Nov. 7, 1944. L. COHEN 2,362,245

WINDING AND SETTING MECHANISM FOR WATCHES

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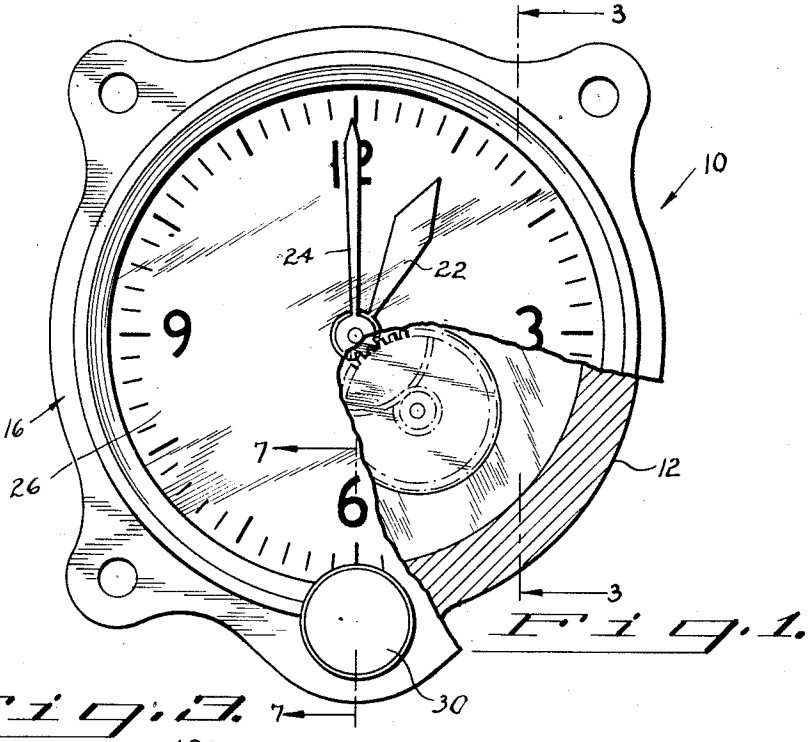
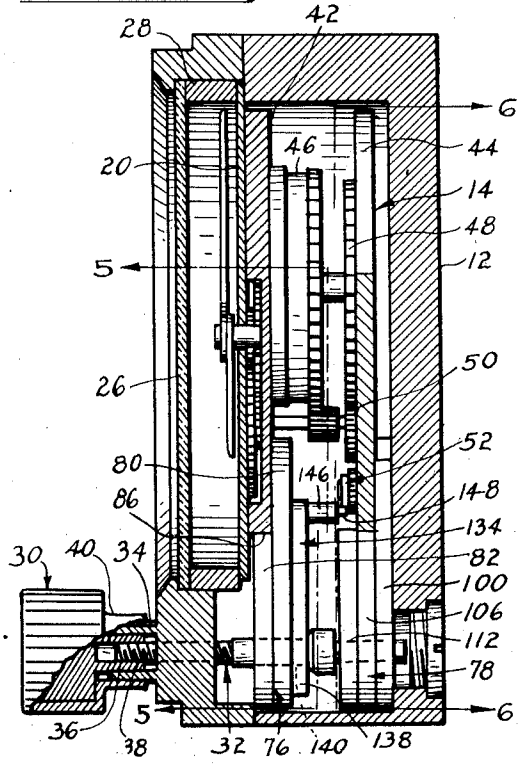


Fig. 1.

Fig. 3.



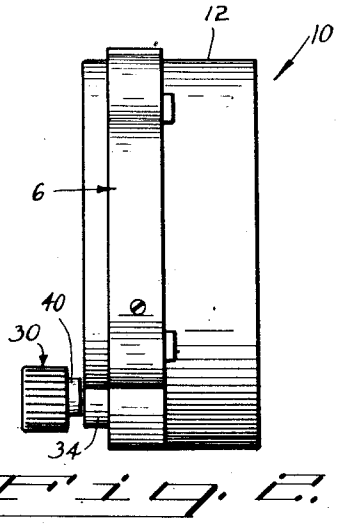


Fig. 2.

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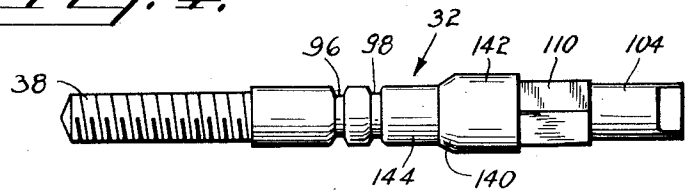
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WINDING AND SETTING MECHANISM FOR WATCHES

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Fig. 4.



