No. 662,655. Patented Nov. 27, 1900.

O. OHLSON.

WINDING INDICATOR FOR WATCHES.

(Application filed June 5, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

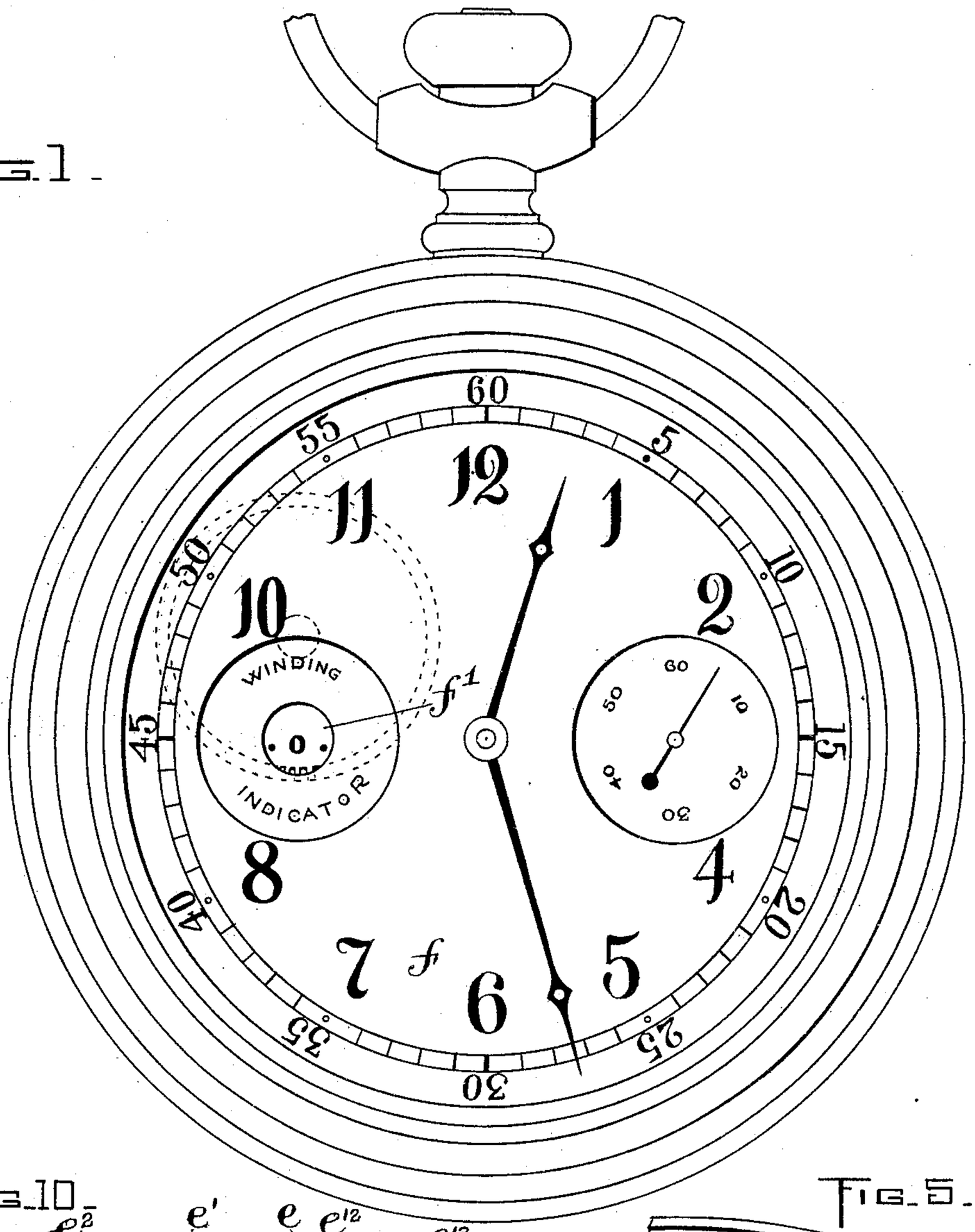


Fig. 10.

