(No Model.) 2 Sheets—Sheet 1.

D. H. CHURCH.

STEM WINDING AND SETTING WATCH.

No. 370,929. Patented Oct. 4, 1887.

Fig: 1.

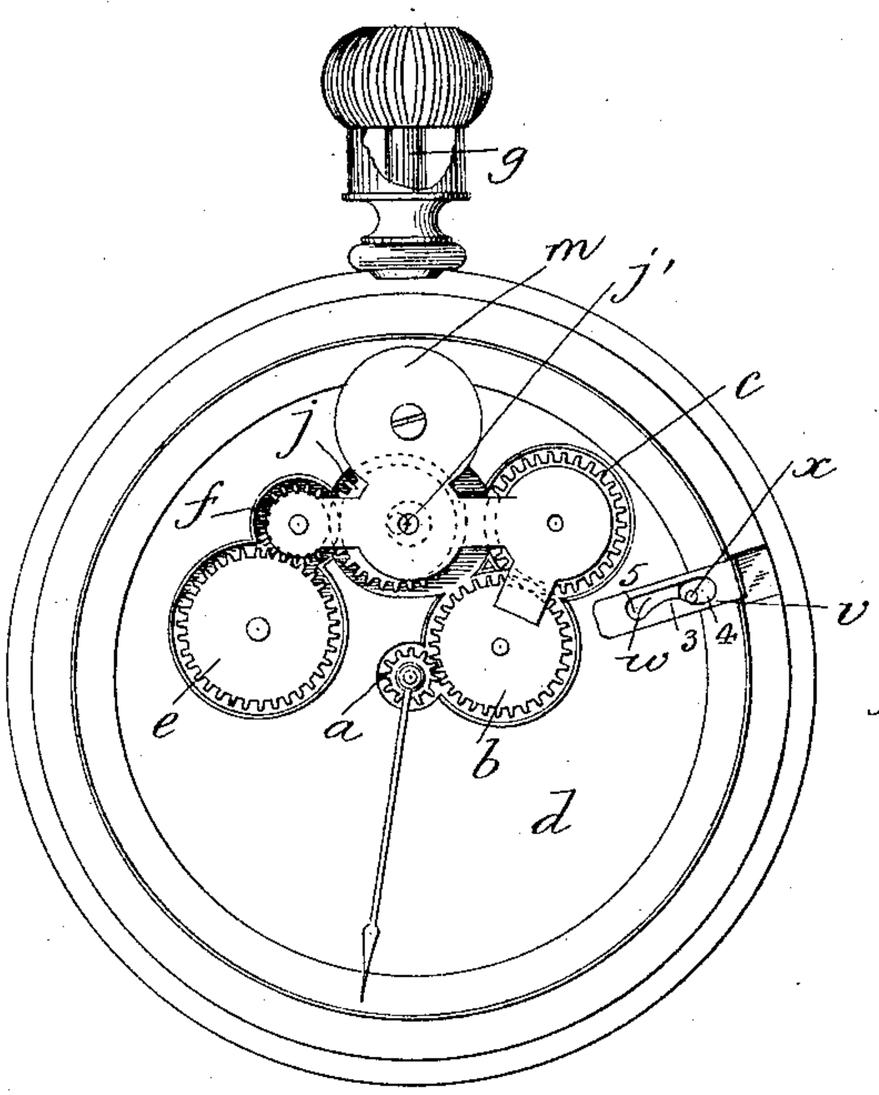


Fig: 2.

