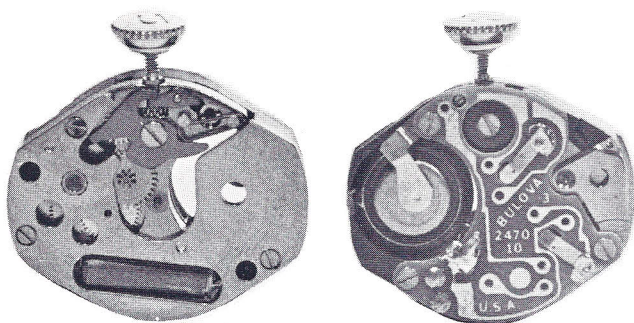


# BULOVA WATCH COMPANY, Inc.

## TECHNICAL BULLETIN



DIAL SIDE

PRINTED CIRCUIT SIDE

Fig. 1. Enlarged view of movement

## BULOVA® ACCUTRON® QUARTZ S M Q® Series 247

### INTRODUCTION

The Series 247 is an electronic movement with analog display. A Quartz Crystal controlled Stepping Motor drives the gear train and the dial train, causing the hands to turn.

### TOOLS

- Quartz Crystal Deviation Counter with 32,768 Hz. capacity
- Bulova Service Meter #700
- Accessory #9920/6603
- Non-magnetic tweezers
- Watchmaker's Screwdrivers
- Watchmaker's Loupe
- Watchmaker's Hand Tools

### IMPORTANT:

See page 2 fig. 2 for recommended Power Cell replacement procedure.

### SPECIFICATIONS

#### QUARTZ FREQUENCY

32,768 Hz. (cycles per second)

#### ELECTRONIC CIRCUIT

Integrated circuit with 12 second impulses.

#### NO POWER DISCONNECT SYSTEM

There is no saving of Battery life when watch is stored with crown in setting position.

#### STEPPING MOTOR

Bipolar, 4 steps per revolution. Steps every 12 seconds.

#### JEWELS

3

#### DIMENSIONS

15.30 mm x 18.10 mm x 4.5 mm

#### LIGNE SIZE

6 3/4 x 8

#### DISPLAY

Model 2470-Minute and Hour Hand

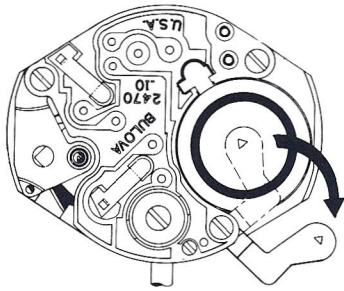
#### POWER SOURCE

One Silver Oxide Battery 1.55 volts, "Bulova 247."

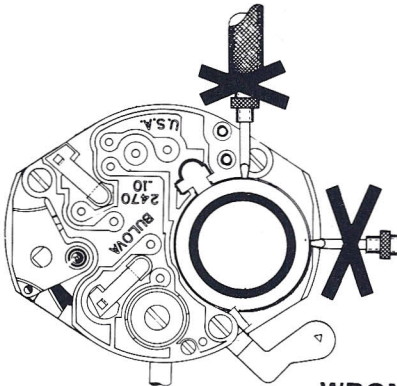


## POWER CELL REPLACEMENT

Due to the contact spring exerting pressure on the side of the Power Cell, it is necessary, when removing the cell, to proceed as described below.

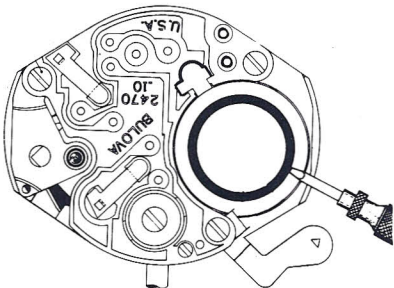


**Step 1.**  
Loosen Cell Strap  
Screw one full turn  
and rotate Strap away  
from Movement.



**CAUTION:**  
Attempting to remove  
the Cell by inserting a  
screwdriver between  
the Battery and the  
Coil Support may cause  
damage to the Coil  
Support.

**WRONG**



**RIGHT**

Fig. 2

## CHECKING THE FREQUENCY (RATE)

Quartz Frequency should be regulated to 32,768 Hz.,  $\pm$  0.17 seconds per day.

