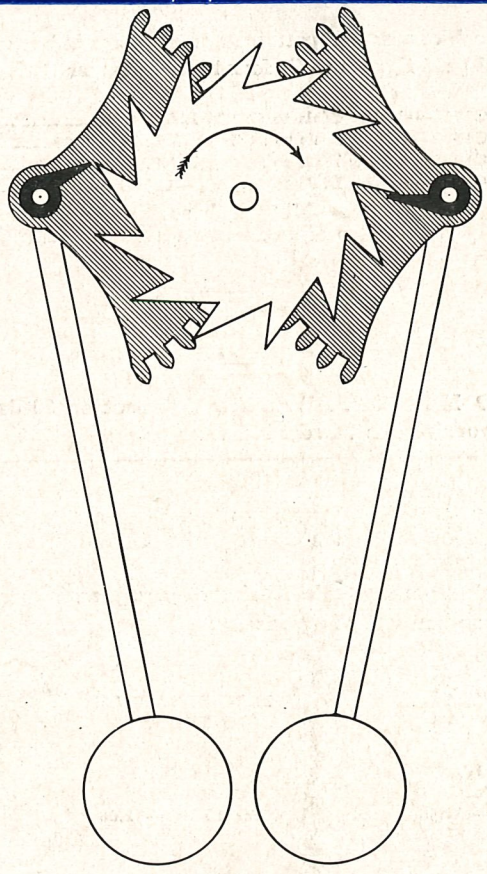
The H·I·A Journal

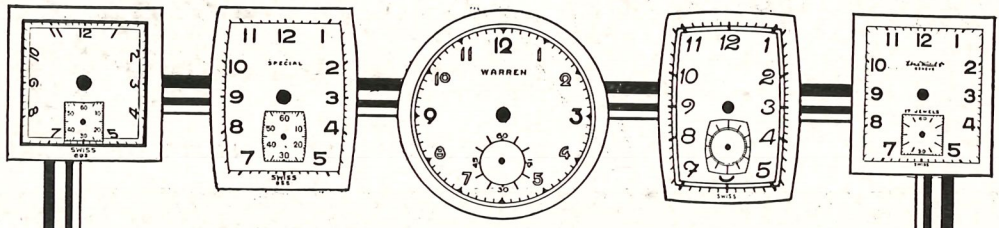
OFFICIAL PUBLICATION OF THE HOROLOGICAL INSTITUTE OF AMERICA



JEAN BAPTISTE DUTERTRE.

PP. 46

JUNE, 1949



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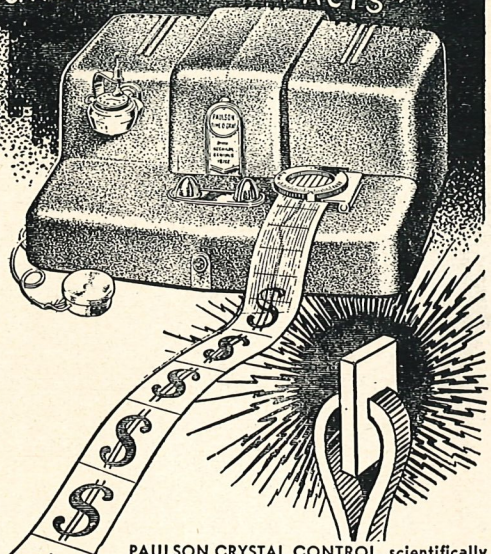

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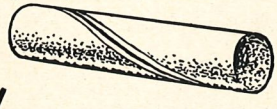

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NEW MODEL PAULSON DYNAMIC WATCH CLEANER

NOTE THESE

AUTOMATIC FEATURES

The basket automatically starts revolving when lowered into the solution and stops when raised. Eliminating at least six manual operations, and the possibility of the solution spattering your work bench.

$69.50

Diameter
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The Only Patented Non-Swirl Watch Cleaner

Paulson Dynamic Watch Cleaner

Paulson DYNAMIC, Non-Swirl Cleaning Machine, Unequaled, Effective, Double Action Cleaning Power.
The square jars with patented flanges in the corners stops the solution from following the revolving basket, giving double action cleaning power. This constant forceful stream ricochet from the flanges in the corners of the jars so the solution can enter the basket from all possible sides. This produces a double or even treble washing and cleaning value unheard of with any other cleaning method to this day, either by hand or by machine.

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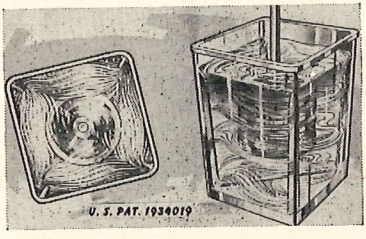

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Patented jars with corner flanges creates a Non-swirling action which more than doubles the resistance and keeps the solution level for greater cleaning power.

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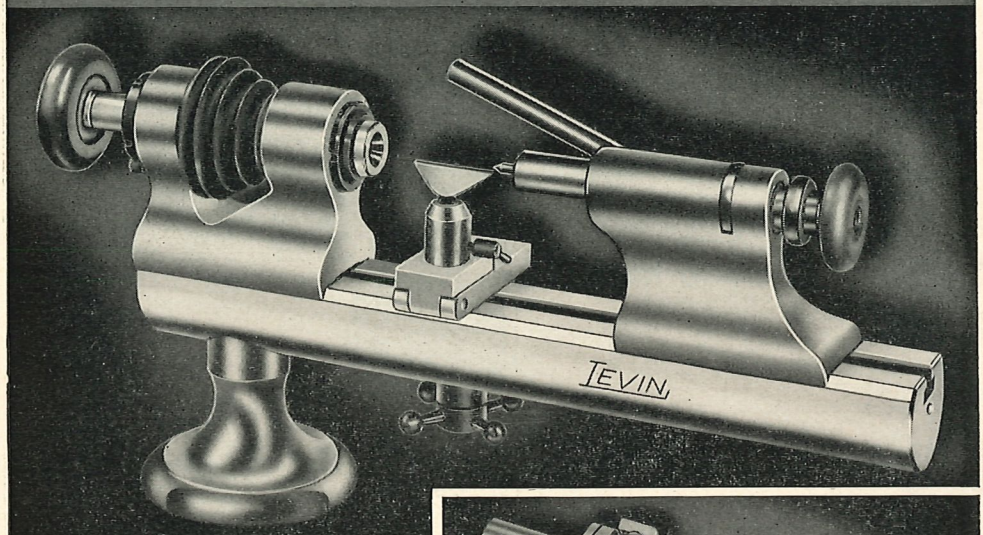
A PRE-LOADED BALL BEARING LATHE



MODEL D LATHE, CAT. No. ABBT

ANOTHER ADDITION TO THE LEVIN LINE OF LATHES

HIGH PRECISION

The new **PRE-LOADED BALL BEARING** spindle has resulted in the highest degree of rigidity and precision obtainable.

EVEN SPEED ASSURED

Low friction of bearings enables lathe to make heavy cuts without slowing down, making it also ideal for light manufacturing.

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Lubricant is sealed in and is sufficient to last the life of the bearing.

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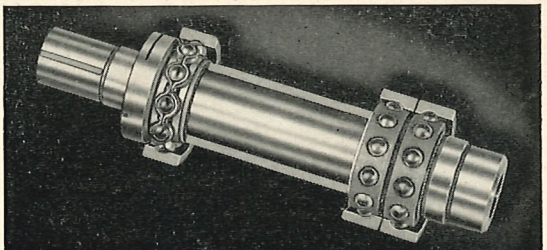
CARRY THIS TRADEMARK

ASK YOUR DEALER FOR 1949 CATALOG "E"



BALL BEARING SPINDLE ASSEMBLY

AFTER a long period of research, we are proud to offer two new lathes equipped with high precision, **PRE-LOADED BALL BEARINGS.** Model C, using standard WW wire chucks (5 mm capacity). Model D, using larger chuck with 8 mm capacity. Both models have same center height as all WW type lathes.

LOUIS LEVIN & SON, INC.
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ANNOUNCING A GREAT DRIVE TO

The Watchmakers of Switzerland Launch a New Advertising Campaign to Help Jewelers Educate and Sell Customers on Quality Watches

This is the July ad, first in the new series appearing in national magazines. It stresses the importance of the quality Swiss jeweled-lever movement, and will be in FULL COLOR.

1. **Ads catch the customers** with warm, human-interest illustrations by famous artists, lead in with gift-theme copy to capitalize on the fact that most people buy watches as gifts; and that there is no finer gift than a quality jeweled-lever Swiss watch.

The ad above, part of the largest campaign of its kind, will make a total of 53,549,400 reader-impressions in LIFE, LOOK and NATIONAL GEOGRAPHIC.

2. **Ads help sell customers** on *quality* watches by constantly driving home these four important points:

In every watch, it's the movement that counts—be sure the watch you buy has a quality Swiss jeweled-lever movement.

Don't be fooled by so-called "watch bargains"—you usually get just about what you pay for.

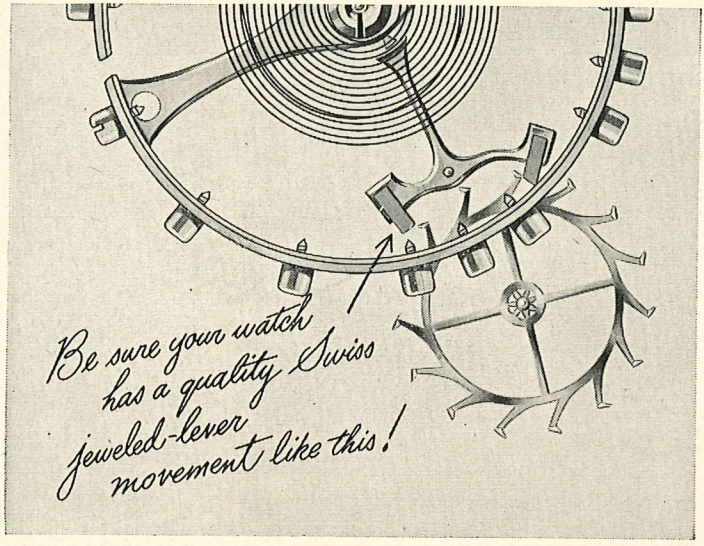
A smart Swiss watch is a treasure of lasting pride—for you—or the fortunate one who receives it from you.

When you buy a new watch, rely on a jeweler in whom you have confidence—he'll show you the best jeweled-lever Swiss movements in your price range.

The WATCHMAKERS OF SWITZERLAND

BOOST YOUR QUALITY WATCH SALES

To Help You Sell-up



3. Ads promote quality features like the jeweled-lever movement. Week after week, month after month, they tell millions of customers about the importance of quality features, stress the point that a quality watch gives the most value for the money. Customers will thus be more quality minded when they come into your store.

4. Ads help you follow through to more profitable sales. It will pay you to use these advertising sales points when you're explaining and selling the importance of quality features to your customers. Remember that *quality watch sales are profitable sales*—they mean more in profit—more in dollar volume—more in satisfied customers.

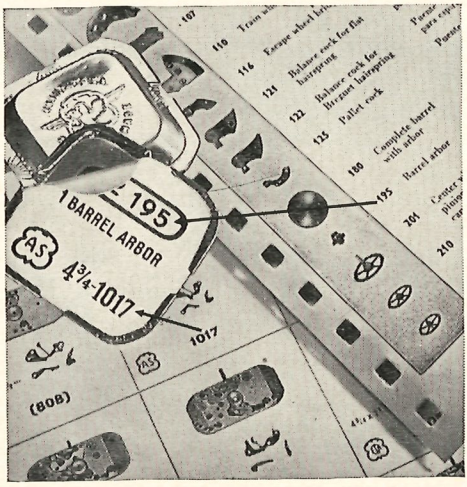
5. If you trade up, you can add up a bigger profit for your store. Advertising is designed to help you tie-in with the quality story, and merchandising displays help carry the quality story right through to point of sale. So, take advantage of this campaign . . . use these ads in your own sales story and be sure to take full advantage of the slogan that appears in every ad . . .

For the gifts you'll give with pride—let your jeweler be your guide

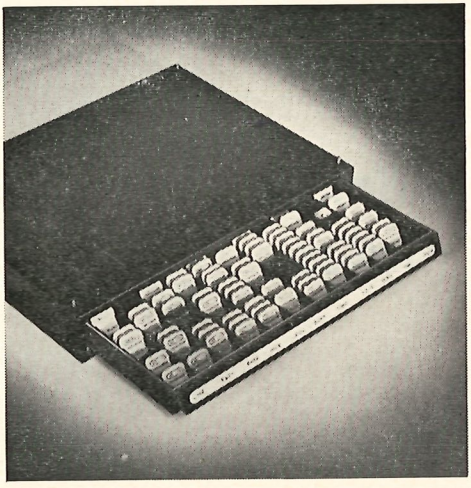
MORE GOOD NEWS FOR YOU

The WATCHMAKERS OF SWITZERLAND

NEW FEATURES OF THE SWISS WATCH



Staffs and stems for the most widely used Ebauches movements are now being distributed in this new Official Package for Swiss Watch Repair Parts.



The new Official Cabinet for Swiss Watch Repair Parts is now available from your supplier. It's the only cabinet made specifically to hold the new Official Parts Package.

Saves time, trouble, and money. Made of heavy foil, the new package helps protect parts against costly corrosion, moisture, dirt and damage. It's completely and clearly labeled—using identification numbers from the Official Catalogue of Swiss Watch Repair Parts. Order packaged staffs and stems from your regular supplier.