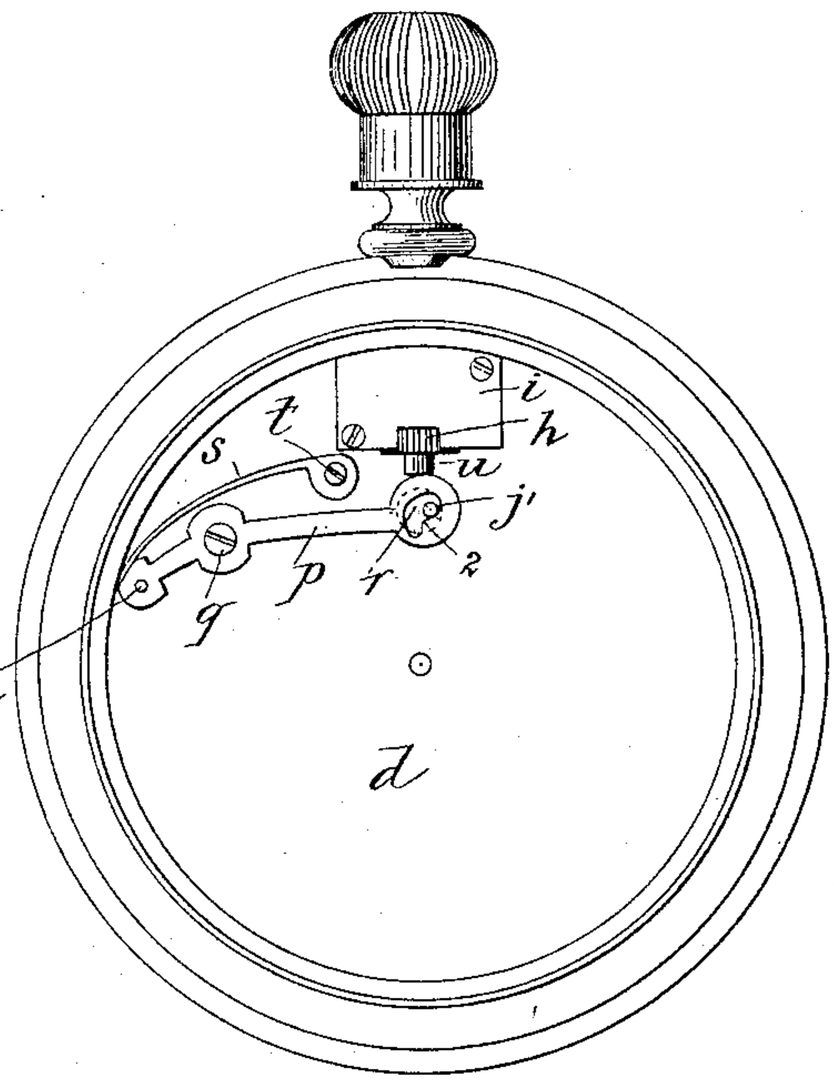


Fig: 3.

