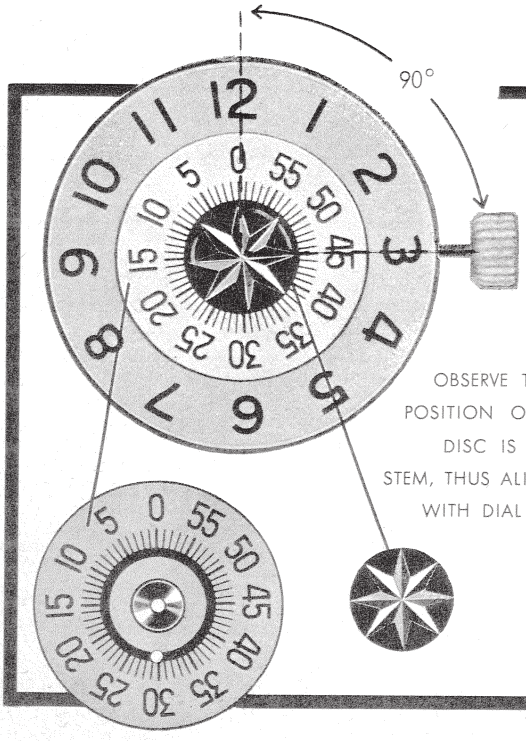
TECHNICAL BULLETIN NO. 102

MODEL EU

MODEL FG

BENRUS DIAL-O-RAMA

ASSEMBLY AND DISASSEMBLY INSTRUCTIONS
GENERAL REPAIR HINTS



OBSERVE THAT ZERO POSITION OF MINUTE DISC IS 90° FROM STEM, THUS ALIGNING IT WITH DIAL WINDOW

Although the DIAL-O-RAMA consists of three rotating discs and a dial with windows, its basic construction is that of a conventional watch. Actually, its minute disc and second star differ from ordinary hands in shape only. And in some styles regular hands rather than discs or stars are used.

Yet, there is an important distinction between the DIAL-O-RAMA and the traditional movement; in that the hour disc jumps once an hour. This, obviously, cannot be accomplished with an hour wheel geared to a train and rotating continuously as in ordinary watches. Consequently, the DIAL-O-RAMA requires a different mechanism to advance the hours.

Model EU employs one type of hour advancing device; and in model FG another even simpler method is used.

Both are described and illustrated in this instruction sheet.