Use of package to be extended. Although staffs and stems for the most widely used Ebauches movements are the only parts now packaged, future plans are to package all Swiss watch parts in so far as practicable. Watch these ads for news.

New efficient design! Drawer-pull carries its own index tabs. And, the drawer tray is especially slotted to hold the packaged parts in an easy-to-see, easy-to-reach position. Later on, you'll be able to buy the tray separately, and adapt it to the cabinet you now have. Order the official cabinet complete with tray now—from your regular supplier.

It's a U. S. operation! The Watchmakers of Switzerland do not profit in any way from the sale or manufacture of this cabinet. The *design* is a Swiss *contribution,* but the production and distribution are handled solely by United States firms.

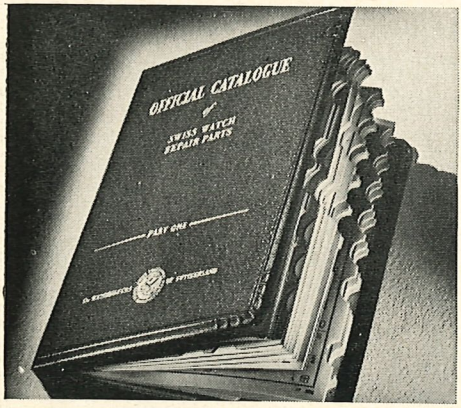
Thanks for your cooperation! The fine work of United States trade and horological associations, importers, wholesalers and jewelers has made possible the widespread introduction of these new features of the Swiss Watch Repair Parts Program.

The WATCHMAKERS OF SWITZERLAND

REPAIR PARTS PROGRAM NOW IN USE

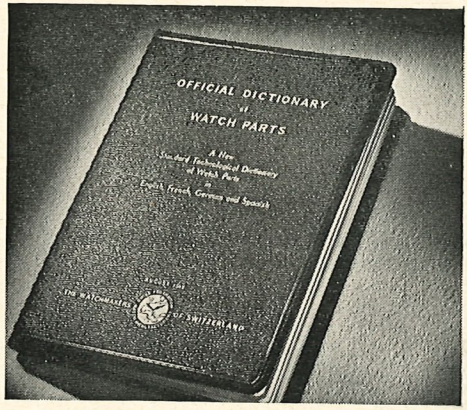
Check below to be sure you are getting the benefit of all six features

1. The official Swiss Watch Repair Parts Information Bureau, located at 730 Fifth Avenue, New York 19, N. Y., is directing the repair program. Although the bureau does not stock repair parts, it's ready to answer your questions and be of service to you.



2. The Official Catalogue of Swiss Watch Repair Parts (Part I) contains a standardized and simplified system of identifying and ordering *all* parts of *all* Ebauches movements. It assigns a single number and symbol to each part — and everyone, from Swiss manufacturer to U. S. jobber, uses this same number. The catalogue is complete with two indexes, and a dictionary section complete enough for everyday needs.

—and Part II of the Official Catalogue of Swiss Watch Repair Parts is on the way. Covering Swiss movements other than Ebauches, it will be distributed later in 1949. Like Part I, it's free to the trade.



3. The Official Dictionary of Watch Parts, prepared especially for the use of highly skilled watchmakers and large watch repair departments. It defines the parts for every type of Swiss movement—giving particular attention to specialized, out-of-the-ordinary movements. Each part is illustrated by a photograph, and watch terms are given in English, French, Spanish and German.

4. The Official Package for Swiss Watch Repair Parts is now being used for staffs and stems of the most widely used Ebauches movements. Order from your regular supplier.

5. The Official Cabinet for Swiss Watch Repair Parts is now available. Order from your regular supplier.

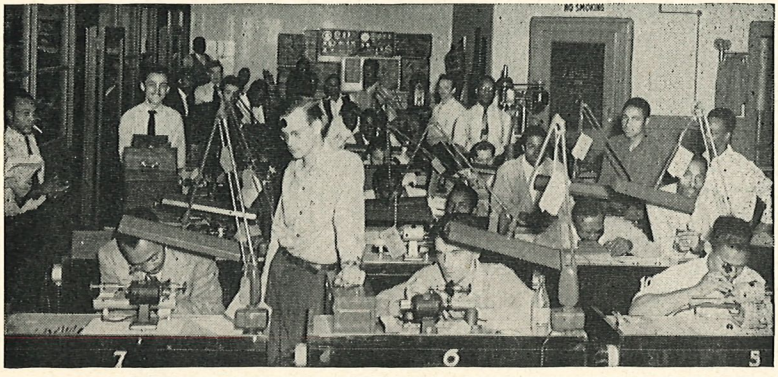
6. A Speaker's Kit — for talks on the Repair Program—can be obtained from National Horological Associations. It includes display material, easel presentations, slides and instructions.

The WATCHMAKERS OF SWITZERLAND

Morgan Vocational Schools

BALTIMORE, MD. and RIDGELEY, W. VA.

"Certified Schools for Certified Watchmakers"



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Courses offered in
Horology, Precision, Mathematics, Machine Work and Mechanical Drawing

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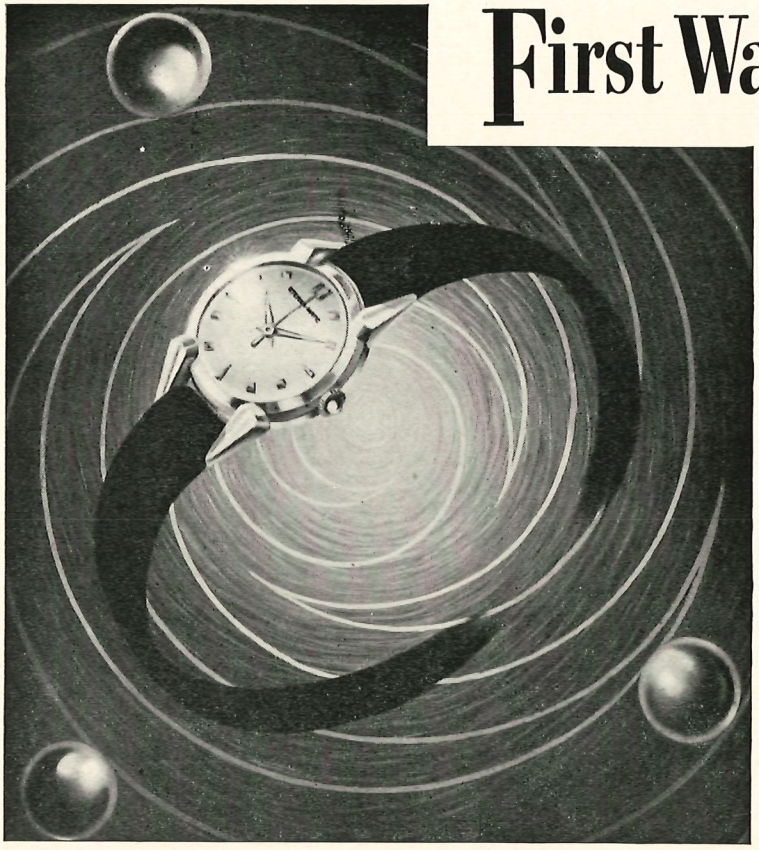
First Watch to



Look for this ETERNA•MATIC symbol on the dial.

ETERNA•MATIC

Ball bearing winder does what no other automatic can do

- Friction-free rotation of the oscillating weight both clockwise and counter-clockwise.
- Full 360° swing of weight with complete freedom.
- Over 40 hours reserve power.
- Jerkless, noiseless self-winding...no bumper springs.
- Simple to service...ball bearing is unbreakable...3 screws, removable in less than 1 minute, expose movement...no click springs.

HISTORY WITH...

Wind Itself on a Ball Bearing

It's here at last—the ball bearing in an automatic watch. It brings with it the ultimate in self-winding efficiency... the same smooth, frictionless performance that makes your steering wheel turn so easily.

After years of painstaking research **ETERNA** introduces this principle *for the first time anywhere* in its new ETERNA·MATIC lady's self-winding watch.

The heart of the ETERNA·MATIC winding action is five tiny steel balls, mounted in a single bearing. These roll with the wearer's slightest motion, enabling power weight to wind the mainspring at every rotation—clockwise and *counter*-clockwise. Swinging freely in a complete circle, it builds up the unusual reserve power of more than 40 hours.

Style-wise, the ETERNA·MATIC is truly lady-like... small, dainty, lightweight and perfectly balanced. It is non-magnetic and fully protected against shock by the latest, most effective shield which guards and cushions the balance.

Here's the new watch market you've been looking for—Nation-wide publicity and advertising featuring this exclusive **ETERNA** invention will tell smart women that they can now satisfy their desire to own a *really* self-winding watch—styled to their discriminating taste. Be prepared with ample stocks of the complete ETERNA·MATIC line.

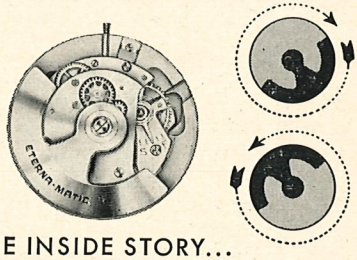
They'll sell as easily as they wind.

FOR YOUR WATCH REPAIR DEPARTMENT

The ball bearing mounting in ETERNA·MATIC is unbreakable—contains no pivot or jewel. Entire automatic system is held in place by three easily accessible screws—removable in 45 seconds—exposing complete movement. No c.ick springs to fly off the bench.

ETERNA THE WATCH OF PROTECTED ACCURACY ...SINCE 1856

ETERNA WATCH CO. OF AMERICA, INC., 580 FIFTH AVE., N.Y. 19



THE INSIDE STORY...

Ball bearing mounting swings oscillating weight freely in a complete circle—both clockwise and counter-clockwise—winds mainspring at the slightest hand motion.

Styled to sell as easily as it winds

ETERNA·MATIC is truly lady-like in design, dainty and smart, lightweight and perfectly balanced. Available in three models, standard cases or waterproof*, in stainless steel, steel and gold, or 14 and 18K cases.

Priced to sell from $71.50 to $200 (F.T.I.)

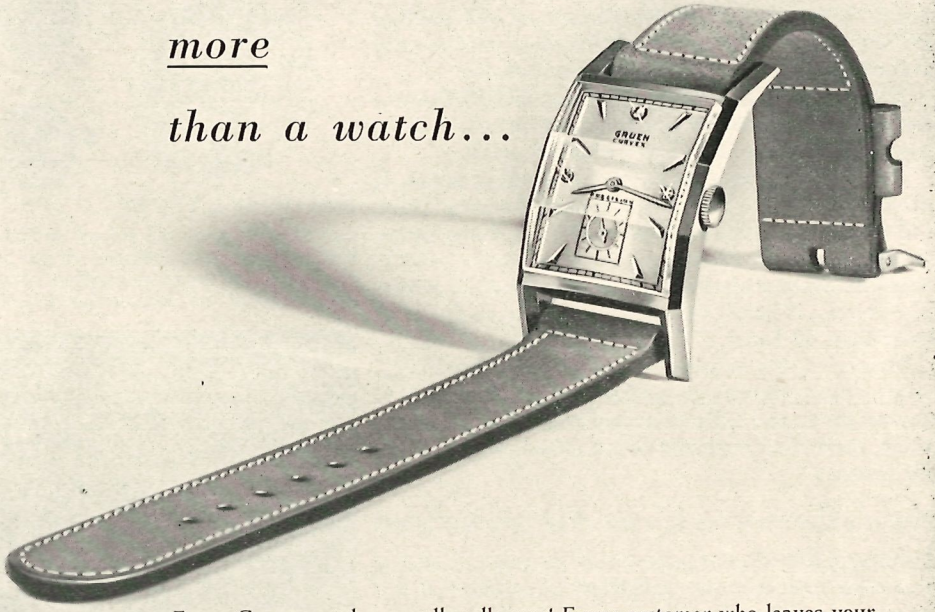
*Guaranteed to remain so even after cleaning or adjustment, if serviced by an authorized ETERNA dealer.

they

take home

more

than a watch...

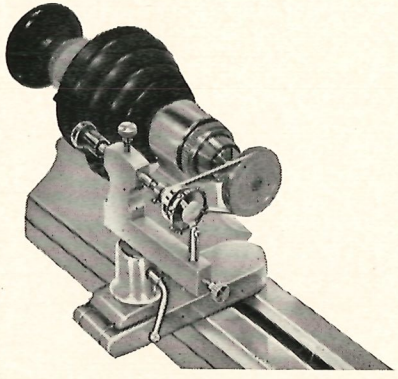


Every Gruen watch you sell—sells you! Every customer who leaves your store with a new Gruen watch, takes with him an increased appreciation of your standing as a merchant, and a better understanding of the fine reputation you enjoy. As the Gruen watch he wears continues to give steadfast service, his esteem for your store increases. Your good-will comes from many things—your integrity... your good taste... your superior values. But it is noteworthy that where the Gruen name is displayed and Gruen watches sold... there you will find public confidence and public respect. This is a goal which The Gruen Watch Company will always keep, as it has for three-quarters of a century. The Gruen Watch Company, Time Hill, Cincinnati, Ohio. In Canada: Toronto, Ontario.

