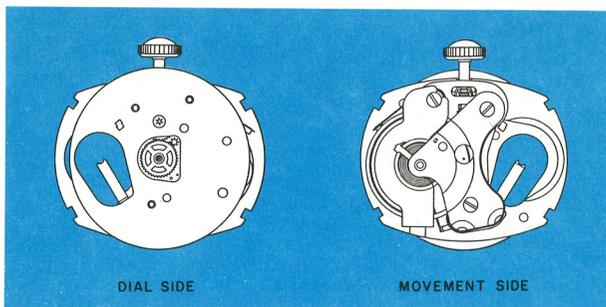


# TIMEX model 40

SERVICE MANUAL  
MODEL 40

9¾ by 12¾ lig.  
22.1 by 28.70 mm  
.870 by 1.130 in.

## the TIMEX Model 40 Movement



The Timex Model 40 is an  $9\frac{3}{4} \times 12\frac{3}{4}$  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 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.

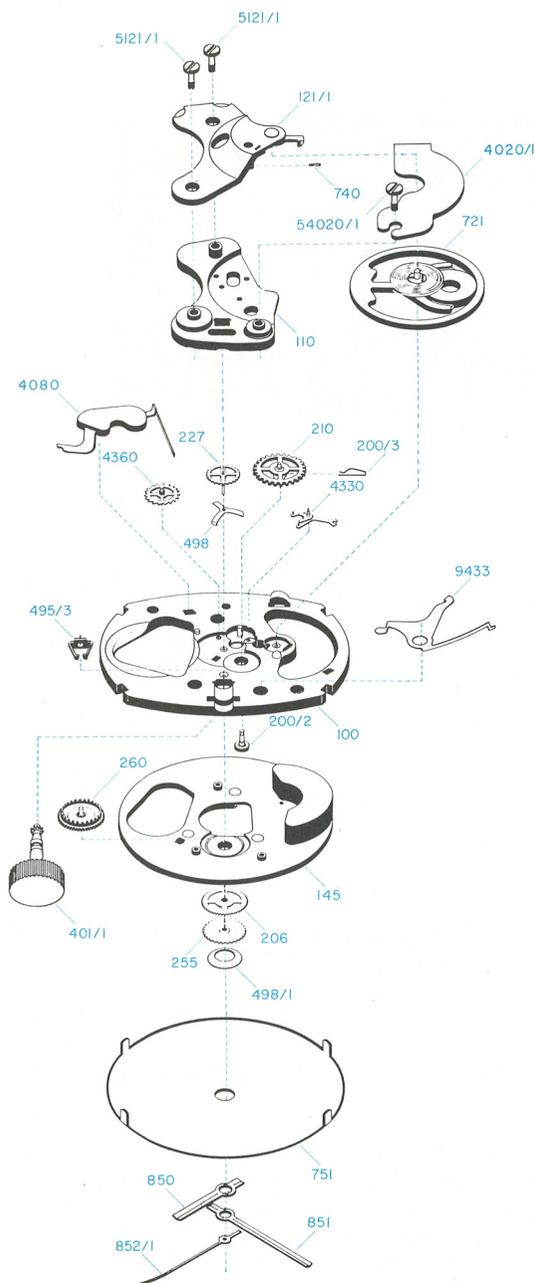
The hands are set in the normal method—that is, pulling out and rotating the crown. The Model 40 incorporates a device which stops the movement when the crown is in the set position. In this position, the flow of current from the energy cell is interrupted and the energy cell is not being discharged.

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 battery voltage, a high ohm volt meter (about 20,000 ohms per volt), which is now in use in most repair stations, is sufficient.

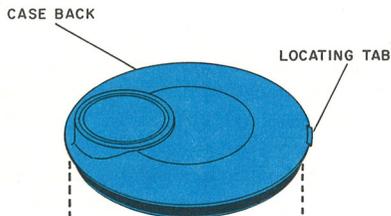
Since watch contains permanent magnets, no attempt should be made to demagnetize the watch.

