

(No Model.)

F. FREY.
STEM WINDING WATCH.

No. 480,814.

Patented Aug. 16, 1892.

Fig. 1.

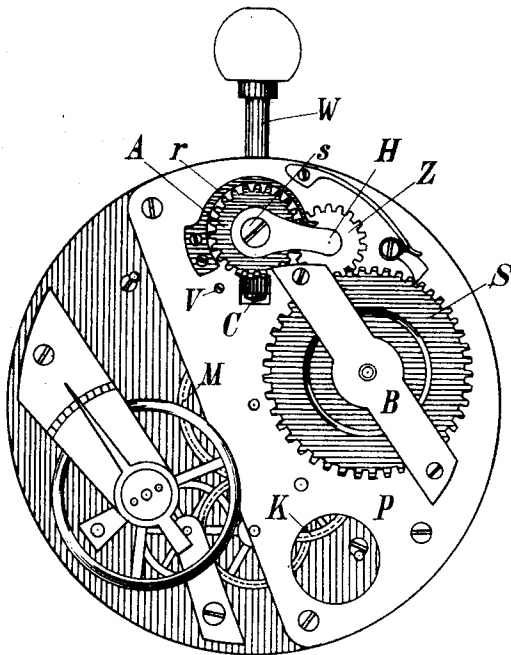


Fig. 2.

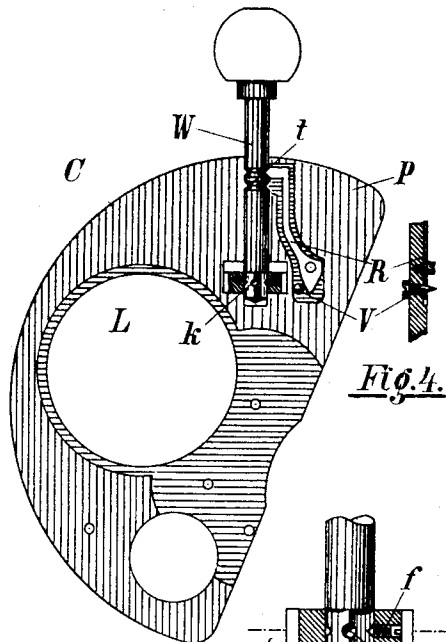


Fig.5.

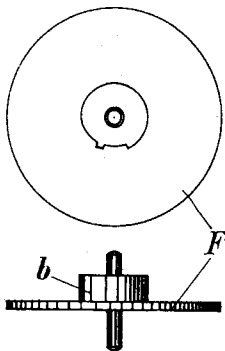


Fig. 6.

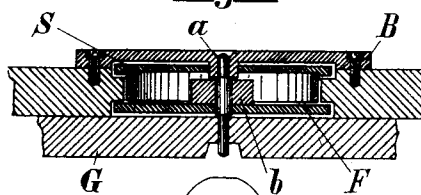


Fig. 7.

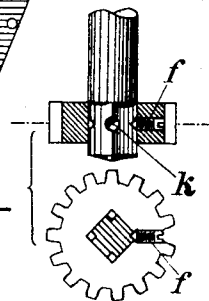


Fig. 8.

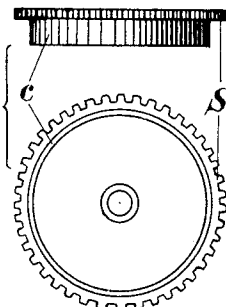
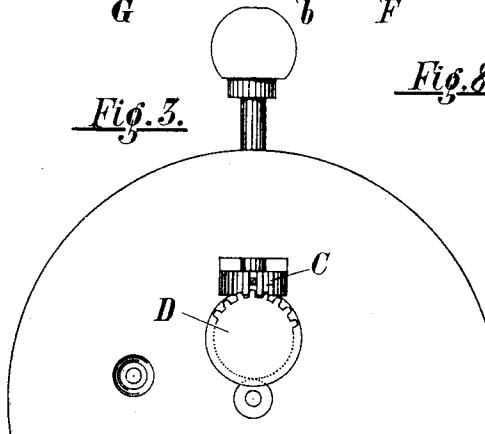


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

FRIEDRICH FREY, OF STUTTGART, GERMANY.

STEM-WINDING WATCH.

SPECIFICATION forming part of Letters Patent No. 480,814, dated August 16, 1892.

