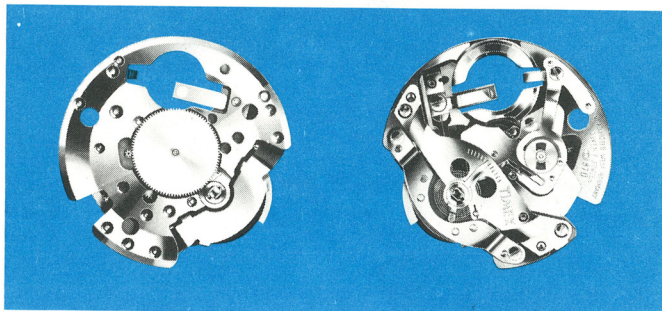


TIMEX model 84

SERVICE MANUAL
MODEL 84

13½ lig.
30.50 mm
1.201 in.

the TIMEX Model 84 Movement



The Timex Model 84 (Caliber 870/871) is a 13-½ 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 wheel. The balance wheel 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.

Other types, although they look the same, may not deliver the necessary voltage or life and, in addition, may leak, seriously damaging the movement.

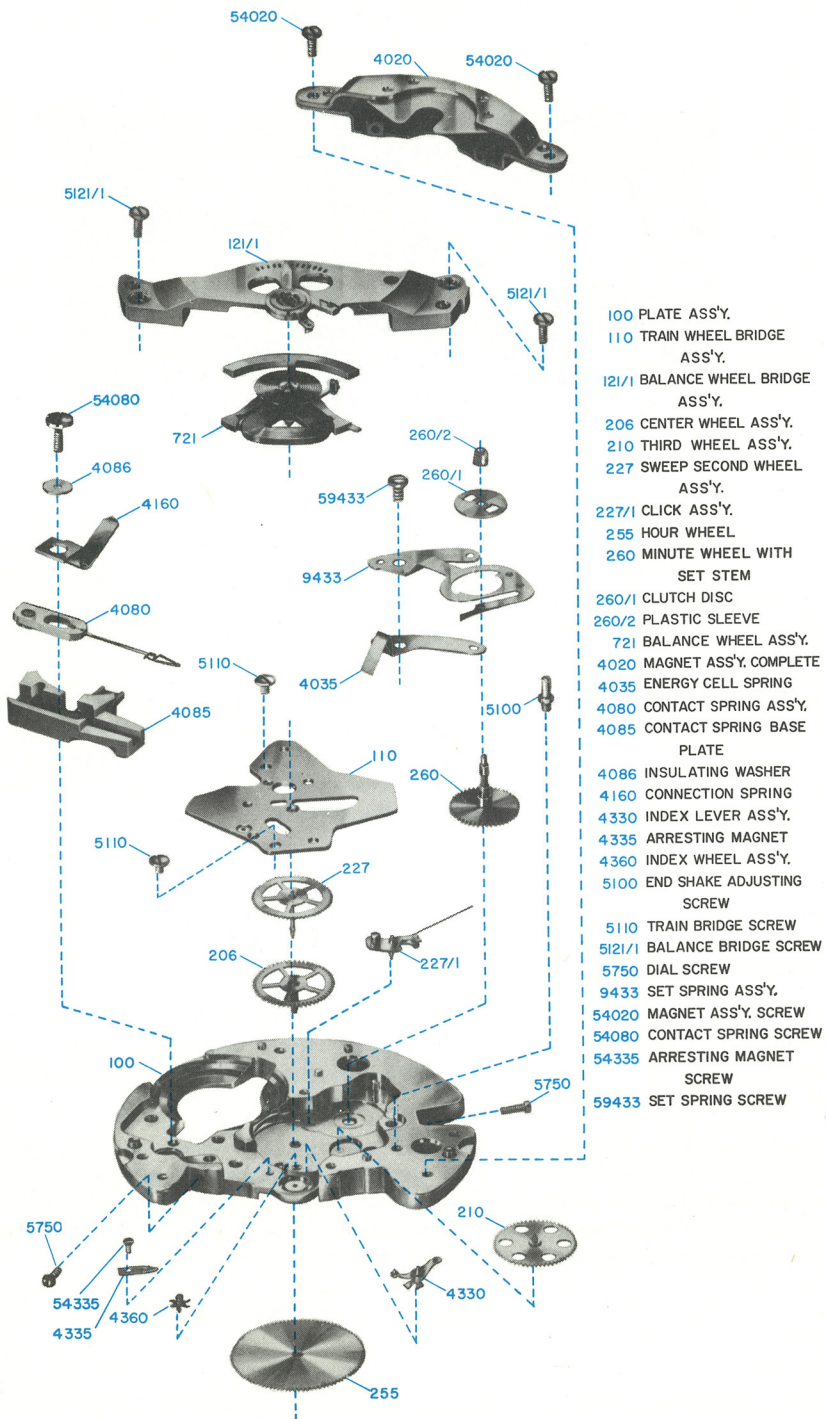
The hands are set by pulling out and turning the crown set wheel located on the back of the watch. The watch is stopped when the crown set wheel is pulled into set position, allowing the time to be set exactly to the second. When the crown set wheel is in the set position, the flow of current is interrupted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

