

[54] DAY-DATE TIMEPIECE

[75] Inventors: **Claude Laesser**, Boudevilliers;
Robert Lambert, Neuchatel, both of
Switzerland

[73] Assignee: **Ebauches S.A.**, Neuchatel,
Switzerland

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[52] U.S. Cl. 58/58

[51] Int. Cl. G04b 19/24

[58] Field of Search..... 58/4, 5, 58

[56] **References Cited**

UNITED STATES PATENTS

3,470,687	10/1969	Ono et al.	58/58
3,470,688	10/1969	Miyasaka	58/58
3,597,916	8/1971	Nakagawa.....	58/58
3,645,090	2/1972	Mochizuki et al.	58/58

3,659,413	5/1972	Tanaka et al.	58/58
3,662,534	5/1972	Colomb	58/58
3,691,756	9/1972	Ono	58/58

Primary Examiner—George H. Miller, Jr.
Attorney—Kenwood Ross et al.

[57] **ABSTRACT**

A calendar timepiece provided with a control mechanism comprising a stem arranged in such a way as to be able to occupy at least two different axial positions, the mechanism comprising, a movable member acting as a selector and which is controlled, at least indirectly, by the stem, the selector being arranged in such a way as to be able to occupy one or the other of two positions, according to the direction in which the stem is rotated, when it occupies one of its two axial positions, called of selection, while, when the stem occupies another axial position, called of work, its rotation produces, according to the position previously given to the selector, either the correction of the date indicator alone or the day and date indicators, or the setting of the hands of the timepiece.