# the TIMEX model 40 movement (exploded view)

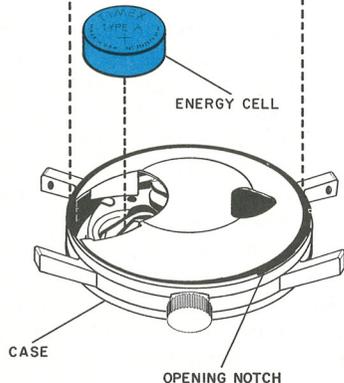


- 100 PLATE ASS'Y.
- 110 TRAIN WHEEL BRIDGE ASS'Y.
- 121/1 BALANCE BRIDGE ASS'Y.
- 145 DIAL REST
- 200/2 FRICTION PINION
- 200/3 FRICTION SPRING
- 206 CENTER WHEEL ASS'Y.
- 210 THIRD WHEEL ASS'Y.
- 227 SECONDS WHEEL ASS'Y.
- 255 HOUR WHEEL ASS'Y.
- 260 MINUTE WHEEL ASS'Y.
- 401/1 SETTING STEM WITH CROWN
- 495/3 STEM BRACKET
- 498 FRICTION WASHER
- 498/1 HOUR WHEEL WASHER
- 721 BALANCE ASS'Y.
- 740 HAIRSPRING WEDGE PIN
- 751 DIAL
- 850 HOUR HAND
- 851 MINUTE HAND
- 852/1 SWEEP SECOND HAND
- 4020/1 SHUNT BRIDGE
- 4080 CONTACT SPRING ASS'Y.
- 4330 INDEX LEVER ASS'Y.
- 4360 INDEX WHEEL ASS'Y.
- 5121/1 BALANCE BRIDGE SCREW
- 54020/1 SHUNT BRIDGE SCREW
- 9433 SET SPRING

## Disassembly of Movement (model 40)

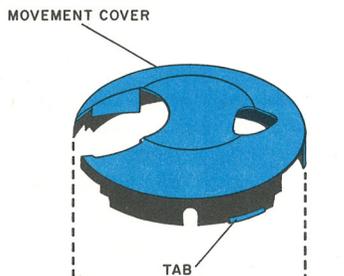


The first step in removing the movement from the case is to remove the caseback. Insert a knife blade in the opening notch on the bezel and snap the caseback off. The locating tab on the caseback is used for orientation of the back during re-assembly.

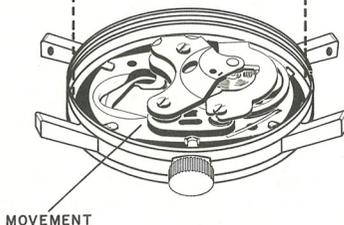


The movement is protected by a movement cover having access for regulation. The energy cell is loose and may be removed for testing.

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.

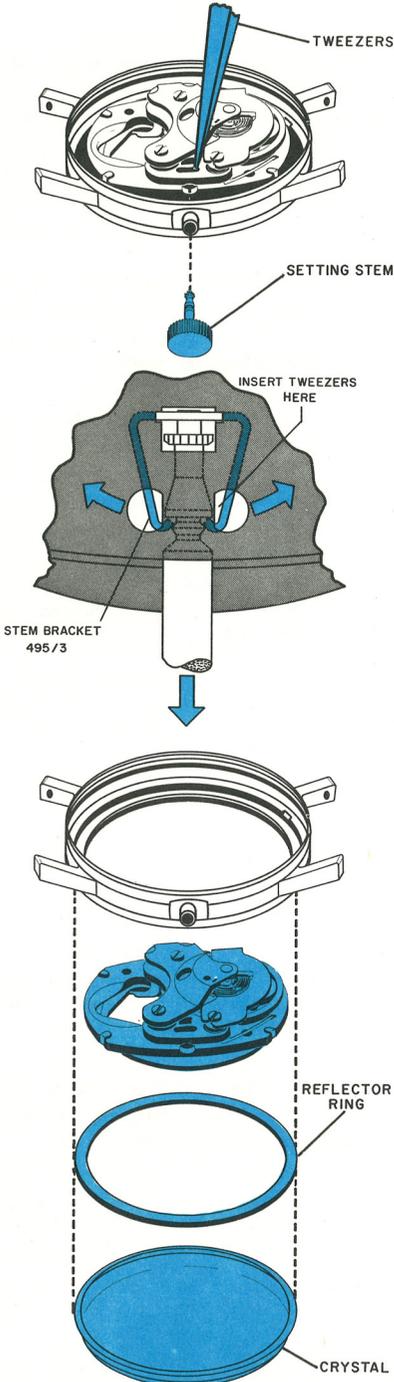


The movement cover may now be removed. It is held in place by two tabs which seat in a recess in the bezel.