## ADJUSTING THE FREQUENCY (RATE)

To Regulate: turn the trimmer (located on Electronic Circuit above the stem hole). The maximum rate change is approximately 7 seconds per day.

## AUDIBLE SOUND

There is no constant audible sound present as with other types of watch movements. The only sound heard is a "click" once every 12 seconds when the motor impulses.

## SERVICE

It is NOT necessary to periodically clean the Series 247 movement, nor completely disassemble the movement when it requires cleaning. DO NOT CLEAN MOVEMENT IN "MIRACLE LUBE," "ONE STEP," etc. Use regular clean and rinse solutions only. When cleaning the movement the following parts must be removed:

- Electronic Circuit (#10.513),
- Rotor Bridge (#10.542),
- Rotor (#20.580),
- Coil Support (#20.594).

The rotor bridge may be cleaned with the movement. The rotor pivots and pinion can be cleaned with "one dip" or soft (pith) wood.

## NOTE:

If the movement is completely disassembled for cleaning, the Main Plate (#10.020) must be placed in a separate compartment in the cleaning basket. This is to prevent possible damage to the train wheel posts.

## LUBRICATION

ONLY the following parts are lubricated:

- Upper and lower Rotor Jewels (Moebius OL 219)
- Off-Center (4th) Wheel (Clutch) (Moebius OL 219).
- Contact between Set Lever and Rocking Bar (Dow Corning #111 or "Silicon 7"). See Fig's. 10 and 11.

## DIALING

The SMQ 247 movement is designed without the use of dial screws. If the dial becomes loose, use a flatnose pliers to carefully pinch, and thereby slightly elongate the dial foot for additional tension. DO NOT OVER PINCH! If this does not correct, replace dial foot bushing (#10.300).

## SETTING

Pull the crown into the "setting position" and turn the hands to approximately 5 min. past the correct time, then back-up to one minute ahead of the correct time. Push crown "in."

## COIL WINDING CHECK

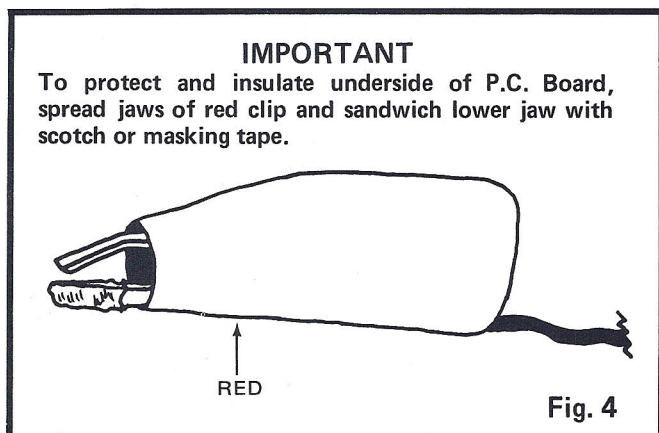
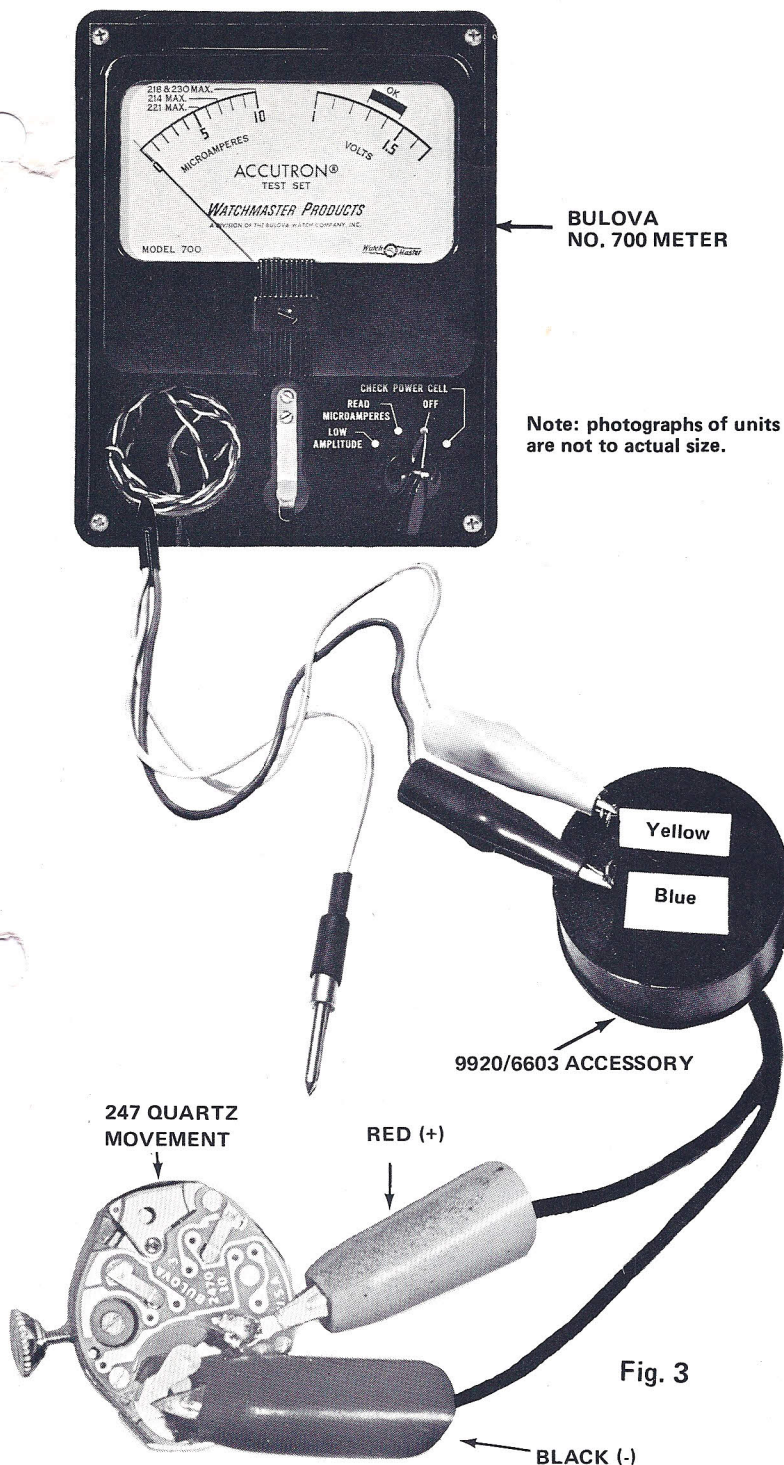
**Step 1.** Remove electronic circuit (#10.513).