17 Claims, 12 Drawing Figures

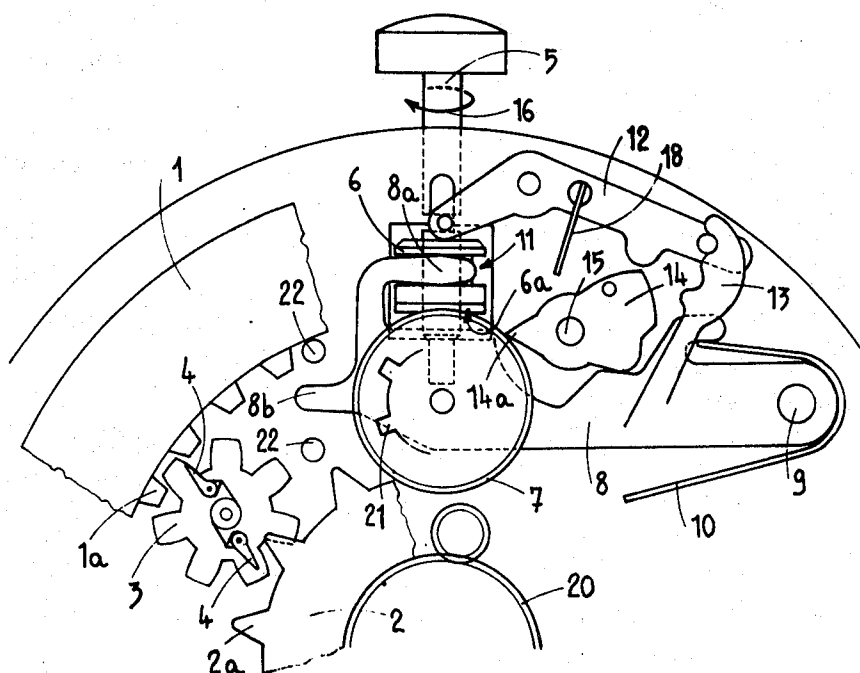


FIG. 1

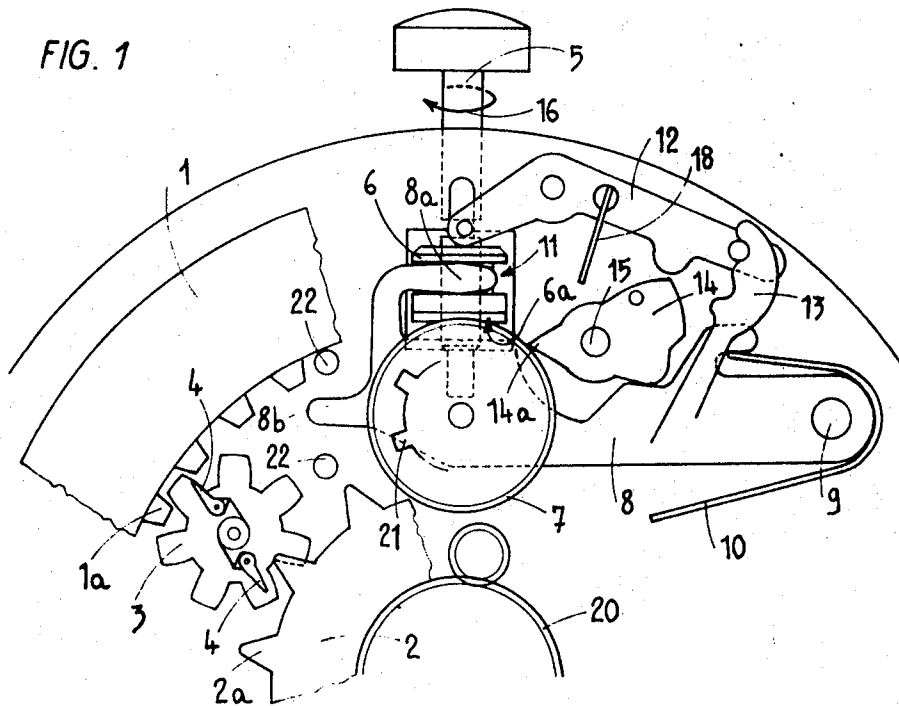


FIG. 2

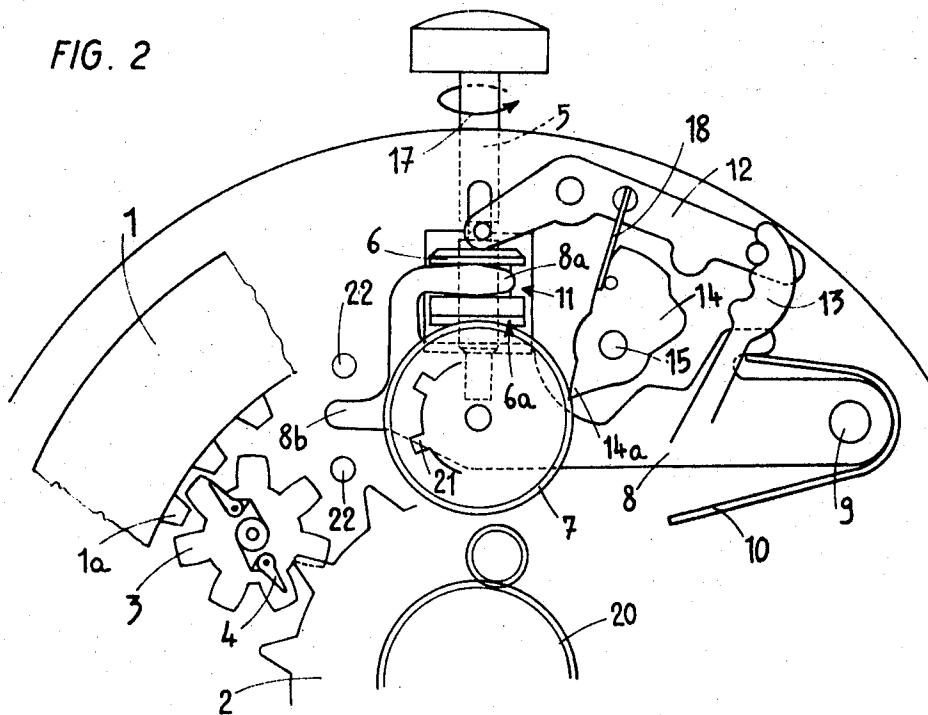


FIG. 3

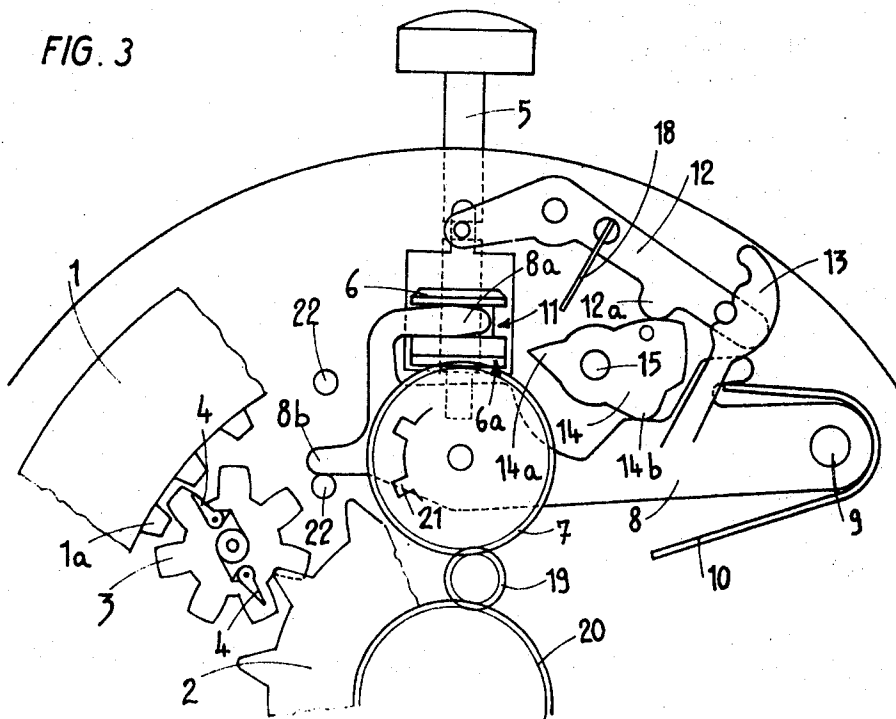


FIG. 4

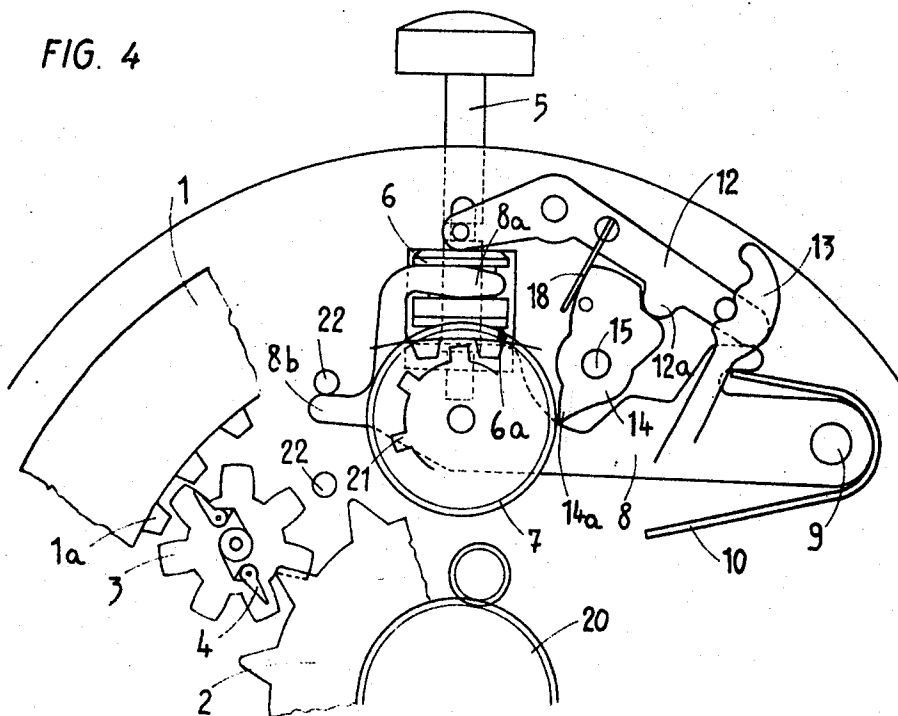


FIG. 5

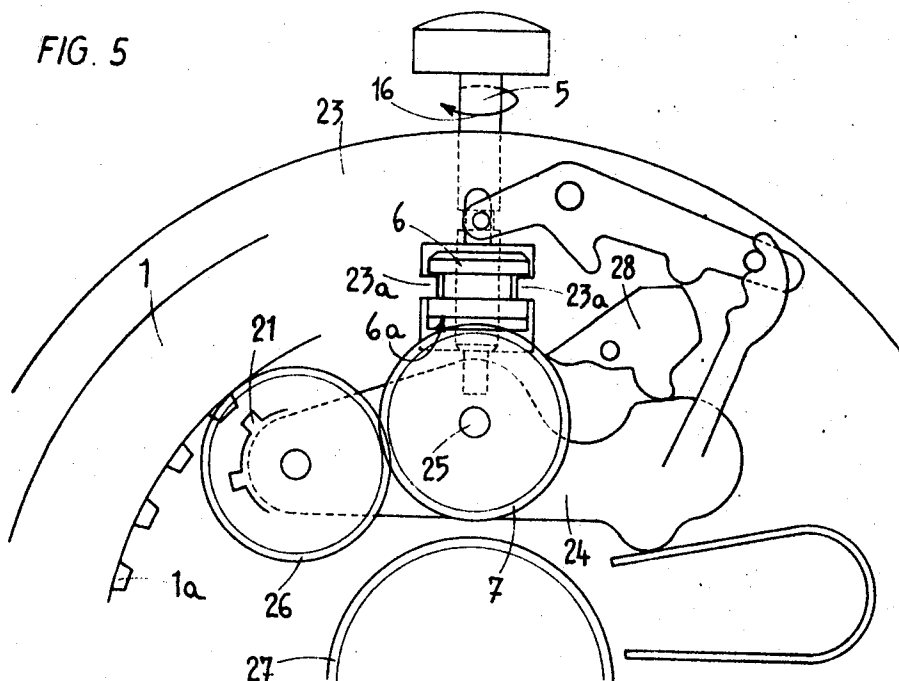


FIG. 6

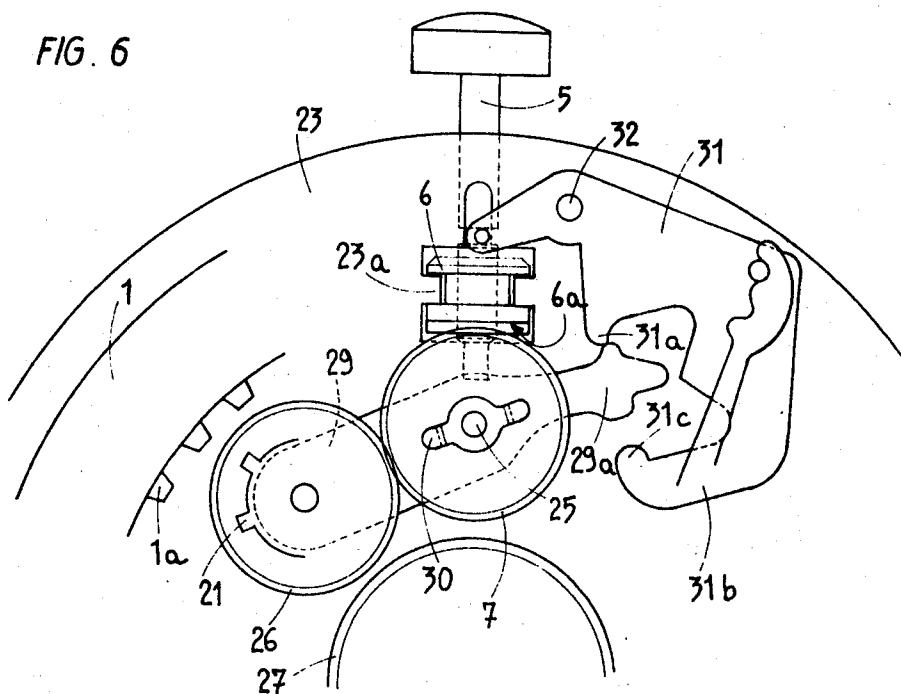


FIG. 7

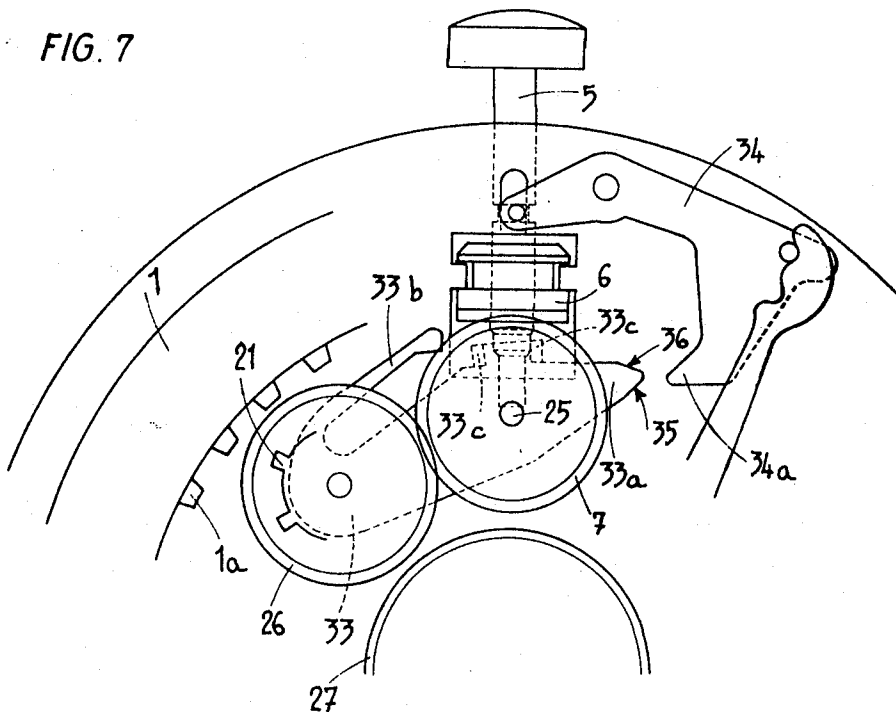


FIG. 8

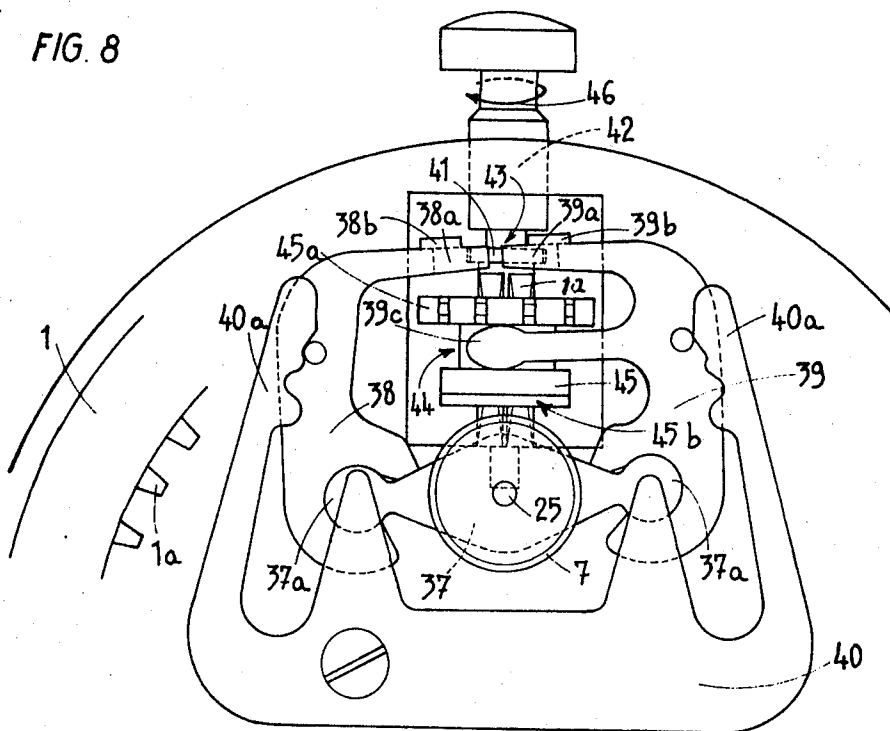


FIG. 9

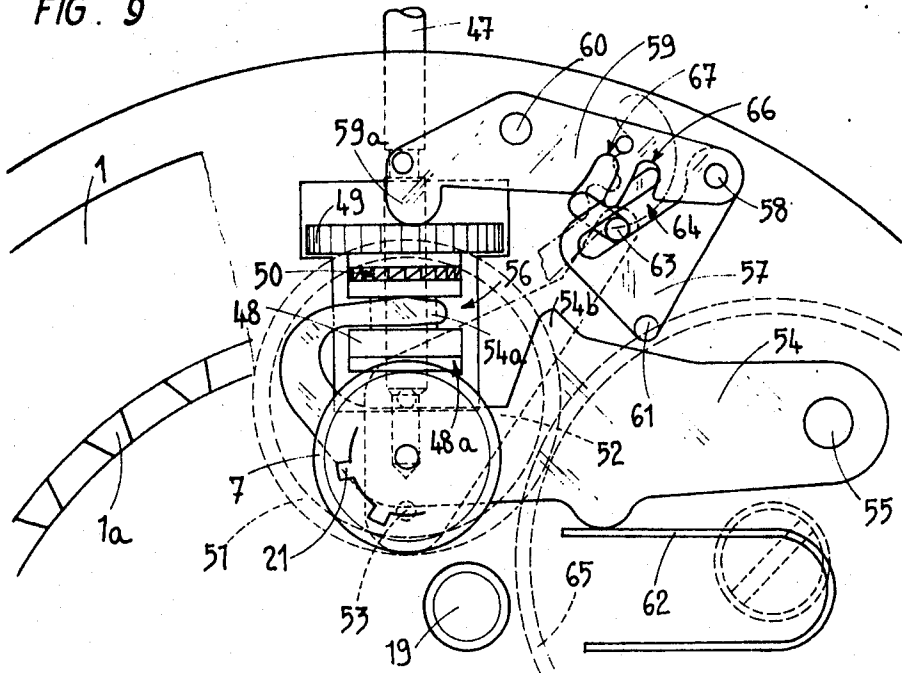


FIG. 10

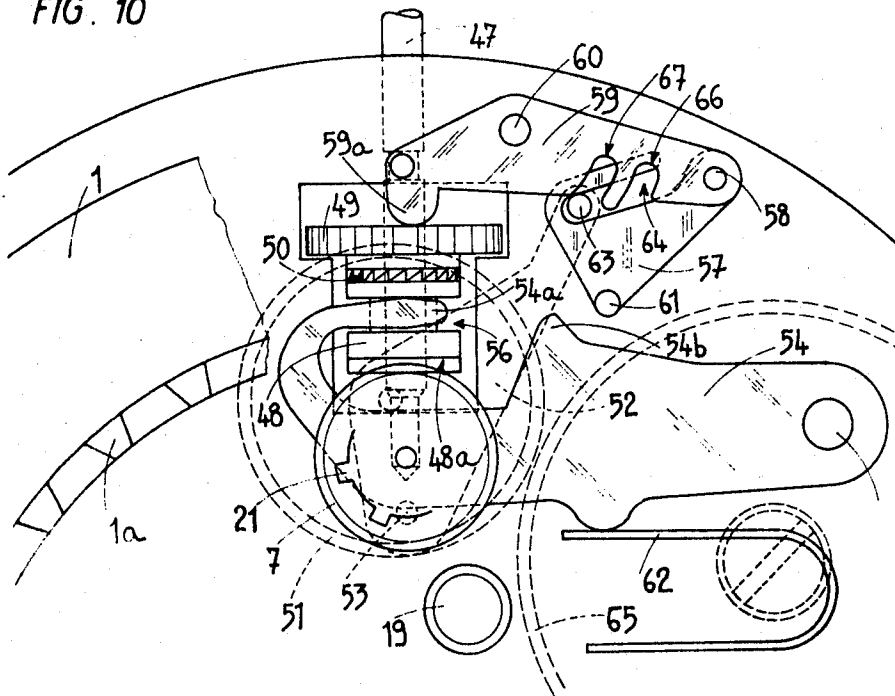


FIG. 11

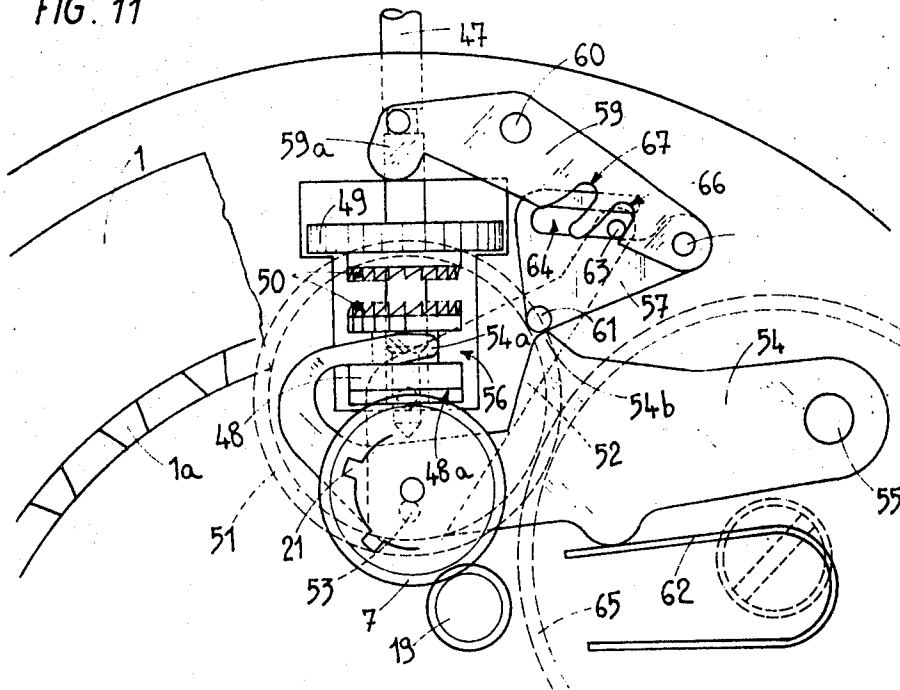
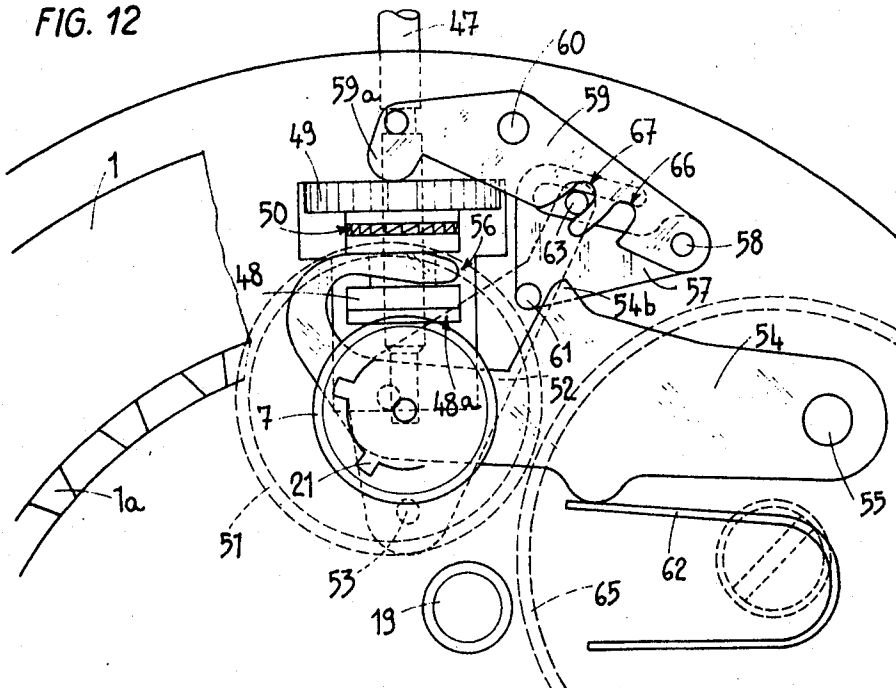


FIG. 12



DAY-DATE TIMEPIECE

The present invention has for object a calendar time-piece provided with a control mechanism comprising a stem arranged in such a way as to be able to occupy at least two different axial positions.

This timepiece is characterized by the fact that the said mechanism comprises a movable element operating as a selector and which is controlled, at least indirectly, by the said stem, this selector being arranged in such a way as to occupy one or the other of two positions, according to the sense of rotation of the said stem when it occupies one of its axial positions, called of