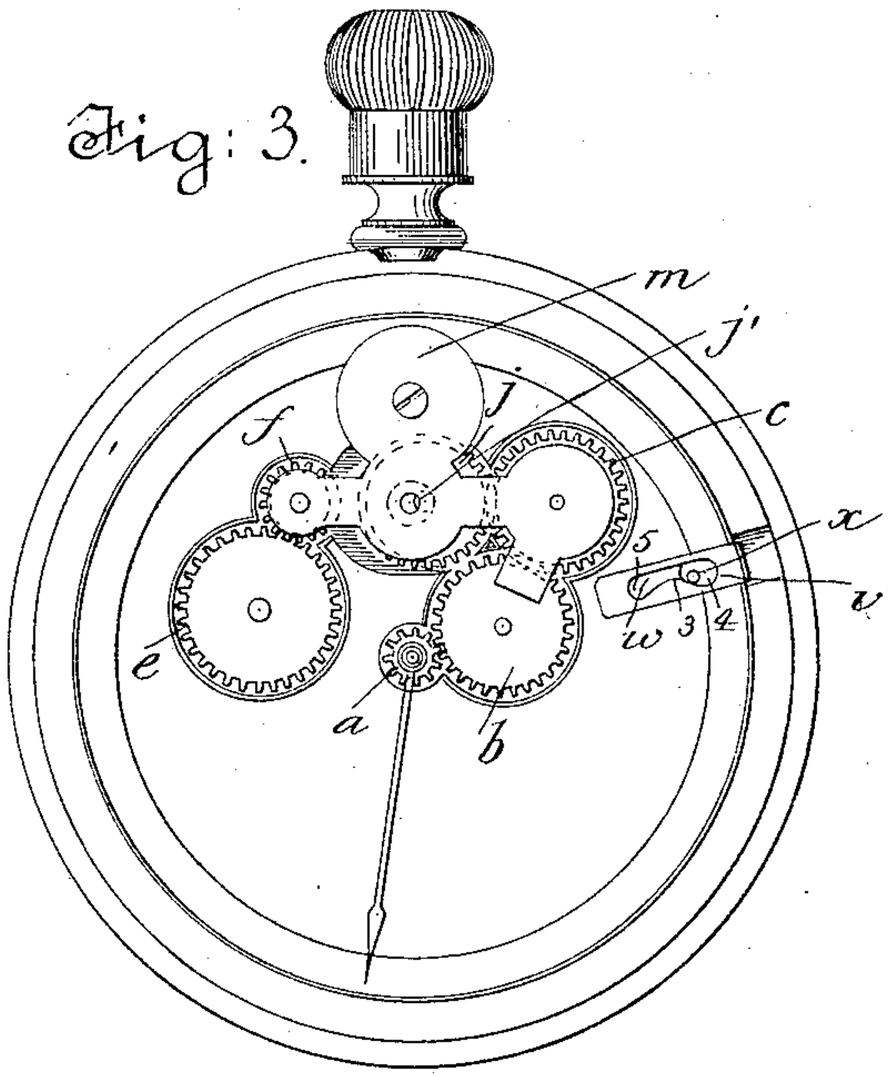
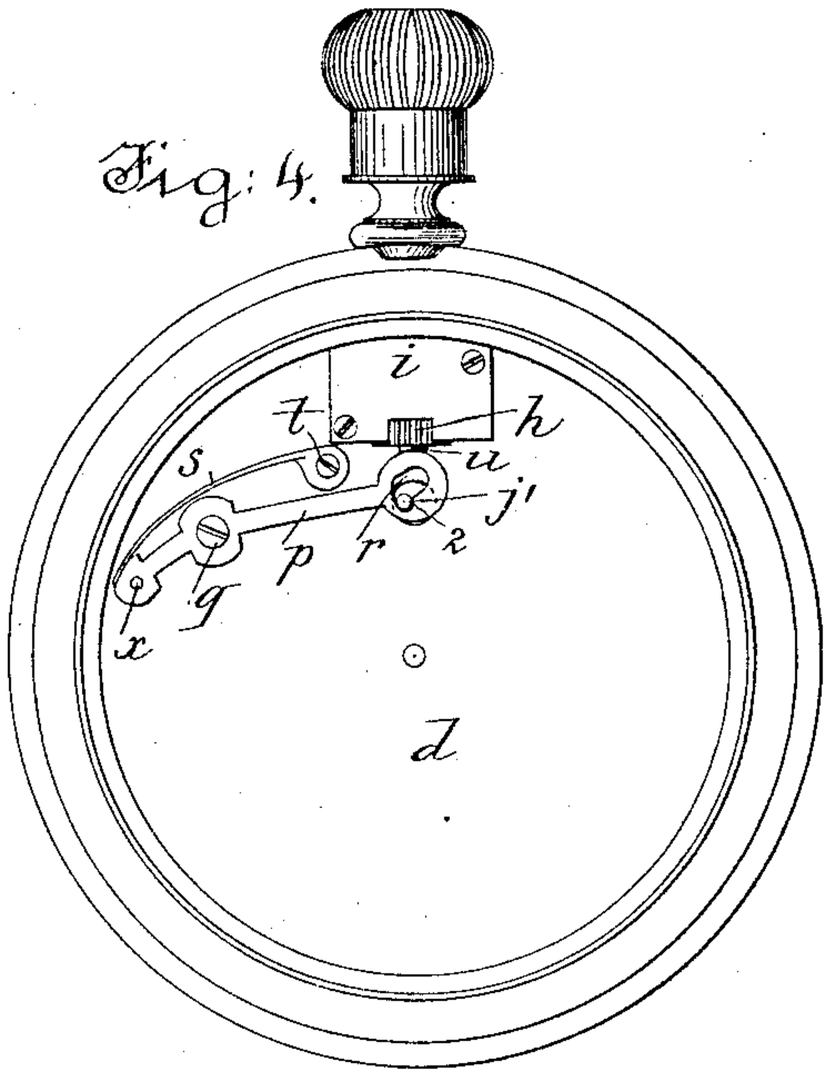


Fig: 4.



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(No Model.) 2 Sheets—Sheet 2.

D. H. CHURCH.

STEM WINDING AND SETTING WATCH.

No. 370,929. Patented Oct. 4, 1887.

Fig: 5.