**Step 2.** Set meter at "Low Amplitude."

**Step 3.** Touch either Meter Clip to the contact post shown in Fig. 11.

**Step 4.** Touch the other Clip to remaining post.

**Step 5.** Pointer on meter will indicate maximum reading (peg) if coil is O.K. Needle will remain at "O" if open. If the coil is open, replace.



## BASIC TEST PROCEDURES

### Step 1

CHECK POWER CELL

1.50 to 1.58 volts: o.k. to

Less than 1.50 volts: repla

### Step 2

CHECK FREQUENCY (RATE)

Rate o.k., or regulate if ne

No rate or very erratic . . .

### Step 3

CONNECT METER TO  
SERVICE ACCESSORY

Remove power cell from  
movement and place in Met  
well. Set meter selector a  
Amplitude."

### Step 4

COIL ASSEMBLY CHECK

Remove electronic circuit  
check coil winding as fo  
Place either Accessory o  
one coil contact pin an  
other clip to remaining c  
pin (Fig. 11).

### Step 5

ROTOR CHECK

When meter indicates im  
rotor should move 90°  
12 seconds and come  
vibrating stop. This confi  
proper performing circuit  
rotor.

### Step 6

CURRENT CHECK

Set Meter Selector At  
Microamperes."

## CONNECTING METER TO MOVEMENT

**Step 1.** Remove Power Cell from Movement and place in the Meter Cell Well.

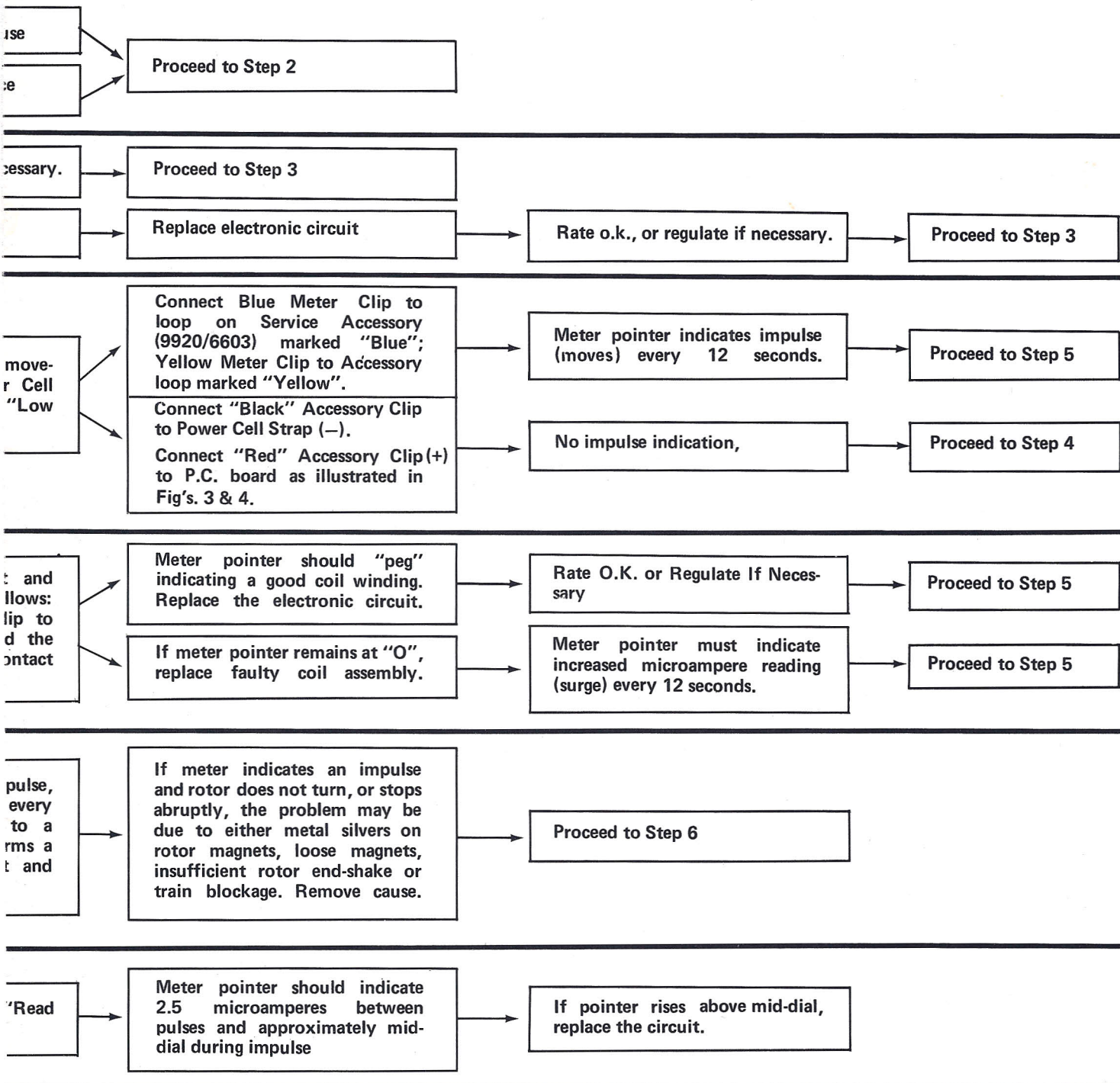
**Step 2.** Set Meter Selector at "LOW AMPLITUDE"

**Step 3.** Connect Blue Meter Clip to loop in service Accessory (9920/6603) marked "Blue"; Yellow Meter Clip to Accessory loop marked "Yellow".

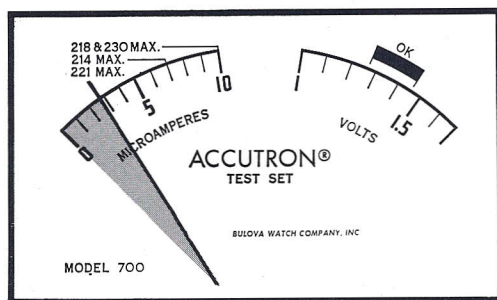
**Step 4.** Connect "Black" Accessory Clip to Power Cell Strap (-).