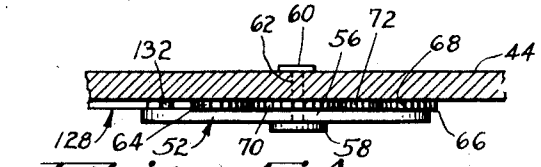


Fig. 6A.

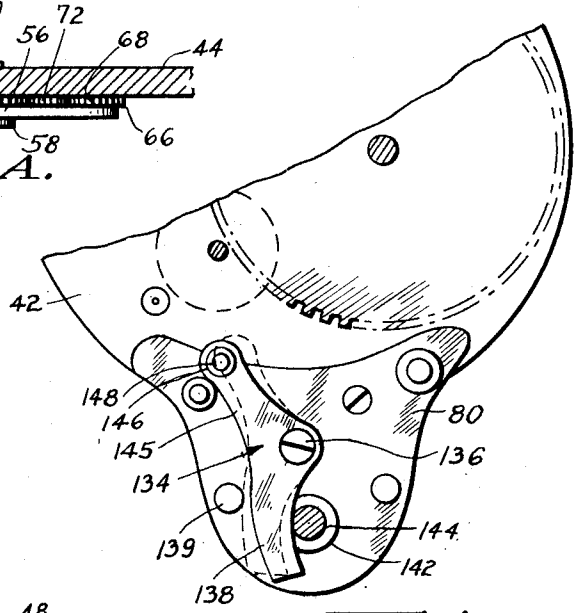


Fig. 5

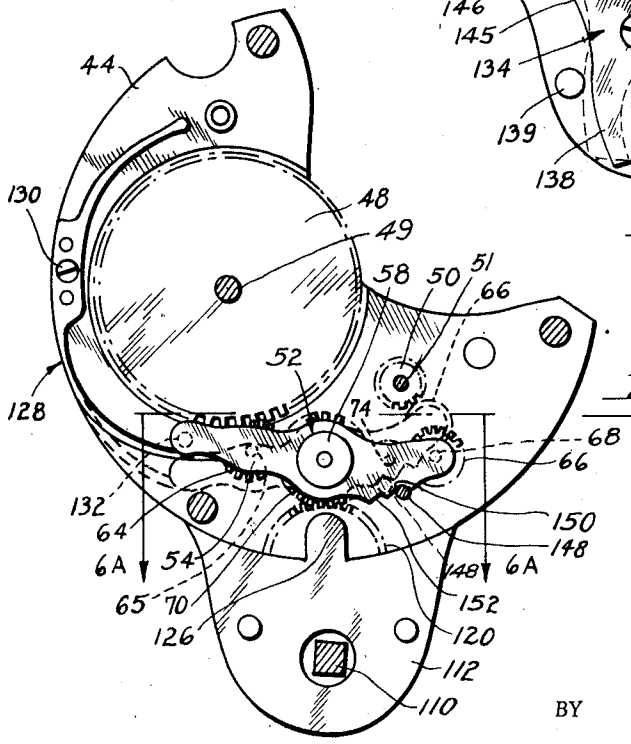


Fig. 6.

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WINDING AND SETTING MECHANISM FOR WATCHES

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Fig. 7.

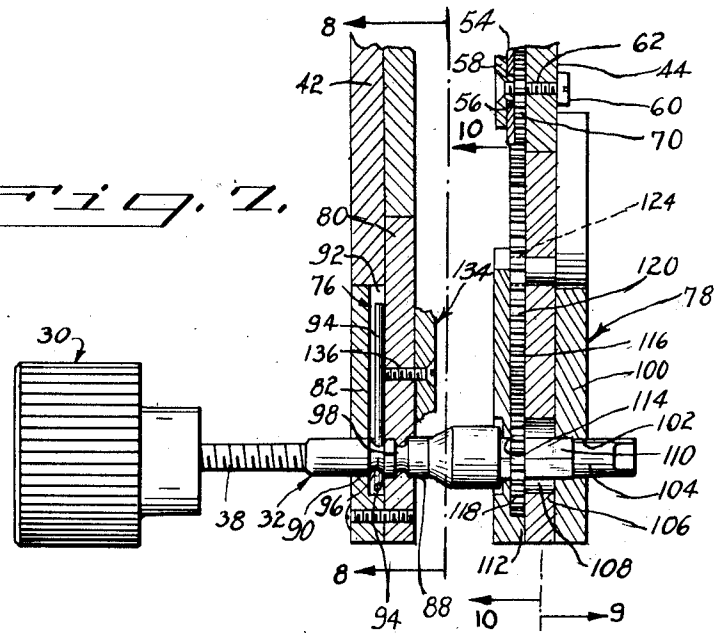


Fig. 8.