selection, while, when the stem occupies another axial position, called of working, its rotation produces, according to the position previously given to the selector, either the correction of the date indicator and/or of the days indicator, or the setting of the hands of the time-piece.

The drawing shows, by way of example, several embodiments of the invention.

FIG. 1 is a plan view of a portion of the first embodiment of a calendar watch.

FIG. 2, 3 and 4 are plan views of this first embodiment in three different operating positions.

FIG. 5 to 8 are plan views of a portion of four other embodiments of a calendar watch, and

FIG. 9 to 12 are plan views, in four different operating positions, of a portion of a sixth embodiment of a calendar watch.

The calendar watch represented in FIG. 1 to 4 comprises a crown 1, indicating the date, provided with an inner toothing 1a by means of which it is driven intermittently by the gearing of the movement, by means of a mechanism which has not been represented, at the rate of one step per 24 hours. The watch comprises also an indicator 2 of the days, situated in the center of the movement, provided with a toothing 2a by means of which it is driven, once per 24 hours, by the crown 1 of the date, by the intermediary of a mechanism comprising a star wheel 3 driven by the toothing 1a of the indicator 1 of the date, and two pawls 4 carried by the wheel 3, cooperating with the toothing 2a. This mechanism constitutes thus a one-way coupling, the indicator 2 of the days being driven by the indicator 1 of the date when this latter is itself driven in its normal sense of rotation by the gearing of the movement or by a manual correcting device which is disclosed hereafter. When, on the contrary, the indicator of the date is driven in the counter direction by means of the manual correction device, the pawls 4 jump on the toothing 2a of the indicator of the days without driving it. One can thus effect the manual correction either of the two indicators simultaneously, for instance when the date and the days have been lost both following a stopping of the watch, either of the date indicator alone, for instance at the end of the months of 31 days, and this can be obtained according to the sense in which the manual correction mechanism is operated.

This mechanism, which serves also to the setting of the watch, comprises a stem 5 able to occupy two axial positions, one pushed (FIG. 1 and 2) and the other one pulled (FIG. 3 and 4). This stem 5 carries a sliding pinion 6 the front toothing 6a of which is meshing with a wheel 7 carried by a lever 8 articulated at 9 on the frame of the movement. This lever is submitted to the action of a return spring 10 which tends to rotate it in

the clockwise direction. The lever 8 is provided with a finger 8a engaging the groove, designated by 11, of the sliding pinion 6 so that this latter follows, while sliding on the stem 5, the movements of the lever 8, its toothing 6a thus remaining permanently meshing with the wheel 7.

The movement of the lever 8 are controlled by a trigger-piece 12 articulated on the frame of the movement, and which is submitted to the action of a jumper spring 13. This trigger-piece 12 acts on the lever 8 by the intermediary of a lever 14, acting as a selector, articulated at 15 on the frame of the movement. This selector 14 is provided with a beak 14a cooperating with the toothing of the wheel 7.

The operation of the control mechanism which is disclosed and represented is the following:

The stem 5 occupying its pushed position, called of selection, represented in FIG. 1 and 2, it can be rotated manually in the sense of the arrow 16 (FIG. 1), that brings the selector 14 into the position of selection represented in FIG. 1, or be rotated in the sense of the arrow 17 (FIG. 2), that brings the selector into the position represented in FIG. 2.

