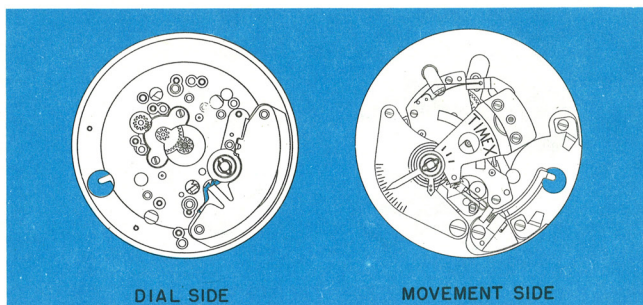


TIMEX model 67

13½ lig.
30.50 mm
1.201 in.

the TIMEX Model 67 Movement



The Timex Model 67 (Caliber 861 & 860) is a $13\frac{1}{2}$ ligne electric watch movement. The power to drive the movement is supplied by a miniature energy cell. Power from the energy cell drives the balance. The balance drives the time train which, in turn, rotates the hands. The sweep second hand of the Timex electric watch jumps once each second rather than "beating" 5 or 6 times per second as in the conventional watch.

The energy cell is guaranteed for 12 months and replacement cells are available from your local Timex dealer, repair station or the Timex Material Sales Division. **It is important to use only genuine Timex Energy Cells, Type A.** Other types, although they look the same, may not deliver the necessary voltage or life and, in addition, may leak, seriously damaging the movement.

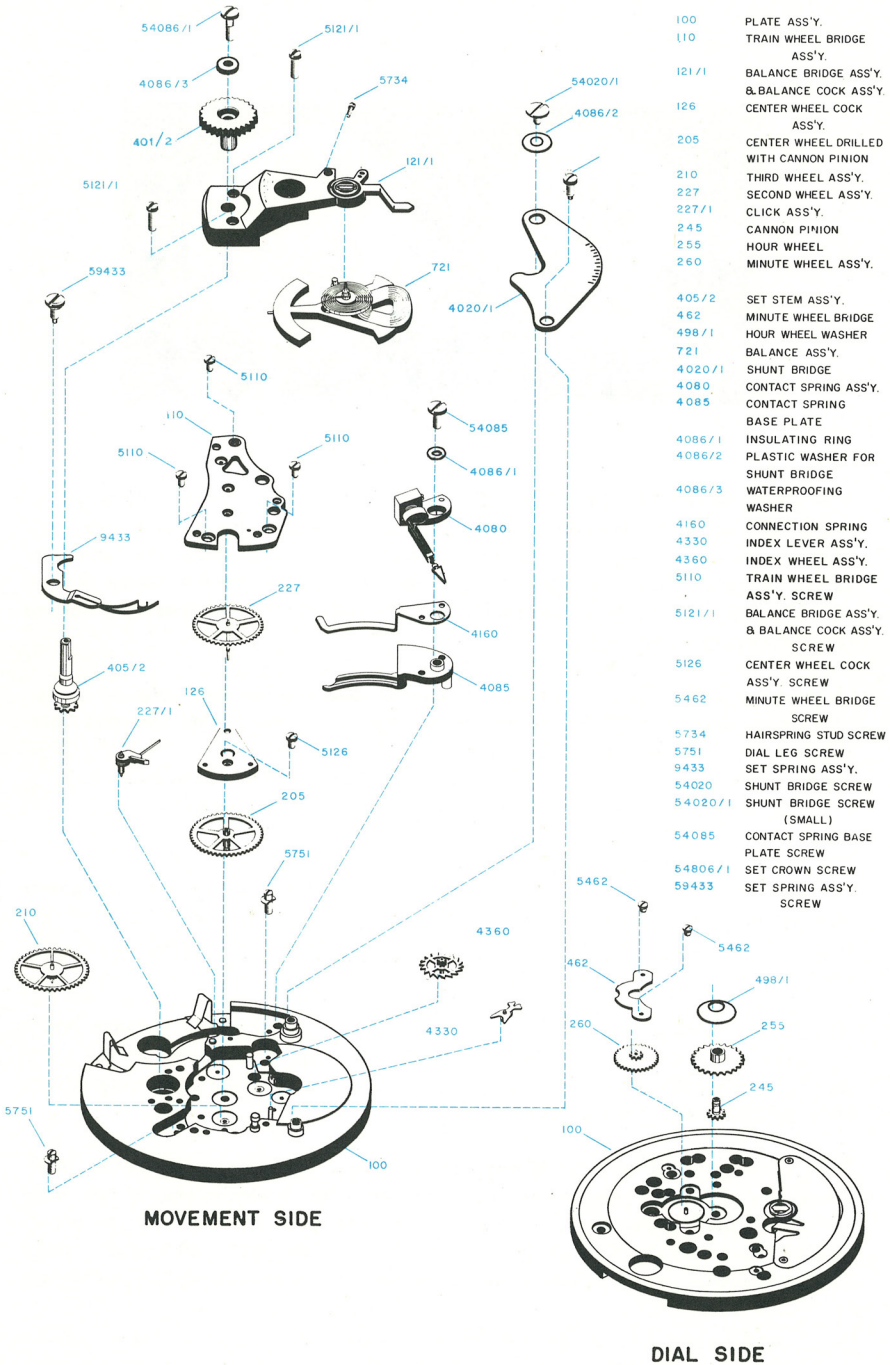
The hands are set by pulling out and turning the crown set wheel located on the back of the watch. The watch is stopped when the crown set wheel is pulled into set position, allowing the time to be set exactly to the second. When the crown set wheel is in the set position, the flow of current is interrupted and the energy cell is not being discharged.