The Timex electric has an hourly beat of 21,600. The large balance wheel 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 battery 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 84 movement (exploded view)



Disassembly of Movement (model 84)



The first step in removing the movement from the case is to remove the energy cell. To avoid damage to the watch case, the energy cell cover should be opened only at the spot indicated on the caseback (arrow and words "lift here" stamped on the caseback). Check the voltage of the energy cell. Any energy cell with a voltage of less than 1.5 volts, or one which is known to have been in service in excess of one year, should be replaced. Avoid short circuiting of the cell by metallic connections between the outer case and the negative pole as this short circuit could shorten the life of the cell.

Next, remove the crystal using a Timex crystal lift or conventional crystal lift. The movement can now be removed through the front of the case. Note the locating notch in the bezel seat (A) and the corresponding key on the balance bridge (B).

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

The crown set wheel remains with the caseback. An automatic coupling device connects it with the setting stem when the movement is replaced in the case.

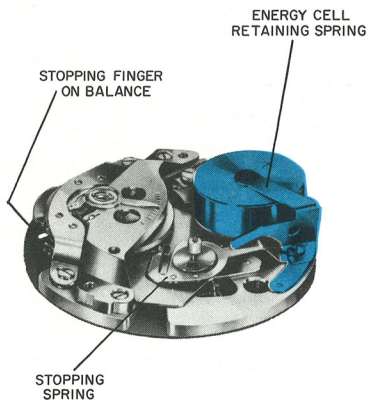
Should it be necessary to remove the crown set wheel, use the following procedure:

- Lift crown set wheel to "stop" position.
- Spread retaining spring open with tips of tweezers and push crown set wheel down through rear of case.

If necessary, the retaining spring and gasket can now be removed.



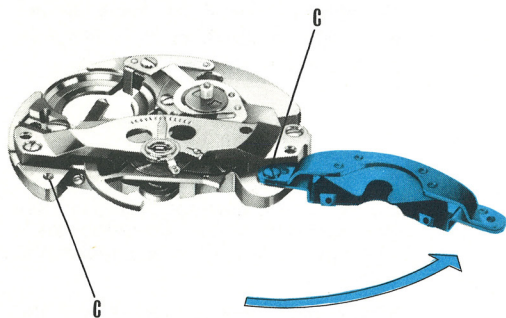
Disassembly of Movement Cont'd.



To examine the function of the movement, place the movement on a suitable movement ring and clamp the energy cell in place with an energy cell retaining spring. (**This spring is available upon request from the Timex Material Sales Division**). One end of this spring depresses the stopping spring fixed to the movement and allows the balance to be turned freely.