GRUEN

THE *Precision* WATCH

The FAMOUS MOSELEY
PIVOT POLISHER
at a
NEW LOW PRICE



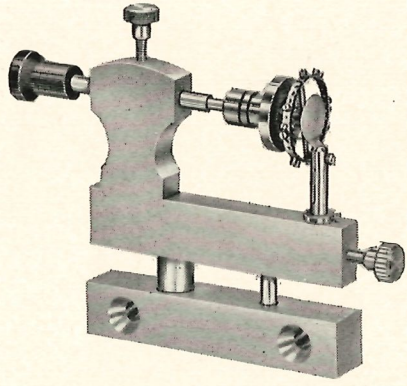
$9.75 No. 39669 complete

We can now lower the price because of the great demand for this tool. Ever since it was first announced, more and more wise watchmakers have insisted on the Moseley. That means longer production runs in our factory . . . new economies made possible by these longer runs. AND WE PASS THE SAVINGS ON TO YOU. This is the same fine Moseley Pivot Polisher that was a tremendous value at $13.50 . . . now only $9.50.

As far as we know, the Moseley is the only Pivot Polisher that operates as this one does. Can be used on any standard lathe or on the bench with a fiddlebow. Has smooth belt drive . . . NOT A FRICTION DRIVE. That means an even flow of power because you control the speed with a rheostat in connection with your lathe motor.

To use on lathe, mount the Moseley Pivot Polisher on any standard lathe by removing the T-Rest and inserting large guide pin of polisher. Fiddlebow can be used by mounting on bench with bar we supply. The combination of large and small guide pins holds polisher firmly on workbench. Perfect alignment of plate and jewel bearing assured by collar which can be locked in position. Will polish all pivots from smallest baguette to largest pocket watch.

Be sure to specify make of lathe or size of opening in T-Rest when ordering.



COMPARE . . .
Features—Quality—Price

- DIRECT BELT DRIVE . . . NOT FRICTION
- FIDDLEBOW NOT NECESSARY BUT CAN BE USED ON BENCH
- RUBY JEWEL PIVOT BEARING
- 3 INTERCHANGEABLE PLATES

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FAMOUS FOR QUALITY THROUGHOUT THE WATCHMAKING INDUSTRY
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THE H. I. A. JOURNAL

DEDICATED TO THE PROGRESS AND DEVELOPMENT OF HOROLOGY IN AMERICA

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L. R. DOUGLAS, Managing Editor
A. S. ROWE, Business Manager

—o—

ADVERTISING

All advertising material must be received before the 5th of the month of publication. Advertising rates will be sent on request.

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Subscription Price of H. I. A. Journal

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BALANCE vs. MAINSPRING

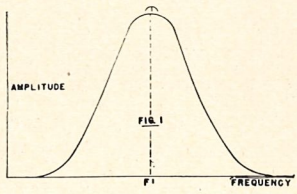
By C. N. Challacombe
Elgin National Watch Company

No doubt the title submitted for this paper has caused some speculation upon the nature of the ideas to be presented. I intend to present and discuss a basic problem in watch design, hoping for and inviting discussion. It is my opinion that friendly arguments on basic horological theory, design and practice carried on through the medium of the Horological Journal would stimulate considerable interest among the readers and also provoke helpful thought upon pertinent questions.

Generally the watch stylists present the watch designer a piece of space having the specified shape and dimensions permitted by the styles of cases in popular demand. It is the problem of the designer to construct a movement using this space to the best advantage. In order to attain a regular rate, the designer seeks to utilize the most stable balance-hairspring combination and at the same time maintain a constant power for at least 24 hours by means of a well designed disposition of the barrel and mainspring. In general, the conditions which improve the stability of the balance will be obtained by sacrificing some of the desirable conditions for the optimum barrel-mainspring design and vice-versa. The balance competes with the mainspring and the designer is forced to compromise between the two or to favor one at the expense of the other. Thus we arrive at the subject for discussion. What is the best balance-mainspring combination which can be placed in an allotted space? In attacking this problem, I shall discuss the balance as a stable oscillator, then the main-spring motor as a source of constant power, and conclude with some speculations on combining the two.

The Balance

The balance-hairspring unit constitutes a mechanical oscillator having a natural frequency. By measuring out equal intervals of time and recording them through the dial mechanism, the balance governs the rate of the watch. The stability of the balance shall be evaluated in terms of its ability to maintain a single constant frequency of oscillation. In order to pursue a discussion of stability, it will be necessary to speak of resonance curves. Fig. 1



illustrates a typical resonance curve for an oscillating mechanism. It consists of a graph of frequency vs. amplitude or balance motion. The frequency f^1 is called the natural frequency or the frequency at which the oscillator wants to run. If uniform pulses of energy are applied at frequencies slightly above or below the natural frequency, the oscillator will vibrate at these forced frequencies but not willingly and the amplitude is low. As the frequency of the pulses approaches the natural frequency the amplitude increases to a maximum. The general shape of this curve can be altered by design and frequency of the balance. The electronic field deals with similar resonance curves for oscillating circuits. As a measure of the sharpness of the resonance peak, a quantity known as the Q-factor is employed. It is convenient to appropriate

this term for our discussion of mechanical oscillators. Fig. 2 illustrates the resonance curves for oscillators having high and low Q-factors. One observes that the oscillator having a high Q responds to a narrower band of frequencies and has a higher amplitude of the natural frequency. For the purposes of this discussion, we can define the Q-factor of the balance as the ratio of the energy stored in a balance operating at a fixed amplitude to the energy dissipated per swing.

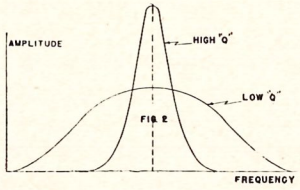


FIG. 2

Before proceeding with a discussion concerning the influence of the Q factor upon stability of rate, let us discuss some of the factors which determine the Q factor of a balance-hairspring unit. The stored energy is simply the energy necessary to turn a balance from the "at rest" position to the amplitude at which it is vibrating. Therefore, the stronger the hairspring, the greater the stored energy at any chosen amplitude of motion. Since the frequency is generally fixed at five beats per second, a stronger hairspring requires a larger moment of inertia for the balance. Thus, at a specified frequency and amplitude, the stored energy increases as the moment of inertia increases. However, the stored energy can be increased without increasing the moment of inertia by increasing the frequency. A six beat watch requires a stronger hairspring than a five beat watch using the same balance. Turning our attention to the energy dissipated per swing this depends upon such factors as friction of pivots, unlocking energy and frictional losses to the escapement as the jewel pin passes through the fork slot, frictional losses due to air resistance of the balance in motion, losses due to internal friction in the hairspring.

In summary, to increase the Q-factor, we try to increase the stored energy and decrease all factors tending to damp out the motion of a balance. Thus we can increase the Q-factor by increasing the frequency, lowering pivot friction, lowering air resistance by streamlining balances through elimination of screws, decreasing losses to the escapement through good escapement manufacture and adjustment, decreasing the hairspring losses through proper adjustment and design of the hairspring, and design of the balance to obtain the greatest moment of inertia with the least weight. It is evident that most of the procedures listed above, with the exception of increasing the frequency are, for the most part, a list of accepted practices in good watchmaking.

Next let us turn our attention to the influence of the Q-factor on watch performance. Does a high Q-factor stabilize the natural frequency of a watch balance? In radio the resonance peak is sometimes too sharp making it difficult to tune the circuit to the frequency of the pulses received but, in the watch, the pulses are triggered by the balance and must remain synchronized at the frequency of the balance. Therefore, no matter what the value of the Q-factor, the balance will adjust itself to its natural frequency and continue to run at that frequency under constant conditions. Sometimes we tend to confuse the stability of a balance with the idea of selectivity in a radio circuit. If a balance were subjected to sets of pulses of different frequencies and had to select one set of pulses corresponding to a desired frequency rejecting all others, it would be a definite advantage to maintain a high Q-factor. In short, it appears that a low Q balance can find its way to its natural frequency just as well as a high Q balance. On the other hand, the oscillation of a balance in a watch

is certainly a "forced" oscillation because pulses are constantly fed to the balance to maintain a constant motion. Considered as a "forced" oscillation, a high Q factor must have some influence in reducing the deviations from the natural frequency at which the balance vibrates when perfectly free. In some respects, the pulses delivered by the escapement have an effect similar to the frequency modulation of an oscillating circuit.

The Q-factor can have a considerable effect upon stability of motion of a balance. If the Q-factor is high, the stored energy is generally high and it is more difficult for any minor disturbance to change the motion of the balance. On the other hand, if the movement is subjected to a disturbance causing a large change in motion, it requires a relatively long time to return to the steady state since the amount of energy supplied by the escapement to maintain the steady state is very small compared to the energy which must be accumulated and stored in the balance to attain the steady state. The marine chronometer balance provides an example of a balance with a very high Q-factor.

Mainspring Motor

In defining the mainspring motor, I include the mainspring, the barrel arbor and the gearing of the barrel to the center wheel. The function of the mainspring motor is to supply a uniform torque to the center wheel throughout a period of at least 24 hours of run. Generally the quality of the mainspring motor is judged by the number of hours required for the watch to run down from the full wound condition. Therefore, the design giving the longest length of run is considered to be the optimum disposition and great emphasis is placed upon length of run although it is actually uniformity of torque for over 24 hours of run which is the important factor. Fortunately, it so happens that, all things considered, the optimum conditions for uniform torque through 24 hours coincide with the conditions for maximum length of run.

In designing a watch, it is essential to allow the largest possible diameter for the barrel. The barrel arbor should have as small a diameter as permissible without danger of breaking the arbor end of the mainspring through overstressing by coiling around too short a radius. The barrel should be as high as possible. In brief, the space available for the mainspring action should be as large as possible and, to obtain maximum length of run, the mainspring itself should occupy one-half of this available space.

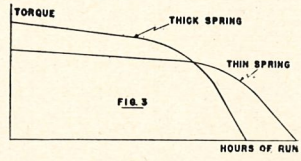
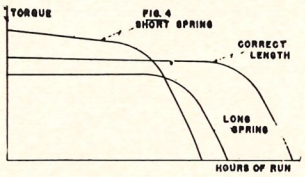


Figure 3 illustrates typical torque curves during the run-down period. At zero hours down, the spring is full-wound but I have assumed sufficient back-lash in the click mechanism to release any excessive tension after the spring becomes solidly compacted around the arbor. In horological parlance, the spring is "off the brace." The torque should remain at approximately the same level for 24 hours of run. As the spring motor approaches perfection, this part of the curve approaches a straight line parallel to the horizontal axis. Next, let us examine how the design of the mainspring effects the shape of the torque curve.

The two curves of figure 3 illustrates the effect of reducing the thickness of the mainspring using the same barrel and arbor, and filling half of the available space in the barrel with the mainspring. As the thickness decreases, the full wound torque decreases, the length of run increases and the torque is more constant especially during the early part of the run.

Figure 4 illustrates the effect of changing the length of the mainspring keeping the thickness and other factors constant. A

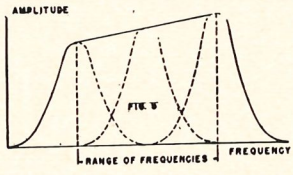


short spring gives a higher full wound torque but it is quite variable. A long spring gives a more uniform torque but the full-wound torque is lower. A recent Swiss publication recommended using a longer mainspring to obtain a more uniform torque through 24 hours of run. However, if it is tried out in practice, the loss of torque necessitates an increase in thickness to restore the motion of the balance and the net result is about the same as obtained using a spring of correct length but, in the meantime, there is a decrease in length of run. Actually, the length of the mainspring is not critical as long as it approximately fills one-half of the space within the barrel. The long and short mainsprings discussed above represent considerable departures from this condition. On the other hand, length of run and uniformity of torque are quite sensitive to changes in thickness.

Next, let us consider the gear ratio between the barrel and center pinion. Ordinarily this ratio varies between 6 to 1 and 8.5 to 1. If a low ratio is employed, a thinner mainspring can be used to run the watch but there is an overall loss in length of run. There is more loss in length of run due to reducing the gear ratio than gain in length of run from reducing the mainspring thickness. A low gear ratio requires a larger center pinion and fewer but larger teeth on the barrel. There is less chance of gear interference but this is obtained by a slight decrease in the barrel diameter which, in turn, reduces length of run. In summary, the net result of reducing the gear ratio is a loss in length of run. Generally, one can afford to sacrifice some length of run in order to gain uniformity of torque over a 24-hour period. Unfortunately, I have made no investigations on the relation between uniformity of torque and gear ratio. Therefore I can make no comments at this time. I have observed, however, that low gear ratios, between 7 to 1 and 6 to 1, are generally employed on the very small watches but this may be for convenience in manufacturing the gears and to improve depthing tolerance.

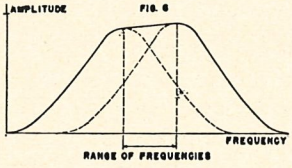
Balance Versus Mainspring Motor

Having discussed the conditions of good balance design and good mainspring motor design, let us proceed to the problem of combinations of the two. The orthodox procedure in designing a watch consists of placing the largest possible barrel in the allotted space, then using the largest possible balance which can be installed in the remaining space, taking into consideration the disposition of a suitable train and escapement. Finally, the thickness and length of the mainspring are determined experimentally to give the desired motion and maximum length of run at five beats per second. In most watch design, due recognition is given individually to the importance of the balance and the mainspring motor. Whether or not sufficient recognition is given to the two acting as a unit is questionable. If balance design is emphasized at the expense of mainspring motor design, one may end up with a fine oscillating unit which must run under widely varying conditions of motion. In terms of the resonance curves discussed above, the balance-hairspring oscillator runs quite accurately under any constant set of conditions but the conditions vary through a considerable range. The solid curve of figure 5 represents a composite resonance



curve over a period of 24 hours. As shown by dotted curves, the oscillator has a sharply

defined natural frequency which is constantly shifting as the amplitude changes. On the other hand, if balance design is sacrificed to obtain a mainspring motor of more constant power, the oscillating unit is more subject to changing conditions but the conditions are more uniform. Figure 6 illustrates this condition. Abandoning the theoretical approach through resonance curves, Q-factors, etc., we may talk in terms of cause and effect.