The Timex electric has an hourly beat of 21,600. The large balance has a temperature compensated hairspring and the rate can be adjusted in the usual way by moving the regulator. The Timex electric can be checked in all positions on a normal watch rate recorder.

The Timex electric can be dismantled and repaired with conventional tools. There is no need for special knowledge of electricity or electronics, or any need for complicated electrical measuring or inspection devices, new tools or microscopes. For checking the energy cell voltage, a high ohm volt meter (about 20,000 ohms per volt), which is now in use in most repair stations, is sufficient.

Since watch contains permanent magnets, no attempt should be made to demagnetize the watch.

the TIMEX model 67 movement (exploded view)



Disassembly of Movement (model 67)

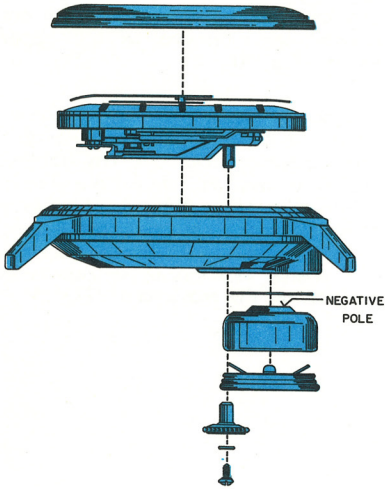
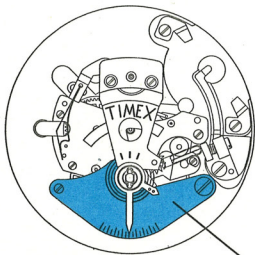


FIG. 1

Before lifting the movement out of the case, first remove the energy cell from the watch case. To avoid damage to the case, the energy cell cover should be opened with a case opener only at the spot indicated for this purpose. After unscrewing the set wheel screw, remove the setting wheel. Using a Timex crystal lift or a conventional crystal lift, remove the crystal from the case. The movement can now be removed from the case (Fig. 1). Note: Movement is taken out from the dial side.

No attempt should ever be made to remove the caseback, as it is fixed in place with epoxy resin.

A small percentage of cases may be found where there is no energy cell cover on the back of the case. To service these models, it is necessary to remove the setting wheel first, and then the crystal. The watch movement can be taken out of the case after removing the crystal. Finally, the energy cell and its component parts can be removed from the recess in the caseback.

