

No. 685,800.

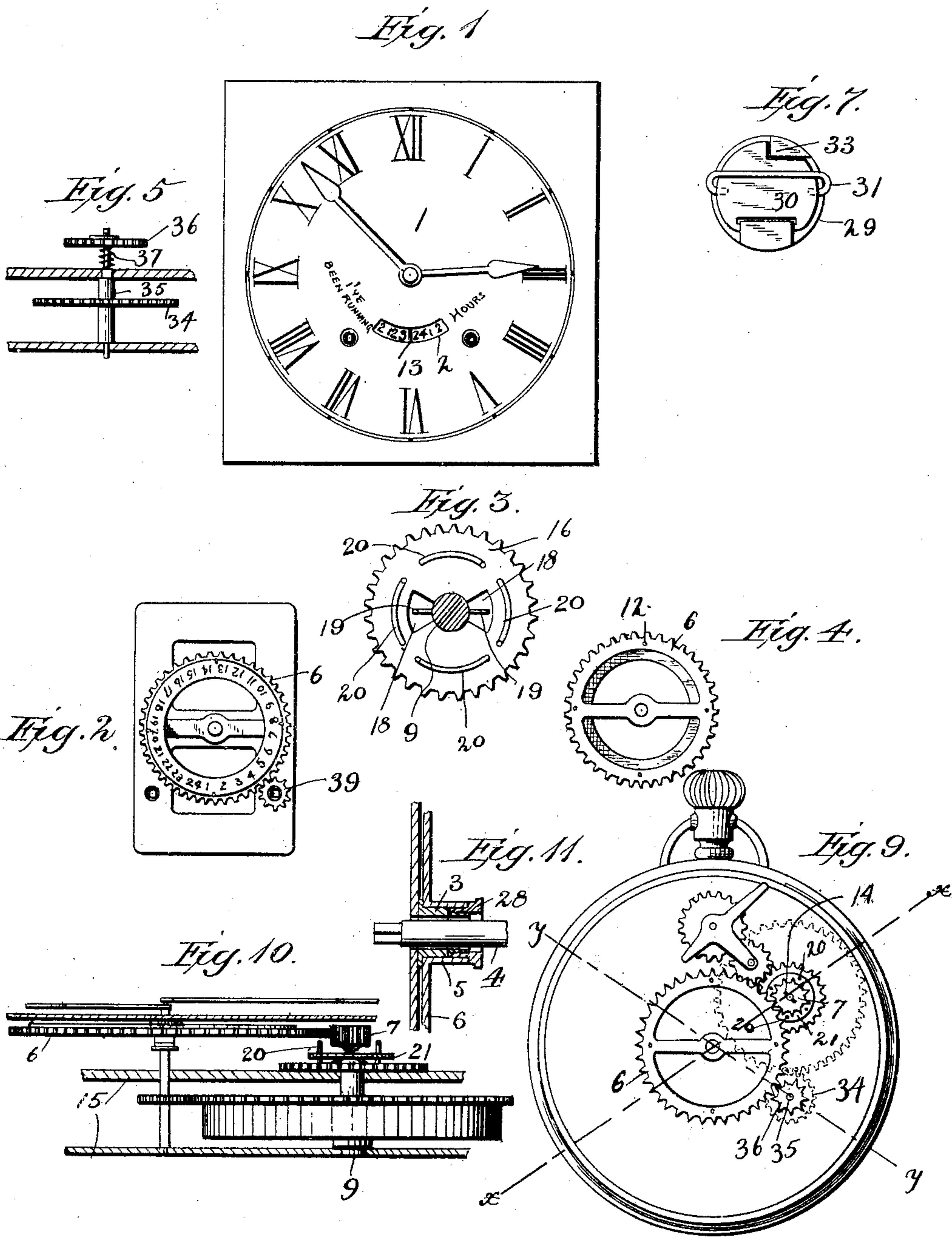
Patented Nov. 5, 1901.

J. A. SAUNDERS.
WATCH WINDING INDICATOR.

(Application filed Feb. 27, 1900.)

(No Model.)

