIDE,

PREFER OUR NAME

ON THE INSIDE.



QUALITY. INNOVATION. LONGEVITY.

maxell

THE WORLD LEADER IN MICRO BATTERY TECHNOLOGY