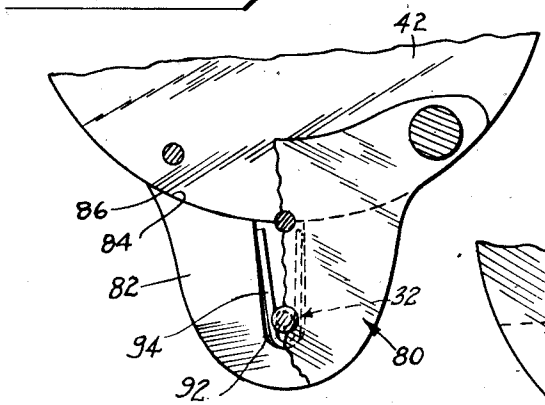


Fig. 11.

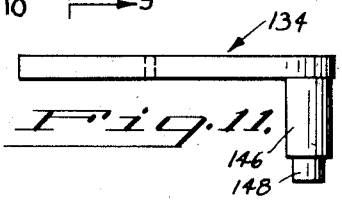


Fig. 9.

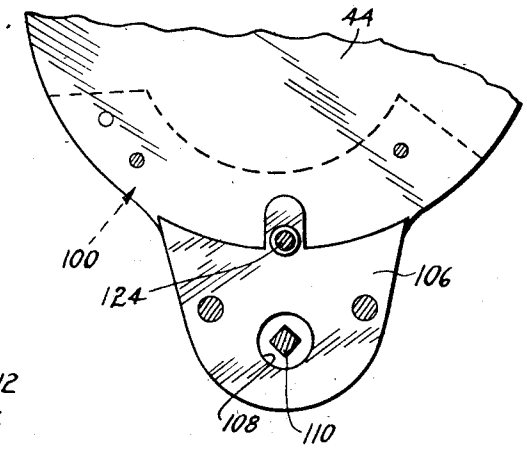
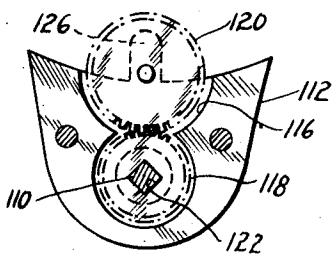


Fig. 10.



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Patented Nov. 7, 1944

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UNITED STATES PATENT OFFICE

2,362,245

WINDING AND SETTING MECHANISM FOR WATCHES

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Application May 20, 1942, Serial No. 443,800

11 Claims. (Cl. 58—71)

The present invention relates to watches and more particularly to winding and setting mechanisms therefor.

In watches which are mounted on instrument panels, for example, the instrument panel of an airplane, it is essential or highly desirable that the stem for winding and setting the watch extend forwardly of the watch dial in a direction transversely thereof and preferably at right angles thereto to a position in which the stem is readily accessible for operation in winding or setting the watch. In a high grade accurate watch, such as that with which the present invention is concerned, the stem winding and setting mechanism must be durable in construction and accurate and reliable in operation. One of the objects of the present invention, therefore, is to provide a watch with a stem winding and setting mechanism having all of these important characteristics.

Another object of the invention is to provide a stem winding and setting mechanism in which the winding and setting stem extends forwardly of the dial and which can be associated with a watch movement of a high grade watch, the original design of which was such that the winding and setting stem was mounted so that it extended in a plane parallel to the watch dial or radially of the latter and rearwardly of the front of the watch.

Another object of the invention is generally to provide an improved winding and setting mechanism for a watch of the type which is mounted on the instrument panel of an airplane.

The above and other objects, features, and advantages of the invention will be more fully understood from the following description, reference being had to the accompanying illustrative drawings.