The movement will stay with the bezel since it can only be removed through the crystal side.

## Disassembly of Movement Cont'd.



Since the only function of the stem in the Model 40 is to stop the movement and set the hands, the stem retention has been simplified by combining the stem and setting pinion and providing a novel stem bracket (495/3).

There are no screws or levers holding the stem. To remove the stem, pull the stem into set position maintaining a slight outward pull. Next, place the points of a heavy set of tweezers into the space between one side of the stem bracket and the stem. Now, gently release one side of the stem bracket from the stem by pushing the ear of the stem bracket in the direction of the arrow. You will notice now that the stem will tilt sideways. While still maintaining the outward pull, repeat the process on the other side of the stem. When both sides of the stem bracket have thus been released, the stem will come out completely.

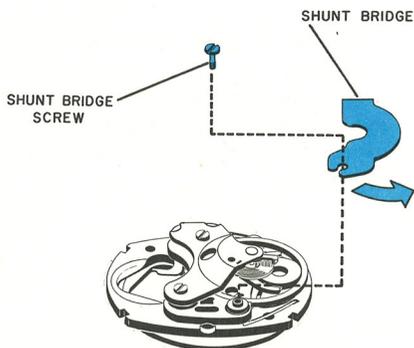
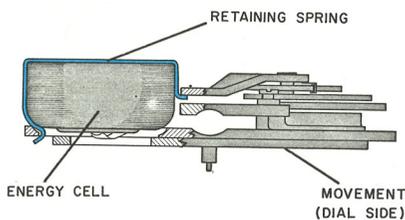
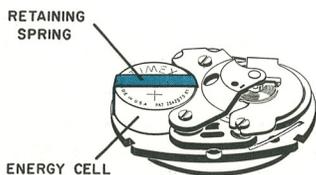
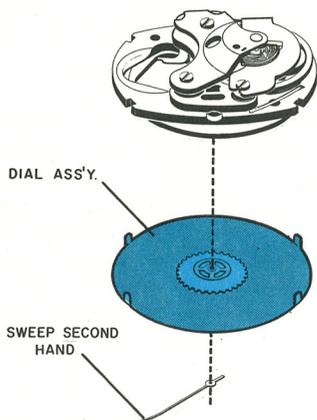
To replace the stem, firmly press the stem in place with a slight rotating motion so that the stem pinion teeth will mesh with the minute wheel teeth.

Next, remove the crystal using a Timex crystal lift, or a conventional crystal lift. The movement and reflector ring can now be removed through the crystal side of the bezel.

Take note of the movement locating tabs in the bezel. When reinserting the movement, be certain that the movement is in its proper position with respect to these locating tabs otherwise the reflector ring and crystal will not seat properly.

## Disassembly of Movement Cont'd.

The next step in dis-assembly of the movement is to remove the dial and hands: (a) remove the sweep second hand. (Minute and hour hands need not be removed.) (b) straighten the four tabs on dial and remove the dial assembly.



To examine the function of the movement, replace the stem and 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 a Timex Material Sales Division.)

The negative pole of the energy cell must touch the contact spring assembly (No. 4080 on exploded view). The positive pole of the energy cell is grounded to the movement. 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 energy cell should be removed before proceeding with further dis-assembly of the movement.

Remove the shunt bridge screw and carefully lift the screw end of the shunt bridge from its post. The opposite end of the shunt bridge is held in place by a tab overlapping the plate. Shifting the screw end of the shunt bridge slightly to the left (see arrow) will unhook this tab.

This operation should be carefully carried out so as not to disturb the hair-spring or balance. After the shunt bridge has been removed, the shunt bridge screw should be put back into place and tightened.