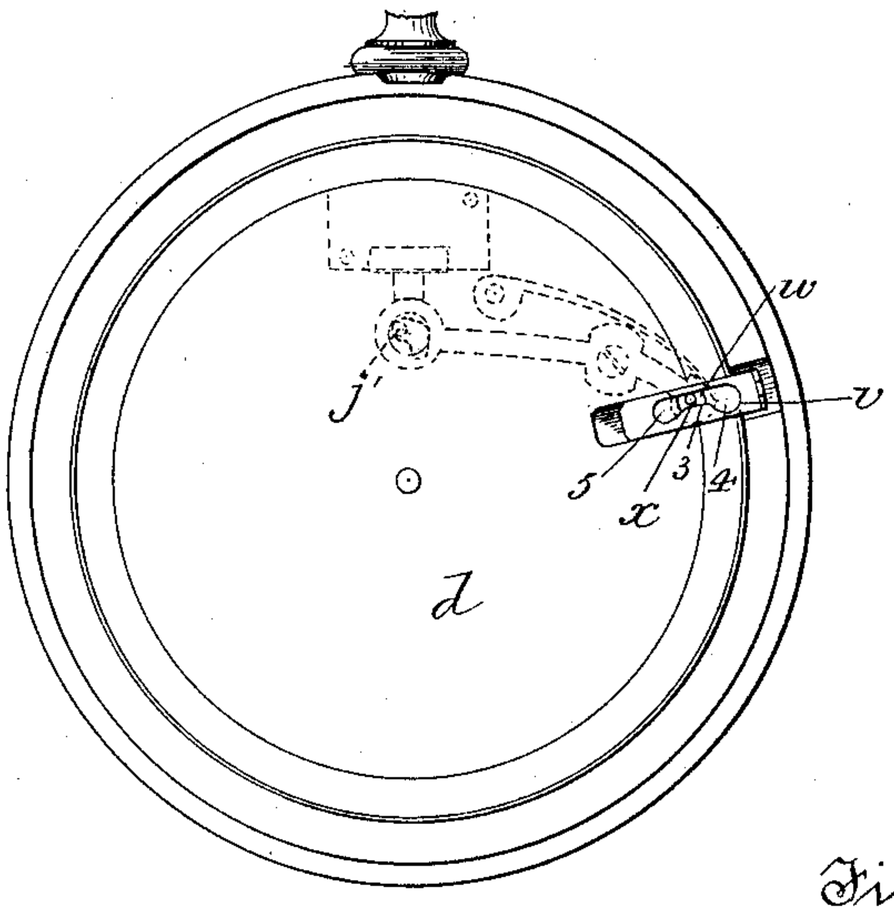


Fig: 6.

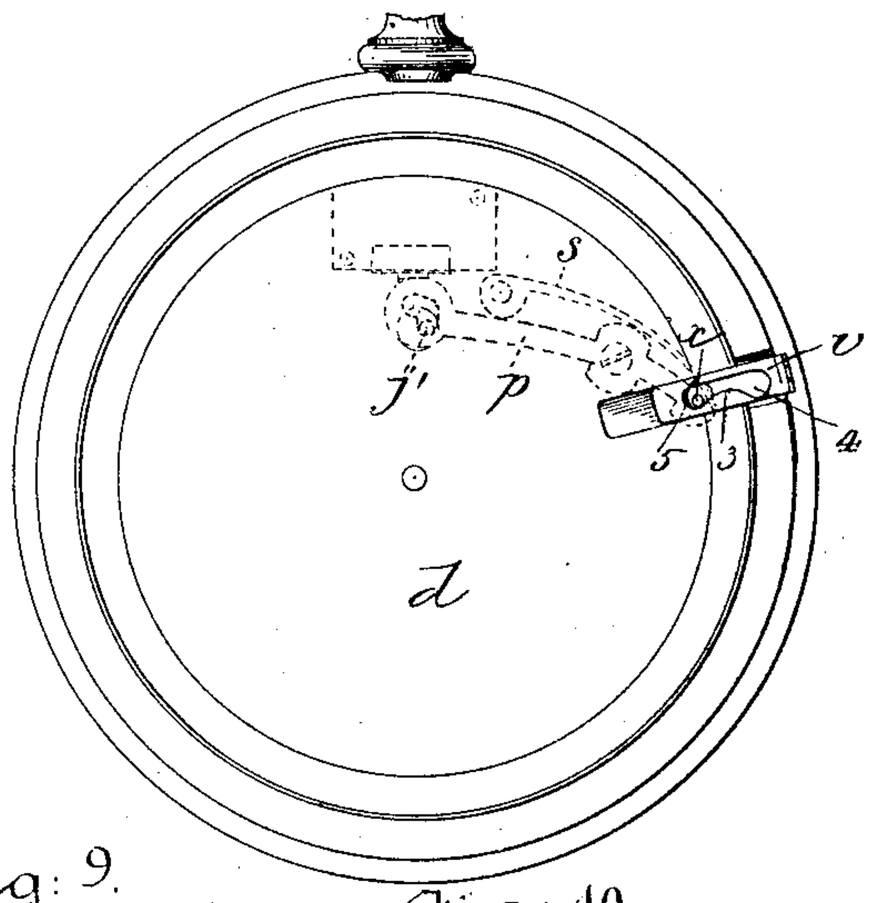


Fig: 7.