In the drawings:

Fig. 1 is a front view of a watch embodying the present invention, with parts broken away for the purpose of illustration;

Fig. 2 is a side view in elevation of the watch;

Fig. 3 is a sectional view on the line 3—3 of Fig. 1;

Fig. 4 is a view in elevation of the winding and setting stem, the turning knob being removed;

Fig. 5 is a sectional view on the line 5—5 of Fig. 3;

Fig. 6 is a sectional view on the line 6—6 of Fig. 3;

Fig. 6a is a sectional view on the line 6a—6a of Fig. 6;

Fig. 7 is a sectional view on the line 7—7 of Fig. 1;

Figs. 8, 9 and 10 are views taken along the lines 8—8, 9—9, and 10—10, respectively, of Fig. 7;

Fig. 11 is a side view of the stem-operated lever forming a part of the mechanism.

Referring now to the drawings in detail the watch 10, provided with the winding and setting mechanism embodying the present invention, comprises the casing part 12 in which the watch movement 14 is housed and the front casing part 16 which is secured to the casing part 12 in a well-known way and which is adapted to be secured to the instrument panel for the mounting of the watch thereon. The watch is provided with the usual dial 20 over which the hour and minute hands move, said hour and minute hands being indicated at 22 and 24. A glass cover 26 is mounted within the front casing part 16 and is held spaced from the hands of the watch by a metal ring 28. The watch includes, of course, all the parts necessary to an operative time-piece, as is well understood by those skilled in the art, and it will be understood that since the present invention is not concerned with the watch movement itself it is unnecessary to show or describe the same except within the extent of the present disclosure in which these are illustrated and described the parts with which the winding-and-setting mechanism directly coacts.

As clearly shown in Figs. 1 to 3, the knob or finger piece 30 for actuating the winding and setting stem 32 is positioned at the front of the watch casing where it is easily accessible for actuating said stem and the mechanism operated thereby for winding and setting the watch. Stem 32 extends, as shown in Fig. 3, in a direction transversely of the watch dial into the forwardly projecting cylindrical part 34 of the front casing part 16. Knob 34 has an inner stem 36 which is threaded internally for removably securing said knob to the forward threaded portion 38 of stem 32. Said knob also has an outer sleeve 40 spaced from sleeve 36 and closely surrounding cylindrical portion 34 in movable relation thereto.

The frame of the watch movement comprises the usual plates 42 and 44 between which the main-spring operated drum 46 and other parts of the watch movement are positioned. The actuating gear for winding the watch is indicated at 48 and is carried by the winding spindle or shaft 49 (Figs. 3 and 6) and the actuating gear for setting the hands of the watch is indicated at 50,

being carried by the setting spindle or shaft 51 which is parallel to spindle 49, said gears being mounted for rotation, as usual, in a plane adjacent and parallel to the inner surfaces of plate 44. A movable gear-carrier 52 is mounted on plate 44 for pivotal movement in a plane parallel to the plane of gears 48 and 50 (Figs. 3, 6 and 6a). Said gear-carrier comprises a lever 54 pivoted between its ends on a sleeve 56 which is internally threaded. Said sleeve has a flange 58 which overlies the outer surface of lever 54, and a screw 60 (Fig. 7) is inserted through an opening 62 through plate 44 and is threaded into said sleeve, thus holding lever 54 in position adjacent the inner surface of plate 44 and permitting said lever to pivot on sleeve 56. A gear 64 is mounted for turning movement on a short stud 65 projecting inwardly from lever 54. Said gear 64 when engaged with watch winding gear 48 and rotated, as hereinafter described, is of course effective to operate said watch winding gear. A gear 66 is mounted for turning movement on a short stud pin 68 fixed to and projecting from the inner surface of lever 52 in position to engage watch setting gear 50 for operating the latter. A gear 70 for rotating gears 64 and 66 is mounted on sleeve 56 and meshes directly with gear 64 for rotating the latter. Said gear 70 is connected to gear 66 by an intermediate gear 72 which is mounted for turning movement on a short pin stud 74 fixed to and projecting from lever 52.

The winding and setting stem 32 is mounted in axially spaced frame parts 76 and 78 which extend laterally of the movement frame in planes parallel and adjacent to the planes of plates 42 and 44, respectively, said frame parts also providing means for mounting parts of the winding and setting mechanism which are controlled and operated by stem 32. Each of said frame parts 76 and 78 comprises a plurality of stationary members which will now be described.