It is to be noted that, when it occupies one or the other of the two above mentioned positions both, called of selection, the selector 14 is returned respectively by the spring 10 of the lever 8 acting thereon by the intermediary of the lever and by a blade spring 18 secured to the trigger-piece 12, so that, in both cases, the extremity of its beak 14a tends to engage the toothing of the wheel 7, so that the selector be always submitted to the action of the stem 5 and so that it is sufficient to rotate this stem in one direction or in the other for urging the selector to pass from one of its selection positions into the other.

When the selector 14 occupies one of its selection positions, for instance the one of FIG. 1, a pull effected on the stem 5 brings it, under the effect of the trigger-piece 12 acting thereon by means of an embossment 12a into the position represented in FIG. 3, after it has effected a rotating movement in the clockwise direction. In this position, an embossment 14b of the selector 14 acts on the lever 8 for rocking it in the counter clockwise direction, against the action of its return spring 10, into the position represented in FIG. 3, in which the wheel 7 is meshing with the setting wheel, designated by 19, itself meshing with the hour wheel designated by 20. Thus, when the stem 5 is brought into its pulled position after the selector 14 has been placed into the position of FIG. 1 (FIG. 3), its rotation in one sense or in the other permits to drive manually the hands, in one sense or in the other, for the setting of the watch.

When the stem 5 is pulled after the selector 14 has been placed into the position represented in FIG. 2 (FIG. 4), the selector 14 rocks, under the action of the embossment 12a of the trigger-piece 12, in the counter clockwise direction and occupies the position represented in FIG. 4 that the lever 8 has reached after a rotation in the clockwise direction under the effect of its return spring 10.

In this position of the lever 8, a star wheel 21, coaxial to the wheel 7 and rigid therewith is meshing with the inner toothing 1a of the date indicator 1. In this position of the control mechanism, the rotation of the stem 5 in one sense or in the other permits to drive manually the date indicator 1 also in one sense or in the other,

the days indicator 2 being driven only in one sense by means of the one-way mechanism 3-4 as disclosed previously.

It is to be noted that the lever 8 is provided with a finger 8b bearing on one or the other of two pins 22 limiting its displacements.

In the embodiment of FIG. 5, the sliding pinion 6 is prevented from moving axially by two protrusions 23a of the base plate 23 of the frame of the movement. It is however called sliding pinion for the reason that the control stem 5 can slide therein axially. The lever 8 is replaced by a lever 24 articulated at 25 on the frame of the movement, that is to say coaxially to the wheel 7. Thus the wheel 7 remains permanently meshing with the front toothing 6a of the sliding pinion 6, whatever the position of the lever 24 may be. The wheel 7, in this embodiment, does not mesh with the setting wheel, as in the first embodiment, but is meshing with a second wheel, designated by 26, carried by the lever 24, which meshes, when the mechanism occupies its setting position, with the hour wheel 27. This wheel 26 is rigid with the star wheel 21 for the correction of the date, which is meshing, when the mechanism occupies its position of correction, with the inner toothing 1a of the date indicator 1.

As in the first embodiment, the stem 5 can occupy two axial positions, one pushed, of selection, and the other one pulled, of work.

The mechanism has been represented in FIG. 5 in the pushed position (of selection) of the stem, after the stem has been rotated in the sense of arrow 16, bringing the selector, here designated by 28, into the position corresponding to this one of FIG. 1 of the first embodiment. The operation is similar to this one of the first embodiment.

In the embodiment of FIG. 6, the lever, designated by 29, is articulated at 25 on the frame of the movement, coaxially to the wheel 7, as in the embodiment of FIG. 5. The sliding pinion 6 is also prevented from moving axially by protrusions 23a of the base plate 23, as in the embodiment of FIG. 5, its toothing 6a thus remaining permanently meshing with the wheel 7. The wheel 7 meshes with a wheel 26 rigid with a star wheel of correction 21, as in the embodiment of FIG. 5.

In this embodiment, the selector is constituted by an extension 29a of the lever 29. It is brought in its selection positions, when the stem 5 is pushed (FIG. 6), directly by the wheel 7 which is frictionally mounted on the lever 29, owing to a spring 30.

In this embodiment, the trigger-piece, designated by 31, articulated at 32 on the frame of the movement, is provided with an embossment 31a and with an arm 31b ending by an embossment 31c situated opposite the embossment 31a; the extension 29a of the lever 29, constituting properly the selector, is located between the embossments 31a and 31c. There results that, according to the position of selection occupied by the selector-lever 29-29a, the trigger-piece, when the stem 5 is pulled, rotates the lever 29 in one sense or in the other, around the axis 25, bringing either the wheel 26 to mesh with the hour wheel 27, or the wheel of correction 21 to mesh with the inner toothing 1a of the date indicator 1.

In the embodiment of FIG. 7, the selector, designated by 33a, is also of one piece with the lever, designated by 33, as in the embodiment of FIG. 6. The wheel 7 is coaxial to the axis of articulation 25 of the lever 33 and

is permanently meshing with the sliding pinion 6. The friction due to the spring 30 of the embodiment of FIG. 6 is replaced by an elastic arm 33b of the lever 33 the end of which, having the shape of a beak, engages the wheel 7. Thus, when the stem 5 occupies its selection position, as represented in FIG. 7, the lever 33, driven by the wheel 7, is rocked in one sense or in the other according to the sense of rotation of the stem.

It is to be noted that the lever 33 is provided with two right angle bent portions 33c, situated on both sides on the stem 5, and which act, while cooperating with the stem, as abutments for limiting its displacements.

The trigger-piece, designated by 34, is provided with a nose 34a which cooperates with one or the other of the edges 35 and 36 of the selector 33a, according to the position of selection occupied previously by the selector, that rocks the lever in one sense or in the other, bringing either the wheel 26 to mesh with the hour wheel 27 or the wheel of correction 21 to mesh with the toothing 1a of the date indicator 1.

In the embodiment of FIG. 8, the selector is constituted by three members, one, designated by 37, having the shape of a compensation bar, articulated on the frame of the movement at 25, coaxially to the wheel 7 and which is provided, at its both ends, with two enlarged circular portions 37a on one of which is articulated a lever 38 and on the other of which is articulated a lever 39. A member 40, having the shape of a stirrup, is provided with two resilient arms 40a operating as jumpers and which act the one on the lever 38 and the other on the lever 39.