The cause of changes in frequency is variation of power. The change in frequency encountered with a change of power is the effect. Is it better to concentrate on eliminating the cause or minimizing the effect? Is it better to favor the mainspring motor design or the balance design? It would be interesting to construct and study a series of models all of the same caliber but using a series of balances of different sizes and number of beats and, also different gearing ratios between the barrel and center pinion. Such a study should provide information concerning the most suitable disposition of balance and mainspring motor for a given size of movement.

At this point, a slight digression may be of interest. The watch industry has become more or less standardized on 5 beat watches. This has aroused my curiosity and since I can find no references in the literature as to how this choice was made, I must resort to my own speculations. It is possible that it originated in designing pocket watches using the orthodox procedure of as large a barrel and balance as possible. Then, by adjusting the number of beats and gear ratios a suitable motion and length of run was obtained. However, it is more probable that this frequency was chosen for the convenience in maintaining a 60 to 1 ratio between the center pinion and fourth wheel to provide a place for a second hand. In either case, the choice was made while designing pocket watches. The practice has been continued and it is interesting to speculate as to whether or not it is the best disposition for small watches especially those which do not use a second hand. This is likewise true of other features of design established while developing pocket watches and carried over into wrist watch design.

Returning to the discussion of the balance and the mainspring, let us make a few remarks concerning isochronism of the balance. The literature on watchmaking reveals that the efforts directed towards providing a movement having a constant instantaneous rate at all times are divided into two schools of thought, (1) making a balance as insensitive as possible to changes in position, motion, etc., and (2) eliminating changes in motion and position errors by constant torque devices, tourbillon escapements, etc. The first is an attempt to eliminate causes. From my own limited experience and from information obtained from the literature, I am inclined to consider the first approach as more or less an attempt to achieve an idealistic goal. The second approach gives more practical results. Naturally, it is desirable to strive along both lines but when an improvement in balance design is accompanied by a sacrifice in the uniformity of power delivered to the balance, I am inclined to be against such a change. In defense of this position, I call to your attention that all of the major causes for changes in the rate of a balance are related either directly or indirectly to changes in motion. Escapement errors, poise errors, isochronal errors of hairsprings, etc., are all related to the motion of the balance. Since they are not all related in the same manner, all of them cannot be corrected or compensated, one by the other. It is more logical, therefore, to minimize the common cause than to attempt to eliminate a number of widely different ef-

fects. As the balance decreases in diameter, these errors due to variation in motion become larger and uniformity of motion becomes even more essential than for large watches. Emphasis upon a constant power source is the basic principle behind the automatic watch. In order to make an automatic watch of size comparable to that of the conventional watch the movement proper must be smaller. This sacrifice in size of both balance and mainspring can be made because of the gain in uniformity of the driving torque.

In summary, after considering the problem of the balance vs. the mainspring, my present opinion is that (1) balance design has been over-emphasized as compared to that relating to the length of run or constant torque, (2) there has been a tendency to accept, without question, principles established for pocket watches and apply them in the design of wrist watches, (3) theoretical and practical considerations indicate that there is a good possibility of improving upon the conventional wrist watch design.

Partial group of officers and members attending the 28th Annual Meeting of the H. I. A. Washington, D. C., May 8, 9, 10, 1949.

H.I.A. ELECT OFFICERS

The 28th annual meeting of the H. I. A. held in the National Academy of Science Building, Washington, D. C., closed the 3-day session on Tuesday afternoon, May 10, with the election of officers for the fiscal year 1949-50.

A. S. Rowe, Indianapolis, was re-elected president; George J. Wild, dean of the Horological Department, Bradley University, Peoria, Ill., vice-president; George T. Gruen, director, Gruen Watchmaking Institute, Cincinnati, Ohio, treasurer; Dr. Ralph E. Gould, time division, National Bureau of Standards, Washington, D. C., was re-appointed executive secretary.

Regional vice-presidents elected were Forrest N. Peters, Washington, D. C.; Howard S. Schrantz, Cleveland, Ohio; Paul E. Morrison, Kalamazoo, Mich.; S. George Cochron, Nashville, Tenn.; A. C. Henry, Houston, Texas; T. O. Sowers, San Jose, California.

Additional members elected to executive committee were: John J. Bowman, Lancaster, Pa.; Harry D. Henshel, Woodside, N. Y., and Robert Mintmier, Peoria, Ill.

What Is A Fine Watch?

By

Frederick T. Haschka

Mr. Frederick T. Haschka was born in Austria and migrated to Germany. He was a graduate of the Glaschute Watchmaking School in Germany. Worked in England, then in Sydney, Australia. Came to U. S. A., worked in San Francisco, Philadelphia and New York. He was head watchmaker for Tiffany and Company for 38 years.

He was one of the founders and an Honorary Member of the Horological Institute of America, the New York Horological Society, and a Life Member of the Franklin Institute in Philadelphia.

Mr. Haschka was a great scholar and a recognized authority in the field of Horology. He died in 1943 at the age of 83.

Frederick T. Haschka

Jewelers are frequently asked wherein lies the real difference between a cheap watch and one of a higher grade and price. Both seem to the customer to be quite the same as timekeepers and frequently the only difference he sees is in the price.

He may be told that in the high-grade watch the movement is more highly finished, has more jewels, and is adjusted to heat and cold, etc.; but these points do not clearly convey the idea that he should therefore spend more money for the fine workmanship, that he cannot actually see and none but the jeweler can really appreciate, if he can buy a cheaper watch that will give him apparently the same service.

It is of course well known that dust gathers more readily on a rough surface than a highly polished one. It also sticks more tenaciously to the one than to the other. Dust is hygroscopic and attracts moisture from the surrounding air, which in turn attacks the surface it is on by tarnishing or corroding the metal and thus accelerating wear.

Rough surfaces are detrimental in fine watches for more reasons than one. Take, for example, a highly polished metal plate and another that is merely filed or ground smooth, and put a drop of oil on each. This drop of oil will remain still and globular on the polished surface, but on the rough one it will spread, the file marks acting as channels for the oil to travel in. This is what happens in watches. Where the parts are more or less rough, the oil travels up on a rough arbor or pinion or winding

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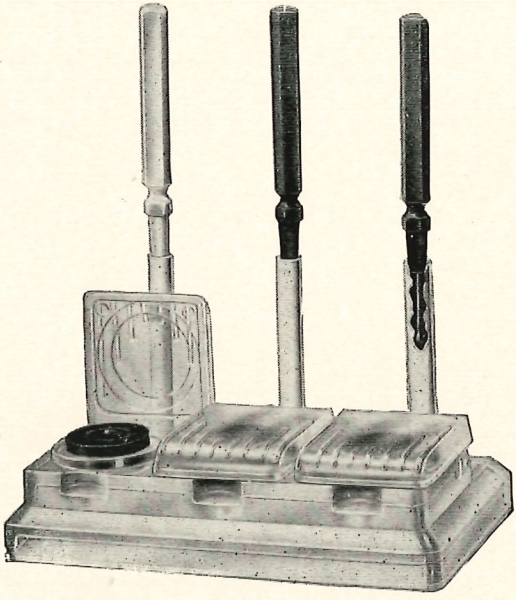

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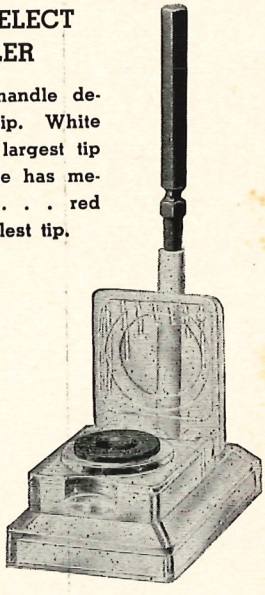

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No. 36323—Plastic Oil Cup, one unit, with oiler .....$ .70
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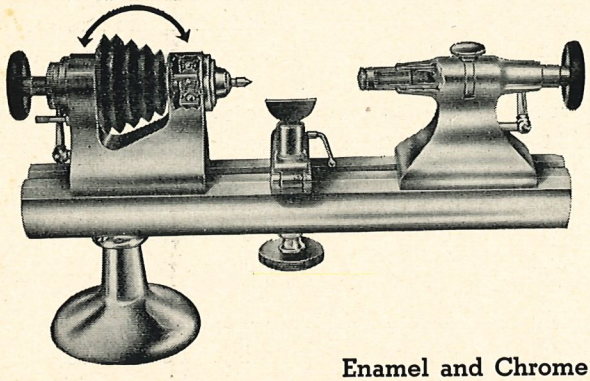

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wheels or barrel, and even spreads on a roughly polished jewel. This dissipating of the oil leaves the part that needs the oil dry, and this means that the wearing process commences at the point of friction much earlier than if the oil had all remained concentrated at that point as was originally intended. It is for this fundamental reason that a fine watch movement is highly polished and finished at every point where friction develops. When one considers that a small movement of say twelve lignes will accommodate only one-tenth of a drop of oil, when properly administered to the points of friction, this matter of correct and exact lubrication is seen to be of greatest importance and also that the character of the surface of the parts is of the same importance.

A cheap watch is of necessity coarsely made, the various parts being stamped, pressed, fraised or otherwise turned out by bulky tools, which are made to produce them in enormous quantities. These parts of course must vary in size and proportion to the wear of the tool. The material, brass or german silver, of which these parts are made, is necessarily soft to lessen the wear of the tool and thereby reduce one element in the cost of production. The shape or form of these parts must be as simple as conditions will permit to reduce the cost of the dies and tools and to reduce also the number of the operations in the process of manufacture. The train of wheels and pinions are generally of coarser number and the brass wheels softer to save the tools and operations in the manufacturing. The whole caliper must be simple and of as few parts as possible to reduce the cost of production.

This method of making parts by machines, however high a degree of mechanical exactitude may be achieved, cannot be as accurate or as durable as those manufactured with a view to high-grade performance and endurance. Machine made parts cannot subsequently be re-examined and improved, or fitted, because the time and ability of the expert would cost more than the first process of manufacture. Therefore all parts must be made so as to allow for slight deviation in sizes and fittings with other parts in the watch, and with such wide limits of accuracy must lead to unsatisfactory results in the finished product.

Cheap watches seldom have been a financial success either to the producer or to the retailer, because subsequent repairs and corrections so often take away the best part of the sales profit; and when they need repairing the charges seem to the customer out of all proportion to the original cost of the watch.

As compared with the mathematical accuracy achieved in machine-made parts, we find in high-grade watches that every individual piece is tested by itself and also in connection with other parts to insure accuracy and perfect fitting. For this reason fine watches can be made thinner without detriment to their good performance.

In a fine watch the brass or nickel is rolled or hammered hard and the number of stamped out parts are fewer, as required accuracy permits of only perfect pieces. This also applies to the cutting of wheels and pinions to assure the correct shape and size of the teeth and the gears have more and finer teeth than in a cheap watch.

It would seem that all machine-made watches ought to be low-priced. Why then this difference in price? A few jewels more or less do not make the difference. It is because in high-grade watches there is a great amount of special or individual work done in examining, fitting and adjusting, which takes a great deal of time, skill and experience, and these elements raise the price and the quality of the article considerably.

Herein lies the essential difference in the two methods of construction and adjustment. However close to perfection mathematical and mechanical accuracy may approach, it cannot achieve the same results obtained by the hand and eye of the trained expert. The thousandth part of an inch means to the layman a fine degree of ac-

curacy; but the eye and the finger of the really expert mechanic transcend even such a minute measurement and achieve results that only the human touch can accomplish.

In a fine watch all surfaces are made very smooth, highly polished and finished so that the dirt will not hold easily and the lubricating oil will stay at the point where it is needed. The wheels and pinions are high numbered, i. e., are cut with the maximum number of teeth, accurately cut and divided; the pinions are hard and finely polished and its development works with the least possible friction.

The double roller escapement is provided with well made and finely polished rubies or sapphires in all its acting parts, closely adjusted to avoid all loss of power.

Jewels in themselves are of little value unless they are applied in such a way as to reduce friction and wear. For that purpose they must be selected rubies or sapphires, of proper shape, the holes upright and highly polished so that the pivots turn in them with a minimum of friction and wear, or they are worse than useless, as cheap and therefore rough jewels wear pivots faster than hard brass would do where there is no jewel.

The compensation balance should be constructed with care and adjusted to temperature; and the Breguet balance spring is adjusted with terminal curves to eliminate the errors of positions to very close limits.

In a fine watch the case is fitted individually to the movement thus insuring a thin, well-fitting case that is a source of pleasure to the discerning wearer and a protection for the works.

In these days when the layman is perhaps more familiar with machines than ever before, he should be more intelligent about the construction and care of his watch. It is a machine which requires for its correct operation, careful handling, proper lubrication and cleanliness.

