

**SERVICE &
REPAIR DATA**

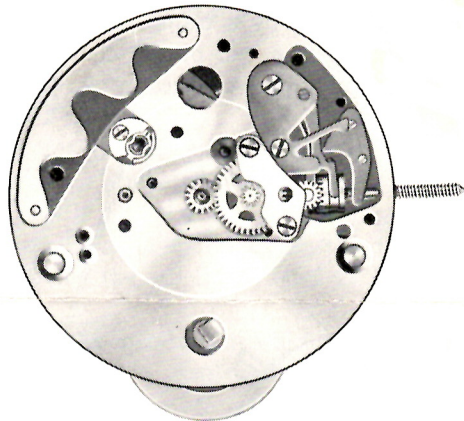
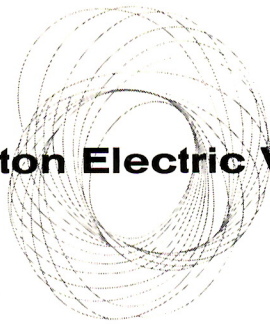
HAMILTON 5/0 MOVEMENT

GRADE 500

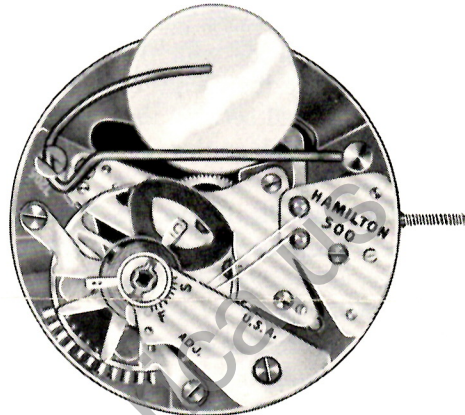
U. S. and Foreign Patents Pending.

Hamilton Electric Watch

**HAMILTON
SERVICE
BULLETIN
217**



DIAL SIDE
2X Actual Size



TRAIN SIDE
2X Actual Size

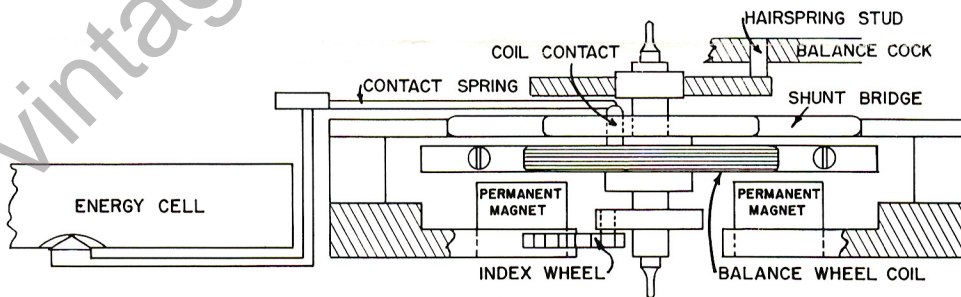
Balance wheel is shown in a position opposite to "at rest position" to illustrate the coil.

The Hamilton Electric watch, Grade 500, is the product of years of engineering research and development, and many months of exhaustive wear tests. It has no mainspring and runs without winding whether or not it is worn. It employs a principle of producing the impulse of the balance wheel by means of an electric current, supplied by an energy cell contained in the movement. The energy cell delivers full power until exhausted, giving the balance wheel constant and steady motion, day after day. The major effects of

isochronal error and poise error are therefore minimized, resulting in a most accurate timekeeper. Over 40 United States patent applications are pending covering various features of this movement.

New parts, totally different from any previously used in watches, are required to employ the electrical principle. Platinum alloy permanent magnets are used in its simplified construction.

Incabloc shock mountings are used to protect the balance staff.



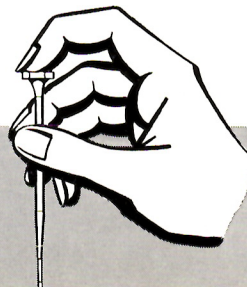
PROFILE OF BALANCE WHEEL MOTOR

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HAMILTON WATCH CO.