These two levers are each provided with a slightly bent portion 38a, respectively 39a, engaging the toothing of a pinion 41 mounted on the control stem, designated by 42. On the other hand, the levers 38 and 39 are each provided with a right angle portion 38b, respectively 39b, engaging alternatively, according to the positions occupied by the levers, a groove 43 of the stem 42. The lever 39 is provided with an arm 39c engaged in the groove, designated by 44, of a sliding pinion 45.

The mechanism as disclosed and represented operates as follows:

The stem 42 occupying its selection position, pushed, as represented in FIG. 8, a rotation of this stem in one sense or in the other brings, by the action of the pinion 41 on the portions 38a and 39a of the levers 38 and 39, one or the other of these levers into a position in which its portion 38b, respectively 39b, is engaged in the groove 43 of the stem 42, the corresponding portion of the other lever being released, and this occurs during the rotation of the levers around their articulations 37a.

In the position represented in FIG. 8, the stem 42 has been rotated in the sense of arrow 46, bringing the portion 39b of the lever 39 engaged into the groove 43 and releasing therefrom the portion 38b of the lever 38.

In this position of the mechanism, a pull exerted on the stem 42 produces a displacement, towards the outside of the movement, of the lever 39, that brings a toothing 45a of the sliding pinion 45 meshing with the toothing 1a of the date indicator 1.

If, on the contrary, the selection had brought the portion 38b of the lever 38 meshing with the groove 43 of the stem 42, a pull exerted on the stem would have displaced the lever 38 towards the outside of the movement and, consequently, the lever 39 towards the center, bringing the toothing 45b of the sliding pinion 45

to mesh with the wheel 7, this wheel being on the other hand in desmodromic relation with the hands, in view of the setting of the watch.

The embodiments disclosed and represented up to here relate to electric watches in which the control stem has not to ensure the operation of winding. On the contrary, the embodiment of FIG. 9 to 13 is applied to a mechanical watch, the control mechanism permitting, over the operations of setting and of correcting the calendar indicators, to ensure the operation of winding.

In this embodiment, the control stem, designated by 47, carries a sliding pinion 48 and a winding pinion 49 coupled, as in the conventional winding mechanisms, by a front ratchet toothing 50. The winding pinion 49 is meshing with the crown or transmission wheel, designated by 51, carried by a lever 52 articulated at 53 on the frame of the movement.

The mechanism comprises a lever 54 articulated at 55 on the frame of the movement and which carries the wheel 7 as well as the star wheel 21 of correction of the days. The lever 54 is provided, as in the first embodiment, with an arm 54a engaged in the groove, designated by 56, of the sliding pinion 48. This pinion is provided with a front toothing 48a permanently meshing with the wheel 7.

In this embodiment, the selector, designated by 57, is constituted by a lever articulated at 58 on the trigger-piece, designated by 59, which is itself articulated at 60 on the frame of the movement. The selector 57 carries a pin 61 intended to cooperate with a nose 54b of the lever 54. This lever is returned by a spring 62.

The displacements of the selector 57, when the stem 47 occupies its pushed position, of selection, are produced by this stem by the intermediary of the lever 52, which is itself driven, by a tangential effect, by the crown wheel 51. The selector 57 is brought into one or the other of its positions of selection by a pin 63 carried by the lever 52 and which passes through a notch 64 provided in the selector. Simultaneously, during the rotation of the stem 47 occupying its position of selection (FIG. 9 and 10), the crown wheel 51 is brought to mesh with the ratchet or winding wheel designated by 65 (FIG. 9) or, on the contrary, to be removed therefrom (FIG. 10), according to the sense of rotation of the stem.

Thus, in the pushed position of the stem 47, the stem can effect at the same time the winding and the selection.

It is to be noted that an embossment 59a of the trigger-piece 59 acts on the winding pinion 49 so that this pinion accompanies the sliding pinion 48 in its axial displacements.

It is also to be noted that the selection can be carried out even if the spring is entirely wound and even when there is no slipping spring, the go-and-back movements of the lever 52, producing the selection, being carried out without the winding-wheel 65 be driven.

If, in the position of selection of the mechanism represented in FIG. 9, a pull is exerted on the stem 47, the trigger-piece 59 brings the selector 57 into the position represented in FIG. 11, in which the pin 63 of the lever 52 is engaged in one of two notches 66 and 67, in the present case in the notch 66, of the trigger-piece. In this position of selector 57, the pin 61 of this selector, acting on the nose 54b of the lever 54, rotates the lever in the counter clockwise direction, against the ac-

tion of its return spring 62, that brings the wheel 7 to mesh with the minute wheel 19. In this position of the mechanism, the rotation of the stem 47, in one sense or in the other, permits to effect the setting of the hands of the watch.

If, from the position of selection of the mechanism represented in FIG. 10, a pull is exerted on the stem 47, the trigger-piece 59 brings the selector 57 into the position represented in FIG. 12, in which the pin 63 is engaged in the notch 67 of the trigger-piece. In this position of the selector 57, the pin 61 is disengaged from the nose 54b of the lever 54, that authorizes this lever to move, under the action of the return spring 62, for bringing the star wheel 21 meshing with the toothing 1a of the date indicator 1.

It is to be noted that, during the setting of the watch, the crown wheel 51 is not driven, the winding pinion 49 being then released from the sliding pinion 48 (FIG. 11). During the correction, the crown wheel 51 is not driven too, since it does no more mesh with the winding pinion 49 (FIG. 12).

It is also to be noted that, during the winding (FIG. 9), the wheel 7 and the star wheel 21 rotate freely, being respectively not meshing with the setting wheel 19 nor with the toothing 1a of the date indicator 1.

What we claim is:

1. Day-care timepiece provided with a control mechanism comprising a stem (5; 42; 47) arranged in such a way as to be able to occupy at least two different axial positions, characterized by the fact that the said mechanism comprises a movable member (14; 28; 29a; 33a; 37-38-39; 57) acting as a selector and which is controlled, at least indirectly, by the said stem, this selector being arranged in such a way as to be able to occupy one or the other of two positions, according to the sense in which the stem is rotated when it occupies one of its two axial positions called of selection while, when the stem occupies another axial position, called of work, its rotation produces, according to the position previously given to the selector, either (I) the correction of the date indicator (1) alone or the date and day (2) indicators together, or (II) the setting of the hands of the timepiece.