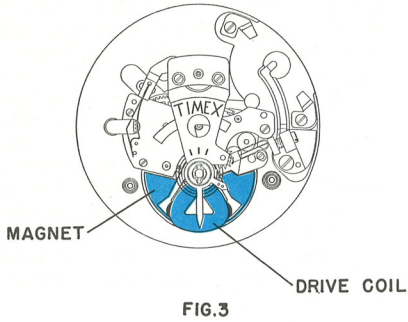


UPPER SHUNT

FIG. 2

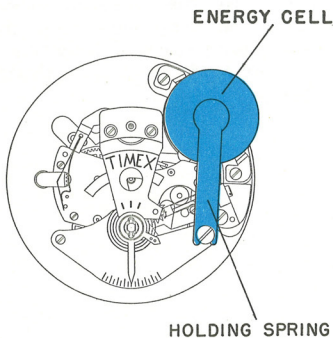
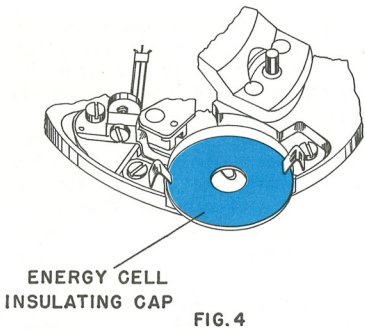
The function of the electrically impulsed balance wheel can be understood by following this simple experiment. For the caliber 861 movement, use the following procedures. Place the movement, with the dial down, on a suitable movement holder and take off the upper shunt (Fig. 2).

Disassembly of Movement Cont'd.



The construction of the driving parts can now readily be seen. The large, specially shaped balance with its drive coil and a large shaped magnet are evident upon removal of the upper shunt (Fig. 3).

The energy cell should now be clamped to the movement by the use of a holding spring (Fig. 5). The holding spring is available from the Timex Corporation and will be supplied upon request. Before clamping the energy cell in position, make certain that the flat energy cell insulating cap is in position on the movement (Fig. 4).



Disassembly of Movement Cont'd.

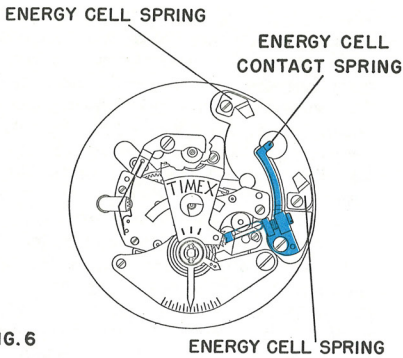


FIG. 6

The negative pole of the energy cell must touch the energy cell contact spring which is insulated from the plate. The positive pole of the energy cell, i.e., the metal case, must touch the two side energy cell springs which are connected to the plate. Note: Never cause any metallic connection between the parts shown in blue in Fig. 6 and the parts shown in white, if done, a temporary short circuit would result which could shorten the life of the energy cell.

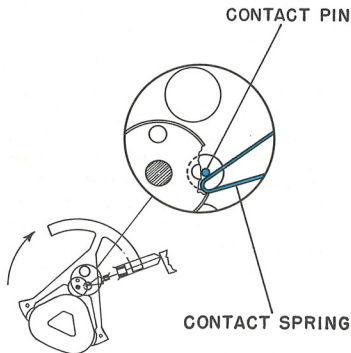


FIG. 7

For the caliber 860 movement, the procedures, as shown above, are used except that the flat energy cell insulator and two side energy cell springs are not present on the movement. Use the shaped plastic energy cell insulator between the movement and the negative pole of the energy cell to insulate the energy cell from the plate.

Rotate the balance slowly from its rest position with a clean brush, (Fig. 7). The instant the contact spring touches the contact pin fixed on the balance drive coil. The current induces a magnetic field which opposes the field of the magnet. This opposition of magnetic fields imparts an impulse to the balance.

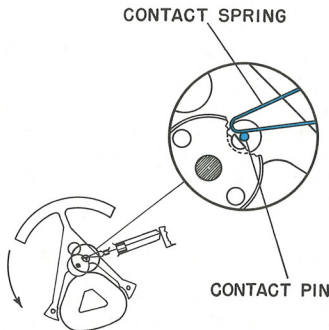
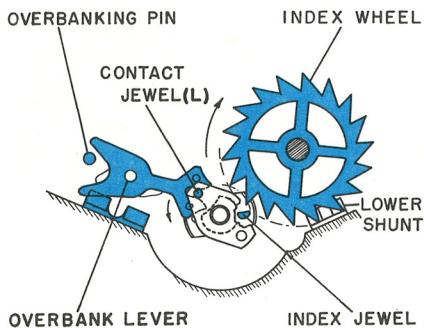
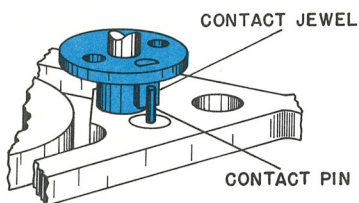
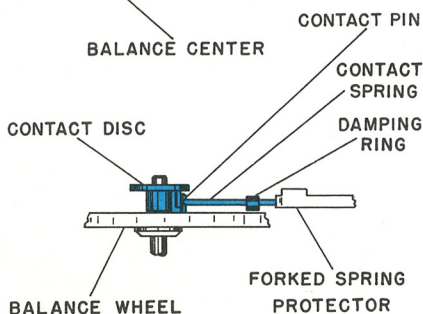
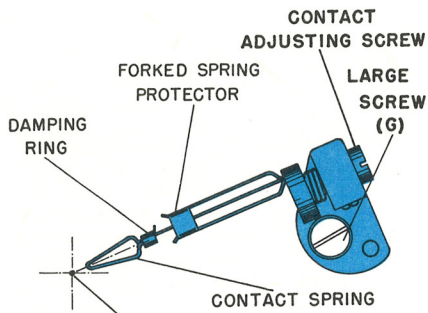