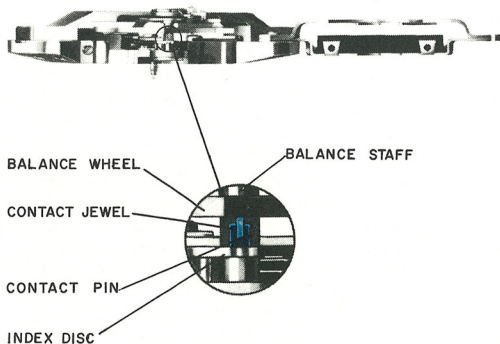
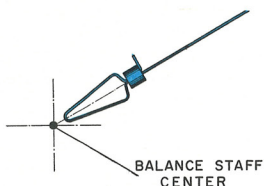
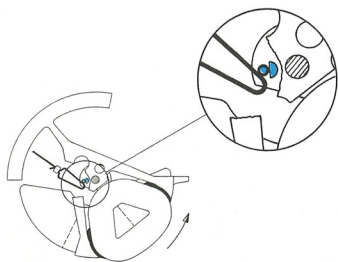
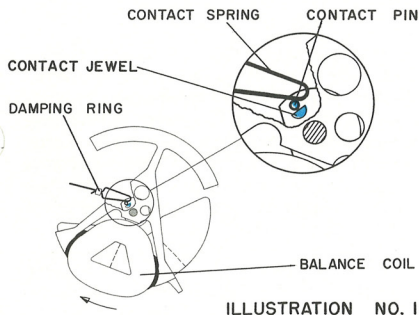
The negative pole of the energy cell must contact the connection spring (No. 4160 on exploded view). Current from the negative pole flows through the connection spring to the contact spring No. 4080. These parts are insulated from the remainder of the movement. The positive pole of the energy cell contacts the battery spring (No. 4035 on exploded view), and thus flows to the plate No. 100.

Never cause a metallic connection between the insulated and uninsulated parts of the movement as this short circuit could shorten the life of the energy cell.



The permanent magnet system, together with the shunt bridge, can be rotated out of position so that the balance wheel and contact system are visible. To do so, remove one screw (C). If desired, this assembly may be completely removed by removing both screws (C).

Disassembly of Movement Cont'd.



Rotate the balance wheel slowly from its rest position with a clean brush. See illustration 1. The instant the contact spring touches the contact pin fixed on the balance wheel, current flows through 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 wheel when the magnet is in place.

The purpose of the contact jewel is to limit the physical contact between the contact pin and contact spring so that the flow of electrical energy occurs at a precise position during the rotation of the balance wheel.

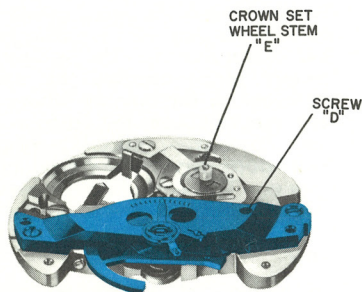
After the balance wheel returns to its neutral position, the same process is repeated in the opposite direction. See illustration 2. Repeat this test several times until the drive action is fully understood. The function of the remainder of the movement is fully mechanical. Before any further work is carried out on the movement, the energy cell should be removed to prevent possibility of a short circuit.

The contact spring must be pointing exactly to the center of the balance staff. It should be centered horizontally between the index disc and the balance wheel. The contact spring requires very careful treatment. Protect it from scratches and deforming and avoid excessive bending while adjusting. Do not touch the contact area at the end of the spring. Do no rubbing, grinding, polishing, etc., in this area. In short, handle it with the same care as is used in handling a hairspring.

The contact pin, contact jewel and contact spring must **NOT** be oiled. The presence of oil on these parts would interrupt the flow of current to the drive coil.

The length of the contact spring is fixed at the factory. No adjustment should be made to adjust this length. Accidental and unnecessary vibrations of this spring are minimized by the loose damping ring on the contact spring.

Disassembly of Movement Cont'd.



After removal of the permanent magnet from the movement, the balance bridge and balance wheel can be removed. Screw (D) serves to adjust endshake of the balance and is fixed in place with epoxy. The hairspring stud may be pressed out of the balance bridge to separate the bridge and balance wheel.