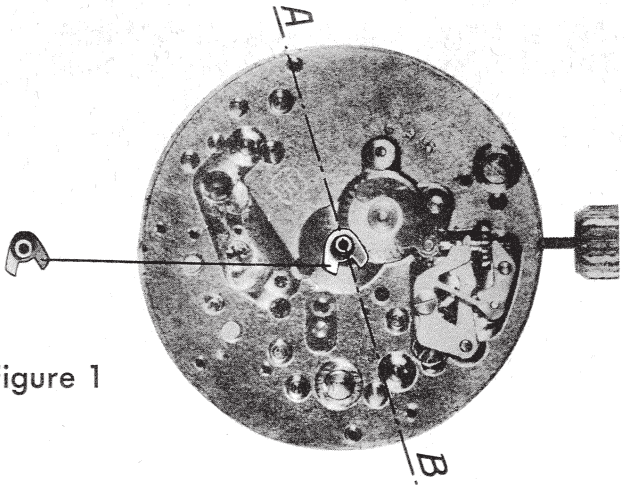


Figure 1

FORK OF CANNON PINION SHOULD BE ALIGNED ALONG AXIS A-B

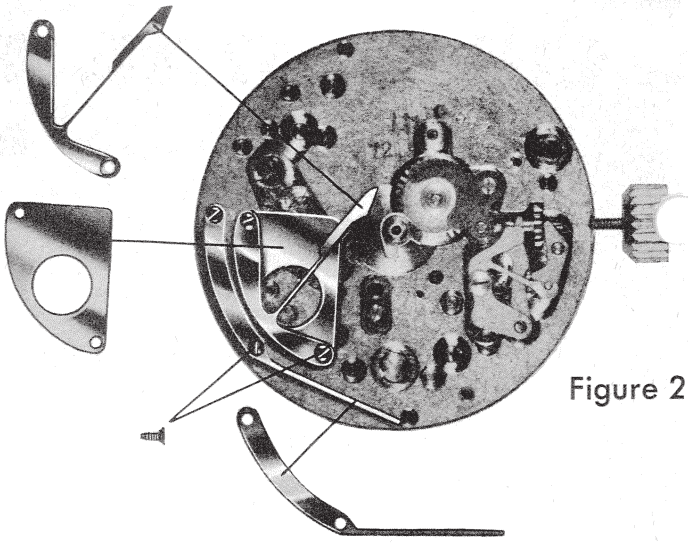


Figure 2

SCREWS 59610 and 59622 ARE IDENTICAL

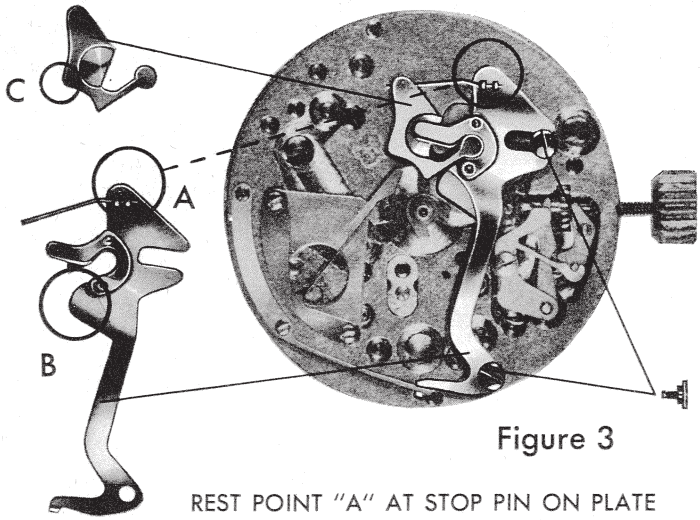


Figure 3

REST POINT "A" AT STOP PIN ON PLATE

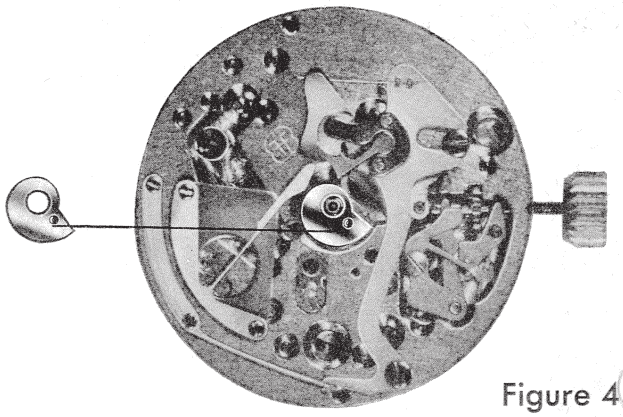
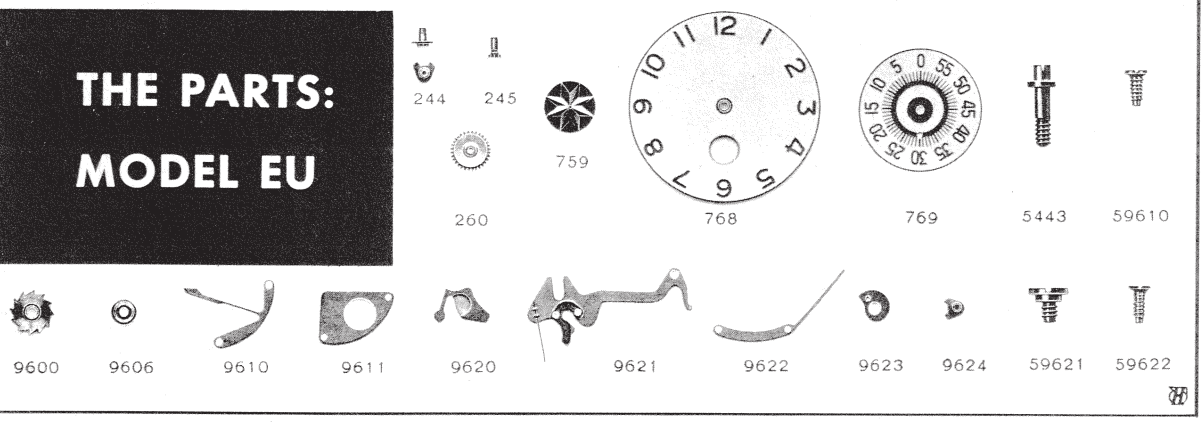