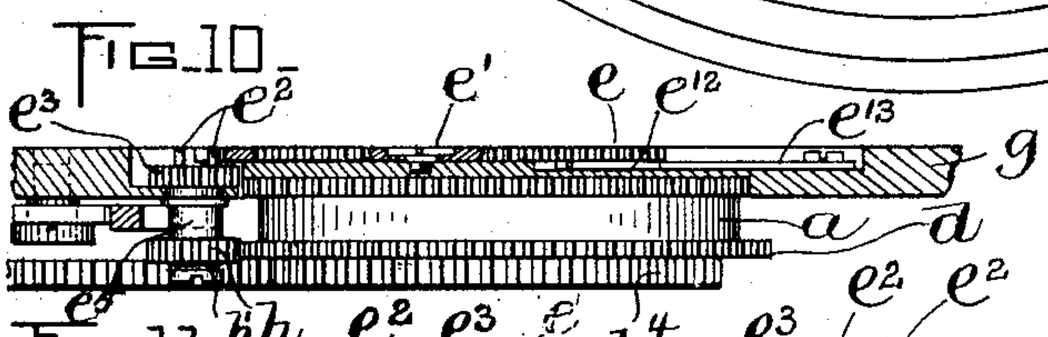


Fig. 11.

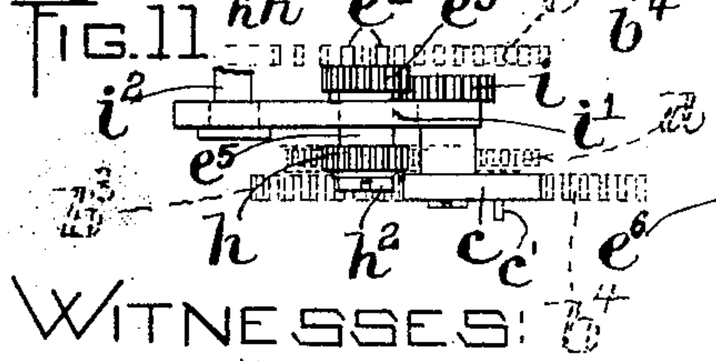


Fig. 12.

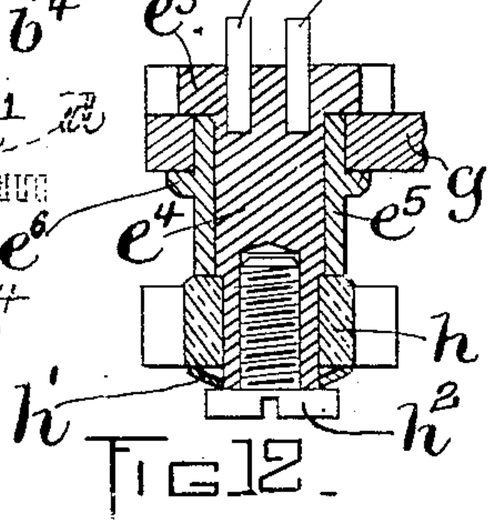
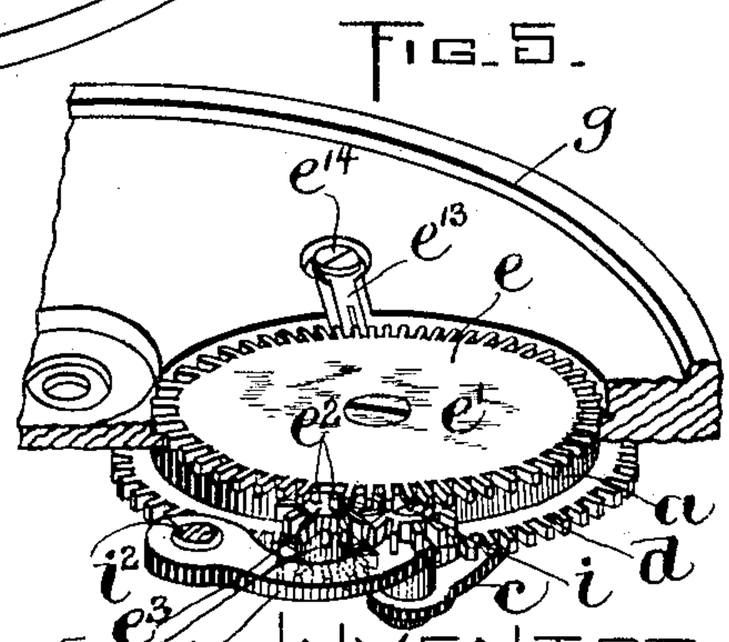


