

Feb. 14, 1967

J. EGGER ETAL

3,303,641

WATCH INDICATOR SETTING MEANS

Filed Dec. 18, 1964

3 Sheets-Sheet 1

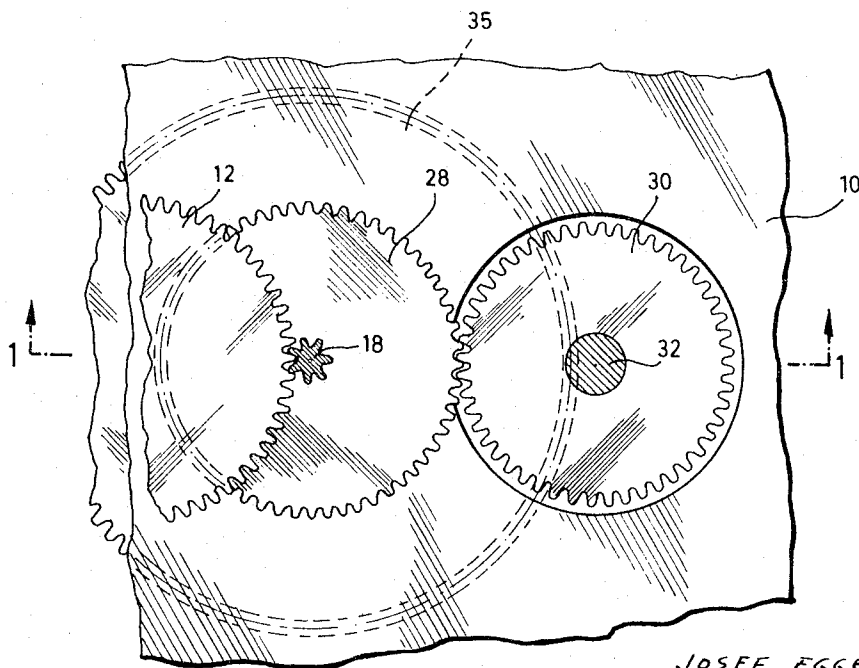
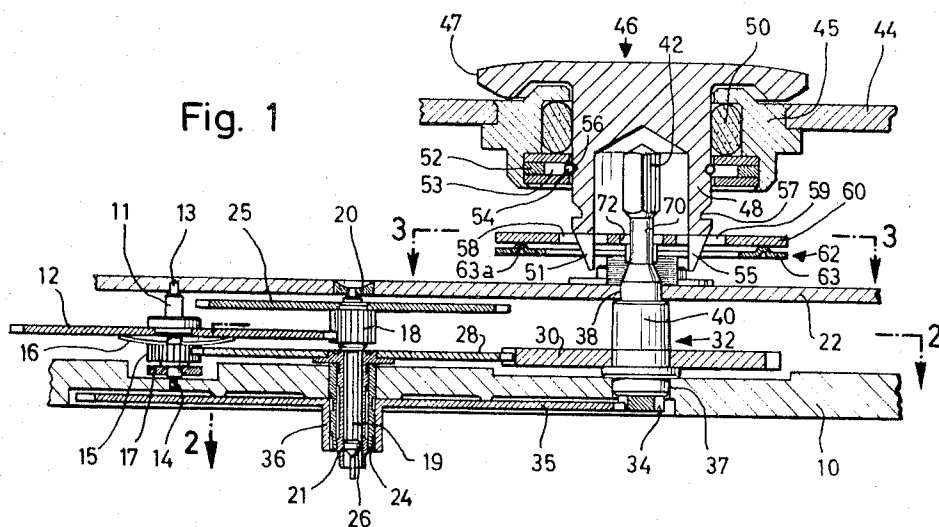


Fig. 2

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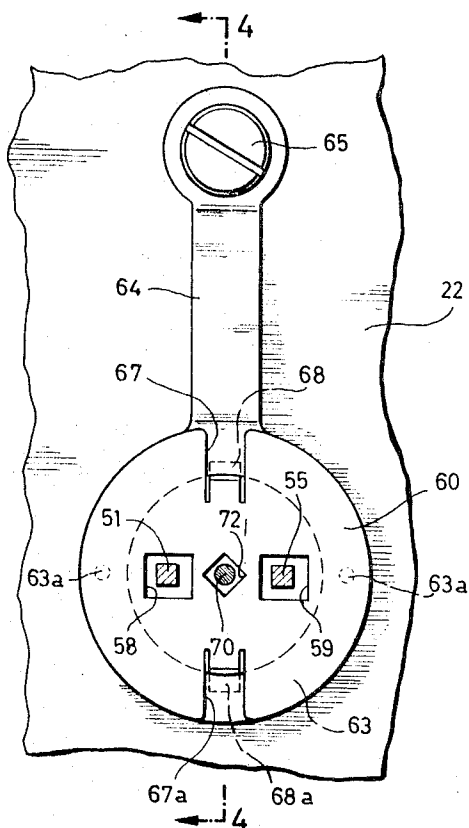