Figure 4

THE PIN OF THE CAM IS DOWN ENGAGING FORK

THE PARTS: MODEL EU



The mechanism consists of a forked cam driver #9624 that is frictioned to the cannon pinion and should not be separated, a loose riding yoke cam #9623, a 12 toothed hour star #9600 riveted to the under side of the hour disc, a star jumper #9610, its seat #9611, an impulse click yoke #9621, its impulse click #9620, and the yoke spring #9622.

244 cannon pinion and cam driver (one unit consisting of 245 and 9624)
245 cannon pinion (see 244)
260 minute pinion
759 second star disc
768 hour disc
769 minute disc
9600 hour star (riveted to disc)
9610 hour star jumper (screw #59610)
9606 tube for minute disc
9611 jumper seat
9620 impulse click
9621 impulse click yoke (screw #59621)
9622 yoke spring (screw #59622)
9623 yoke cam
9624 yoke cam driver (see 244)

HOW IT WORKS

Start from position of Figure 4.

When cam driver #244 revolves, it drags along the engaged yoke cam #9623 above it. As the ever widening diameter of the yoke cam #9623 contacts yoke #9621 at point "B", Figure 3, [Yoke cam #9623 does not appear in this figure] it drives yoke #9621 back along its slotted path at screw #59621 opposite click #9620.

While this action takes place, point "C" of impulse click #9620 travels along the unlocking side of one tooth of the hour star. When yoke #9621 is driven back far enough by yoke cam #9623 for the click #9620 to clear the tooth, the click under tension drops inward and now faces impulse face of the tooth. A few minutes later, the wide portion of the cam #9623 comes to an abrupt end. The yoke #9[illegible] under tension, springs inward toward [illegible] now shallow cam. Then the yoke's impulse click strikes the tooth in its path and advances the star to the next tooth, spinning its attached disc to the next hour number.

NOTE: Until moment of impulse, hour disc remains stationary.

GENERAL REPAIR HINTS

FOR MODELS EU AND FG

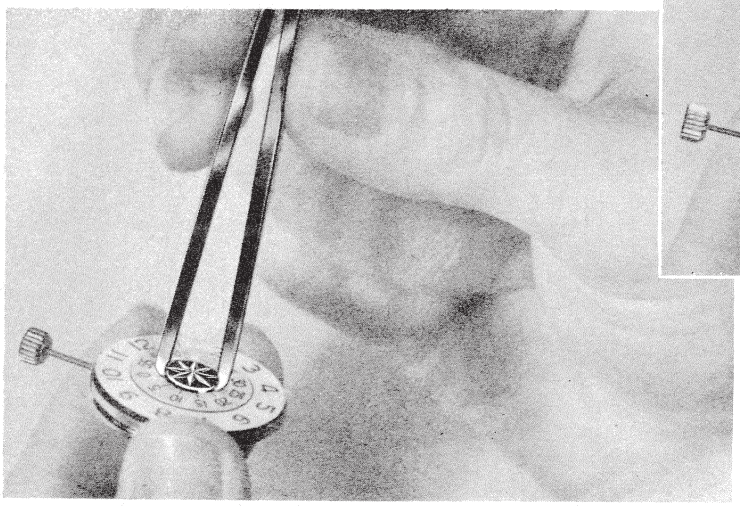
DO NOT lubricate any part of the disc mechanism.
THE CANNON PINION ONLY IS TO BE OILED IN THE USUAL MANNER.