The crown set wheel stem (E) is also the staff of the minute wheel, and, as such, is connected to the crown set wheel on the caseback through a clutch device.

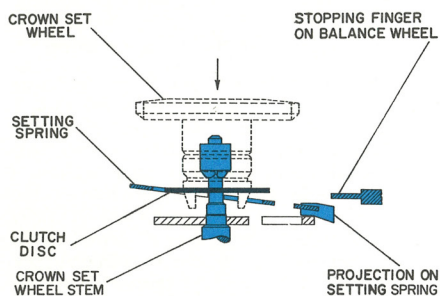


ILLUSTRATION NO. 3

In illustration 3 the crown set wheel is depressed to its running position. The clutch disc is kept out of engagement with the stem and the setting spring is depressed. In this position the projection on the setting spring is kept out of engagement with the stopping finger of the balance wheel.

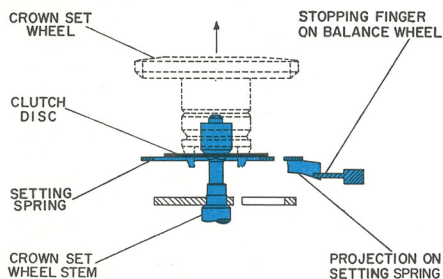


ILLUSTRATION NO. 4

In illustration 4, the crown set wheel is in the set position. The clutch disc now engages with the square portion of the stem and couples the stem and crown set wheel, thus allowing the hands to be set. This position of the crown set wheel also allows the setting spring to move upwards and butt against the stopping finger on the balance wheel, thus stopping the balance wheel.

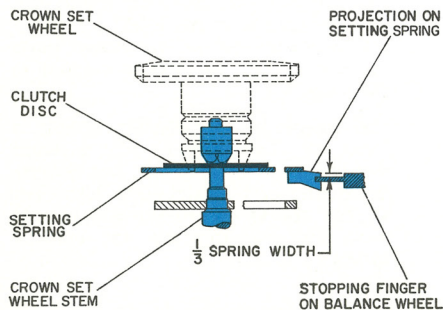
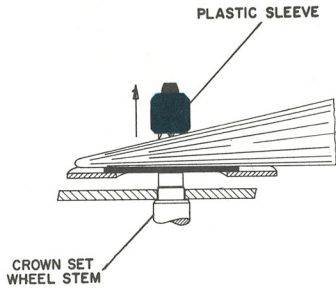


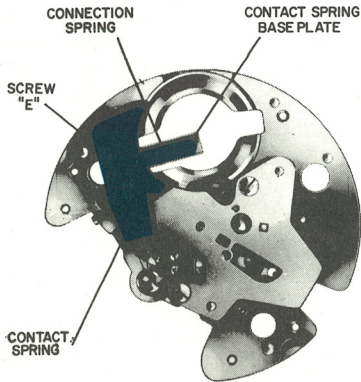
ILLUSTRATION NO. 5

Should the setting spring require adjustment, use the following procedure. Move the crown set wheel upwards so that the clutch disc is just out of engagement with the square portion of the set stem (illustration 5). The clutch disc will rest against the bottom of the square portion of the stem. In this position, the projection on the setting spring must contact the stopping finger on the balance wheel by the amount shown. When the crown set wheel is pulled into set position (illustration 4), the stopping finger on the balance wheel must be in full contact with the projection on the setting spring.

Disassembly of Movement Cont'd.



To remove the clutch mechanism from the movement, first lift the plastic sleeve from the stem with tweezers as shown. Next, remove the clutch disc. Finally, remove the screw holding the setting spring to the plate and remove the setting spring. The crown set stem will remain with the movement.



Now, remove the contact spring, contact spring base plate and connection spring. Note the insulating washer beneath the screw (E). When re-assembling the movement, be certain to replace this washer, otherwise a short circuit will occur.

Disassembly of Movement Cont'd.

The illustrations on the facing page show the gear train exposed (i.e., train bridge removed).