Fig. 3

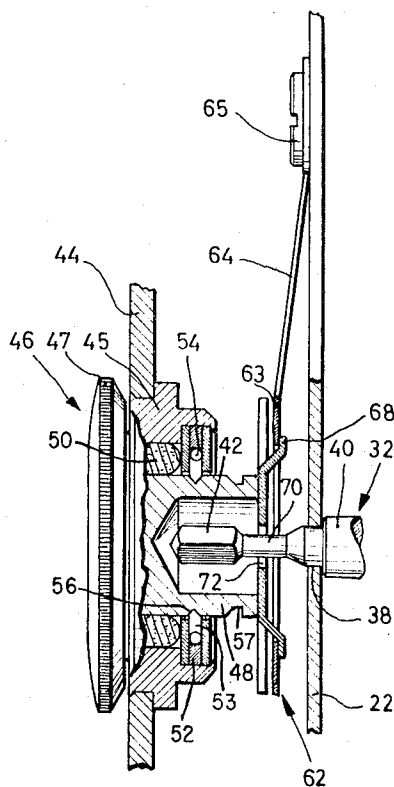


Fig. 4

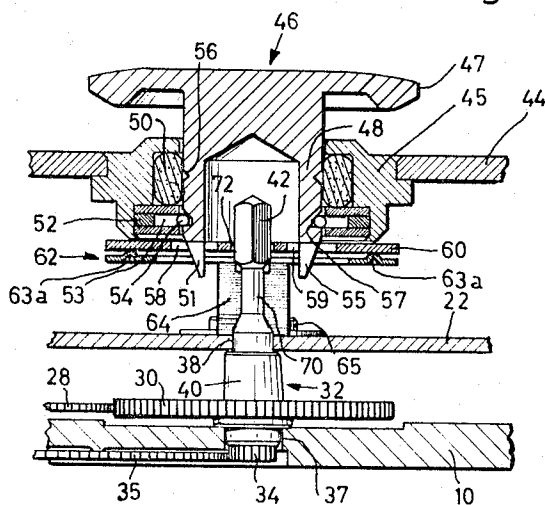


Fig. 5

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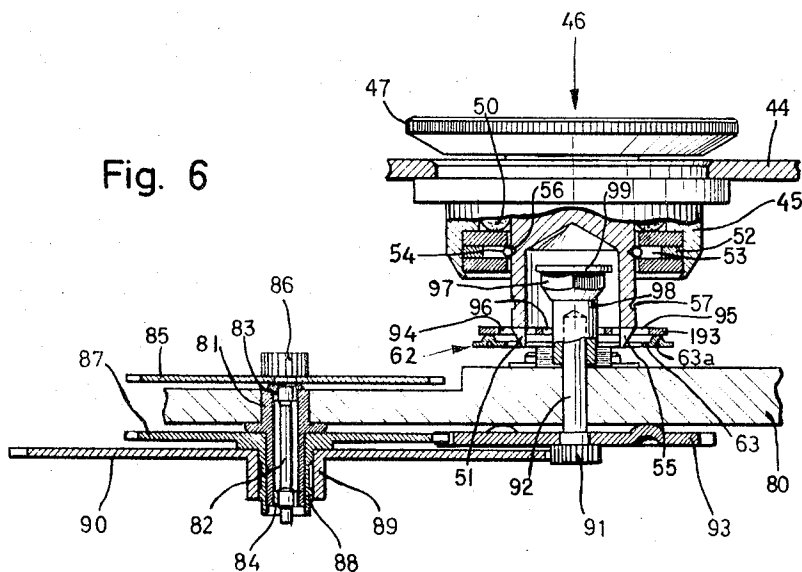
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Fig. 6



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WATCH INDICATOR SETTING MEANS

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8 Claims. (Cl. 58—85.5)

The present invention relates to watches and more particularly to a hand-setting device to adjust the minute and hour hand.

A hand-setting device to set the hands of a watch is known in which a setting crown on the outside of the case is coupled with a gear by a setting stem. The gear meshes with a second gear and this second gear meshes with the dial train to set the hands. This known construction has the disadvantage that it requires a relatively large space. In addition, separate bearings for the setting stem are provided so that the watch is correspondingly more expensive.

In accordance with the present invention, a watch having a crown exterior to the case is provided for setting the hands. The crown is capable of being coupled to a setting stem when it is pulled outward from the case. The setting stem carries a gear which is in constant mesh with a gear arranged on the center wheel staff. Another gear on the setting stem is in constant mesh with the hour wheel. By this arrangement a special setting stem to adjust the hands is no longer necessary, but this setting stem coincides with another staff which is needed in the watch movement. The setting stem does not take additional room and parts are saved so that the total hand-setting device can be arranged in a smaller volume and a corresponding reduction in cost is also obtained.