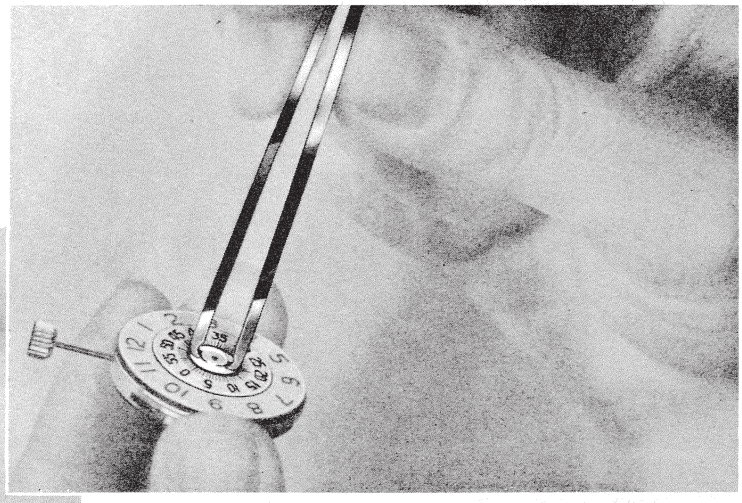
- Holes in discs facilitate shifting and viewing of under parts.
- Position Hour Disc and Minute Disc with the movement in the case.
- Never repair movement while the discs are fixed in place.
- When checking alignment of minute zero with hour number, turn stem very slowly between 55 and zero.
- Springs 9610, 9615 and 9622 can be bent while on the movement in the following manner:
  Straddle spring at base with points of tweezers and bend in desired direction with massaging motion.
- In some styles a minute hand and second hand are used instead of discs.
- Waterproof cases.
  See pages 11-12 of General Catalog.
  There are no reflector rings in these models.
  The dial and its dial support ring are used instead.

ASSEMBLY AND DISASSEMBLY: MODEL EU

DISASSEMBLY

1. Remove dial support ring by prying up with knife. Avoid prying up the dial. The dial should not be separated from the ring.
2. Remove second star and minute disc as shown.
3. Lift off hour disc with fingers.
4. Proceed backwards from Figure 4.





ASSEMBLY

Begin with Figure 1, Steps 1-4 correspond with Figures 1-4.

1. Place cannon pinion with its attached forked cam on center post with a slight twist. (Bevelled teeth on minute wheel reduces possible damage).
   With crown, position fork along axis A-B (Figure 1)
2. Position jumper #9611, hour star jumper #9610 and yoke spring for impulse click #9622 as shown in Figure 2.
   Note end point of jumper is aligned with recess in plate.
3. a. On the bench, assemble impulse click yoke #9621 with impulse click #9620. Position click spring (at A) in the groove of the click as shown on illustration of main plate.
   b. Pick up both parts together with tweezers and place on movement resting point "A" against stop pin on plate.
   c. Screw down 59621 at opposite end.
   d. Screw down screw at slot.
   e. Check for freedom of yoke.
   f. Lift end of yoke spring #9622 over hook of impulse click yoke #9621.
4. First recheck position of fork—should be as shown in Figure 1, then place yoke cam #9623 with its pin down into fork. See Figure 4.
5. Place disc on movement so that the hole exposes the jumper arm. Push jumper out of path of star by pressing tweezer point against arm. Then, while maintaining gentle downward finger pressure on dial, press points of tweezers against hole edge and push dial clockwise until some part of the yoke is exposed.
   (If the disc is properly seated its center bushing will be at the same level as the shoulder of the cannon pinion and the yoke and click action can be seen or heard).
   Maintaining finger pressure on dial turn crown slowly toward you until yoke impulse occurs. (Not to be confused with click release that precedes it).
6. Immediately, place minute disc on cannon pinion, aligning zero with number 90° from stem, and press home. Note: Unless the minute disc is pressed home, excessive end-shake between the hour disc and the minute disc will prevent proper checking of the spin of hour disc.
7. Place movement in case. Place dial with dial support ring on movement. Aligning dial legs with corresponding grooves on edge of plate along stem axis.
   In case, dial has been accidentally separated from dial support ring.
   a. Align dial legs with grooves in dial support ring and seat dial in ring.
      NOTE: In some instances it may be necessary to reverse the position of the ring to properly center the red dot at the minute window. Dial leg should be true — Dial flush with ring.
   b. Position of shoulder of ring affects the firm seating of the movement in the case. This can be checked only when the case is completely assembled.
8. Check alignment of zero of minute disc. When the hour change occurs the zero should appear directly below the hour number and aligned with red dot at center of dial window. When making this check, turn stem very slowly between 55 and zero. If the zero appears too soon or too late, reposition minute disc.