Chicago Institute of Watchmaking Awards Merchant Marine Scholarship

Director Paul Leeds (at microphone) of the Chicago Institute of Watchmaking, congratulating ex-merchant marine, Stanley Repel, Chicago, on his scholarship award, as Harold Herron (left), dean of the C. I. W., and Gerald Kimes (center), president of the Illinois Watchmakers Association and one of the judges of the Scholarship Award Committee, look on.

As merchant marines are not eligible for schooling under the G.I. Bill of Rights, Mr. Paul Leeds, director of the Chicago Institute of Watchmaking, 7 S. Pulaski Road, has made it possible, through the merchant marine scholarship award, for ex-merchant marines, who possess unusual mechanical aptitude, and other qualifications, to secure a watchmaking scholarship at his H.I.A. Certified Watchmaking School.

Mr. Leeds made his school's first merchant marine Scholarship Award to ex-merchant marine Stanley Repel, 4542 Richmond Street, Chicago, before more than 1,000 attending the school's alumni dance,

held in the Bal Taberin Room of the Hotel Sherman, Saturday night, May 14th.

In addition to the Chicago Institute of Watchmaking Scholarship Award, Mr. Repel will receive watchmaking equipment totaling $1,150.00.

Mr. Leeds, prior to the time he established the Chicago Institute of Watchmaking, was chief of vocational rehabilitation information for the Veterans Administration and ex-G.I.'s, and is sincerely interested in the future welfare of all who did their part to bring World War II to a successful conclusion.

KEYSTONE WATCHMAKERS HELD SUCCESSFUL MEETING

The Watchmakers Association of Pennsylvania met in Pittsburgh, April 27th, in the I. O. O. F. hall, on Beaver Ave., on Pittsburgh's north side.

This meeting was of unusual interest because of the initiation into the Guild of student and apprentice watchmakers.

Educational sound pictures were shown by the Aluminum Company of America, the Elgin Watch Company. The Hamilton Watch Company supplied their new booklet, "What Makes a Fine Watch Fine," which was enjoyed by all present.

Refreshments were served and a genuine spirit of good fellowship prevailed throughout the evening.

Arrangements are being completed for the annual picnic which will be held at West View Club in August, the exact date to be announced later. The arrangements committee has promised to surpass last year's exceptionally successful picnic.

SAVANNAH (GA.) WATCHMAKERS' GUILD JOINS H.I.A.

At a recent meeting the Savannah (Georgia) Horological Association voted to affiliate with the Horological Institute of America, Inc.

Mr. F. H. Pruitt, (Desbouillons Jewelers), is president of the local guild.

MERIT AWARDS RECEIVED BY 8 MASTER WATCHMAKERS

At the May 8 meeting of the Joint H. I. A. Executive Committee and the Advisory Council, held in the Hotel Raleigh, Washington, D. C., the Award of Merit was given to eight Certified Master Watchmakers who received 810 or more points out of a possible 900 points (equivalent to 90 per cent or more) on their master watchmaker examination tests, during the fiscal year ending April 30.

The names listed below qualified for the awards:

Leighton C. Johnson	Elgin, Ill.	831 points
James J. Gilliam	Mt. Ranier, Md.	823 points
Miller McCraw, Jr.	Houston, Texas	823 points
Eugene F. Trask	Mt. Ayr, Iowa	820 points
Ralph L. Tomer	Clovis, N. Mex.	819 points
Floyd G. Snyder	Bethlehem, Pa.	813 points
Harold E. Bolsius	Lancaster, Pa.	811 points
William R. Kingston	Chattanooga, Tenn.	811 points

TWENTY-SIX CERTIFIED WATCHMAKERS QUALIFIED

The names listed below received 380 or more points out of a possible 400, (equal to 90 per cent or more) on their Certified Watchmaker's test during the fiscal year:

Floyd W. Clark	Whitestone, N. C.	391 points
Raymond J. Osborne	Indianapolis, Ind.	389 points
Oscar E. Thomas	Pine Hill, Ala.	389 points
Philip J. Injerd	Chicago, Ill.	387 points
John W. Medearis	Greensboro, N. C.	387 points
James E. Taylor	Elgin, Ill.	387 points
Charles H. Gilbert, Jr.	Portland, Oreg.	385 points
Walter F. Ottoson	Portland, Oreg.	385 points
John H. Taylor	Elgin, Ill.	384 points
Clair E. Graham	Lancaster, Pa.	383 points
Hugh B. Little	Logan, Ohio	383 points
Dyer T. McCrory	Birmingham, Ala.	383 points
John F. Daniel, Jr.	Woodward, Okla.	382 points
David Nelson	Comox, British Columbia	382 points
Doyne G. Sunderman	Elgin, Ill.	382 points
A. Benton Wilmarth	Weed, Calif.	382 points
Sabastian A. Marino	Lawrence, Mass.	381 points
Fred M. Padgett, Jr.	Chicago, Ill.	381 points
Melvin W. Schuren	St. Louis, Mo.	381 points
Leroy F. Upham	Peoria, Ill.	381 points
Willie G. Welch	Birmingham, Ala.	381 points
Gordon R. Brantley	Elgin, Ill.	380 points
William J. Brown	Peoria, Ill.	380 points
Norman F. Farah	Lowell, Mass.	380 points
Edward R. Sherk	Cumberland, Md.	380 points
Bruno F. Vasil	Jamaica Plain, Mass.	380 points

70 MORE WATCHMAKERS CERTIFIED

During the months of March and April, 1949, the following watchmakers have been granted certificates by the *Horological Institute of America* after having passed all the requirements of the prescribed examinations.

Certified Watchmakers

Name	*Address*	*Employed by*
Willie L. Allen	Gallatin, Tenn.	John C. Koehn.
John F. Daniel, Jr.	Woodward, Okla.	Mrs. L. P. Northup.
Henry Karoglanian	New York, N. Y.	Unemployed.
Clarence Russell Lehman	Fort Thomas, Ky.	Self—D. B. A. Lehmann Jewelers.
Michael C. Medwid	Amsterdam, N. Y.	George A. Clark.
James G. Messaros	Canton, Ohio	Rogers.
William L. Newton	Gallatin, Tenn.	John C. Koehn.
Raymond L. Osborne	Indianapolis, Ind.	
Gertrude St. Laurent	New Bedford, Mass.	Ernest T. Desaulniers.

Students at Baronian School, Philadelphia, Pa.

Donald Y. D. Chang.....Honolulu, Hawaii
Floyd Goshow.....Souderton, Pa.
Joseph R. Petkus.....Philadelphia, Pa.
Water J. Rowand.....Philadelphia, Pa.

Students at Bowman Technical School, Lancaster, Pa.

Clair E. Graham.....Lancaster, Pa.
Richard L. Smith.....Lancaster, Pa.

Students at Bradley University, Peoria, Illinois

Herman Bengston.....Peoria, Ill.
Erwin F. Dreibus.....Peoria, Ill.
Lloyd A. Hambleton.....Peoria, Ill.
George M. Hiraoka.....Peoria, Ill.
C. LaMoyne Phialmlee.....Peoria, Ill.
Paul Andrew Lombardo.....Peoria, Ill.

Students at Joseph Bulova School of Watchmaking, Woodside, N. Y.

Donald J. DeWolfe.....East Orange, N. J.
Johnny E. Harrigal.....Woodside, N. Y.

Students at Elgin Watchmakers College, Elgin, Illinois

Robert M. Hudson.....St. Mary's, Ohio
Donald W. Meier.....Bird Island, Miss.
Robert J. McVeigh.....Chicago, Ill.

Student at Emily Griffith Opportunity School, Denver, Colorado

Edward C. DeVore.....Pueblo, Colo.

Student at Greensboro School of Watchmaking, Greensboro, N. C.

Leon Carol Avant.....Greensboro, N. C.
Kirby Aaron Blake.....Whiteville, N. C.
John William Medearis.....Greensboro, N. C.
Norwood Thompson.....Greensboro, N. C.

Students at Gruen Watchmaking Institute, Cincinnati, Ohio

Melvin Wayne Baker.....Covington, Ky.
Albert F. Collas.....Cincinnati, Ohio
Russell E. Fox.....Cheviot, Ohio
Tesuro Kunimura.....Hilo, Hawaii

Student at Jes. I. Hansen School, Denver, Colorado

Raymond Wrona.....Denver, Colo.

Students at Houston Technical College, Houston, Texas

Donald I. Hanson.....Houston, Texas
Ben Woodward.....Houston, Texas

Student at Jewelry Training Service, Chicago, Illinois

Philip George Injerd.....Chicago, Ill.

Student at Midwest School of Horology, Albany, Missouri

Morris C. Fleming.....Albany, Mo.

Student at Morgan Vocational School, Ridgeley, W. Va.

Verl Max Ruby.....Cumberland, Md.

Student at National Jewelry and Instrument Training School, Columbus, Ohio

Donald Roger Ryan.....Columbus, Ohio

Students at New York State Agr. and Tech. Institute, Morrisville, N. Y.

Robert B. Jacobs.....Munnsville, N. Y.
Angelo A. Monico.....Cherry Creek, N. Y.

Student at Peters School of Horology, Washington, D. C.

Salvatore A. Marucci.....Washington, D. C.

Student at San Jose State College, San Jose, California

Allan B. Jones.....San Jose, Calif.

Students at Taus School of Watchmaking, New York, N. Y.

Louis Merle Allen.....Whitestone, N. Y.
Frank Castino.....New York, N. Y.
Floyd W. Clark.....Whitestone, N. Y.
Kenneth George Hauser.....Staten Island, N. Y.
Frank J. Hilovsky.....Patchogue, N. Y.
Jack I. Hoffman.....Bronx, N. Y.
Louis Kalowitz.....Brooklyn, N. Y.
Anthony S. J. Nicolini.....New York, N. Y.
Walter Riley Norris.....New York, N. Y.
Frank J. Randazzo, Jr.....Brooklyn, N. Y.
Herbert D. Sloves.....Brooklyn, N. Y.
John E. Wolfe.....New York, N. Y.

Students at Waltham School of Watchmaking, Waltham, Mass.

Paul J. Algiers.....Waltham, Mass.
Aleck G. Boutselis.....Lowell, Mass.
Robert Joseph Conty.....Waltham, Mass.
John O. Kercheval.....Sheridan, Ind.
John L. Lelievre.....Waltham, Mass.
Richard L. Martin.....Gloucester, Mass.
A. Kenneth Remillard.....Turners Falls, Mass.

Certified Master Watchmakers

Name	*Address*	*Employed by*
J. Wayne Driver	Lancaster, Pa.	Student — Bowman Technical School.
Leighton C. Johnson	Elgin, Ill.	Self.
Ronald L. Mathews	Lancaster, Pa.	Student — Bowman Technical School.
John G. Reimers	Chicago, Ill.	Nathan Donsky, San Angelo, Texas.
Ralph L. Tomer	Clovis, N. Mex.	May Bros. Jewelry, Clovis, N. Mex.

Your Questions Answered Here!

By "The Professor"

EDITOR'S NOTE: *A nationally renowned professor—who prefers to remain anonymous—has consented to answer questions from our readers pertaining to the science of horology and its various practical applications in the field of watch repair. Simply address your questions to the editor, H. I. A. Journal, 921 State Life Building, Indianapolis 4, Indiana. It will be our pleasant duty to forward all questions received to "The Professor" for a prompt reply and publishing in these columns every month.*

Dear "Professor":

I seem to be having trouble with the oil I have been using, or the cleaning solution. On some jewels the oil completely disappears, on others, in the same watch, sufficient oil remains. I take the utmost care in application, so am at a loss to understand what is wrong. Could you recommend any oil or cleaning solution which you consider satisfactory? I prefer the non-foaming, waterless solutions. Also, do you think it necessary when oiling hole and cap jewels, through the hole jewel, to remove any oil adhering to reservoir of hole jewel?

Your reply will be deeply appreciated.

R. V. T., Bluford, Ill.

Answer:

Yours is a problem that occurs everywhere and always calls for about the same answer, except in cases wherein the inquirer goes into such great detail about the method and materials used in cleaning and oiling, that we can spot something definite that is wrong, and advise accordingly. In the absence of this, our suggestions have to be of a more general nature. We can hardly name one brand of cleaning solution or of oil as anything like "the best"; there are several well-known good ones offered for sale by dealers, and any of these, used properly, should give excellent results. But none of them will be trouble-free unless the watches cleaned are taken entirely apart, cap-jeweled bearings removed to clean hole and cap-jewels separately, and, after cleaning in the machine, all pivot holes should be rubbed out thoroughly with pointed pegwood, and flat surfaces like acting faces of pallet-stones and endstones rubbed with pegwood cut to a form like a screwdriver-blade. This is insurance against any film

left by evaporation of solutions, possibly affecting the fresh oil. In oiling, either of the extremes in quantity must be avoided; use enough to lubricate freely, but no more, to prevent risk of oil creeping away from where needed. Answering your question about "removing *any* oil adhering to reservoir of hole-jewel," we would say "don't"; but after enough oil has been let in between hole-jewel and endstone, there should be little more left standing in the "cup" than will fill the pivot hole, and perhaps just the bottom of the cup; but no more, and certainly not enough to fill the cup.

"THE PROFESSOR."