An especially favorable construction results, according to the invention, if the first gear fixed on the setting stem is the "minute wheel"—i.e. the wheel between the wheel carrying the minute hand and the wheel carrying the hour hand. By this arrangement the transmission ratio is chosen so that the adjustment of the minute hand can be accurate. An especially high accuracy results when this minute wheel engages with a special further wheel, the cannon pinion (center wheel) having a similar number of teeth, preferably an equal number of teeth.

It is an objective of the present invention to provide a watch, especially a wrist watch, having setting means for the minute and hour hand which is relatively inexpensive, accurate and occupies relatively little space.

Other objectives will be apparent from the preferred embodiments of the invention shown in the accompanying drawings, in which:

FIG. 1 is a side view, taken in cross-section along line 1—1 of FIG. 2, of the hand-setting device of the present invention in uncoupled condition;

FIG. 2 is a top sectional view along line 2—2 of FIG. 1;

FIG. 3 is a partial sectional view along line 3—3 of FIG. 1;

FIG. 4 is a partial sectional view along line 4—4 of FIG. 3;

FIG. 5 is a view similar to that of FIG. 1 of a portion of the device shown in FIG. 1, but with the hand-setting device in coupled condition; and

FIG. 6 is a cross-sectional view of another embodiment of the present invention.

The following description refers to the embodiment of FIGS. 1—5. The fourth wheel is driven by any driving means, preferably by an electric drive. A suitable driving

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means is described in U.S. Patent No. 3,046,460 to Ewald Zemla, Pforzheim, West Germany.

The fourth wheel 25, which is sometimes called a "seconds wheel," is fixed on a fourth wheel staff 19. The seconds hand (not shown) is attached to staff 19. Staff 19 is pivoted in bearing 20 of a bridge 22. The second bearing of this staff will be described later in more detail.

Underneath the fourth wheel 25 a fourth pinion 18 is fixed on the fourth wheel staff 19. Pinion 18 engages a third wheel 12 which is fixed on third wheel staff 11. The third wheel staff 11 pivots in bearing 13 in bridge 22 and in bearing 14 in a frame plate 10. A third pinion 15 is turnably arranged on staff 11 so that it is free to rotate on the staff. Pinion 15 presses a spring blade 16 which rests between pinion 15 and the third wheel 12. Pinion 15 is pressed downwards against a positioning ring 17 fixed on the third wheel staff 11. This arrangement acts as a friction coupling so that, by application of a predetermined force, the third wheel staff 11 can be turned relative to the third wheel pinion 15. The third wheel pinion 15 engages a center wheel 28 which is fixed on a center tube 21. Tube 21 turns within bearing tube 24 fixed in the frame plate 10. The second bearing 26 of the fourth wheel staff 19 is within center tube 21.

The minute wheel 30 is turnably arranged on a multi-purpose staff 32 and it engages the center wheel 28. A minute pinion 34, fixed on staff 32, engages an hour wheel 35. Hour wheel 35 and hour tube 36 are turnably arranged on the bearing tube 24 and an hour hand (not shown) is fixed on tube 36.

Staff 32 is pivoted in bearing 37 in the frame plate 10 and in bearing 38 in the bridge 22. The shoulder and reinforcing portion 40 of staff 32 determines the staff's axial position between the frame plate 10 and the bridge 22.

Watch case 44 has an opening in which ring 45 is fixed, in which a setting crown 46 can be shifted forwards and backwards. Setting crown 46 has a knurled ring 47 and a shaft 48 which is positioned within the retainer ring 45 by means of a gasket 50. A lock spring carrier 52 is arranged on the inner key of the retainer ring 45. A lock spring 54 in carrier 52 cooperates with an outer lock recess 56 in the pressed-in condition of the setting crown and cooperates with the lock recess 57 in the pulled-out condition of the setting crown.

Two follower fingers 51 and 55 are arranged on the lower end of the shaft 48 which engage with the recesses 58 and 59 of a coupling disc 60.

A coupling spring 62 presses against coupling disc 60. Spring 62 has a ring-shaped pressure part 63 and a spring arm 64 which is fixed with a screw 65 on the bridge 22 (see especially FIGS. 3 and 4). Furthermore the coupling disc 60 has two notches 67 and 67a and two bent-off tongs 68 and 68a which with their front end engage under the pressure part 63 (see FIG. 3).

The multi-purpose staff 32 has a staff neck portion 70 having a relatively small diameter. The coupling spring 62 and coupling disc 60 have a square hole 72 which corresponds in its form with the coupling square 42 of staff 32.