Application filed April 7, 1891. Serial No. 388,053. (No model.)

To all whom it may concern:

Be it known that I, FRIEDRICH FREY, a citizen of Würtemberg, Germany, residing at Stuttgart, Germany, have invented certain new and useful Improvements in Watches, of which the following is a specification.

My present invention is designed to essentially simplify the stem-winding and hand-setting mechanism, the escapement, and the barrel. I substitute for the barrel a simple wheel with a winding-arbor and a simple ring integral with the escapement. By this arrangement the winding-arbor, which was formerly provided with four pivots, a square, and a screw, is reduced to one having only two pivots, the cover of the barrel being entirely eliminated.

My novel double escapement radically differs from the form at present employed in that my escapement-wheel may be more cheaply and accurately produced by stamping out and that by virtue of its form the oil more easily adheres to the tips of the teeth of the smaller wheel. The upper pivot, moreover, may be easily repolished without the necessity of removing and afterward again securing the same in position. There is consequently a saving of a very tedious piece of work to the watchmaker, and one which often results in injury to the quality of the part in question. To further simplify the construction, I substitute a simple steel disk provided with a notch for the finger of the well-known duplex escapement and a notch in the arbor of this steel disk for the escapement-wheel. By this means the great fragility of the arbors with stone roller or of the cylinders in lever or cylinder watches is obviated. Moreover, the elimination of the cylinder-carriage, which may be here dispensed with, is also of importance, inasmuch as a watch with the simplified duplex escapement used in connection with the same simple balance that is customary in cylinder-works undoubtedly exceeds the latter in cheapness, and will be superior to the cylinder-escapement in accuracy of movement if accurately constructed. I also considerably reduce the danger of so-called "sliding," which occurs in the finer and more expensive duplex watches, inasmuch as the

amplitude of my simplified duplex escapement is reduced and equal to that of the cylinder-works. If necessary, the sliding may be made impossible by the addition of a guard-pin, as in the latter. A further advantage is the avoiding of stoppage caused by the heavy balance heretofore employed.

In the accompanying drawings, Figure 1 represents the winding mechanism and the train of works as the same appears when the watch is opened; Fig. 2, the under side of the bridge P, in which is arranged the spring R, which retains the spindle W in its various positions. Fig. 3 represents so much of the watch-works as necessary to illustrate the engagement of the pendant-pinion with the setting-wheel; Fig. 4, a detail sectional view of the spring R; Fig. 5, a detail view in plan and side elevation of the spring-wheel F; Fig. 6, a vertical central section of the various parts of the spring-barrel assembled; Fig. 7, detail views in vertical section and plan of the pendant-pinion, and Fig. 8 detail views in elevation and plan of the flanged click-wheel.

The tooth R' of spring R engages with both grooves *t* of the spindle or pendant W—viz., with the lower one when the watch is to be wound and with the upper one when it is desired to set the hands and the knob or crown has been pushed in sufficiently to enable the spring R to snap into the upper groove. In this position the pinion C, removably secured to the squared end of the pendant, as herein-after described, Fig. 3, is caused to mesh directly with the setting-wheel D, enabling the setting of the hands by turning the knob or crown. The setting-pinion employed in place of the usual *chausse glissant* is mounted on the squared portion *n* of the pendant W, Fig. 2, and is secured thereto by a screw *f*, Fig. 4, which passes radially into the pinion C, as shown, and whose point enters one of the notches *k*, formed in the edge of the square end. When the pinion C is secured to the pendant W, the latter is also secured in position in the watch. When the screw *f* is sufficiently loosened, the pendant W may be readily drawn out and restored without first removing the plate. When the pendant W in its ordinary position is drawn out by the

knob in winding, the pinion C meshes with winding-wheel A, Fig. 1, which revolves in a recess or depression provided for the purpose, and in turn meshes with an intermediate wheel Z, revolving on a pivot of the lever or yoke H. This pivot is somewhat longer than the thickness of the wheel Z, so that it projects below and rests against the wall of a depression in the bridge P for the purpose of regulating the extent of engagement with the click-wheel S.

Lever H is pivoted on the screw *s*, by which it is attached. The screw V, Fig. 1, extending from the watch-plate transversely to the spring R, pivoted at *r'*, is for the purpose of regulating the spring R with respect to pendant W, inasmuch as a slight loosening or tightening of the same will press the spring R more or less against the pendant W by virtue of its conical end V', whose sides bear against a toe R² on the pivoted spring R. The spring *r*, acting on lever H, effects the proper engagement between the intermediate wheel Z and the click-wheel S. In reversing the knob the lever H, with the intermediate wheel Z, swings back somewhat, so that the engagement is broken.