Fig. 5.



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No. 662,655. Patented Nov. 27, 1900.

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WINDING INDICATOR FOR WATCHES.

(Application filed June 5, 1899.)

(No Model.) 2 Sheets—Sheet 2.

FIG. 9

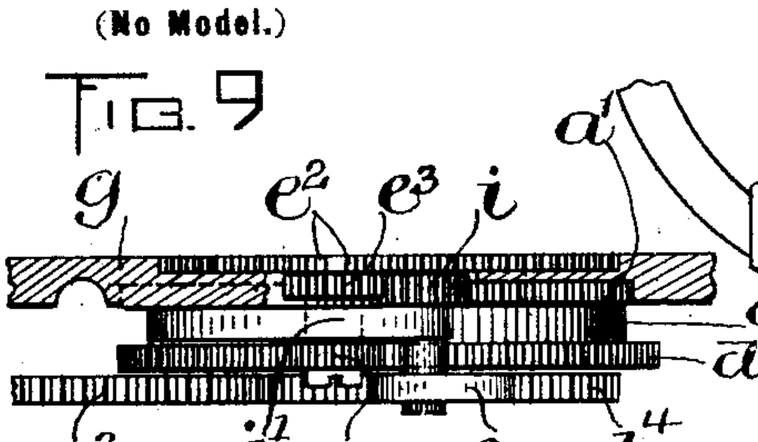


FIG. 6

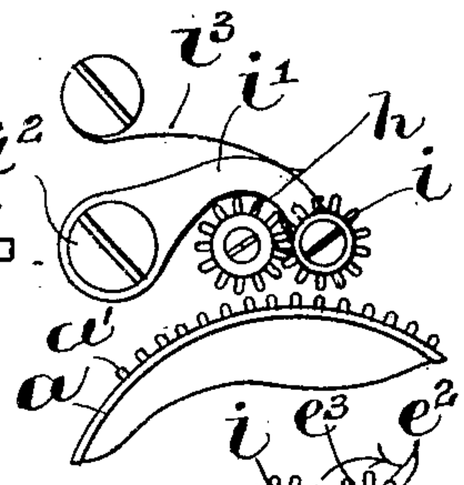


FIG. 8

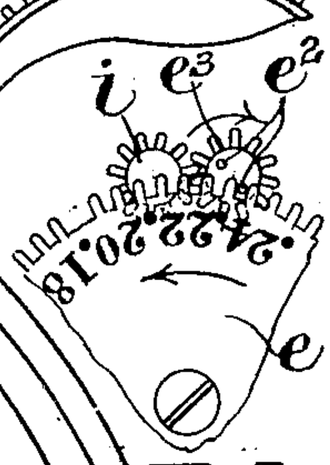


FIG. 2

FIG. 4

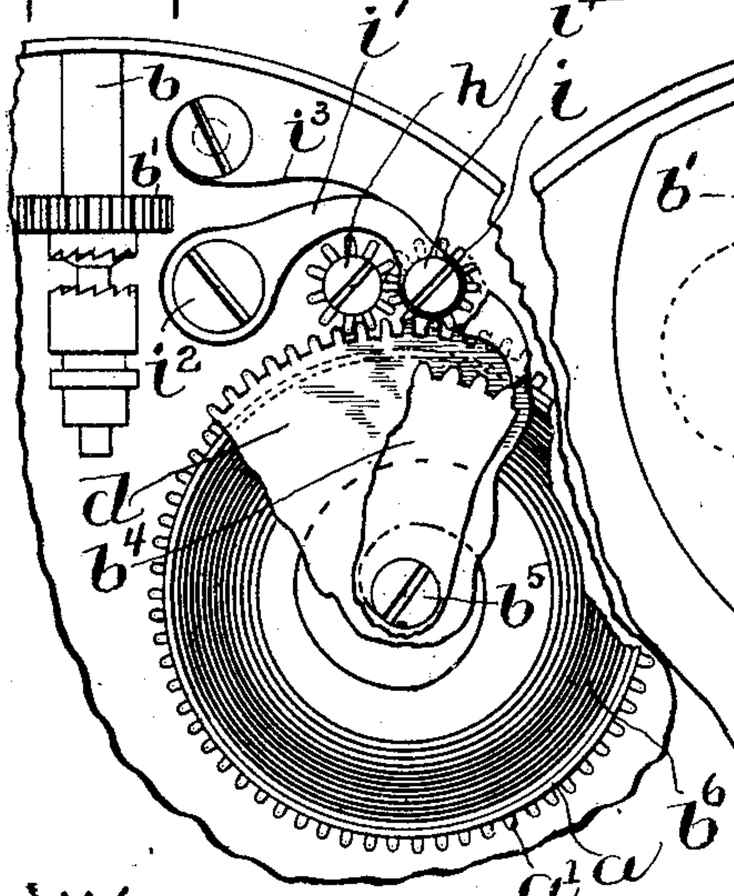


FIG. 5

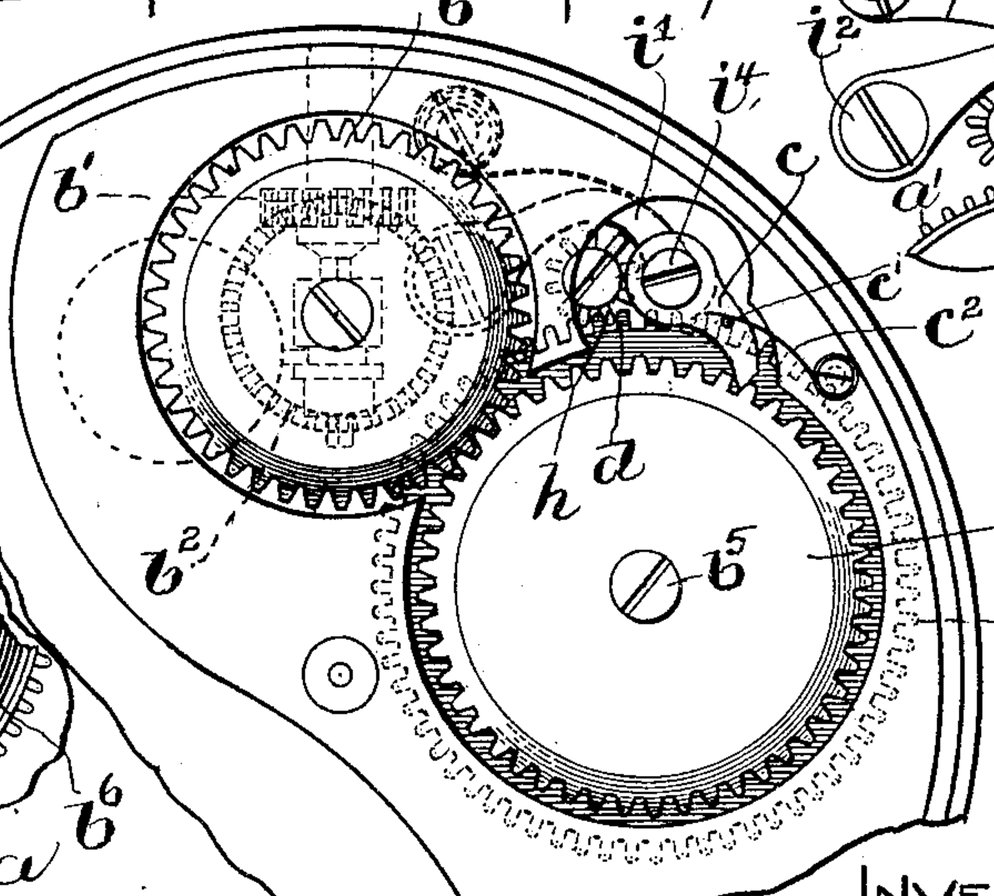
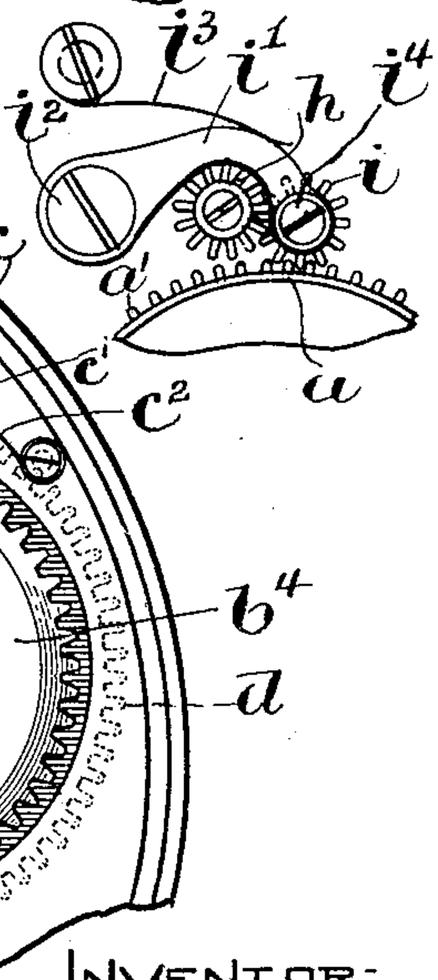