Frame part 76 comprises a plate 80 fixed to plate 42 at the inner marginal edge surface thereof. A plate 82 is superposed on plate 80 and is removably secured in fixed relation thereto, the inner edge 84 of plate 82 abutting the adjacent peripheral edge portion 86 of plate 42. Plates 80 and 82 are provided with circular openings 88 and 90, respectively, in which stem 32 is mounted for rotation and for axial movement thereof. A groove 92 is provided in plate 82 and a spring 94 is mounted in said groove and is held between the two plates. Said spring engages stem 32 and is arranged to engage stem 30 releasably in the axially spaced peripheral grooves 96 and 98, respectively, thereof for holding stem 30 releasably in its axially adjusted position. When stem 32 is moved forwardly it is in watch setting position, spring 94 engaging said stem in groove 98, and it will be understood that when said stem is moved inwardly, it is in watch winding position and is releasably held in said position by spring 94 which engages the stem in groove 96.

Referring now to the frame part 78, the latter comprises a plate 100 fixed to the outer surface of plate 44 in overlapping relation with the marginal edge portion of said last mentioned plate. Said plate 100 is provided with a cylindrical opening 102 in axial alignment with the openings in plates 80 and 82, the cylindrical end portion 104 of stem 32 having a rotary bearing engagement with plate 100 in said opening which also provides a guide for said stem in the axial movement thereof. An intermediate plate 106 is superposed on plate 100 and is provided with an opening 108 in alignment with opening 102 but of larger diameter than the latter to receive the non-circular portion 112 of stem 32 when the latter is in watch winding position. An upper plate 112 is superposed on plate 106 and is fixed thereto. Said plate 112 is provided with an opening 114 which is in alignment with opening 102 of plate 100, said opening 114 permitting the rotary and axial movement of the non-circular portion 110 of stem 32. Said plate 112 has an internal recess 116 in which gears 118 and 120 are positioned and mounted for rotation.

Gears 118 and 120 are held between the spaced confronting surfaces of plates 106 and 112 and are rotatable between said surfaces. Gear 118 is provided with a non-circular opening 122 into which the non-circular portion portion 110 of stem 32 slidably fits, whereby said stem is axially movable but is held against rotation in relation to gear 118. Gear 120 which meshes with gear 118 is journalled for rotation on a stud pin 124 projecting inwardly from plate 106. It will be noted that gear 120 overlaps the inner surface of plate 44 and turns thereon. A projection 126 on plate 112 engages the opposite surface of gear 120 for holding the latter against movement axially of stud pin 124.

Gear 120 meshes with gear 70 of gear carrier 52 so that when stem 32 is rotated in either the watch-winding or watch-setting position thereof, gear 70 is rotated and rotates gears 64 and 66 which in turn rotate watch winding gear 48 and watch setting gear 50 when engaged with the last mentioned gears, respectively. In this connection, it will be noted that the non-circular portion 110 of stem 32 is sufficiently long to engage gear 118 in operative turning relation therewith in either of said axial positions of said stem. Gear carrier 52 is normally in such position that gear 64 thereof meshes with watch winding gear 48 so that in order to wind the watch it is merely necessary to rotate stem 32. Said gear carrier 52 is held in said normal position by a spring 128 (Fig. 6) fixed to the inner surface of plate 44 by a screw 130, which bears against a pin 132 fixed to and projecting inwardly from lever 54 of said gear carrier adjacent one end thereof, as shown more clearly in Fig. 6a.

When gear carrier 52 is in its normal position with gear 64 thereof in mesh with watch winding gear 48, gear 66 is out of mesh with watch setting gear 50. This position of gear carrier 52 is shown in full lines in Fig. 6. When it is necessary to set the watch, gear carrier 52 is moved from said full line position to a position, indicated in dotted lines, in which gear 64 is disengaged from gear 48 and gear 66 is engaged with gear 50. This movement of gear 52 from the watch winding position to the watch setting position thereof is accomplished pursuant to the axial movement of stem 32 in a direction forwardly of the watch dial. Conversely, after the watch has been set and it is desired to return stem 32 to its normal position the inward axial movement of stem 32 results in the return of gear carrier 52 to the normal position thereof in which gear 66 is disengaged from gear 50 and in which gear 64 is engaged with gear 48. The means for accomplishing this will now be described.