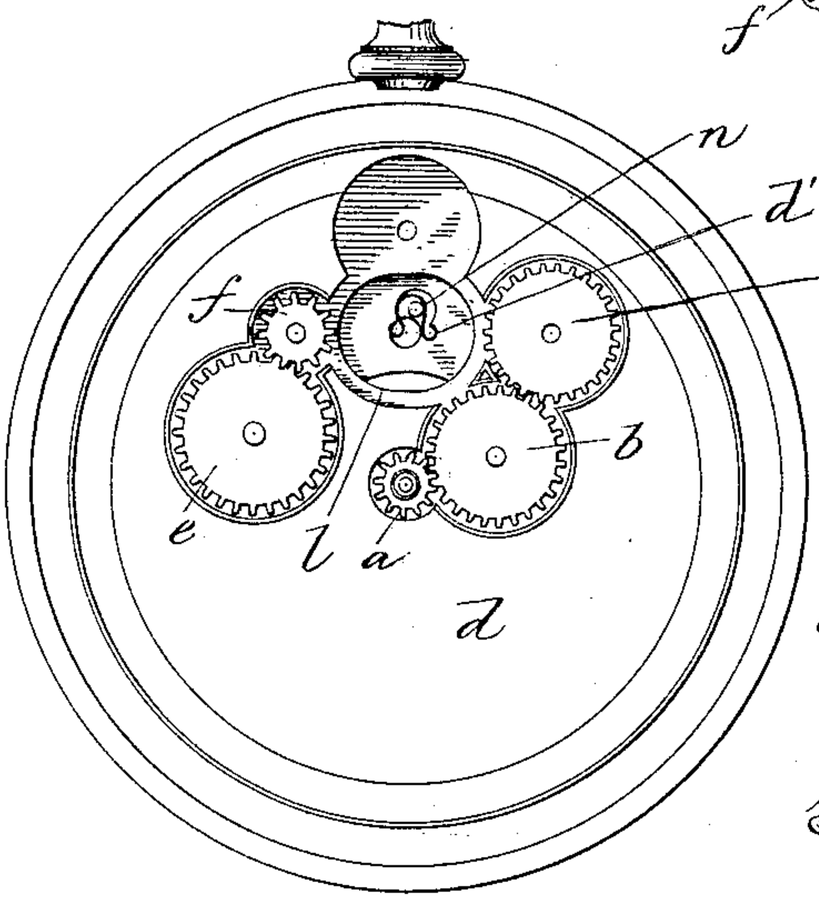


Fig: 9.

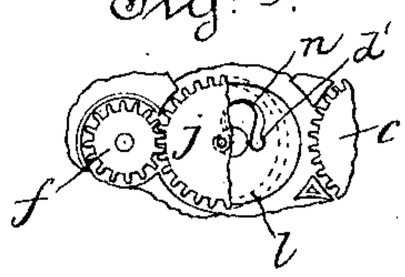


Fig: 10.

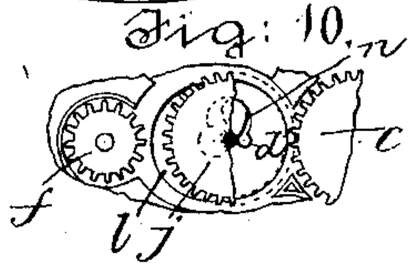


Fig: 8.

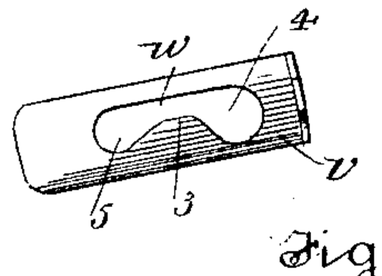


Fig: 12.

Fig: 13.