FIG. 8

After the balance returns to its neutral position, the same process is repeated in the opposite direction (Fig. 8). Repeat this test several times until the drive action is fully understood. The function of the remainder of the movement is fully mechanical. Before any further work is carried out on the movement, the energy cell should be removed to prevent possibility of a short circuit.

Disassembly of Movement Cont'd.

The contact parts —

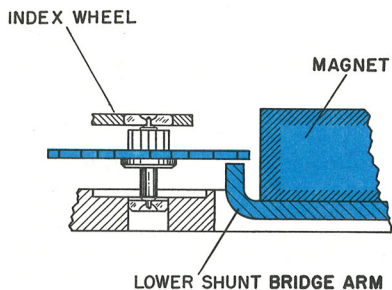


The contact spring must be pointing exactly to the center of the balance staff. It should be centered horizontally between the contact disc and the balance. The forked spring protector should be adjusted so that the contact spring is exactly in its center. The contact spring requires very careful treatment. Protect it from scratches and deforming and avoid bending while adjusting. Do not touch the contact end of the spring. Do no rubbing, grinding, polishing, etc., on it. In short, treat it exactly as you would a hairspring. After removing the large screw (G) and the insulating washer beneath it, remove the complete contact spring assembly together with the insulating plate. The loose damping ring and the spring protector need not be dismantled further. The contact adjusting screw should not be turned. It has been fixed in the best position at the factory with a drop of epoxy resin. You can now remove the balance cock and the balance. Treat the contact pin on the balance with the same delicacy afforded the contact spring. The contact pin is protected to a great extent by the contact jewel behind it and the contact disc located on top of it.

The caliber 861 incorporates an overbanking lever not used in the caliber 860 movement. The overbanking lever is operated by the jewel (L) fixed on the balance assembly and is kept in place at its extremities by magnetic attraction. The overbanking pin limits the amplitude of the overbanking lever in the same manner as a banking pin limits the amplitude of the pallet lever in a mechanical watch.

Your next inspection should be the gear train of the watch. It is driven by the "D" shaped index jewel located on the balance. This jewel moves the index wheel one tooth at every second half oscillation of the balance.

Disassembly of Movement Cont'd.



So long as the index jewel is not in contact with the index wheel, the index wheel is held in its rest position by magnetic attraction between it and the arm of the lower shunt. By rotating the index wheel slowly with a fine pointed cleaning stick, the driving action can be observed. The sweep second wheel is moved one tooth at every third index of the index wheel. The gear arrangement serves to move the sweep second wheel between second jumps in such a position that the straight side of the sweep second wheel tooth, next engaged by an indexing pinion tooth, is exactly on the center line between the sweep second wheel center and the index wheel center. The face of the teeth on the index pinion also fall on the same center line after every third indexing, and touches a sweep second wheel tooth. To adjust the position of the index wheel, bend the lower shunt bridge arm. To adjust the position of the sweep second wheel, move the spring loaded click jewel.