FIG. 7



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UNITED STATES PATENT OFFICE.

OLOF OHLSON, OF WALTHAM, MASSACHUSETTS, ASSIGNOR TO THE AMERICAN WALTHAM WATCH COMPANY, OF SAME PLACE.

WINDING-INDICATOR FOR WATCHES.

SPECIFICATION forming part of Letters Patent No. 662,655, dated November 27, 1900.

Application filed June 5, 1899. Serial No. 719,352. (No model.)

To all whom it may concern:

Be it known that I, OLOF OHLSON, of Waltham, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Watch or Clock Movements, of which the following is a specification.

This invention has relation to clocks and watches, and has for its object to provide mechanism for indicating the condition or state of laxity of the mainspring.

My invention comprises improved means whereby the condition of the mainspring is made apparent and also the length of time that the watch has been running since it was last wound, my invention having particular reference to provisions whereby the winding up or the running down of the mainspring may continue after the stoppage of the movement of the indicator.

The invention consists in the construction substantially as hereinafter described, and pointed out in the claims.

The form of construction is such that provision is made to prevent any possible disarrangement of or injury to the mechanism by overwinding in case of a broken mainspring or in case of the employment of a drag-spring for connecting the mainspring frictionally to the barrel.

Reference is to be had to the accompanying drawings, and to the letters marked thereon, forming a part of this specification, the same letters indicating the same parts or features, as the case may be, wherever they occur.

Of the drawings, Figure 1 represents in face view a watch embodying my invention. Fig. 2 represents the same with the dial removed and with only those parts illustrated which are comprehended within the invention. Fig. 3 represents a view looking from the rear of the watch. Fig. 4 represents the same with some of the parts broken away and shows the resetting-pinion in engagement with the gear on the barrel. Fig. 5 represents in perspective view the indicator, the spring-barrel, the pinion for feeding the indicator, and the pinion for resetting the latter. Figs. 6 and 7 illustrate the different positions assumed by the resetting-pinion. Fig. 8 illustrates the mechanism for rotating the indicator. Figs. 9, 10, and 11 illustrate in partial section the parts employed in that embodiment of the invention hereinbefore referred to. Fig. 12 illustrates the pinion for transmitting power from the spring to the indicator.