———

Dear "Professor":

I have in my shop a clock for repair that was made in Germany. I will try and draw the trade stamps that are on the back of the plate:

GUSTAV BECKER MEDAILLE
G B

SERIAL ♯
2281229

FREIBURG
IN SCHL. D'OR

On the dial side is K.C. CO. GERMANY. I am told this clock will run a year without winding. It does not have a pendulum which swings but a device suspended on a small steel ribbon. This device being beneath the clock unit and having four fingers which can be expanded or contracted for regulation. This device, which acts somewhat like a governor, turns around forward and backward just like the balance wheel does in a watch. You are probably familiar with this clock; however, it is the first I have had any contact with. I would like to know where I could secure parts for this. I need a glass globe which fits down over movement to protect it from dirt, etc. Height about 10 inches, diameter about 5⅝ inches, and also the steel ribbon from which the device that turns is suspended.

I have repaired the ribbon and have the clock running at the present time. The device that turns makes about a 4/5 of a complete turn. I wonder if this is enough or how can it be increased? Would also know what kind of time this clock should keep? Any information on this will be greatly appreciated.

F. A. O., Anderson, Ind.

———

Answer:

The clock described is known in the trade as a "400-day" clock, or "anniversary" clock. The pendulum is of the type known as a "torsion" (twisting) pendulum. The principle of the clock is of course that it takes so long for the pendulum to make each rotation and alternately unlock the escapement, that this uses up the amount of power stored by one winding so slowly, that the clock runs much longer than one with a vibrating pendulum that unlocks its escapement very often per hour. But torsion pendulum clocks cannot keep time nearly as accurately as vibrating pendulum clocks can. These clocks were made in Germany; since the war started, importation of them and repair parts for them, ceased, and many dealers have none in stock now, but you could write to dealers and possibly find some parts still on hand, here and there. The glass shade could probably be furnished or made to order for you, by DeMuth's Glass Works, Brooklyn, N. Y. The flat steel pendulum suspension ribbon may be obtained of F. J. Boesse & Co., Inc., 9 Rockefeller Plaza, New York 20, N. Y.

"THE PROFESSOR."

———

Dear "Professor":

We have a Velvo-Clear Watch Cleaning machine which needs new rubber gaskets in the top.

This is the part which clamps down over the jars and the gasket seals the jar being used so that the cleaning solution does not seep out.

This make of cleaning machine is out of manufacture now but we should like to know if you can advise a source of supply for replacement parts, particularly for these gaskets.

E. T. M., Clifton Springs, N. Y.

Answer:

The only way we can suggest for you to find out whether any material house may have in stock any replacement parts for your Velvo-Clear watch cleaning machine, would be for you to write some of those dealers and ask them. We do not keep data on what stock dealers may have on hand. Or, any ingenious machinist can make parts, perhaps in an automobile repair shop, where material for gaskets should also be on hand, and mechanics who could cut it to required form for your machine.

"THE PROFESSOR."

Dear "Professor":

As I am a subscriber to the H. I. A. JOURNAL, and I read each of your Questions and Answers each month, I was hoping to find some questions similar to the one I have to ask, but have not found such question asked and answered in the Journal, therefore, here is the Question.

Professor, please send me some information concerning where I can make contact to obtain a watch display carrying case and an assortment of different trade name new watches, such as Hamilton, Bulova, Elgin, Waltham, etc.

I am asking for this information because I would like to, or rather plan to, be a salesman and sell these different types of new watches. Please tell me where and how I can buy them wholesale to sell?

I will appreciate an answer from you either through mail or through an article published in the H. I. A. JOURNAL.

Thanking you very kindly.

M. W., Baltimore, Md.

Answer: We understand your idea is to obtain samples of the various grades and models of watches made by the Hamilton Watch Co., Elgin Watch Co., Bulova Watch Co., etc.; and from these samples take orders and sell watches to customers you would find, by showing the samples. You could write to these watch manufacturers about this; but we are sure what they would inform you would be that they sell watches only to jewelers who carry the watches in stock, in established stores (usually retail jewelry stores); and do business in that way only. In fact, these manufacturers are only now emerging from wartime conditions of scarcity of product, that required them to supply goods only to firms that had been doing business with them in prewar years; and some of the lines are still more or less rationed out to dealers; and until supply has caught up with demand, the manufacturers are slow to open new accounts.

"THE PROFESSOR"

KANSAS STATE HOROS ELECT OFFICERS

The following officers were elected on April 3 at the annual convention of the Kansas State Horological Association: President, Richard L. Bock, Salina; vice-president, Richard C. Kogler, Wichita; secretary-treasurer, Bruce E. Brunk, McPherson; technical advisor, W. H. Widiger, McPherson; state trustee, P. E. Loomis, Newton; directors, Ira F. Bailey, Hutchinson, chairman; Robert Beals, Dodge City; J. E. Lewis, Jr., Great Bend; W. E. Sellers, Emporia; Ed Marshall, Anthony.

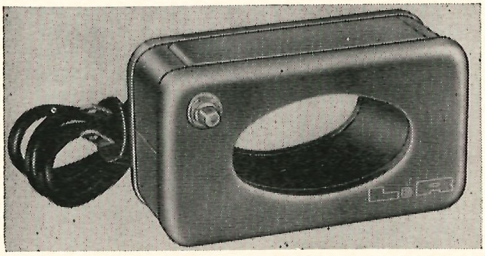
Plans for increasing the membership of the organization were discussed. P. E. Loomis gave a report on the licensing law activities at the Kansas Legislature. The Association plans to try again at the next session of the Legislature.

NEW LOW PRICE DEMAGNITIZER NOW AVAILABLE

A new low-priced ALTERNATING current, 115-volt, 60 cycle, demagnitizer is now being offered by leading watch material supply houses at the exceptionally low price of $3.75. This demagnitizer comes complete with 6 ft. rubber plug-in cord.

This precision-built demagnitizer is manufactured by the L. & R. MANUFACTURING COMPANY, Arlington, N. J., builders of the renown L. & R. Watch Cleaning machines.

The same exacting specifications which L. & R. demand of all their products is maintained in their L. & R. No. 2 Demagnitizer. The operating coils of this demagnitizer are produced in their own plant on special built precision-coil winding machines, thus assuring long and dependable



service. The operating coils are enclosed in an attractive satin-finished aluminum housing. Each L. & R. No. 2 Demagnitizer comes in an individual box, which protects the Demagnitizer from dust when not in use.

For further information, contact your Watch Material Supply House, or write direct to L. & R. Manufacturing Company, 577 Elm Street, Arlington, N. J., or their branch offices, 55 East Washington Street, Chicago, Illinois, and 355 South Broadway, Los Angeles, California.

WATCHMAKERS' ASSOCIATION OF INDIANA TO HOLD 16TH ANNUAL CONVENTION

The convention committee of the W. A. I. reports that final arrangements have been completed for the sixteenth annual convention, which will be held Sunday, June 26, in the Antlers Hotel, Indianapolis.

This convention is expected to surpass in interest and attendance any previous convention held by this justly famed watchmakers' organization.

The program committee reports that never before have so many famous horological educators signified their intention to attend a state watchmakers' convention. Among those who will attend are: Howard L. Beehler, Beehler School of Watchmaking, Chebeague Island, Maine, and Joseph Bulova School of Watchmaking, Woodside, N. Y.; George J. Wild, Bradley University, Peoria, Ill.; Harold Herron, Chicago Institute of Watchmaking, Chicago; William Samelius, Elgin Watchmaking College, Elgin, Ill.; George T. Gruen, Gruen Watchmaking Institute, Cincinnati; S. Geo. Cochron, Cochron School of Watchmaking, Nashville, Tenn.; Robert Ibaugh, Terre Haute School of Watchmaking, Terre Haute, Ind.; Henry B. Fried, George Westinghouse Vocational High School, Brooklyn, N. Y. Others are expected to be present.

The program committee announces the following speakers who will address the convention: Henry B. Fried, "The Ball Bearing Watch"; Howard L. Beehler, "The Balance, Hairspring and Escapement"; Richard Slaugh, (Master Watchmaker, Hamilton Watch Co.) "How to Keep a Fine Watch Working"; Daniel Geeding, (Gruen Watch Co.); Clifton Rigsby, "How the 500-Mile Speedway Races Are Timed and Scored"; Dr. Carlisle, (Prof. Butler University) and other short talks by recognized horological authorities.

There will be no registration fee, and, as usual, all members holding 1949-50 membership receipt cards will receive free, their dinner.

Officers of the Watchmakers Association of Indiana, are: T. S. Banta, Waveland, president; Paul Sheddrick, Middletown, vice-president; Harold K. Calvert, 508 State Life Bldg., Indianapolis, secretary-treasurer.

The official program and year book will be in the mail by June 15.

WATCHMAKERS' ANTI-RUST HAND SOAP AGAIN AVAILABLE

This soap has been in use for years in Swiss watch factories to prevent rust due to perspiration. Simply wash the hands twice daily, using this soap in the usual

manner, and your hands will remain free from perspiration. Consequently you will eliminate danger of rusted parts and tools caused by moisture from the hands. A cake costs only 75c and lasts a long time—cheap insurance against rust and a good investment in summer comfort.

This is the same soap which was introduced into this country by Swartchild & Co. and sold so widely before the war. It is now available again and is made exclusively for Swartchild & Co. by the same chemist in Switzerland for the first time since the war. See the Swartchild advertisement on page 16.

PRESENTED H.I.A. MERIT AWARD AT ALUMNI DANCE

Paul Leeds, Director Chicago Institute of Watchmaking, presenting H. I. A. Award to Fred Padgett.

Paul Leeds, director of the Chicago Institute of Watchmaking, 7 South Pulaski Road, Chicago, makes the presentation of the H.I.A. Merit Award to Fred Padgett, former student of the Chicago Institute of Watchmaking, who scored 382 out of a possible 400 points when taking his certified watchmaking examination. The award was made Saturday evening, May 14, before a crowd of more than 1,000 gathered in the Bal Taberin Room of the Hotel Sherman, Chicago, for the Chicago Institute of Watchmaking alumni dance. Looking on as the award is being given by Leeds (right) to Padgett (left) is Vernon Gros (center), president of the Student Alumni Association of the Chicago Institute of Watchmaking.

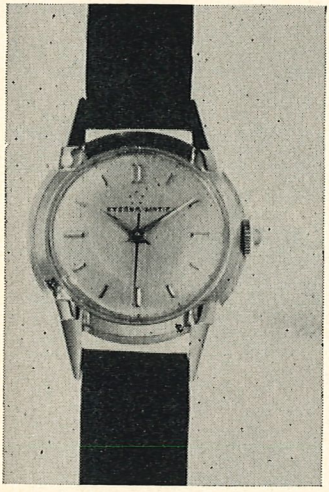
Joseph Dean Writes Booklet on Watch Repairing

An interesting and informative 64-page booklet on watch repairing by Joseph Dean, "What Makes It Tick — A Study in Watches," has just been released. This booklet contains over 120 illustrations of the various functions and constructions of escapements, balance truing, staffing, cleaning, oiling, various number of "beats" of different makes of watches, correct selection of mainspring and various other valuable information which will appeal to the apprentices and student watchmakers. A section is devoted to sweep second and chronometer watches.

This 64-page booklet is distributed through THE DEAN WATCH COMPANY, 116 Nassau Street, N. Y. C. 7, New York.

NEW "ETERNA-MATIC" MOVEMENT PRODUCED

The new "ETERNA-MATIC" movement in three basic models, providing automatic winding in ladies' watches, will be on the market in June, following experiments during the past two years by engineers to perfect the thinnest automatic watch.



This new movement has an unbreakable automatic winder, composed of five miniature steel balls, each the size of half the head of a pin, mounted on a bearing and supporting the swinging weight. It will continue to run forty hours without winding and winds more efficiently than any previously made automatic movement.

The ETERNA - MATIC movement winder's unique mounting permits the weight, which winds the mainspring at every rotation, clockwise or counter-clockwise, to swing in a complete circle, thus deriving power from a full 360-degree turn.

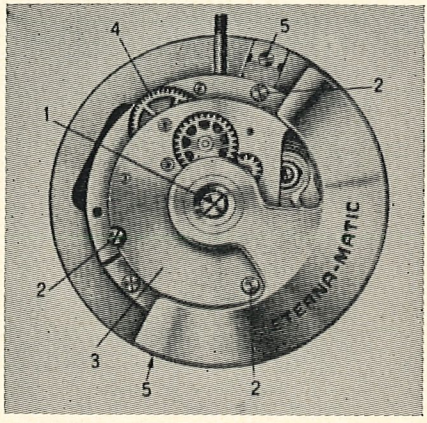
Because of the sensitivity of the ball-bearing, the weight swings with less friction than that created by brushing the tip of a feather against glass. Engineers point out that the slightest movement in any direction winds the watch. The movement has a super-shock resistant system.

Makers of ETERNA-MATIC claim that the automatic winding device can be removed as a unit within forty-five seconds, when the watchmaker unscrews only three screws to remove the unit, and gains free access to the movement.

Advantages of the Ball-Bearing

The ball-bearing in the ETERNA-MATIC consists of five tiny balls, each .0256-inch in diameter. A total of 25,500 of these balls will weigh approximately one ounce! Each is produced to extremely close tolerances.

The ball-bearing holds the oscillating weight. Its function is to provide the movement with an exceptionally durable, smooth-operating transmission with strong



reserve power. The weight thus acts as a rotor and the movement derives power from a full 360° turn during any slight motion of the wrist. This assures jerkless and noiseless self-winding for the first time—both clockwise and counter - clockwise. Bumper springs, with their attendant repair problems, are eliminated.