## Disassembly of Movement Cont'd.

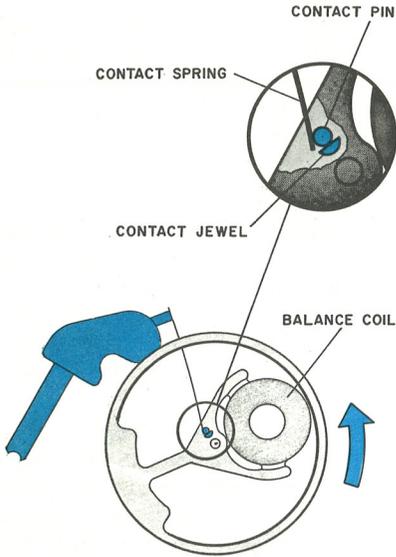


ILLUSTRATION 1

To observe the action of the contact spring and balance use the following procedures:

Rotate the balance 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, 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 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.

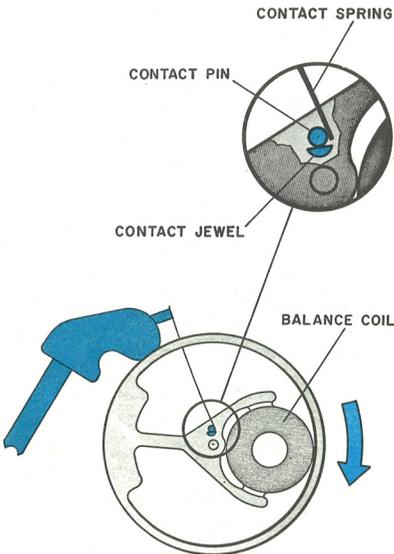
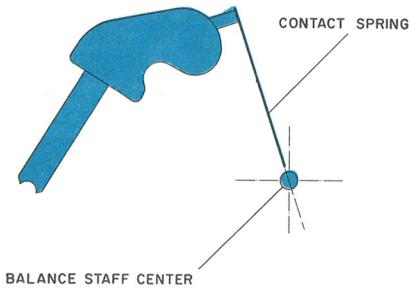


ILLUSTRATION 2

After the balance 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.

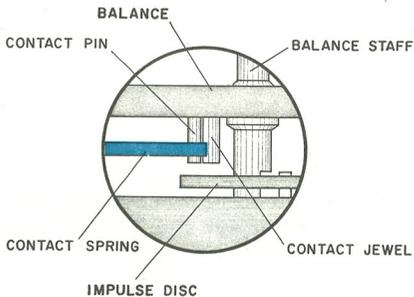
## Disassembly of Movement Cont'd.



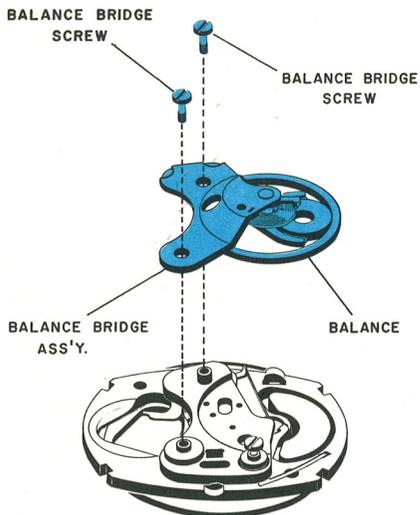
The contact spring must be pointing exactly to the center of the balance staff. It should be centered horizontally between the impulse disc and the balance. The contact spring requires very careful treatment. Protect it from scratches and deforming and avoid excessive bending while adjusting. Do not 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 attempt should be made to adjust this length.