A lever 134 is mounted for pivotal movement on plate 80 by means of a pivot screw 136, it being noted that said lever 134 has a pivotal movement about the stem of screw 136 in a plane

parallel to the plane of the watch dial. One arm 138 of lever 134 bears against and is in slidable engagement with stem 32 and more particularly with the tapered portion 140 thereof extending between the enlarged part 142 of said stem and the adjacent portion 144. Normally, when the stem 32 is in its watch winding position arm 138 engages stem 32 at the portion 144 thereof. When stem 32 is moved to its watch setting position arm 138 of lever 134 is engaged, first by tapered portion 140 and thereafter by enlarged part 142 of the stem whereby said lever is turned about its pivot pin 136. A stop 139 is provided to limit the movement of arm 138 by part 142 of the stem. The other arm 145 of lever 134 is provided with a pin 146 which projects toward plate 44 and which has an outer end portion 148 of reduced diameter. Said end portion 148 bears against gear carrier 52 in the region of the portion thereof which carries gear 66. Thus, one end of lever 134 slidably engages stem 32 while the other end of said lever slidably engages gear carrier 52 and it will be noted that due to the action of spring 128 said ends of lever 134 have a resilient engagement with the stem and with the gear carrier. Lever 54 of the gear carrier is provided with recesses 150 and 152 in which end portion 148 of lever 134 is engaged when lever 54 is in the watch winding and watch setting positions, respectively. More particularly, when stem 32 is in watch-winding position end portion 148 of lever 134 engages lever 54 of the gear carrier in recess 150, said gear carrier being then in its normal position in which gear 64 engages watch winding gear 48. When, however, the stem 32 is moved to its watch-setting position, end portion 148 of lever 134 engages lever 54 of the gear carrier in recess 152 and in moving from recess 150 to recess 152 bears against the edge of said lever 54 and turns the latter counterclockwise (viewing Fig. 6) whereby to disengage gear 64 from gear 48 and to engage gear 66 with watch-setting gear 50. It will be understood that rotation of stem 32 while the latter is in its outwardly projected or watch-setting position results in setting the hands of the watch due to the rotation of gear 50 by gear 66.

While I have shown and described the preferred embodiment of my invention, it will be understood that the latter may be embodied otherwise than as herein shown or described and that in the illustrated embodiment certain changes in the mechanical details and in the arrangement of parts may be made and will suggest themselves to skilled artisans in view of the present disclosure. Therefore, the invention is not to be limited to the specific construction herein shown or described except to the extent which may be required by the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a watch having a movement and a dial, said movement comprising parallel winding and setting spindles and actuating gears carried by said spindles, respectively, a stem-winder-and-setter mechanism including a stem projecting forwardly of the dial in a direction transversely thereof for access at the front of the watch for winding and setting purposes, said mechanism comprising, in addition to said stem, a member mounted for pivotal movement on said frame on a pivot parallel to said spindles, gearing carried by said member including a first gear normally in engagement with one of said actuating gears and operable in one position of said member to wind the watch, a second gear normally out of engagement with the other of said actuating gears and operable in another position of said member to engage said other actuating gear to set the watch, and an intermediate gear meshing with both of said gears of said pivoted member for rotating the same, means mounting said stem for rotation and for axial movement parallel to said spindles, a gear surrounding said stem and rotatable thereby, a gear connecting said last mentioned gear to said intermediate gear, and means operable by said stem in the axial movement thereof for positively moving said member to a position in which said first gear is moved out of said one position to a position in which it is inoperative to wind the watch and said second gear is moved from an inoperative position to said position thereof for setting the watch.

2. In a watch having a movement and a dial, said movement comprising parallel winding and setting spindles and actuating gears carried by said spindles, respectively, a stem-winder-and-setter mechanism including a stem projecting forwardly of the dial in a direction transversely thereof for access at the front of the watch for winding and setting purposes, said mechanism comprising, in addition to said stem, a member mounted for pivotal movement on said frame on a pivot parallel to said spindles, gearing carried by said member including a first gear normally in engagement with one of said actuating gears and operable in one position of said member to wind the watch, a second gear normally out of engagement with the other of said actuating gears and operable in another position of said member to engage said other actuating gear to set the watch, and an intermediate gear meshing with both of said gears of said pivoted member for rotating the same, means mounting said stem for rotation and for axial movement parallel to said spindles, a gear surrounding said stem and rotatable thereby, a gear connecting said last mentioned gear to said intermediate gear, and means operable by said stem in the axial movement thereof for positively moving said member to a position in which said first gear is moved out of said one position to a position in which it is inoperative to wind the watch and said second gear is moved from an inoperative position to said position thereof for setting the watch, said last mentioned means comprising a pivoted lever having one end in slidable engagement with said stem and its opposite end in continuous engagement with said pivoted member at one side of the latter's pivot point, and a spring for holding said member resiliently in continuous engagement with said last mentioned end of said lever.