In operation, when the setting crown 46 is pulled out, as shown in FIG. 5, the lock spring 54 disengages from the outer lock recess 56 and engages in the inner lock recess 57. The coupling disc 60 follows the setting crown in its upward movement under the influence of the coupling spring 62 so that the follower fingers 51 and 55 stay in the recesses 58 and 59. During their upward movement the coupling disc slides over the coupling square 42. Since the opening 72 of the coupling disc corresponds with this coupling square, a coupled condition is now created be-

tween the coupling square and the coupling disc. Also, the follower fingers 51 and 55 are coupled with the shaft 48 of the setting crown. Consequently, by rotating the setting crown 46, the staff 32 and also the minute wheel 30 will be rotated.

This multi-purpose staff 32 combines the minute wheel staff and the setting stem into a common staff which thus serves several purposes, namely to carry the minute wheel and to cause a hand adjustment by the setting crown.

FIG. 6 shows a variation of the form of construction of FIGS. 1 to 5. Since the parts do not completely correspond with the parts of the form of construction of FIG. 1, they are mentioned again.

The bearing tube 81 is fixed in a frame plate 80 in which a fourth wheel staff 82 is pivoted at 83 and 84. In FIG. 6 the fourth wheel staff 82 carries on its upper end a fourth wheel 85 and a fourth pinion 86. The second hand (not shown) is connected to staff 82. A center tube 88 rotates on tube 81 and carries a center wheel 87. An hour tube 89 rotates on center tube 88. Hour tube 89 is integral with an hour wheel 90 which engages with a minute pinion 91 which is fixed on a multi-purpose staff 92. Staff 92 pivots in a frame plate 80. The staff 92 carries a minute pinion and a minute wheel 93 which engages in the center wheel 87.

The setting crown and the coupling spring correspond with the parts shown in the form of construction of FIGS. 1 to 5 and they are labeled with the same reference symbols.

The coupling disc 193 has recesses 94 and 95 for the fingers 51 and 55 and a coupling hole 96 with which a coupling square cooperates. A coupling bushing 98 is fixed on the multi-purpose staff 92. Disc 99 prevents the dropping out of the coupling disc 193, when the whole watch movement is taken out of the watch case 44, since this positioning disc has a larger diameter than the coupling hole 96. The method of operation of this form of construction is the same as in the form of FIGS. 1-5.

It is seen that the motion transmission from the setting stem to the setting organ can be laid out by corresponding transmission members in such a manner that the motion of the setting stem to the setting organ is such that the setting organ is arranged on the surface of the case. An especially simple construction results, according to the invention, when the axis of the setting stem is arranged parallel to the axis of the staffs carrying the hands and the setting organ is arranged on the case bottom.

In these embodiments the coupling and the setting organ are co-axial with the setting stem. This arrangement permits an easy assembly of the parts so that the setting organ is positioned on a case part, i.e. on the case bottom, and can be moved into a coupling position and into an uncoupling position. The coupling itself is separated from this setting organ. The first half of the coupling is placed on the setting stem or connected with it and the second half of the coupling is arranged on the movement, i.e. on a frame plate or a bridge which

forms a part of the total watch movement. By this construction it is possible to fix the setting organ on the case, i.e. in the case bottom, completely independent from the other parts cooperating with the setting organ and to then complete the assembly by inserting the entire movement as a whole on the coupling.

We claim:

1. A hand-setting device to adjust the minute and the hour hand of a watch encased in a case, including a frame plate, a gear train rotatably mounted on the frame plate and having an hour wheel, a crown at least a portion of which is exterior to the case, a setting staff which performs at all times the function of supporting gears in said gear train and which performs selectively the function of a setting staff, means mounting said setting staff on the frame plate and adapted to be coupled to the crown, means to couple and uncouple the crown into a direct driving relation with the setting stem, first and second gears carried by the setting staff, and a center staff rotatably mounted on the frame plate and a gear fixed to said staff, wherein the first gear is in mesh with the gear on the center staff and functions in the gear train, and the second gear on the setting staff meshes with the hour wheel.

2. A hand-setting device according to claim 1, wherein the first gear is the minute wheel.

3. A hand-setting device according to claim 1, wherein the axis of the setting staff is parallel to the axis of the staffs carrying the hands.

4. A hand-setting device according to claim 1, wherein the setting stem is journaled in a frame plate positioned between its two gears.

5. A hand-setting device according to claim 1, wherein the first and second gears of the setting staff are arranged next to each other and on the other side of the frame plate from the crown.

6. Hand-setting device according to claim 1 wherein the coupling means and the crown are coaxial.

7. Hand-setting device according to claim 1 wherein the coupling means includes a coupling disc which is constantly in effective connection with the crown and held against it by spring pressure.

8. Hand-setting device according to claim 7, wherein the crown has at least one finger-like protrusion which penetrates in a recess of the coupling disc.

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