**Step 5.** Connect "Red" Accessory Clip to Printed Circuit Board as illustrated in Fig's. 3 & 4.



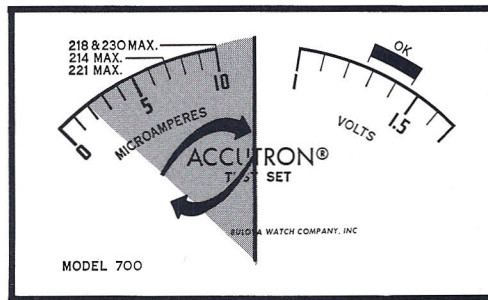


**2.5 MICROAMPERES MAX.  
BETWEEN PULSES**



**Fig 5.**

**MID-DIAL MAX.  
DURING IMPULSE**



**Fig. 6**

#### NOTE: CANNON PINION COMPOUNDING

The Cannon Pinion is "Free Floating" and has been specifically designed in this manner. Do not attempt to tighten it. To reduce play in the minute hand, proceed as follows:

Place a small amount of Dow Corning Compound #111 or Silicon 7 on the inside of the Cannon Pinion. (See illustrations). This will restrain the motion of the Cannon Pinion/minute hand.

The use of any other compound may create excessive drag. Be sure to re-apply this compound after each cleaning of the movement.

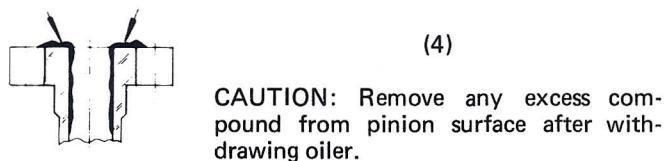
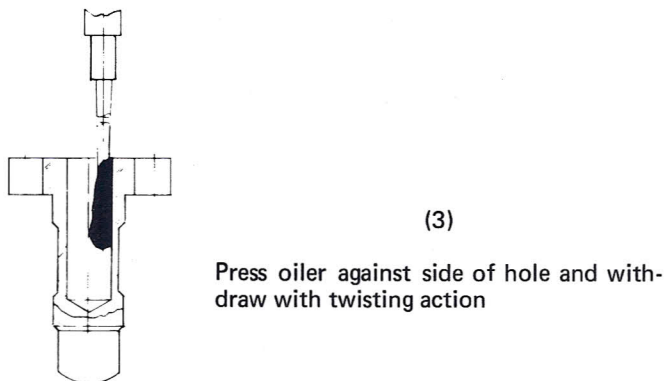
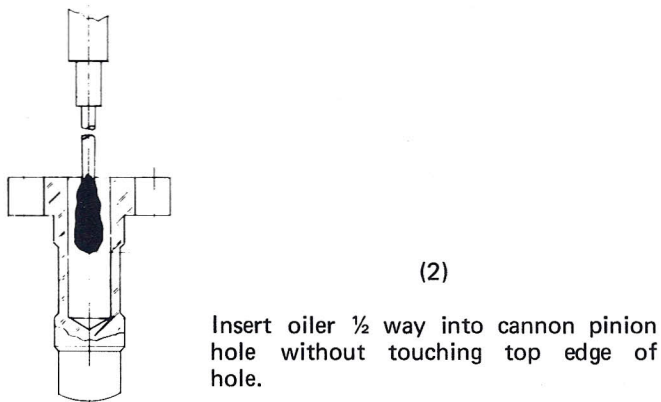
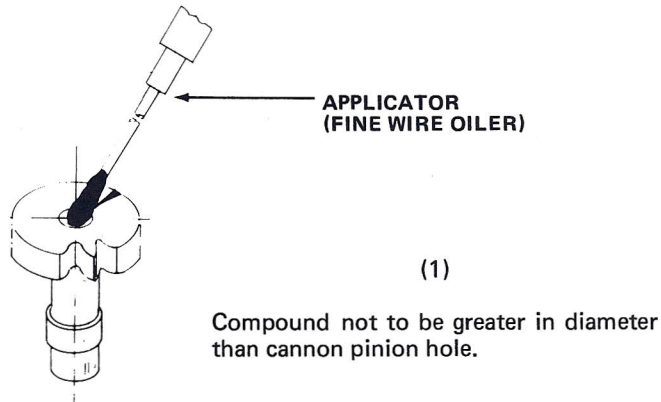
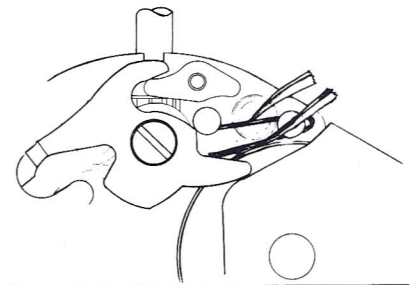