The click-wheel S is provided with a round hole and revolves on the journal or flange *a* on the bridge B, made removable by securing the same to the bridge P by screws *b' b'* or otherwise, Fig. 7. A ring *c* is set into the inner face of this click-wheel, Fig. 6, so as to form one piece, the "spring-barrel," with the same. In winding, this spring-barrel, together with the spring contained therein, revolves in the hole L of the bridge P, Fig. 2, between the bracket of bridge P and the bridge B, Fig. 7, and around the stationary barrel-arbor *b*, Figs. 5 and 7, which is integral with the main or spring wheel F. The spring is thereby wound on the barrel-arbor, so that the same propels the works by turning with its two pivots in bearings in the bed-plate and in the bridge B, Fig. 7. These pivots are considerably smaller than the corresponding ones in other watches, thus serving to reduce the friction. Manifestly the click-wheel S may be made integral with the ring and from any suitable metal.

The arrangement of the wheel-works is as follows: The spring-wheel F revolves directly above the bed-plate below the spring-barrel, as shown in Fig. 7. The minute-wheel M, Fig. 1, is below the spring-wheel in a recess in the bed-plate, the intermediate or third wheel K lies in a somewhat deeper depression or cavity, and the seconds-wheel in the deepest recess or cavity below the third wheel and the driving-wheel. By locating the minute-wheel below the balance the frequent error of collision with the hair-spring or rubbing of the same or the balance-wheel is prevented.

A further advantage of my watch is the great amount of free available space, as well

in respect to depth as to area, left below the dial. This space may be utilized for the reception of special mechanisms—such as dating, repeating, &c., devices. It is, moreover, to be observed that I attain great facility in fitting a new spring into the spring-barrel, inasmuch as it is not necessary for this purpose to remove the works from the case, but simply to remove the bridge B. In general my improvements permit a simpler and more convenient assembling.

To prevent the slipping out of the end of the spring from the open spring-barrel and a constant rubbing against the spring-wheel, the bent end of the said spring is mitered or beveled off, Fig. 10, so that the pointed end is wedged in between the hook in the barrel and the base of the same.

The large click-wheel S imparts the advantageous appearance of the finer class of watches and effects an easy winding operation.

The play of the movement is precisely the same as that of the well-known duplex escapement. In Fig. 8 is shown a top view of the escapement-wheel *d*, together with the notched steel disk E in its various positions. The escapement-wheel *d*, it will be observed, is provided with the teeth *d'* and the teeth or prongs *d''*, extending outward from the escapement-wheel in a different plane from that of the teeth *d'*, and preferably in the shape of bent prongs extending forward below the said teeth *d'*, as shown. These teeth and prongs alternately engage the notch *e'* in the arbor *e* and the notch E' in the steel disk or roller E, in a manner well understood by those familiar with the art. The arbor of the steel disk or roller is here shown in transverse section to show the notch therein. Fig. 9 shows an elevation and plan of the steel disk E, together with its arbor *e* and the notch in the same.

I claim—

1. In a watch, the combination of a pendant provided with grooves and a spring, as R, attached to the watch-plate and adapted to engage one or the other of said grooves, substantially as set forth.

2. In a watch, the combination of a pendant provided with grooves, a spring, as R, adapted to engage the grooves and provided with a toe, as R², and a screw provided with a conical end bearing against the toe, substantially as set forth.

3. In a watch, the combination of a pendant or stem, as W, provided with two notches, of a spring, as R, having a tooth, as R', engaging with one or the other of the notches, and a screw provided with a conical end bearing against the spring R, substantially as set forth.

4. In a watch, the combination, with the time mechanism comprising a pendant or stem, as W, a pinion, as C, thereon, and gears, 130

as A and Z, of a barrel consisting of a click-wheel, as S, having an annular flange, an arbor, as *b*, and a spring-wheel, as F, integral therewith, and a removable bridge, as B, having a depending flange, as *a*, upon which
5 the click-wheel S is journaled, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two witnesses.

FRIEDRICH FREY.

Witnesses:

KARL SCHLOSSAREOK,
OSKAR PFUN.