So far as the general features of my invention are concerned it will be understood that it may be employed in connection with the movement of any ordinary watch or clock; but for the purpose of disclosure I have illustrated it in connection with a Waltham watch, in which there is a spring-barrel a, which is separable from the main wheel carried by the same arbor and which acts as a safety device in case of the breakage of the mainspring. The winding and setting stem b (see dotted lines in Fig. 2) is provided with a gear b', intermeshing with and driving a crown-wheel b^2, connected to the gear b^3, in turn intermeshing with and driving the wheel b^4 on the spring-arbor b^5, the spring b^6 being connected to the barrel a and to the gear-wheel d, as shown in Fig. 4.

The click is indicated at c and engages the winding-wheel b^4; but as it plays an important part in this embodiment of my invention I will reserve its description until later, except to state that it is provided with the pin c', against which the spring c^2 bears to hold it in engagement with the teeth of the winding-wheel.

The winding-wheel b^4 is rigidly secured to the arbor b^5, as is the barrel a, while the main wheel d, to which the inner end of the spring is attached, is mounted loosely upon the arbor. As shown in Figs. 4 and 6, the barrel is provided with gear-teeth a' for a purpose to be subsequently set forth, although, if desired, the teeth may be formed on a wheel rigidly secured to the arbor b^5.

The watch-plate g is provided with a recess to receive an indicator, as shown in Fig. 2, said indicator consisting in the present case of a numeral-bearing wheel e, provided with peripheral gear-teeth, the numerals extending from "0" to "34" and indicating the hours or the length of time the spring has been running or the tension or condition of the spring.

The dial f is provided with an aperture f', through which one numeral is visible at a

time, and the parts are so arranged that when the spring is entirely rewound the indicator is set at zero, so that the "0" appears through the aperture, and as the spring unwinds the wheel e rotates gradually, so that as the numerals pass successively under the aperture f' the length of time that the spring has been unwinding or its condition is easily determined.

In order that the face of the watch shall be symmetrical, the seconds-hand and the aperture f' are diametrically opposite each other, as best shown in Fig. 1.

The indicator-wheel e is journaled upon a screw-pin e', set into the watch-plate g, and it is rotated by the pins e^2 on a pinion e^3. The said pinion e^3 is formed with an arbor e^4, extending through a sleeve or bushing e^5, inserted in the watch-plate and having flanges e^6 bearing against the under side of said plate. On the reduced end of the arbor e^4, which projects beyond the sleeve or bushing e^5, is a pinion h, which is mounted loosely thereon and which is frictionally engaged therewith by a spring h' and a screw h^2, set into the end of the arbor. The engagement between the pinion h and the arbor e^4 is such that under ordinary conditions the rotation of the former causes a corresponding rotation of the pinion e^3 and a consequent movement of the indicator-wheel e. The pinion h intermeshes at all times with the going main wheel d, as shown in Fig. 4, so that as long as the wheel continues to move the indicator-wheel will be likewise rotated through the medium of the pinions h e^3 and the arbor e^4. The wheel d, of course, has no retrograde movement when the spring is being rewound, and it is necessary, therefore, to provide some means for resetting the indicator-wheel at such times. This resetting mechanism comprises a pinion i, journaled upon the end of an arm or lever i', fulcrumed upon a screw-pin i^2, passed into the watch-plate. A spring i^3 tends to hold the pinion i in engagement with the teeth a' on the barrel, as shown in Fig. 7, said pinion also intermeshing at all times with the pinion e^3, heretofore referred to. A stud i^4 projects upwardly from the end of the arm i' to receive the click c, which engages the winding-wheel b^4, as shown in Fig. 3, and when the spring is unwinding the pressure of the teeth of the wheel b^4 against the end of the click c is sufficient to force the arm i' outwardly into the position shown in Fig. 6 and free the pinion i from engagement with the teeth a' on the barrel; but when the spring is being rewound the tension against the end of the click is relieved and the strength of the spring i^3 is sufficient to throw the pinion i into engagement with the barrel, as shown in Fig. 4. When the spring is running down or unwinding, the indicator-wheel e is rotated, as previously described, the pinion i at this time being out of engagement with the gear on the barrel and running loosely with the pinion e^3; but as soon as the winding-wheel b^4 is rotated the pinion i drops into engagement with the teeth on the barrel and rotates the pinion e^3 in the reverse direction to carry the indicator-wheel back to its starting-point, this being permitted by the frictional engagement of the wheel h with the arbor e^4, for at this time the said pinion h is held from movement by its engagement with the wheel d.