2. Timepiece as claimed in claim 1, characterized by the fact that the selector is constituted by a lever (14; 28; 29a; 33a; 37-38-39; 57), this selector being arranged in such a way as to be moved by the stem, during its axial displacements bringing it from its position of selection into its position of work, that brings this selector into one or the other of two positions of work, according to the position of selection it was previously occupying.

3. Timepiece as claimed in claim 2, characterized by the fact that the selector is made of three elements (37-38-39) one of which (37) is articulated on the frame of the movement and the others of which (38; 39) are articulated on the first one, each of these other elements being provided with an end (38a; 39a) engaging a pinion (41) carried by the stem (42) and with a bent portion (38b; 39b) adapted to engage alternatively, according to the position occupied by the said elements (38; 39) of the selector, a groove (43) of the stem (42), one of the said elements (39) being provided with an extension (39c) engaged in the groove (44) of a sliding pinion (45) carried by the stem (42), this sliding pinion being arranged in such a way as to be desmodromically connected either with the hands of

the timepiece that permits the setting thereof, or with the date indicator that permits the correction of this indicator, according to the axial position it occupies, controlled by the said element (39) of the selector the displacements of which are effected in one sense or in the other according to each of the said elements (38; 39) has a respective bent portion (38b; 39b) engaged in the groove (43) of the stem (42).

4. Timepiece as claimed in claim 2, in which the control mechanism comprises a trigger-piece (12; 31; 34; 59), characterized by the fact that the said trigger-piece acts on the selector for bringing it into one or the other of its positions of work, according to its position of selection, when the stem passes from its position of selection into its position of work.

5. Timepiece as claimed in claim 4, characterized by the fact that the control mechanism comprises a lever (52) moved by the control stem (47) when the control stem occupies its position of selection and which acts on the selector (57) for bringing it into one or the other of its positions of selection.

6. Timepiece as claimed in claim 5, characterized by the fact that the selector (57) is articulated on the trigger-piece (59).

7. Timepiece as claimed in claim 5, characterized by the fact that the said lever (52) carries the crown wheel (51) meshing with a winding pinion (49) carried by the stem (47), the force exerted on the said crown wheel (51) by the winding pinion (49) producing the displacements, in one sense or in the other, according to the sense of rotation of the stem (47), of the lever (52) ensuring on the one hand the movements of selection of the selector (57), and on the other hand the winding while bringing, in one sense of rotation of the stem (47), the crown wheel (51) into mesh with the winding-wheel (65) and releasing, during the rotation of the stem (47) in the reverse direction, the crown wheel (51) from the winding-wheel (65), for effecting winding by a rotative movement of the stem (47).

8. Timepiece as claimed in claim 7, characterized by the fact that the control mechanism comprises a second lever (54) articulated on the frame of the movement, carrying a wheel (7) meshing with a sliding pinion (48) carried by the control stem (47) and arranged in such a way as to remain meshing with the said wheel (7) whatever the position of the stem (47) may be, the selector (57) acting on this second lever (54) against the action of a return spring (62) for maintaining it in one or the other of two positions, according to the position it occupies itself, in one of which the said wheel (7) is in desmodromic connection with the hands of the timepiece, that permits the setting thereof, and in the other of which a correcting member (21) carried by the second lever (54) and controlled by the said wheel (7) is meshing with the toothing (1a) of the date indicator (1) that permits the correction of this indicator.

9. Timepiece as claimed in claim 4, characterized by the fact that it comprises a lever (8; 24; 29; 33) articulated on the frame of the movement, carrying a wheel (7) controlling the selector (14; 28; 29a; 33a), this wheel being meshing with a sliding pinion (6) carried by the control stem (5) and which is arranged in such a way as to remain meshing with the said wheel whatever the position of the stem may be, the selector acting on this lever for maintaining it in one or the other of two positions, according to the position it occupies it-

self, in one of which the said wheel is in desmodromic connection with the hands of the timepiece, that permits the setting of the timepiece, and in the other of which a correcting member (21) carried by the lever and controlled by the said wheel, is meshing with the toothing 1a of the date indicator (1) that permits the correction of the latter.

10. Timepiece as claimed in claim 9, characterized by the fact that the lever is provided with a finger (8a) engaging the groove (11) of the sliding pinion (6) so that this latter follows the displacements of the lever (8) and remains permanently meshing with the wheel (7) carried by this lever.

11. Timepiece as claimed in claim 9, characterized by the fact that the correcting member (21) cooperating with the toothing (1a) of the date indicator (1) is coaxial to the wheel (7) and rigid with this wheel which is carried by the lever (8).

12. Timepiece as claimed in claim 9, characterized by the fact that the sliding pinion 6 is prevented from moving axially by abutting means (23a), the lever (24; 29; 33) being articulated on the frame of the movement coaxially to the wheel 7 that it carries, which remains thus meshing with the sliding pinion whatever the position of the lever may be, this wheel being meshing with the second wheel (26) carried by the lever and ensuring, in one position of work of this lever, the driving of the hands of the timepiece, this second wheel being coaxial and rigid with the correcting member (21) which acts, in the other position of work of the lever, on the toothing (1a) of the date indicator (1).

13. Timepiece as claimed in claim 12, characterized by the fact that the selector (29a) and the lever (29) are made of one piece, the wheel (7) which controls this lever-selector being frictionally mounted thereon, so that to drive it in one sense or in the other, according to the sense of rotation of the control stem.

14. Timepiece as claimed in claim 10, characterized by the fact that the selector (33a) and the lever (33) are made of only one piece, this lever-selector being provided with an elastic arm (33b) ending by a beak engaging resiliently the toothing of its driving wheel (7).

15. Timepiece as claimed in claim 9, characterized by the fact that the said selector (14; 33a) is provided with a beak (14a; 33b) meshing with the wheel (7) of the lever (8; 33) so that the rotation of this wheel (7) in one sense or in the other, when the stem (5) occupies its position of selection, imparts to the selector a rotating movement in one sense or in the other.

16. Timepiece as claimed in claim 15, characterized by the fact that a double elastic device (10-18) acts on the selector (14), when the stem (5) occupies its position of selection, for returning it into the position in which its beak (14a) tends to engage the wheel (7) which drives it.

17. Timepiece as claimed in claim 16, characterized by the fact that the said double elastic device (10-18) is constituted on the one hand by a return spring (10) of the lever (8) which acts on the selector (14) by the intermediary of this lever when the selector occupies one of its positions of selection, and on the other hand by a blade spring (18) carried by the trigger-piece (12) and which acts also on the selector (14) when this selector occupies the other position of selection.