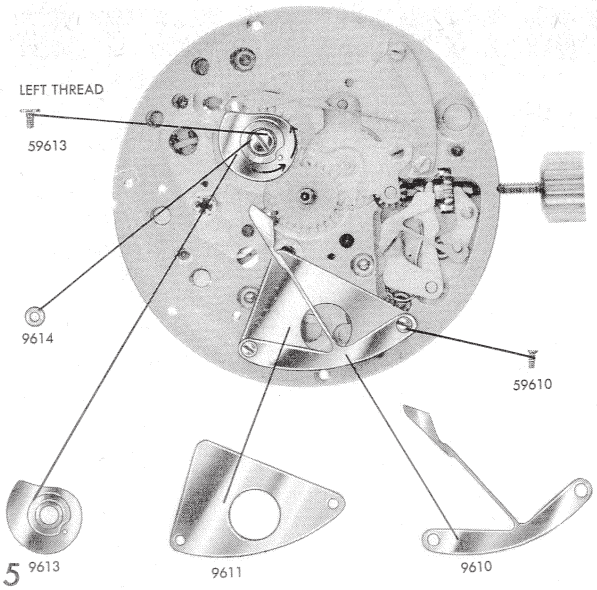


Figure 5

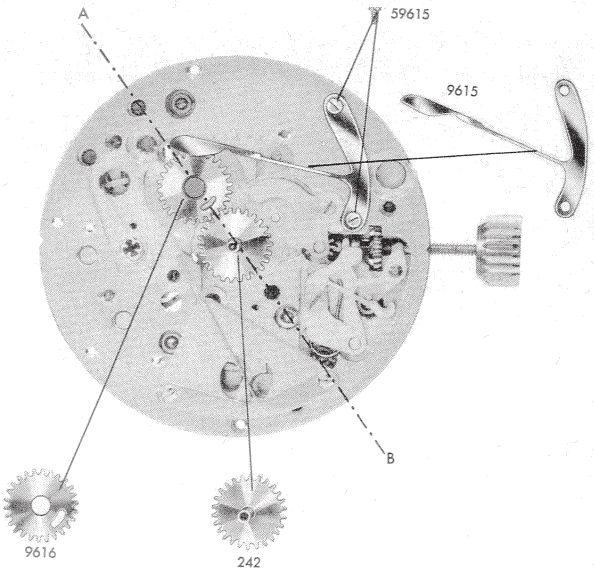


Figure 6

MODEL FG THE PARTS

HOW IT WORKS

Starting from the position in Figure 5.

As the impulse eccentric #9613 (driven by the cannon pinion and its driving wheels) revolves, (note arrow) its ever widening arc pushes back click spring #9615. At the end of its revolution, a sharp break in the arc of the eccentric occurs, presenting an impulse face to the tensed click spring. When this let-off point is reached, the springhead kicks the eccentric around.