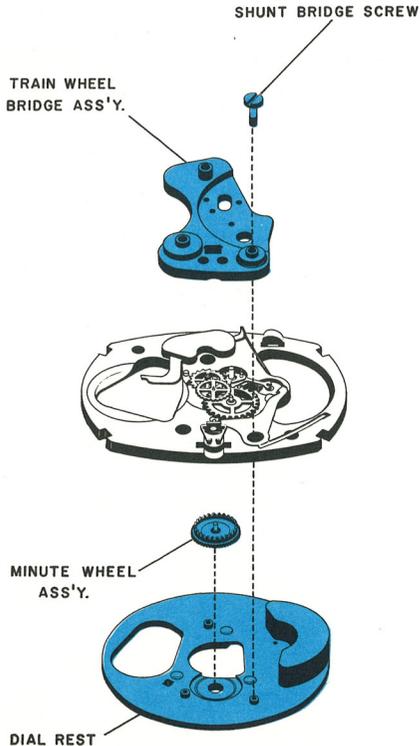


## Disassembly of Movement Cont'd.



Remove the two balance bridge screws. Next, remove balance bridge assembly and the balance.

(Note: Be certain that the shunt bridge screw is in place before removal of the balance bridge otherwise the train wheel bridge will be disturbed.)



Remove the shunt bridge screw. The train wheel bridge and dial rest may now be removed.

## Disassembly of Movement Cont'd.

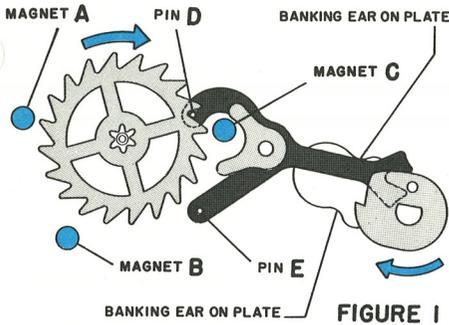


FIGURE 1

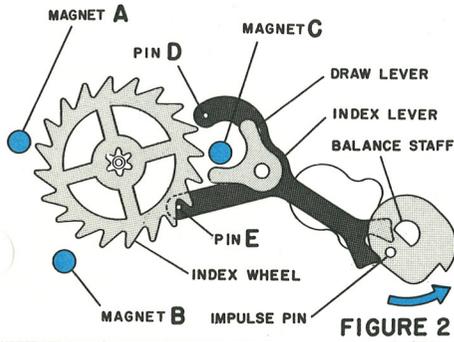


FIGURE 2

The action of the gear train is as follows:

### Figure 1

The impulse pin on the balance, when moving clockwise, engages with the fork on the lever and moves the lever counterclockwise. The pin "D" on the lever, engages with the index wheel and moves the index wheel forward approximately  $\frac{3}{4}$  of one tooth. The magnets (A, B and C) attract the tips of the index wheel teeth and move the wheel forward the remaining  $\frac{1}{4}$  tooth. The magnet (C) also attracts the draw lever on the index lever and holds the index lever in place.

### Figure 2

If, for any reason, the index wheel is not positioned correctly by the magnets, pin "E" on the lever turns the index wheel to its correct position so that the next engagement of pin "D" (actuated by a clockwise rotation of the balance) will advance the index wheel correctly.

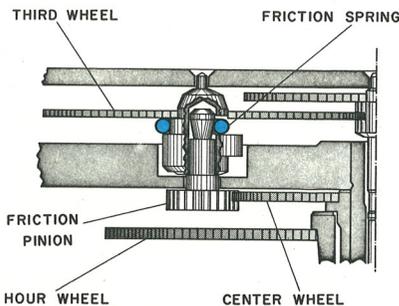
Setting friction for the dial train is provided by a spring connecting the friction pinion and the third wheel. The third wheel and friction pinion may be separated by lifting the friction pinion with tweezers.

This will unsnap the friction pinion from the friction spring.

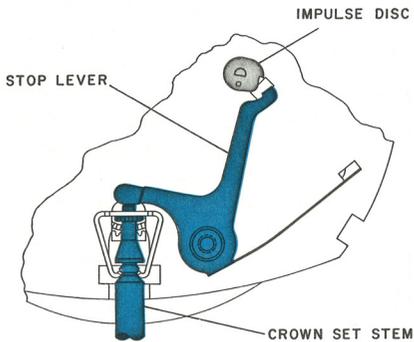
The friction for the dial frame is provided by a spring connecting the friction pinion and the third wheel. The third wheel and friction pinion may be separated by lifting the friction pinion with tweezers.

This will unsnap the friction pinion from the friction spring.