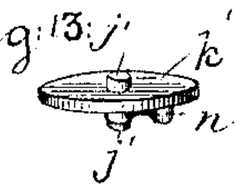
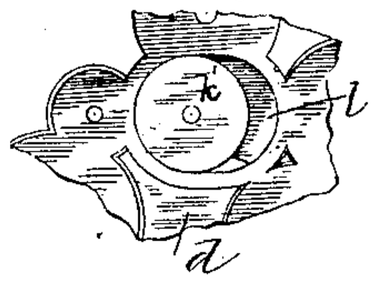


Fig: 11.



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UNITED STATES PATENT OFFICE.

DUANE H. CHURCH, OF NEWTON, MASSACHUSETTS.

STEM WINDING AND SETTING WATCH.

SPECIFICATION forming part of Letters Patent No. 370,929, dated October 4, 1887.

Application filed October 13, 1886. Serial No. 216,114. (No model.)

To all whom it may concern:

Be it known that I, DUANE H. CHURCH, of Newton, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Pendant Winding and Setting Watches, of which the following is a specification.

This invention relates to pendant winding and setting watches, and has for its object to enable the wheel which communicates motion from the winding-bar in the pendant to either the winding or the hands-setting mechanism to be operatively connected with either the winding-wheel or the dial-train by a movement substantially at right angles with its axis of rotation, instead of by the swinging movement of two shiftable wheels carried by a swinging yoke, as heretofore; and to this end it consists, mainly, in the combination of a winding-train and a dial-train, each of which is composed entirely of wheels which are not shiftable like those carried by a swinging yoke, a wheel which is capable of rotation by the pinion rotated by the winding-bar, and is movable between said trains substantially at right angles to the axis of its rotation, and is capable of engaging said trains alternately, a spring which, when free to act, holds said wheel in engagement with one of the members of the winding-train, and a spring-impelled lever which normally overcomes the pressure of said spring and holds said wheel in engagement with one of the members of the dial-train, and is adapted to be made inoperative by the winding-bar when the latter is capable of an endwise movement, or by a slide on the watch-plate when the winding-bar is not capable of such movement, all of which I will now proceed to describe.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a front view of the plate of a watch-movement having my improvements, showing the shiftable wheel in engagement with one of the members of the winding-train. Fig. 2 represents a back view of the plate, the parts being in the position shown in Fig. 1. Fig. 3 represents a front view of the plate, showing the shiftable wheel in engagement with a member of the dial-train. Fig. 4 represents a back view of the plate, the parts being in the position shown in Fig. 3. Figs. 5 and 6 represent front views of a part of the plate, showing the slide which moves the shiftable wheel in a watch in which the winding-bar is not movable endwise. Fig. 7 represents a front view of a part of the plate with the shiftable wheel and its retaining-plate removed. Fig. 8 represents an enlarged view of the slide *v*. Figs. 9, 10, 11, 12, and 13 represent detail views.

In carrying out my invention I dispense with the usual oscillatory yoke which carries the intermediate wheels, whereby motion is communicated from the wheel meshing with the pinion on the winding-bar, respectively, to the winding-wheel and dial-train. I provide a dial-train composed of the common pinion, *a*, the wheel *b*, meshing therewith and journaled on the plate *d*, as usual, and the wheel *c*, which, instead of being journaled in an oscillatory yoke or otherwise adapted to be moved into and out of engagement with the wheel *b*, as heretofore, is journaled on a fixed bearing, and is in continual engagement with the wheel *b*.

e represents the winding-wheel, and *f* a wheel journaled on a fixed bearing and in continual engagement with the winding-wheel, said wheel and the winding-wheel constituting a winding-train, the wheel *f* being a substitute for the shiftable intermediate winding-wheel, which is usually carried by the oscillatory yoke above referred to.

g represents the winding-bar, and *h* the pinion, which is rotated thereby, said pinion having in this instance an arbor journaled in a block, *i*, on the plate *d*, and provided with a squared socket, which receives the squared end of the winding-bar, so that the bar is capable of an endwise movement, as usual in watches in which the connection of the winding-bar with the winding and hands-setting wheels is changed by an endwise movement of said bar.

j represents the wheel which is in continual engagement with the pinion *h* and receives motion therefrom. Said wheel *j* corresponds to the crown-wheel, which, in a watch having a swinging yoke, is journaled on a fixed bearing, and is in continual engagement with the two swinging wheels heretofore used in place of the wheels *c* and *f*.