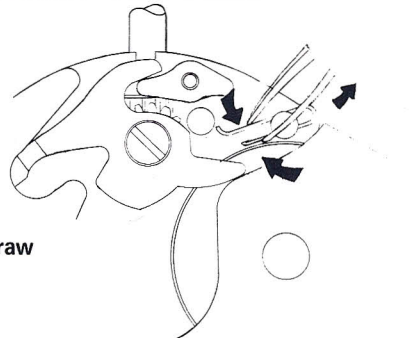
Fig. 7

#### To Remove Rocking Bar Spring:

Grasp both tines at the open end of the spring.



Pinch spring and withdraw



Once clear, remove.

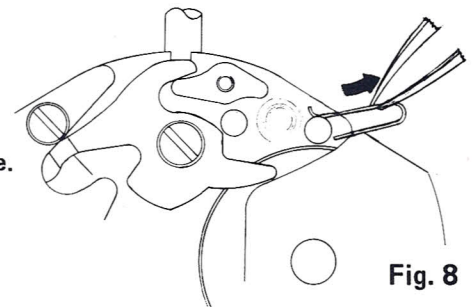


Fig. 8

#### LOOSE ROTOR MAGNET

If a magnet becomes loose or separated from the rotor, proceed as follows:

1. Place rotor on piece of "one touch" (rodico) and holding the loose magnet with a non-magnetic tweezer, approach the magnet next to the empty space on the rotor plate. See Fig. 9.
2. The magnet held in the tweezer must be repelled when held above either of the fixed magnets that are next to the empty space. If the magnet is attracted, invert (turn over) the tweezer held magnet.
3. Apply cement to the empty space on the rotor plate and place the magnet on to the rotor plate. Allow to dry.

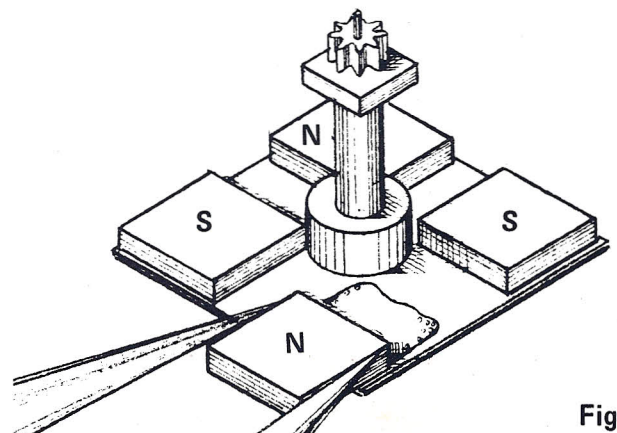


Fig. 9.