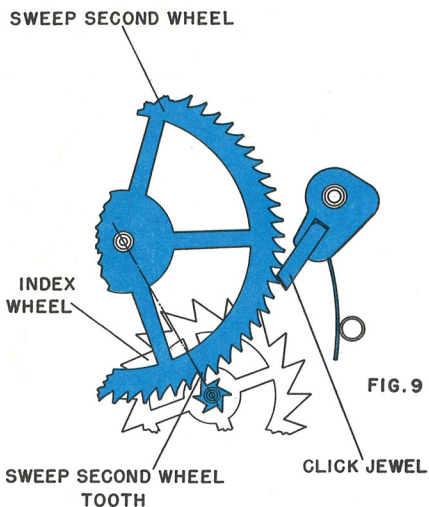


FIG. 9

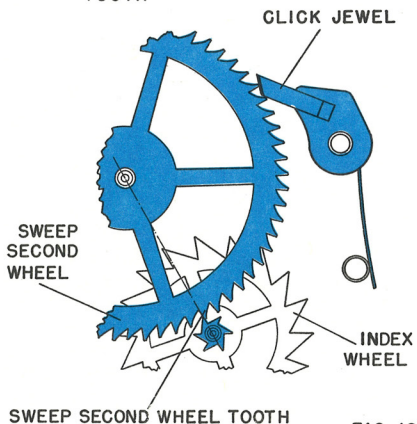


FIG. 10

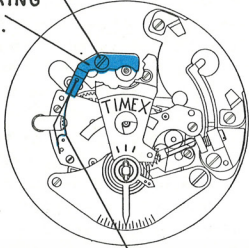
Two different click jewel arrangements have been used on the Model 67 movement. The type shown in Fig. 10 will be found on the latest Model 67 movements, while the type shown in Fig. 9 will be found on earlier movements.

Caution: The teeth in the index pinion are in precise alignment to the index wheel. Do not disturb this relationship. Also, care should be taken so as not to increase the air gap between the index wheel and the lower shunt arm. If the spring loaded click jewel is adjusted, the tension of the click should not be changed, as it is adjusted for the best action.

Disassembly of Movement Cont'd.

SET SPRING SCREW

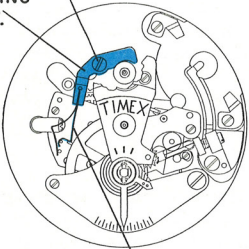
SET SPRING
ASS'Y.



STOPPING SPRING

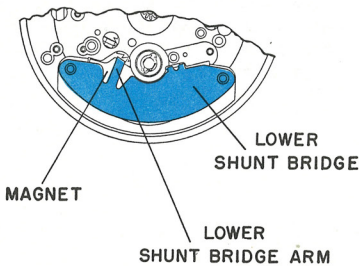
SET SPRING SCREW

SET SPRING
ASS'Y.



STOPPING SPRING

The function of the hand setting device is quite simple and needs little explanation. The balance stopping arrangement should be adjusted so that the stopping spring contacts the balance stopping pin only when the setting wheel located on the caseback is pulled out. After removal of the set spring assembly (the balance stop lever holding screw has a left hand thread) and the other parts, only the magnet and the lower shunt bridge remain on the movement. Make no attempt to remove these parts from the plate.



Cleaning, Lubricating and Timing The TIMEX Model 67 Electric

1. The movement may now be cleaned in the usual method using normal watch cleaning and rinsing solutions. The balance and contacts must be cleaned very carefully using only new and clean solutions. Do not clean the energy cell with any liquid. If necessary, it should be wiped with a dry cloth only.

2. After cleaning, any particles adhering to the magnet should be carefully removed. A piece of scotch tape rolled to a point will be found useful in removing particles. (This process should not be used when the movement is assembled as there is danger of severing the lead wires of the balance coil.) The other parts of the movement must be free of particles, especially steel or nickel which would be attracted by the magnet. Needless to say, the watch should not be demagnetized.

3. Lubricate jeweled bearing and pivots of the train wheels and balance when assembling. In addition, the bearings and pivots of the overbanking lever and dial train should be lubricated. The remainder of the non-jeweled wheel bearings require no lubrication as the gear train is not stressed. Oil the spring loaded pawl jewel on the sweep second wheel, so that the teeth of the wheel become covered with a thin oil film. Lubricate the bearing surface of the balance stop lever at the screw, the conical part of the setting stem and the bearing of the setting stem in the balance cock. **Never** lubricate the contact pin on the balance, the contact spring assembly (spring, damping ring, etc.), the index jewel or the teeth of the index wheel.

4. The Timex electric achieves its best running results if the hairspring does not vibrate within the regulator slot. The outside edge of the hairspring should be in light permanent contact with the inside edge of the regulator key. This adjustment should not be changed. Waved lines with a period of 6 seconds and a double printed line on the recorded pattern of the watch rate recorder does not indicate poor balance amplitude with this type of watch. They are a typical feature of watches with direct gearing between balance and train wheels and have no influence on timekeeping. The average inclination of the pattern line indicates the rate of the watch.