The action of the gear train is as follows:

In illustration 1, the balance wheel, when moving counterclockwise, will move the indexing lever (1) to the left. The lever contains a steel "D" shaped pin which advances the index wheel (2) forward one tooth. After it has advanced the index wheel forward one tooth, the indexing lever comes to rest against the banking pin (3). The tip of one tooth on the index wheel is attracted and held in position by the magnet (4). Since the index wheel is magnetically fixed in position, the steel "D" shaped pin on the index lever cannot move of its own accord out of its position between the teeth of the index wheel.

In illustration 2, when the balance wheel moves clockwise, it moves the index lever to the right. The steel "D" shaped pin will now move the index wheel backwards slightly until the pin clears the tooth of the index wheel. The index lever comes to rest against the banking pin (3) and is held by the magnetic attraction between the magnet (4) and the steel "D" shaped pin. The instant the steel "D" shaped pin clears the tooth of the index wheel, the magnetic attraction retracts the wheel back to its original position where it is set for another one-tooth advancement during the next counterclockwise rotation of the balance wheel.

When the index wheel has thus been moved forward three teeth, one tooth of the two-toothed pinion fixed to the index wheel engages the sweep second wheel and rotates it forward one tooth. This one tooth rotation of the sweep second wheel, aided by the click (5) provides the one second "jump" of the sweep second hand. The safety finger (6) insures that no more than one tooth of the sweep second wheel will index at a time.

Disassembly of Movement Cont'd.