To reassemble, press the pinion firmly back into place. It is not necessary to remove the friction spring from the third wheel.



## Disassembly of Movement Cont'd.

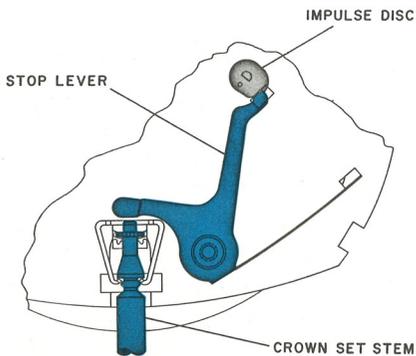


The balance stop mechanism is purely mechanical.

In the running position, the tip of the stem butts against the stop lever and keeps the tip of the stop lever away from the balance impulse disc.



**RUNNING POSITION**

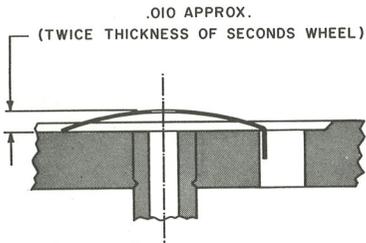


In the stop position (when the stem is pulled out into the set position), the tip of the stop lever butts against the impulse disc on the balance, thus stopping the balance.

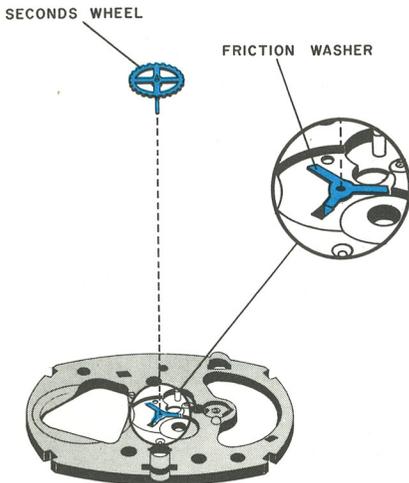


**STOP POSITION**

## Disassembly of Movement Cont'd.



A friction washer is located between the plate and the seconds wheel. As shown, the washer is domed slightly. Check to see that the washer has not become damaged during disassembly. Too much friction will cause too great a drag on the movement. Too little will cause an erratic sweep second hand action.



A tab has been provided on one leg of the friction washer. This tab fits into a slot on the plate to prevent the friction washer from turning.

# Cleaning and Lubricating The Timex Electric

## Cleaning the Model 40 Movement

Timex has found, after careful investigation, that the best way to clean the movement is to disassemble the movement only to the point of removing the balance bridge and the balance.

The balance should be cleaned separately in a small jar to avoid damage to the coil. The coil is composed of ultra-fine copper wire and should not be handled with tweezers or other sharp instruments.

Only standard watch cleaning solutions should be used throughout. Particles adhering to the magnet can be removed with Scotch tape.

## Lubricating the Model 40 Movement

The movement should be re-lubricated in the normal manner using only hi-grade watch oils (oils used in factory assembly is Elgin M56 b). The balance bearings should be filled  $\frac{1}{2}$  full before inserting the balance.

Other lubricating points are:

- 1—Impulse pin or fork slot
- 2—Index lever pivots
- 3—Index wheel teeth
- 4—All wheel pivots
- 5—The junction of the center wheel pinion and fraction washer
- 6—The junction between the minute wheel and dial rest

Apply grease (Hamilton PML type) to the stem where it is held by the stem bracket.

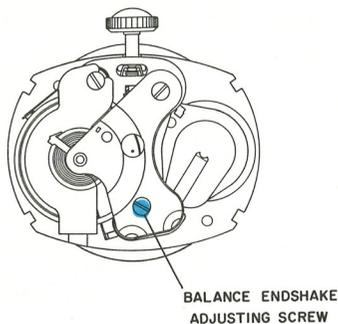
**DO NOT** lubricate contact spring or contact pin on the balance.