My improvement involves a further depart-

ure from the construction heretofore employed, in that the wheel *j* is not journaled on a fixed bearing, and is not engaged at the same time with the wheels *c* and *f*, but is capable of an edgewise movement substantially at right angles with the axis of its rotation, and is of such size relatively to the space between the wheels *c f* that it can engage with but one of said wheels at a time, its capability of edgewise movement enabling it to be engaged with either the wheel *f* or the wheel *c*, and thus to communicate motion from the winding-bar either to the winding-train or to the dial-train.

The wheel *j* is mounted on a stud, *j'*, which is affixed to a circular guiding plate or disk, *k'*. Said guiding-plate is adapted to slide in an elongated recess, *l*, Figs. 7 and 11, in the plate *d*, the width of the recess being such that the guiding-plate fits closely in it and is guided by its edges. A U-shaped spring, *n*, is placed in a smaller recess formed in the bottom of the recess *l*, one end of said spring being engaged with an indentation, *d'*, in said smaller recess, while its other end is engaged with the arbor *j'* at the under side of the guiding-plate *k'*. A cap, *m*, rigidly secured to the plate *d*, projects over the wheels *j*, *f*, and *c*, and retains them in place on the studs on which they rotate. When said spring *n* is free to act, it forces the wheel *j* into engagement with the wheel *f* of the winding-train, as shown in Fig. 1, and thus causes the rotation of the winding-bar in one direction to operate the winding mechanism, the spring permitting the wheel *j* to yield and "ratchet" on the wheel *f* when the winding-bar is rotated in the opposite direction, as more fully described hereinafter.

In a watch in which the winding-bar is movable endwise to shift its connection from the winding to the hands-setting mechanism, or vice versa, the wheel *j* is in engagement with the wheel *f* of the winding-train when the winding-bar is pushed in, devices (next described) being provided, which, when the winding-bar is pulled outwardly, operate automatically to move the wheel *j* against the pressure of its spring *n* into engagement with the wheel *c* of the dial-train. Said devices are in this instance a lever, *p*, pivoted at *q* to the plate *d*, and having at one end a cam-shaped slot, *r*, which receives the stud or arbor *j'* on the plate *k'*, and a spring, *s*, secured at *t* to the plate and bearing against the end of the lever *p* opposite to that end which contains the slot *r*. A pin, *u*, longitudinally movable in the pinion *h*, bears against the lever *p* and against the inner end of the winding-bar *g*, and when the winding-bar is pushed in said pin is caused by the winding-bar to hold the lever *p* in the position shown in Fig. 2, so that the enlarged end of the slot *r* receives the arbor *j'* of the plate *k'* and permits the spring *n* to act and hold the wheel *j* with a yielding pressure in engagement with the winding-train, the arbor *j'* being free to move in the enlarged end of the slot *r* in the direction required to permit the teeth of the wheel *j* to move alternately into and out of engagement with the wheel *f* of the winding-train, and as the wheel *j* is held in contact with the wheel *f* with a yielding pressure, it follows that the wheel *j* can yield or ratchet on the wheel *f*, as above stated, as shown in Fig. 1. When the winding-bar is drawn outwardly, the pin *u* releases the lever *p*, and the spring *s* then forces said lever to the position shown in Fig. 4 and causes the side 2 of the slot *r* to bear on the arbor *j'* of the plate *k'* and force said wheel against the pressure of the spring *n* into engagement with the wheel *c* of the dial-train, the wheel *j* being thus normally held in its hands-setting position and locked so that it cannot yield or ratchet by the engagement of the arbor *j'* with the narrower end of the slot *r*, as shown in Fig. 4. When the winding-bar is not movable endwise, the spring-pressed shifting-lever *p* may be moved by a slide, *v*, fitted in a groove in the plate *d* and projecting at its outer end through an aperture in the case-center, so that when the case-bezel is opened it may be moved out or in, as in many styles of pendant setting watches now in use, the outer end of said slide having a lip whereby it may conveniently be manipulated.

In the slide *v* is a slot, *w*, which receives a stud, *x*, on the shorter arm of the lever *p*. One side of said slot is formed to act as a cam, and the stud *x* is pressed against said cam-shaped side by the spring *s*. When the slide *v* is in the position shown in Fig. 5, the projection 3 on the side of its slot, against which the stud *x* of the lever *p* bears, holds said stud and lever in the inoperative position of the latter, so that the wheel *j* is held by its spring *n* in its winding position. When the slide *v* is drawn outwardly, as shown in Fig. 6, the enlargement 5 of its slot permits the lever *p* to assume its normal position, and thus shift the wheel *j* into its setting position.