3. In a watch having a movement, a dial, and a frame in which said movement is mounted, said movement including a gear for winding the watch and a gear for setting the watch, parallel spindles carrying said gears, respectively, auxiliary plates extending laterally from said frame and carried thereby in spaced planes parallel to the plane of the watch dial, said plates having aligned openings, a winding and setting stem mounted in said plates for rotation in said openings and for axial movement in said openings transversely of said plates and parallel to said spindles, a gear mounted on a part of said stem for rotation thereby, said gear having an opening in alignment with said plate openings and in which said stem is axially movable but rotatably fixed in relation to said gear, a gear carrier mounted for movement on said frame about a pivot parallel

to said spindles and comprising a gear releasably engageable with said winding gear and a gear releasably engageable with said setting gear, for operating the same, respectively, gearing connecting said stem-mounted gear to said gears on the carrier, and means continuously engaged by said stem and continuously engaging said carrier and operable by said stem in the axial movement thereof for moving said gear carrier to disengage one of said carrier gears from the gear operated thereby and for engaging said other carrier-gear with the gear operated thereby.

4. In a watch having a movement, a dial, and a frame in which said movement is mounted, said movement including a gear for winding the watch, a gear for setting the watch and parallel spindles carrying said gears, respectively, auxiliary plates extending laterally from said frame and carried thereby in spaced planes parallel to the plane of the watch dial, said plates having aligned openings, a winding and setting stem mounted in said plates for rotation in said openings and for axial movement in said openings transversely of said plates and parallel to said spindles, to two positions for setting and winding the watch, respectively, means operable by the rotation of said stem in one of said positions thereof for operating said winding gear, means operable by the rotation of said stem in the other of said positions thereof for operating said setting gear, and means pivotally mounted on one of said auxiliary plates for pivotal movement about a pivot parallel to said spindles and movable by said longitudinal movement of said stem for controlling the operations of said gear-operating means by said rotations of said stem.

5. In a watch having a movement, a dial, and a frame in which said movement is mounted, said movement including a gear for winding the watch, a gear for setting the watch and parallel spindles carrying said gears, respectively, auxiliary plates carried by said frame and extending laterally from said frame in spaced planes parallel to the plane of the watch dial, said plates having aligned openings, a winding and setting stem mounted in said plates for rotation in said openings and for axial movement in said openings parallel to said spindles and transversely of said plates, to two positions for setting and winding the watch, respectively, means operable by the rotation of said stem in one of said positions thereof for operating said winding gear, and means operable by the rotation of said stem in the other of said positions thereof for operating said setting gear, means mounted in one of said plates and releasably engageable with axially spaced parts, respectively, of said stem for releasably holding the latter in either of said positions thereof, and means pivotally mounted on one of said auxiliary plates for pivotal movement about a pivot parallel to said spindles and movable by said longitudinal movement of said stem for controlling the operations of said gear-operating means by said rotations of said stem.

6. In a watch having a movement, a dial, and a frame in which said movement is mounted, said movement including a gear for winding the watch and a gear for setting the watch, parallel spindles carrying said gears, respectively, said frame having axially spaced parts in planes parallel to the plane of the watch dial and provided with aligned openings, a winding and setting stem mounted in said parts for rotation in said openings and for axial movement in said openings transversely of said parts and parallel to said spindles to two positions for setting and winding the watch, respectively, means operable by the rotation of said stem in one of said positions thereof for operating said winding gear, means operable by the rotation of said stem in the other of said positions thereof for operating said setting gear, means mounted on one of said spaced parts of the frame for pivotal movement about a pivot parallel to said spindles and movable by the longitudinal movement of said stem for controlling the operations of said gear-operating means by said rotations of said stem, and means mounted in one of said frame parts and releasably engageable with axially spaced parts, respectively, of said stem for releasably holding the latter in either of said positions thereof.