LANCASTER, PENNSYLVANIA

SERVICE



BULLETIN

How to Start the Watch

The Hamilton Electric watch has a seconds setting feature. Pulling the crown out to setting position stops the watch. When the mechanism is in setting position, the balance wheel is not in contact with the electrical system and there is no drain on the energy cell, and no current is then used.

Initial shipments of Electric watches will be made with the watches running.

As production increases and stocks are built up, shipments will be made with the watches in setting position to conserve the energy cell. A plastic energy guard will be inserted between the case and the crown to prevent accidental seating of the crown in running position.

To start the watch, remove the energy guard and snap the crown toward the case, into running position.

How to Set

To set the watch to the second, pull the crown into setting position, stopping the watch in advance of a time signal, or of a standard time piece. Set the hour and minute hands to the desired hour and minute. At the signal, or when the standard time piece coincides with the watch setting, snap the crown to its seat, in running position. The watch will start, on time to the second. *Caution: Be careful not to turn the crown while pressing it to running position.* If turning tension is maintained on the crown while it is snapped to running position, the balance wheel may be released before the setting mechanism and the hands may "spin". This causes no harm, merely requires that the watch again be set, and the crown snapped in properly.

Servicing

Electric watches will be a very small part of the watchmaker's total watch repairs for quite some time to come. It is not economically wise for him to invest now in the necessary equipment to fully service electric watches. When they become more general, Hamilton will guide him in the selection of the necessary equipment, and will provide training or instructions for fully servicing electric watches.

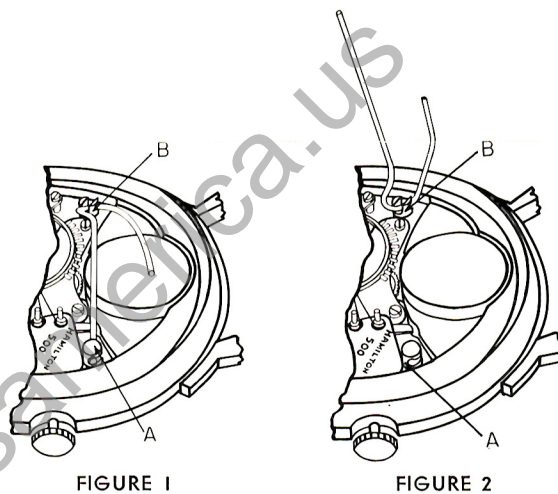
For the present, factory service is desired in order that Hamilton research technicians be fully informed on the use of this new concept in timekeeping mechanisms, in the field. This experience will enable Hamilton to give exact and comprehensive instructions to the watchmaker.

The watchmaker should change energy cells, crystals and straps. He should regulate the rate of the watch as necessary for individual owners. For all other service, electric watches should be forwarded *by the jeweler* to Hamilton Watch Company, until such time as it is practical for the watchmaker to enter the field.

Hamilton Watch Company will handle electric watch servicing on a movement exchange basis, requiring about one week in the factory. This will provide quick service at minimum cost. Or, if the customer desires, the original movement will be reconditioned, which will require three weeks in the factory.

Replacing the Energy Cell

The energy cell is held in the movement, in a recess of the case ring, by a clamp designed on the safety pin principle. One end of the clamp holds the cell, while the spring part engages in two posts inserted in the pillar plate.



To remove the cell, remove the back of the case. Place the watch, crystal down, on the bench, with the crown to the front, as shown in Figure 1. Push the spring clamp end down slightly and to the right. This will disengage the spring from post **A**.

Raise the spring clamp to an upright position as shown in Figure 2. Then, holding the spring clamp, turn it in a counterclockwise direction and lift it from the watch. Turn the watch over and the energy cell will fall out.

Place the new cell in the case ring recess, *flat side up*. In placing the cell in its recess hold it in your fingers by its edge. Or, hold it near its edge with tweezers, *so as not to contact its center and cover at the same time* which would short the cell and decrease its life. The spring clamp is replaced in the reverse order that it was removed. Hold the spring clamp upright and insert the square bend in post **B**. Gently rotate the clamp clockwise to engage it in the post. Lower and push the spring clamp along the right side of post **A** and engage it in the slot on the post side. Be sure to push the spring end into the post securely.