I prefer to provide each watch-movement to which my invention is applied with a slide, *v*, so that the movement can be used interchangeably with a case having a longitudinally-movable winding-bar, or with one in which the winding-bar is not movable longitudinally. The slot *w* is enlarged at its outer end, so that when the movement is used with a case having a longitudinally-movable winding-bar the slide may be pushed inwardly until the enlargement 4 receives the stud *x* of the lever *p*, as shown in Fig. 1. The slide is inoperative while it remains in said position, so that it does not interfere with the operation of the lever *p* by the winding-bar. The slide is, moreover, when in this position so nearly within the margin of the plate *d* that it will not interfere with the case to which the movement is applied.

It will be observed that by the described improvements the construction of the winding and setting mechanism is considerably simplified and the expense is correspondingly reduced.

In stating that the wheel *j* moves at right

angles to the axis of its rotation, I do not mean that it necessarily moves in a straight line at right angles to said axis, nor exactly or absolutely at right angles thereto.

I claim—

1. In a pendant winding and setting watch, a shiftable wheel driven by the winding-pinion and without positive pivotal attachment, which is caused to engage with the winding-train or with the hands-setting train by the endwise movement of the winding-bar, and which, when engaged with the winding-train, is held by a yielding pressure, but when engaged with the hands-setting train is positively locked in such position, as shown and described.

2. In a pendant winding and setting watch, the combination of a winding-train and a dial-train, none of whose members is shiftable, a winding-pinion, a shiftable wheel driven by the winding-pinion, a longitudinally-movable winding-bar, and devices co-operating therewith, whereby the said shiftable wheel is moved from engagement with the winding-train into engagement with the hands-setting train, or vice versa, at each endwise movement of the winding-bar, the arrangement being such that the said wheel when engaged with the winding-train is held with a yielding pressure, but when engaged with the hands-setting train is positively held, substantially as set forth.

3. In a pendant winding and setting watch, the combination of a winding-bar, a winding-train, and a dial-train, none of whose members is shiftable, a wheel which is movable edgewise, or substantially at right angles with its axis of rotation, and is driven by the winding-bar, a spring which when free to act forces said wheel into engagement with a member of the winding-train, and a spring-pressed lever which normally holds said wheel against the pressure of its spring in engagement with the dial-train, as set forth.

4. In a pendant winding and setting watch, the combination of a winding-bar, a winding-train, and a dial-train, none of whose members is shiftable, a wheel which is movable between said trains substantially at right angles with its axis of rotation and is driven by the winding-bar, a spring which when free to act forces said wheel into engagement with a member of the winding-train, a spring-pressed lever which normally holds said wheel against the pressure of its spring in engagement with the dial-train, and means, substantially as described, whereby said lever may be made operative or inoperative, as set forth.

5. In a pendant winding and setting watch, the combination of a winding-bar, a winding-train, and a dial-train, none of whose members is shiftable, a wheel which is movable between said trains substantially at right angles with its axis of rotation and is driven by the winding-bar, a spring which when free to operate forces said wheel into engagement with a member of the winding-train, a spring-pressed lever which normally holds said wheel against the pressure of its spring in engagement with the dial-train, and a movable pin or slide, whereby said lever may be displaced and made inoperative, as set forth.

6. In a pendant winding and setting watch, the combination of the plate *d*, having an elongated recess, *l*, the winding-train, and the dial-train, none of whose members is shiftable, the guiding-plate *k'*, movable in said recess *l*, the wheel *j*, engaged with said plate, a spring, *n*, which when free to act holds said plate and wheel in the winding position of the latter, and a spring-pressed lever which normally holds said plate and wheel against the pressure of the spring *n*, as set forth.

7. In a pendant winding and setting watch, the combination of the winding and dial trains, the spring-pressed wheel adapted to move edgewise substantially at right angles with its axis of rotation between said trains, the spring-pressed lever which normally controls said wheel against the pressure of its spring, the longitudinally-movable winding-bar adapted to make said lever inoperative, and the longitudinally-movable slide adapted to make said lever operative when moved to either extreme of its movement, and to make it inoperative when moved to an intermediate position, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 15th day of September, 1886.

DUANE H. CHURCH.

Witnesses:
C. F. BROWN,
A. D. HARRISON.