I prevent the indicator-wheel from being carried too far in its forward and reverse movements by cutting away a tooth, as at e^{10}, (see Fig. 2,) and in order to start the wheel again it is provided with a pin e^{11}, which is adapted to bear against a spring e^{12}, set in an arm e^{13}, secured in place by a pin e^{14}, extending into a watch-plate.

When the indicator-wheel has reached its point of limit in its forward or its reverse movement, the pin e^{11} strikes against the spring e^{12}, and the pins e^2 e^2 on the pinion e^3 turn loosely between the two teeth e^{15} on the wheel e without effecting a movement of the said indicator-wheel. As soon, however, as the winding begins or ceases the spring e^{12}, bearing against the pin e^{11}, carries the indicator-wheel backward or forward, as the case may be, so that the pins e^2 can engage the teeth of the said indicator-wheel. Therefore the movement of the indicator may be stopped prior to the cessation of the winding operation or prior to the running down of the mainspring. This construction is furthermore desirable, since it permits the employment of a drag-spring in connection with the mainspring to prevent the latter from being wound too tightly and also the employment of an indicator which indicates a smaller number of hours than the spring is capable of running—that is to say, the spring may have, for instance, a capacity of forty-hours' work, while the indicator shows but thirty-seven, and consequently when the indicator reaches zero position in its forward movement it is automatically disconnected from the spring, while the latter continues to unwind, and when a drag-spring is employed the indicator is likewise automatically disconnected from the winding mechanism when the indicator reaches zero in its reverse movement without affecting the continued rotation of the winding-wheel.

Having thus explained the nature of the invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, I declare that what I claim is—

1. In a watch or clock movement, a mainspring, an indicator for showing the length of time the spring has been running, means for winding the spring and resetting the indicator, and devices whereby the indicator may be automatically disconnected from the winding means during the forward movement of the winding devices prior to the cessation of the winding operation.

2. A watch or clock movement comprising in addition to the usual time-indicating mech-

anism, a mainspring, an indicator for showing the length of time the spring has been running, spring-winding mechanism, operative connections between said spring and the indicator, and between the winding mechanism and the indicator, and devices for automatically disconnecting said indicator from said connections when said indicator reaches a predetermined limit in either direction, whereby movement of the indicator may be stopped prior to the cessation of the winding operation or prior to the running down of the mainspring.

3. A watch or clock movement comprising the toothed indicator-wheel e having one tooth omitted, the pinion e^3 having pins e^2 for engaging the teeth of said wheel, the arbor e^4 of said pinion, the pinion h loose on the said arbor, a friction-spring for frictionally engaging the pinion h with the arbor, and means for rotating the pinion e^3 or the pinion h.

4. In a watch or clock movement, the mainspring-barrel a having teeth a', the pinion i carried by a lever i', spring i^3 for holding the pinion i in engagement with the teeth a' of the barrel, said pinion i being constantly engaged with the pinion e^3, the winding-wheel click c carried by the lever i', the indicator-wheel e, the pinion e^3 having means for effecting rotation of the indicator-wheel and carried by the arbor e^4, and the pinion h frictionally engaged with the arbor e^4.

In testimony whereof I have affixed my signature in presence of two witnesses.

OLOF OHLSON.

Witnesses:
M. B. MAY,
C. C. STECHER.