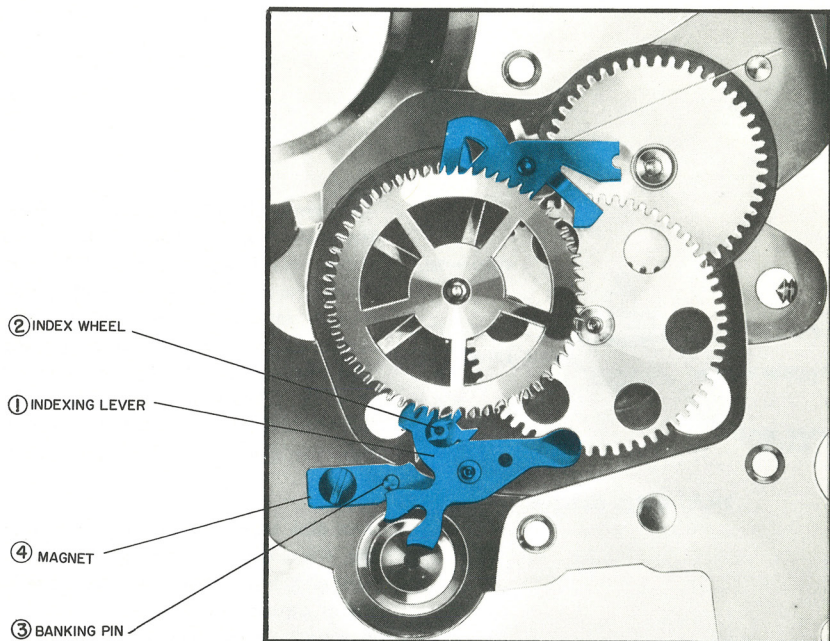


ILLUSTRATION 1

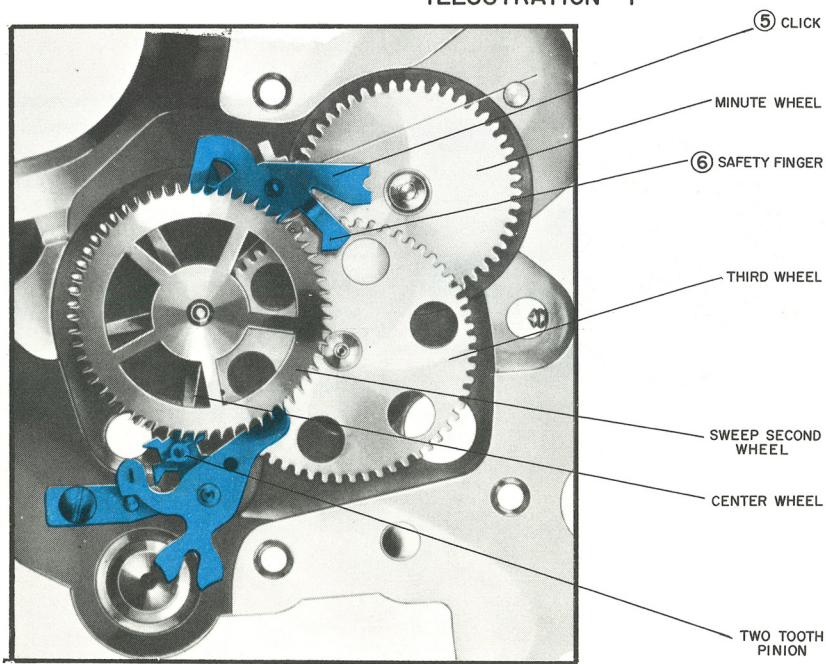
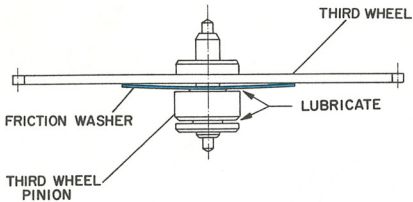


ILLUSTRATION 2

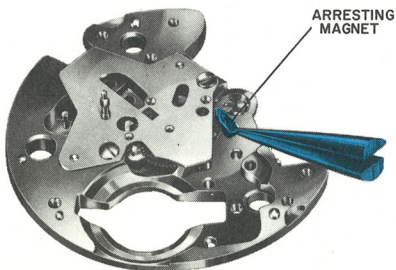
Disassembly of Movement Cont'd.



THIRD WHEEL ASSEMBLY

The remainder of the gear train functions in the normal manner. The sweep second wheel pinion drives the third wheel. The third wheel pinion, in turn, rotates the center wheel. The center wheel carries the minute hand. The teeth of the center wheel mesh with the minute wheel. The staff of the minute wheel projects through to the dial side and carries the minute pinion.

The dial train friction is provided by the third wheel assembly. A friction washer is interposed between the third wheel pinion and the third wheel. It is important to carefully lubricate this as indicated after cleaning.



The index magnet may be removed to check the train. During removal of the magnet, the index lever must be in the position shown in illustration 1, Page 84.9.

When assembling the hands, it is important that the sweep second wheel assembly be supported at the pivot to avoid damage.

When replacing the movement into the case, pull the crown set wheel out into set position to facilitate entry of the setting stem into the crown set wheel.

Cleaning, Lubricating and Timing The Timex Electric

1. The movement may be cleaned in the usual method using normal watch cleaning and rinsing solutions. The balance and contacts must be cleaned separately to prevent damage to the coil and contact spring. 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 before assembly. 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. The movement should be re-oiled in the normal manner using only high grade watch oils (oil used in factory assembly is Hamilton PML 79) Under no circumstances should oil or grease containing silicone be used. The particular points requiring lubrication are as follows:

- a) The jewel bearings and pivots of the train wheels and balance.
- b) The minute wheel and set stem bearing surfaces.
- c) The steel "D" shaped pin on the Index lever.
- d) The surface of the click which rests against the sweep second wheel.
- e) The third wheel assembly as indicated on page 84.10.
- f) The pipe of the crown set wheel so that the lubricant will seep down to the rubber waterproofing gasket which surrounds the pipe.
- g) The impulse pin on the balance wheel which moves the index lever should be lightly lubricated if the impulse pin is made of steel. In later models the steel impulse pin has been replaced by a jewel impulse pin. In this case, the jewel impulse pin should not be lubricated.

Never lubricate the contact pin on the balance or any part of the contact spring assembly.

4. The best performance of the Timex electric is achieved if the hairspring does not vibrate between the pin and key of the regulator. The outside edge of the hairspring should be in light permanent contact with the inside edge of the regulator key.