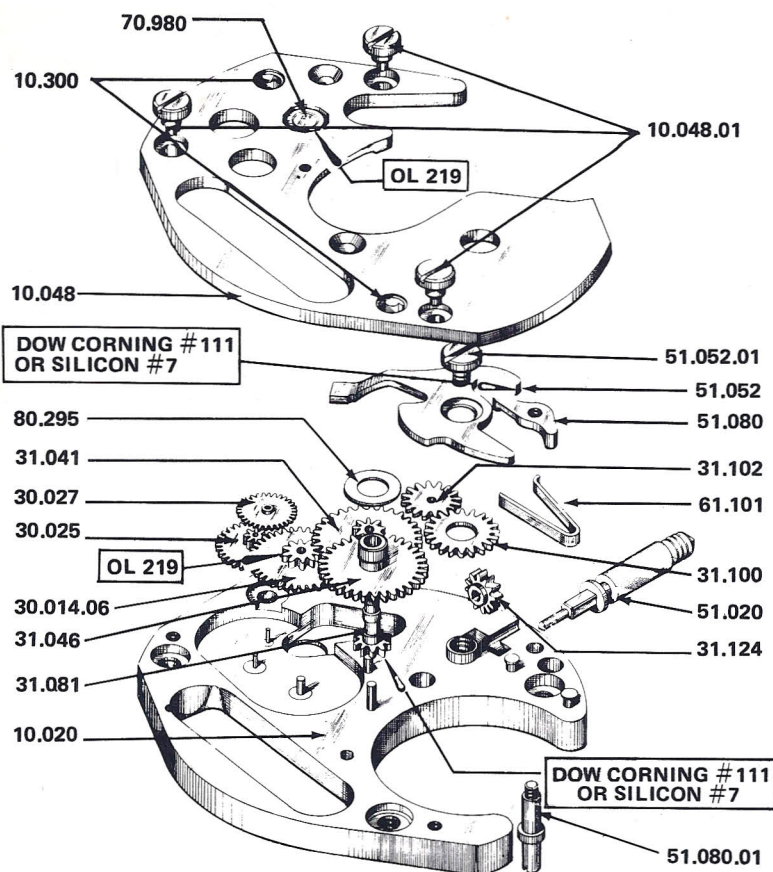


Fig. 10

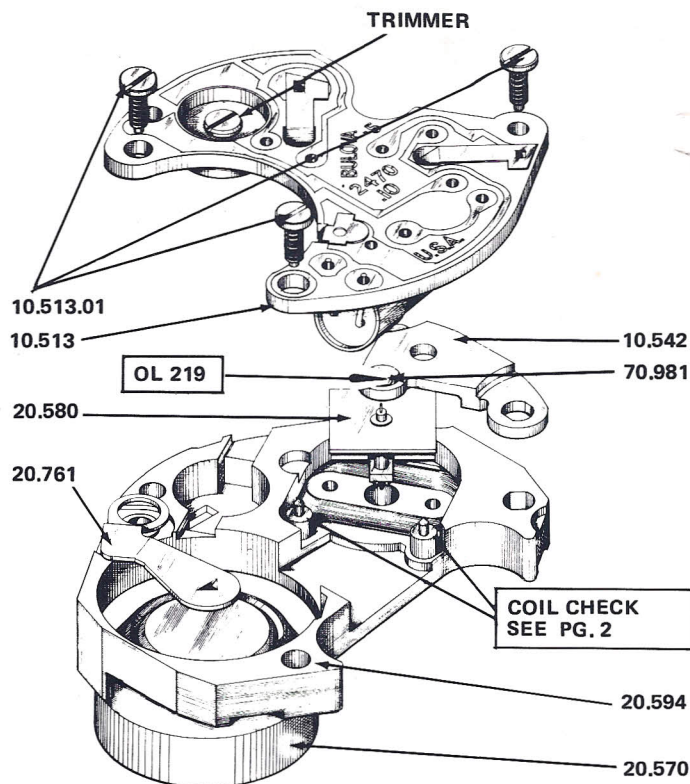


Fig. 11

#### LUBRICANTS

- Moebius OL 219
- ⏸ Dow Corning #111 or Silicon #7

| Part No.  | Part Name                 | Part No.    | Part Name                         |
|-----------|---------------------------|-------------|-----------------------------------|
| 10.020    | Main Plate                | 31.081      | Cannon Pinion                     |
| 10.048    | Train Wheel Bridge        | 31.100      | Setting Wheel                     |
| 10.048.01 | Train Wheel Bridge Screw  | 31.102      | Motion Work Setting Wheel         |
| 10.300    | Dial Foot Bushing         | 31.124      | Setting Pinion                    |
| 10.513    | Electronic Circuit        | 51.020      | Setting Stem                      |
| 10.513.01 | Electronic Circuit Screw  | 51.052      | Rocking Bar                       |
| 10.542    | Rotor Bridge              | 51.052.01   | Rocking Bar Screw                 |
| 20.570    | Power Cell (Bulova # 247) | 51.080      | Setting Lever                     |
| 20.580    | Rotor                     | 51.080.01   | Setting Lever Screw               |
| 20.594    | Coil Support              | 61.101      | Rocking Bar Spring                |
| 20.761    | Power Cell Strap          | 70.980      | Rotor Jewel Ass'y. (Train Bridge) |
| 30.014.06 | Off-Center Wheel (fourth) | 70.981      | Rotor Bridge Jewel                |
| 30.025    | Third Wheel               | 80.295      | Dial Spacer                       |
| 30.027    | Second Wheel              | * 80.820    | Rotor Bridge Foot (threaded)      |
| 31.041    | Minute Wheel              | * 80.820.90 | Circuit Board Foot (threaded)     |
| 31.046    | Hour Wheel                |             |                                   |

\* Not Shown

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