Instructions for Handling and Repair

How to Replace the Mainspring

Release the three small screws (2) of the automatic bridge (3), *but do not release the center screw of the weight.* The entire automatic winding mechanism including the weight, is thus entirely removable. The barrel is now easily accessible and can be removed without touching the train.

How to Reach the Balance Staff or Hairspring

Proceed as above and remove the winding mechanism (3 screws).

When re-assembling the automatic bridge and weight, see that the pinion of the third automatic wheel (4) gears accurately into the ratchet. This can be helped by a slight clockwise winding of the crown. The crown wheel, contrary to standard movements, is not set on a steady pivot, but is mounted on a movable lever which should always remain movable.

How to Re-Oil the Ball-Bearing

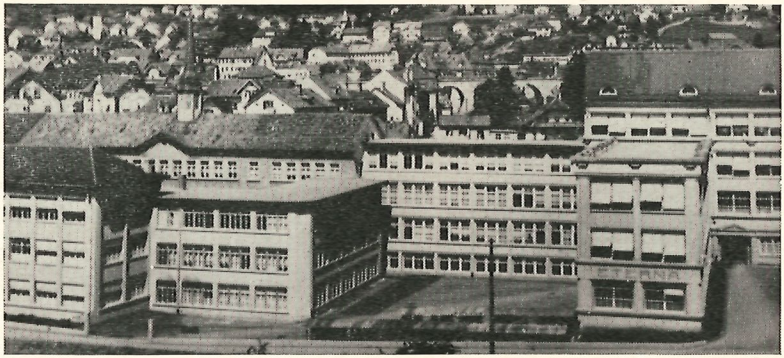
The ball-bearing should only be re-oiled when the winding mechanism has been treated with a cleaning solution which washes out the original lubricant in the bearing.

Use the same oil to lubricate the ball-bearing that you use for oiling the balance staff. Insert the oil between any of the five balls in the bearing.

Do not use mineral oils, thick oils or greases of any kind on the ball-bearing.

How to Remove the Movement From Its Case

The case screws (5) should be released by two turns. *They should never be unscrewed completely.* Push the two holders slightly towards the center and tighten the screws slightly.



Shown above is a view of the Eterna Watch Company factory in Grenchen, Switzerland, makers of new "self-winding" Eterna-matic watches, one of the few Swiss plants making complete watches under one roof.

HAMILTON GRANTED PATENT ON NEW CASE

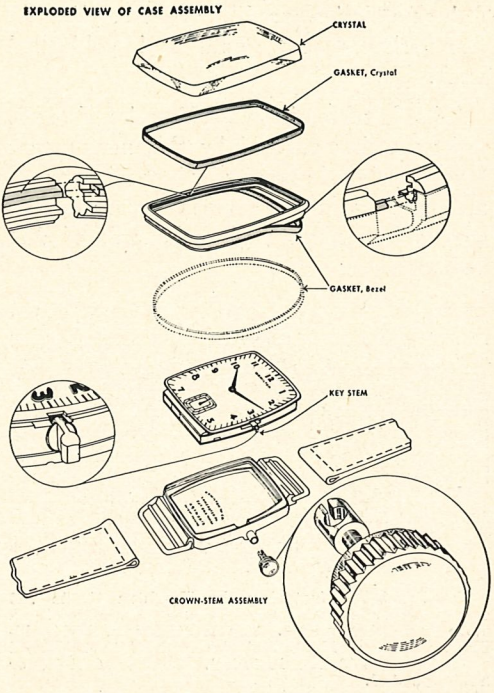
Henri E. Vermot, Director of Styling, Hamilton Watch Company.

The Hamilton Watch Company has been granted a patent for its new CLD (sealed) watch cases developed by Henri E. Vermot, director of the company's styling division. The patent grant was made on April 12.

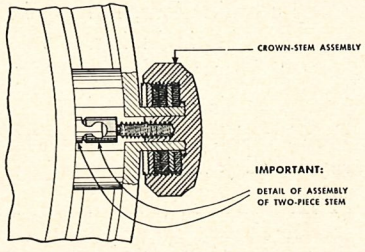
The new Hamilton cases are the result of four years of special research and experimental activities, during which time novel methods to overcome unsatisfactory performance of certain so-called "waterproof" watches were tried and discarded before the final unique and unsatisfactory sealing principles of the new CLD cases were established.

The new Hamilton cases are constructed of three precisely-fitted pieces, crystal, bezel and back, joined by plastic gaskets, and are easily assembled and disassembled without the aid of special tools or without affecting the original sealing qualities.

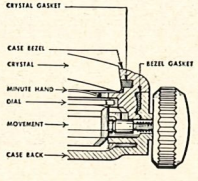
Tempered glass crystals are used instead of the unstable plastic type and the simpli-



The Hamilton CLD model illustrated here in "exploded" form is the Brandon. All Hamilton CLD cases, however, are identical in construction principles. Note that the Bezel Gasket is shown both on the bezel and in phantom form to show that this gasket is virtually round before it is assembled.



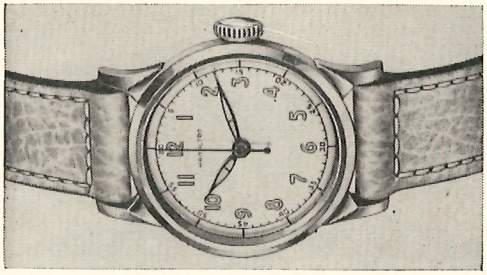
Cross section detail of the CLD crown-stem assembly illustrates the construction of this component. Notice that the gaskets between the underside of the crown and stem pipe are adjustable by a brass adjusting washer.



Cross section detail of the CLD case assembly illustrates and identifies all principle parts of the complete cased watch. This illustration shows how the gaskets are deflected to seal the fit of the three units (crystal, bezel, and back).

fied case design readily adapts styling in many shapes from gold and gold-filled stock.

The first Hamilton CLD series of men's wrist watches covered by this new patent found ready sale among budget-wise sportsmen and professional men, whose watches were subjected to various hazards of dirt and moisture.



The NORDON, featuring the Hamilton Grade 748 sweep seconds movement, is also available in a more expensive model. The NORDON in 10K gold-filled sells for $71.50, and the NORDE in 14K gold sells for $160.00 tax included. Choice of AGN or luminous dial.

The Langdon, Brandon and Nordon styles are offered in the new Hamilton CLD series, with ten different dial and case quality combinations, ranging in prices from $66 to $160, including tax.

A small identifying seal containing the letters, "CLD," is featured in Hamilton's national advertising and all promotional material offered jewelers.

LOUIS LEVIN & SON, INC. ISSUE NEW TOOL CATALOG

Louis Levin & Son, Inc., internationally-famous manufacturers of exacting precision-built tools and equipment, specializing in watchmakers' tools, have issued a most artistic 8½ inch x 11 inch, 32-page catalog.

Their latest precision-built watchmakers' lathes, chucks, slide rests, milling and wheel-cutting attachments, staking, poising tools, balance truing calipers, Tungsten Carbide cutting kits, diamond laps, etc., are graphically described in the new catalog, which is now ready for distribution and is available by addressing a request for "CATALOG 'E' " to: Louis Levin & Son, Inc., 782 E. Pico Boulevard, Los Angeles 21, Calif.

CORRECTION

On Page 17, April 1949 issue of the H. I. A. JOURNAL, Article (e), "How to make application for H. I. A. Certification," should read . . . "Send in a cased 12^s or 16^s, 15-jeweled or better grade pocket watch of recognized merit, American or Swiss manufacture, capable of being restored to its original factory timekeeping condition.

SURVEY SERVICE IS OFFERED WATCH REPAIRERS

Above are expert accountants and business engineers engaged in compiling results of a survey made by C. & E. Marshall, of a watch repairing shop to help improve efficiency in the shop.

President J. K. Marshall of C. & E. Marshall Co. has announced the opening of a watch repair department survey service for watchmaking and jewelry stores. He explained that this department was planned for the good of the industry and to help prevent business failures.

Mr. Marshall said that the subjects covered in this survey are the following: A recommended repair department layout for greatest efficiency, a recommended flow of work within the department, the best method of stocking, ordering and selecting repair parts, establishing of suggested time standards and repair prices, methods of determining profit and loss in your repair department, a summary of the savings possible, analysis of sales methods, etc.

This department was set up so that C. & E. Marshall acts as a clearing house for ideas in the industry. As a national organization, Marshalls are in a position to observe the methods of jewelers, and are passing this experience on to others. (A jewelry store in Maine may develop a watch repair selling program or something else that can be used effectively throughout the industry.) Through the Business Engineering Department, such information is pooled, and the best is selected for presentation to the industry as a whole. The department has been of service to many organizations, and one very fine jewelry store is in business today, principally because of the effort of these engineers. The owner of this store was in poor health and unable to carry on. He asked these engineers to work out a plan relieving him of the responsibilities of direct supervision of the business. Working with local accountants, they were able to do this so that the owner now has time to rest and is regaining his health. The business is being operated profitably and the owner was not forced to sell his business at a loss, which he might otherwise have done.

Survey Engineers have found that the following subjects are of most interest to the watchmaker and jeweler:

1. What is the best long term watch repair advertising in use today?
2. Where and how should watches be filed to handle them with the greatest convenience to the customer and the least amount of handling for us?
3. What is the average time for first class men to perform certain repairs? (How long should I take to staff, to clean, etc.)
4. Now that material will be received from Switzerland in sealed packages and these unbroken packages passed on to me by calibre, my systems must be adapted to this new method. What is the best way to go about it?
5. What is the way to handle material detail most economically?
6. What is the average percentage of material cost in relation to sales?

Any store owner may write about his own problems, his own interests and complete details of this service—without obligation—addressing C. & E. MARSHALL COMPANY, Box 7737, Chicago 80, Illinois, personal attention of Mr. J. K. Marshall, President.

MOBILE GUILD HELD ITS THIRD ANNUAL MEETING

The third annual meeting of the Mobile (Ala.) Guild was held Sunday, May 15 and Monday, May 16. Registration showed a splendid turnout of members and guests. Plans for forming a state association were discussed at the convention.

State Senator Joe Langan gave the address of welcome. Speakers at the first day's session were: W. H. Samelius of the Elgin Watchmakers College, Elgin, Ill., who spoke on "The Evolution of the Escapement"; and Jack Ivers, who gave a demonstration of the Watchmaster.

The principal speaker at the banquet held May 16 was S. George Cochron of the Cochron School of Watchmaking, Nashville, Tenn., representing the Horological Institute of America. More than 100 attended the banquet. A "Mobile-style" dinner was served.

Several trade films were shown at the convention, including films of Gruen, Elgin, Westclock and others.

Plans for forming a state association were worked out and a meeting of representatives of other guilds of the state is expected to be held soon to discuss organization matters.

Much credit goes to President R. E. Nelson, Vice-President Fritz Kraft and Secretary Pete Sienke for the success of the meeting. Cedric Ludtke and Mr. Smith were in charge of arrangements for the meeting.

Scenic films of points of interest in and near Mobile were also shown at the meeting. Reports were submitted by officers and plans for future meetings were announced.

PETERS STUDENTS WILL ENTER SPECIAL CONTEST

Plans have been completed for a horological contest for students of the Peters School of Horology and prizes are to be awarded winners, Forrest E. Peters, tech-

nical director of the school, has announced.

The contest will begin in June and continue through December 1, 1949. All entrants must submit their watches to the standard "Certified Watchmaker" examination given by the H.I.A. and the examination results will determine who will receive the special awards, Mr. Peters said.

A minimum grade of 90 must be made by the students to qualify for any of the prizes and a minimum of ten entrants must have qualifying grades, he explained. The contestant with the highest grade will receive first prize.

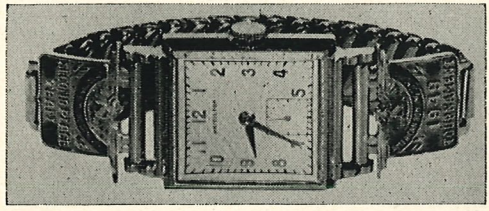
First prize will be a Peerless lathe, complete with motor, rheostat and ten chucks.

Second prize will be a Peerless cleaning machine with automatic reversing.

Third prize will be a Moseley staking tool.

Fourth prize will be a Marco mainspring assortment with cabinet.

The value of the prizes is almost $400, Mr. Peters stated.



Erlfmeyer & Son, Co., Inc., Milwaukee, Wisconsin, designed and produced this special bracelet for the 1949 American Bowling Congress. Nine Hamilton watches fitted with the special bracelet were awarded to second place winners at the bowling classic in Atlantic City. Model pictured is the 14K gold Glenn.