Consequently, its impulse pin, located near its center strikes the tooth of the hour star and in turn, propels it around. The star is advanced to the next tooth and its attached disk is advanced to its next number.

It should be noted, that the crescent at the pin permits the passage of the star point—while unlocking is prevented by the pin itself. When the star point is not in the crescent the safety function is assumed by the steel shoulder of the eccentric. The relationship of star point to crescented shoulder is obviously the same as a guard pin to a roller.

The consequence of this locking mechanism with its close tolerances is that if the crown is turned too quickly, during setting, a **normal butting action may take place.**

DISASSEMBLY:

1. Remove dial support ring by prying up with knife. Avoid prying up the dial. The dial should not be separated from the ring.
2. Remove second star and minute disc as shown. (Figures page 3).
3. Lift off hour disc with fingers.

FIGURE 5

4. Remove left threaded—screw 59613, which holds the eccentric #9613. Remove other parts shown.

(NOTE: The screw has a washer—The impulse click ring #9614)

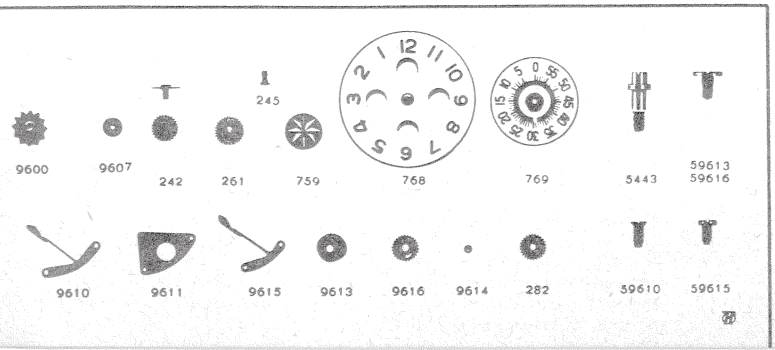


FIGURE 6

5. Lift out impulse click driving wheel #9616.
6. Remove impulse click spring #9615.
7. Remove cannon pinion (the cannon pinion is frictioned to a driving wheel and should not be separated).

ASSEMBLY:

FIGURE 6

1. Position cannon pinion twisting downward on center post. (Bevelled teeth on minute wheel minimize damage)
2. Position impulse click spring #9615.
3. Place driving wheel #9616 over screw hole, positioning its slot along axis A-B.

FIGURE 5

4. With steel shoulder of eccentric up — place over driving wheel. (The eccentric has an upper and a lower pin. The lower pin engages the slot.)
5. Hold in place with one pair of tweezers, and with another, place impulse ring in center.
6. Screw down left threaded screw #59613. Check for freedom of eccentric within slot before tightening.
7. Position jumper seat #9611 and jumper spring #9610.
8. Place hour disk on movement. Use twisting motion so that star will be properly seated.

CHECKS:

- **a.** Star bushing should be level with cannon pinion shoulder.
- **b.** The disk should lock—its free range is about half the distance between numbers.
- **c.** Turn crown toward you. After each revolution of eccentric, the disk should spin to next number. (This test can be made without minute disk in place, as in model previously described.)

9. Immediately, place minute disc on cannon pinion, aligning zero with number 90° from stem, and press home.
10. See steps 7 & 8 of EU (Page 3).

242 Cannon pinion and driving wheel (one unit consisting of #245 and #282)
245 Cannon pinion (see #242)
261 Minute wheel
282 Driving wheel (see #242)
759 Second star
768 Hour disc
769 Minute disc
9600 Hour star (riveted to disc)
9607 Tube for minute disc (riveted to disc)
9610 Hour star jumper (screw #56910)
9611 Jumper seat
9613 Impulse eccentric for hour star (left screw #59613)
9614 Impulse click ring
9615 Impulse click spring (screw #59615)
9616 Impulse click driving wheel