7. In a watch having a movement, a dial, and a frame in which said movement is mounted, said movement including a gear for winding the watch and a gear for setting the watch and parallel spindles carrying said gears, respectively, said frame having axially spaced parts in planes parallel to the plane of the watch dial and provided with aligned openings, a winding and setting stem mounted in said parts for rotation in said openings and for axial movement in said openings parallel to said spindles and transversely of said parts to two positions for setting and winding the watch, respectively, means operable by the rotation of said stem in one of said positions thereof for operating said winding gear, and means operable by the rotation of said stem in the other of said positions thereof for operating said setting gear, said last mentioned means including gears mounted for rotating about axes parallel to said spindles and a gear mounted on said stem and rotatable thereby, said last mentioned gear having an opening in alignment with said plate openings and in which said stem is axially movable but rotatably fixed in relation to said last mentioned gear, and means mounted in one of said frame parts and releasably engageable with axially spaced parts, respectively, of said stem for releasably holding the latter in either of said positions thereof.

8. In a watch having a movement, a dial, and a frame in which said movement is mounted, said movement including a gear for winding the watch and a gear for setting the watch and parallel spindles carrying said gears, respectively, auxiliary plates carried by and extending laterally from said frame in spaced planes parallel to the plane of the watch dial, said plates having aligned openings, a winding and setting stem mounted in said plates for rotation in said openings and for axial movement in said openings parallel to said spindles and transversely of said plates, to two positions for setting and winding the watch, respectively, a lever pivotally mounted on one of said auxiliary plates for pivotal movement in a plane parallel to the plane of the watch dial and at right angles to said spindles, said stem having an enlarged part engageable with one arm of said lever for turning the latter when the stem is moved to watch-setting position, a movable gear carrier mounted for turning movement in a plane parallel to the plane of the watch dial, said gear carrier being mounted on a pivot parallel to said stem and having a gear movable from an inoperative position out of mesh with said setting gear to an operative position in mesh with said setting gear, and a pin carried by and extending transversely of the other arm of said lever and engageable with said gear carrier for moving the latter to position its second gear in mesh with

said setting gear when said first arm of said lever is engaged by the enlarged part of said stem.

9. A stem-winder-and-setter mechanism for a watch, having a winding gear and a setting gear and parallel spindles carrying said gears, respectively, said mechanism comprising a stem mounted for axial movement parallel to said spindles and for turning movement about its axis, a member mounted for pivotal movement in a plane transversely of said stem axis about a pivot parallel to said spindles, a member movable in a plane parallel to and spaced from said first mentioned plane, means carried by said second member and operable in one position thereof to actuate said watch-winding gear, means carried by said second member and operable in another position thereof for actuating said watch-setting gear, said first mentioned member being operatively connected to said second member for moving the same from said first mentioned position thereof to said second mentioned position thereof, a connection between said stem and said first mentioned member for pivotally moving the latter when the stem is moved axially thereof, and means actuated by said stem by said turning movement thereof for operating said means carried by said second member.

10. A stem-winder-and-setter mechanism for a watch having a winding gear and a setting gear and parallel spindles carrying said gears, respectively, said mechanism comprising a stem mounted for axial movement parallel to said spindles and for turning movement about its axis, a member mounted for pivotal movement in a plane transversely of said stem axis and about a pivot parallel to said spindles, a member pivotally movable in a plane parallel to and spaced from said first mentioned plane, means carried by said second member and operable in one position thereof to actuate said watch-winding gear, means carried by said second member and operable in another position thereof for actuating said watch-setting gear, said first mentioned member being operatively connected to said second member for moving the same from said first mentioned position thereof to said second mentioned position thereof, a connection between said stem and said first mentioned member for pivotally moving the latter about said pivot when the stem is moved axially thereof, and means including a gear slidably mounted on said stem and turnable thereby for operating said means carried by said second member.

11. A stem-winder-and-setting mechanism for a watch having a winding gear and a setting gear and parallel spindles carrying said gears, respectively, said mechanism comprising a stem mounted for axial movement parallel to said spindles and for turning movement about its axis, a member mounted for pivotal movement in a plane transversely of said stem axis and about a pivot parallel to said spindles, said stem having axially spaced portions of different diameters connected by a tapered intermediate portion, said member having a slidable engagement with said portions of the stem and operable by the axial movement of the latter to impart a pivotal movement to said member about said pivot thereof, a member pivotally movable in a plane parallel to and spaced from said first mentioned plane, means carried by said second member and operable in one position thereof to actuate said watch-winding gear, means carried by said second member and operable in another position thereof for actuating said watch-setting gear, said first mentioned member being operatively connected to said second member for moving the same from said first mentioned position thereof to said second mentioned position thereof, a connection between said stem and said first mentioned member for pivotally moving the latter about said pivot thereof when the stem is moved axially thereof, and means including a gear slidably mounted on said stem and turnable thereby for operating said means carried by said second member.

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