Paulson Introduces Automatic Hairspring "Untangler"

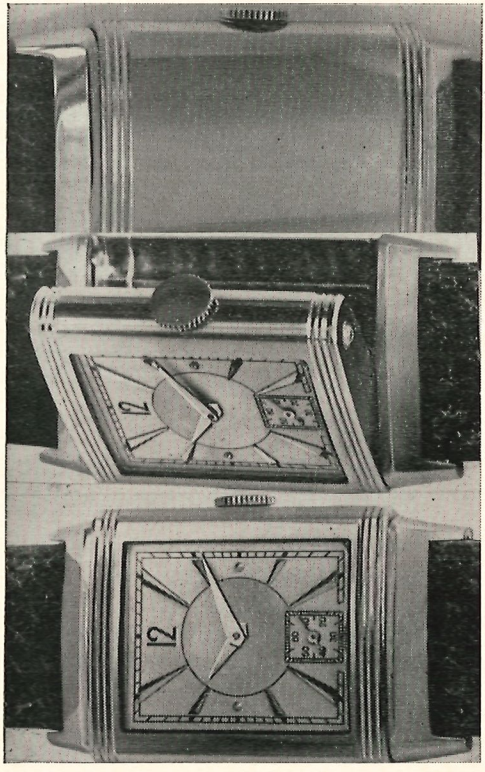
A new tool which promises to fill a much-needed want has been introduced by Henry Paulson & Co., 131 S. Wabash Ave., Chicago 3, Illinois. This tool has been highly recommended by watchmakers who have used it, as the answer to a tedious and time-consuming operation. The tangled coils of a hairspring can be quickly and safely "unraveled" on any size or type of hairsprings.

For further information, write HENRY PAULSON AND CO., Chicago.

CLUTCH: A device, in the stem-wind watch to shift power from the stem to either the winding or setting gearing.

REVERSIBLE WATCHES DEVELOPED BY SWISS

The Swiss watch industry has revealed one of the newest is a smartly designed, special-duty jeweled-lever wristwatch which is reversible. In normal position, the watch resembles any quality Swiss watch. But before beginning a game of tennis or other sport, the wearer simply pushes the watch from one side, sliding the case along its metal frame, flipping it over, with the steel back facing up from the wrist, and the crystal face down.



The new "REVERSIBLE" wrist watch shown above, was designed to meet the rugged demands of the sportsman. He can now engage in his favorite game without worrying about breaking the crystal. The lower picture shows the "reversible" case in normal dial position. The center illustration shows the normal position of the watch being changed to safety position. The top photo shows the case in "dial-down" position and protecting the crystal.

This reversible case is of double-purpose design for those who prefer two uses in one watch. In normal position it is a standard attractive watch. The reversed position is a practical method of avoiding shock and breakage. This position also permits the watch to be used as an identification barcelet, with name, initials, coat-of-arms, fraternity or club insignia engraved on the back of the case.

CLOCKWISE: Moving in the same direction as the hands of a clock—from left to right, looking at the top of motion.

The June Cover Story

Horologists of the early 18th Century had turned their talents to designing a clock escapement which would overcome the handicap of "pitch" and "roll" of a ship at sea.

The escapement drawing, shown on the front of this issue, is the idea of JEAN BAPTISTE DUTERTRE, a famous French horologist, who conceived the idea that by using two pendulums so arranged that their "swings" would cross, would overcome the "pitch" and "roll" of the vessel, and one pendulum would be "active." Dutertre constructed a clock of this description in 1728, only to find it was impractical.

A running model of Dutertre's double pendulum escapement can be seen in the famous ELGIN WATCH COMPANY'S Earl Clock Escapement Collection now on display in the "TIME ROOM" of the Museum of Science and Industry, Jackson Park, Chicago. The famous PACKARD COLLECTION of watches, the property of the Horological Institute of America, is also on display in the "TIME ROOM" of the Museum.

LOST AND FOUND

LOST—The sale of a watch repair because you were unable to obtain the necessary part. Found, a complete supply house that specializes in "Hard-to-Get" watch parts. If you are having difficulty in obtaining a Swiss or American watch part, try JOHN A. POLTOCK & CO., 15 Maiden Lane, New York 7, N. Y. Write for FREE catalogue, ligne gauge and stationery.

Classified Advertising

CLASSIFIED—Payable in advance. Rates under all headings, except "Positions Wanted," $1.50 for first 25 words, five cents for each additional word. "Positions Wanted," 75 cents for first 25 words, five cents for each additional word. Bold face type five cents additional per word; capitals, also five cents additional per word. Box numbers for "Blind" advertisements, 50 cents additional for postage and handling.

● SPECIAL SERVICES

HAIRSPRING VIBRATING — Same day service. Flat, $1.75; Breguet, $2.50. Fitted to bridge—leveled—poised—checked. Write today for mailing envelopes. CHARLES THOMAS & CO., P. O. BOX 330, Union City, N. J.

Assorted staffs for American Watches: Elgin, Waltham, Hampden, Howard, etc., 50 for $2.95; 100 for $4.95. Mainsprings, assorted, same—$1 per doz.; 100 for $5.95. MORRIS FREY WATCH CO., 915 Holland Bldg., St. Louis 1, Mo.

WATCHES USED:
5—Swiss Wrist Watches in Y.R.G.P. and G.F. cases, needing minor repairs.....$20.00
10—Swiss Wright Watches needing repairs..$20.00
5—Assorted Wrist and Pocket Watches.....$ 6.00

B. LOWE
2nd Floor Holland Bldg., St. Louis 1, Missouri

BALANCE STAFFS made for unusual or obsolete watches. Send sample staff only—prompt service. C. R. CHAPMAN, Box 268, Laramie, WYOMING.

Dumont Tweezers No. 3—3c—5	Each	$1.50
Stems—Swiss or American	Dozens Only	.50
Staffs—Swiss, 90c	Dozens Only	1.25
Mainsprings—Swiss	Dozens Only	1.50
Crowns—GF, 60c—Waterproof	Dozens Only	1.50
Complete Balances flat hairspring	Each	1.50
Screws—Assorted; over 1,000—dial—jewel—etc., complete		2.50
New 17-Jewel Movements, 8¾ and 6 x 8 L.—Each		8.95

WILSON IMPORTERS, 811 HUNTS POINT
New York 59, N. Y.

● SITUATIONS WANTED

INDIANA LICENSED WATCHMAKER—Served apprenticeship. Also graduate watchmaker. Five years of diversified experience in watch, clock and jewelry repair. Capable of taking complete charge of repair department. D. A. RIGDON, JR., Box 5, Salem, Indiana.

WATCHMAKER, H. I. A. certified BRADLEY trained, experience since January, would like position to increase speed and efficiency. Permanent. Salary or commission. Illinois preferred. Lawrence Redig, 327 North Ninth Avenue, West Bend, Wisconsin.

● HOROLOGICAL BOOKS

WHAT MAKES IT TICK—A text book for Watchmakers and Students; 64 pages, fully illustrated. 75c copy. DEAN CO., 116-H Nassau St., New York 7, N. Y.

OLD - NEW—Practical, Theoretical, Historical, all phases Watch and Clockmaking. Liberal estimates entire libraries, books, periodicals, embracing horological subjects. Advise requirements; or what have you? "HOROLOGIAN," 841 S. Park, Springfield, Illinois.

JOSEPH BULOVA School of Watchmaking Technical Training Manuals—$5.00, including 1-year membership in the Horological Institute of America, Inc., 1 year's subscription to the H. I. A. JOURNAL. The MANUAL contains more than 250 pages of practical information on every phase of successful watch repairing and more than 600 accurate drawings. Ralph E. Gould, Sec'y, Horological Institute of America, Inc., Washington 12, D. C.

WATCHMAKERS, Apprentices, Students, Instructors—THE WATCH REPAIRER'S MANUAL, by Henry B. Fried. A complete Manual on every phase of watch repair. See page 2. D. VAN NOSTRAND CO., Publishers, New York City.

WATCHMAKERS—Increase your earning power. Increase your skill quickly and easily; 7th edition, "PRACTICAL BENCHWORK FOR HOROLOGISTS," by Louis and Samuel Levine; 20,000 copies sold. FOR SALE AT ALL LEADING WATCH MATERIAL AND JEWELERS SUPPLY HOUSES. PRICE $5.00.

● TRADE WATCH REPAIRING

HIGH-GRADE WATCH REPAIRING for the trade. Work time and checked on the WATCHMASTER. Satisfaction guaranteed. Complicated watches a specialty. 10-day service. Write for price list. CURTIS V. HASKINS, 1215 West 32nd Street, Indianapolis, Ind.

WATCH REPAIRING for the trade, estimates solicited. Price list upon request. Complicated and regular repairs accepted for complete or partial work. HOWARD SIMON, Box 273, Lake Ronkonkoma, New York.

● BUSINESS OPPORTUNITIES

FOR SALE—WATCH MOVEMENTS for sale. For practice, hobby, or material. Sold 'as is.' Hundreds listed. Send 25 cents in stamps. LEO KHALIF, P. O. Box 2441, New Orleans, La.

TRADE—Send us a pound of yellow gold-plated and gold-filled scrap, for our selection of 25 Swiss wrist watch movements, or 25 usable assorted yellow gold-filled and gold-plated wrist watch cases. B. LOWE, Holland Bldg., St. Louis 1, Mo.

FOR SALE—W. W. and Moseley Style Wire Chucks in half sizes—1 to 3, $3.50 each—4 to 9, $2.50—special precision made—gauaranteed TRUE. Regular CHUCKS 10-80, $1.50. Lathe Repairing, Wheels, Pinions and Music Box Worms made to order. JES I. HANSEN, 202 Denver Theatre Bldg., Denver, Colo.

FOR SALE—PEERLESS No. 2 Lathe, 10 Chucks, Motor and Rheostat, A-1 condition, $100. STAKING TOOL, $40. Box A112, H. I. A. JOURNAL.

WATCHMASTER for $350; 4-foot show-case; GS crystal cabinet; all very slightly used. Illness forces quick sale. Exceptional value. R. BAKIN, 2321 E. Third St., Los Angeles, Calif. TEL. AN. 92491.

"As the Pendulum Swings"

Horology in America is "pacing" the world's progress in scientific research.

This fact is borne out in the revelations made at the annual convention of the Horological Institute of America held last month in the nation's capital, when a splendid representative group of the outstanding horologists of America, as well as representatives of Switzerland, met to discuss pertinent problems of horology.

As the history of Horology reveals, America is one of the "infant" nations of the globe, and yet it has surpassed all other nations in its comparatively short career in horological development. That same "Yankee sagacity" is evident today in extending the scope of horological development.

Problems of "mass production" in watch and clockmaking have been solved in America, just as the nephews of Uncle Sam have forged ahead of other nations in the making of airplanes, automobiles, radios, television sets, etc. In all of these commercial and economical achievements, Horology has played a most vital part.

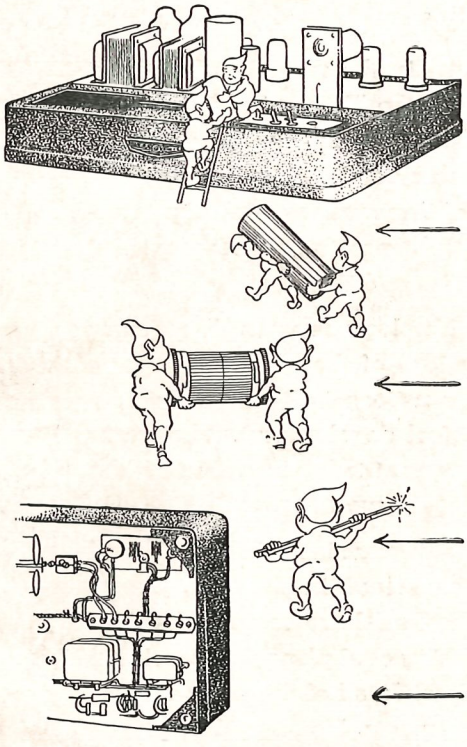
Publications of papers read at the H. I. A. convention in the H. I. A. JOURNAL will reveal much of the progress made during the past years, and students of Horology will gain much valuable information of horological achievements. Higher standards of efficiency in the training of horologists have been established, too.

Thus, "TIME MARCHES ON . . . !"

Why Do Large Watch Manufacturers

AND SO MANY OF THE TOP JEWELERS AND WATCHMAKERS use the

Watch Master



SEE WHAT THEY GET FOR THEIR MONEY

THE FREQUENCY STANDARD is a bi-metallic, electronically-driven tuning fork, hermetically sealed against temperature and barometric changes. It is guaranteed accurate to 1/1,000th of 1% and is calibrated against a standard accurate to 1 part in ten million. This standard was chosen for the WatchMaster because of its *stable* precision under all conditions and because it operates at a *low frequency*, ideal for watch-rating.

THE DRUM, on which the watch record appears, holds the chart paper *tight* so that it cannot sway or falter, thus producing a *precision* record.

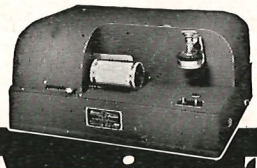
THE STYLUS, which prints the record, is tipped with a sapphire which prints a *round dot*. The closeness of the dots produce a record by which even the slightest watch irregularities can be detected without recourse to measurement by mechanical means.

THE ELECTRONIC HOOK-UP. Note the simplicity made possible by the *low-frequency* of the tuning fork. This contributes to trouble-free operation. NO WATCHMASTER HAS EVER WORN OUT.

* * *

With the WatchMaster comes personal installation, mechanical instruction, educational data on watch-rating as improved methods are developed, guild lectures throughout the country, advertising material for the promotion of your business, a nation-wide service set-up and a customer acceptance evidenced by the fact that so many ask, "Have you a WatchMaster?"

IN TIME-SAVING, BETTER WORK AND CUSTOMER GOOD-WILL HUNDREDS OF USERS SAY, "THE WATCHMASTER QUICKLY PAYS FOR ITSELF."



American Time Products, Inc.

580 FIFTH AVENUE NEW YORK, N. Y.

Distributors of Western-Electric Watch-rate Recorders