After replacing the energy cell, start the balance wheel by pulling the crown into setting position and returning the crown to running position. The balance wheel motion should increase until it is again running

at full motion, about $1\frac{1}{4}$ turns in a flat position. If the balance wheel does not continue running, the cell may not be properly seated on the contact. Remove the cell and repeat the procedure.

If, after following the above procedure, the balance wheel does not continue to rotate, repeat the procedure with a second new cell. If the balance wheel will not continue to rotate after replacing the cell the second time, the watch must be considered in need of service and should be forwarded to Hamilton Watch Company.

The Energy Cell

Replacement energy cells are packaged in sealed foil envelopes with a laminated plastic liner to prevent shorting the cell. Replacement cells are guaranteed to run the watch for 12 months from the date of the cell sale, provided the cell is less than 12 months old when sold.

The lower the temperature in which cells are stored the longer the cell life. Replacement cells should be stored in a cool place, *never in a temperature in excess of 90° F.* The higher the temperature to which cells and watches are exposed, the shorter the cell life. Exposure of the watches and cells to high temperatures should be avoided.

Cells which fail in less than a year will be replaced free of charge.

Order energy cells direct from Hamilton Watch Company, Lancaster, Pa.

Stavar* Anti-Magnetic Hairspring

The hairspring of the Hamilton Electric watch is of Stavar*, a new anti-magnetic alloy specially developed for this application. It is not affected by the permanent magnets in the watch.

The Permanent Magnets

In the electrical system platinum alloy permanent magnets are employed. These are necessary; the watch will not run if these are demagnetized. Demagnetizers presently available to watchmakers cannot demagnetize them. They should not be subjected to stronger demagnetizers.

The platinum alloy permanent magnets are powerful but small and their magnetic field is correspondingly small. They have no permanent effect on the hairspring or other watch parts. They will magnetize tools which come in contact with them. It is recommended that brass or nickel tweezers be used in cell changing or regulation.

The Stavar* hairspring is unaffected by outside magnetic fields, but other steel parts may be magnetized by outside fields. Because of the permanent magnets in the watch, a compass is of no use whatsoever in detecting whether steel parts are magnetized, in the assembled watch. A slight change of rate is the only indication of exposure to strong outside magnetic fields. Demagnetizing the watch with an ordinary demagnetizer will demagnetize the carbon steel parts but will have no effect on the platinum alloy permanent magnets. An improvement in rate is the only indication that the demagnetizing has been effective. Non-magnetic second hands (brass or nickel) must be used.

Regulation

The Hamilton Electric watch is equipped with a "tail-less" regulator. This provides a great range of regulation. When regulating the watch, the position of the regulator slot is compared to the markings on the balance cock. Moving the regulator one space of the balance cock markings is equal to about $2\frac{1}{2}$ minutes per day. It should not be necessary to alter the balance screws or to add washers for regulation.

Use of Rate Recorders

The electrical system of the Hamilton Electric watch does not produce the hard tick of conventional watches and standard rate recorders with the usual sound sensitive crystal microphones will not produce "clean" lines. In fact, such microphones will produce one sided lines, two separated lines, or scalloped lines, depending on the sensitivity of the machine. *Pay no attention to such lines. They are meaningless in the electric watch and are not an indication of its performance.* Read only the direction of the line for determining the rate for regulation.

18,000 Beat Train

The train is 18,000 beats per hour, the same as standard watches. Calculation of the rate on a timing machine is made as usual. While the train is standard, advancement is in one direction of the balance wheel only. Each advance is two-fifths of a second. The second hand will make five advances in two seconds. Close observance of the second hand will show that the hand will be "on the dot" every two seconds.

Waterproof Cases

Case gaskets, crowns, crown gaskets, crown nuts, and crystals are available from Hamilton Material dealers.

* Stavar is a trademark of the Hamilton Watch Company.