**DO NOT** use oil or greases containing silicone.

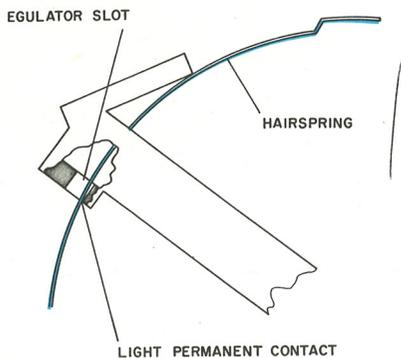
## Reassembly of Movement (model 40)

If the movement is taken fully apart, the correct order of train assembly is:

- 1—Third Wheel\*
- 2—Friction Washer
- 3—Index Lever
- 4—Index Wheel
- 5—Seconds Wheel
- 6—Stem Bracket
- 7—Stop Lever
- 8—Contact Spring
- 9—Train Wheel Bridge and Screw



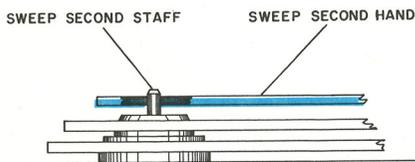
\* The third wheel and friction pinion should be replaced in the following manner: First, place the friction pinion (pinion side down) on a flat anvil—next place the movement plate over the friction pinion—finally snap the third wheel, together with friction spring, over the post of the friction pinion. This method will avoid damage to the hole in the movement plate. (See illustration on Page 40.9).



### Balance Endshake

The balance bridge screw on the 9 o'clock side serves to adjust the balance endshake. Tightening this screw will reduce the balance endshake. Use caution while adjusting the endshake to avoid damage to the points of the balance staff.

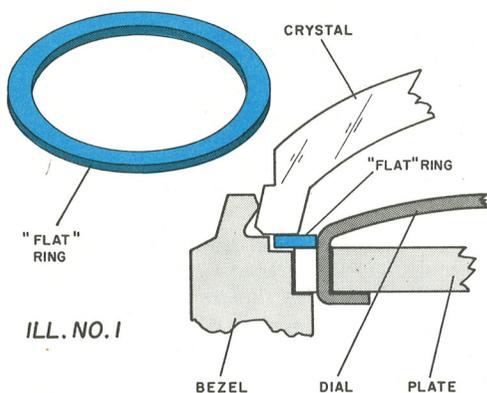
Inspect the hairspring to be certain that it is properly adjusted. As shown, the hairspring should be in light permanent contact with the inside edge of the regulator slot. The hairspring is held in this position by a tab extending from the regulator.



When replacing the dial assembly, pre-position the hands to 12:00 before inserting the tabs on the dial into the plate. Bend tabs to secure dial.

Replace the sweep second hand by driving it just below the end of the sweep second staff as shown in the diagram. Be certain the sweep hand is set below the chamfer on the top of the staff.

## Model 40 & 41 Reflector Rings

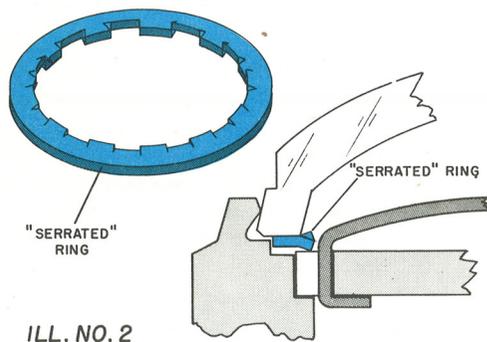


The first TIMEX Model 40 and 41 movements were produced using a plain FLAT Reflector Ring (Illustration No. 1).

TIMEX later changed the Reflector Ring to a SERRATED style (Illustration No. 2).

If the watch being serviced contains a FLAT Reflector Ring, it should be replaced with a SERRATED Reflector Ring (TIMEX part number 930/3).

Beginning in early 1971, TIMEX further modified the Reflector Ring to a thin "CUP" style (Illustration No. 3). This style must be used ONLY in conjunction with the FLANGE type dial.



THE "CUP" REFLECTOR RING CANNOT BE USED ON A DIAL HAVING NO FLANGE.

THE SERRATED REFLECTOR RING CANNOT BE USED ON A FLANGE TYPE DIAL.

When ordering, please specify which type is required, i.e., CUP TYPE or SERRATED TYPE.