2 Sheets—Sheet 1.



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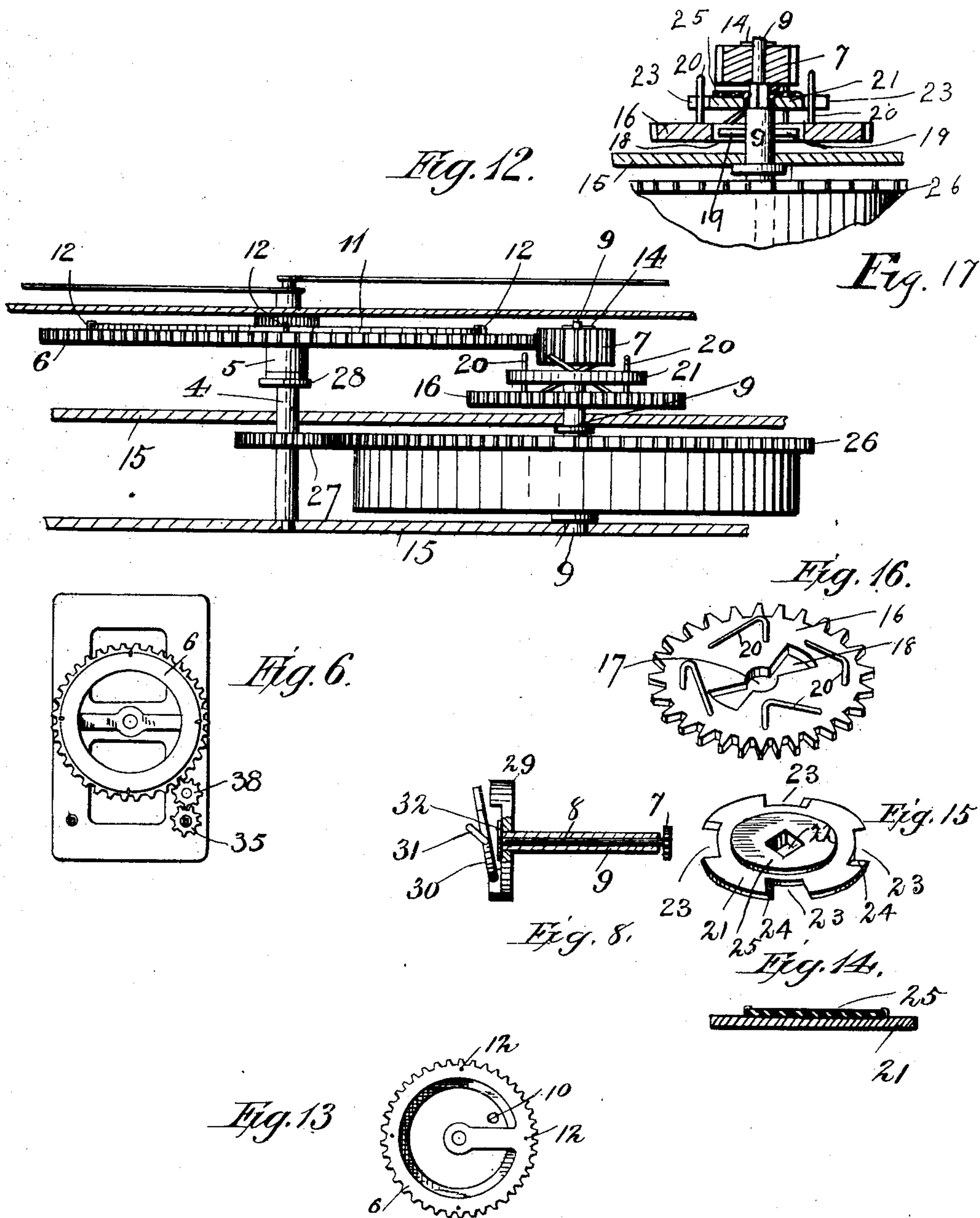
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

JOHN AUBREY SAUNDERS, OF POINDEXTER, VIRGINIA.

WATCH-WINDING INDICATOR.

SPECIFICATION forming part of Letters Patent No. 685,800, dated November 5, 1901.

Application filed February 27, 1900. Serial No. 6,751. (No model.)

To all whom it may concern:

Be it known that I, JOHN AUBREY SAUNDERS, a citizen of the United States, residing at Poindexter, in the county of Louisa and State of Virginia, have invented certain new and useful Improvements in Indicators for Watches and Clocks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain novel features of combination and construction of parts required to produce a reliable indicator for watches and clocks.

The object of my invention is to provide an indicating device by which it may be determined at a glance when it is time to wind the watch or clock, thereby insuring that if the warning is heeded the mechanism involved will not become deranged through irregular manipulation. It will be seen, therefore, that my indicator will prove desirable and valuable, inasmuch as it is an infallible reminder that a necessary duty should be performed. I will set forth the preferred details involved in the production of an indicating device, it being understood that I desire to comprehend such substantial equivalents thereof as may fall fairly within the scope of my invention.

In the accompanying drawings, Figure 1 represents the face of an ordinary twenty-four-hour clock which has been running, as pointed out by the indicator, twenty-three and one-half hours. Fig. 2 shows the indicator-wheel, the face or dial of the clock being removed, and also showing the indicator-wheel in a different position from that shown in Fig. 1. Fig. 3 is a detail view of one of the cooperating parts of my indicator-actuating mechanism. Fig. 4 indicates the reverse side of the indicator-wheel shown in Fig. 2. Fig. 5 shows a sectional view of a portion of the frame and part of the indicator-controlling mechanism, taken on line *y y* of Fig. 9, said construction fitting my invention for use upon a clock. Fig. 6 shows the indicator-wheel without any graduations. Fig. 7 indicates part of the winding mechanism common to clocks now in use. Fig. 8 shows a side view

of Fig. 7, together with a sectional view of the shaft and an edge view of one of the gear-wheels employed. Fig. 9 shows my invention adapted for use upon a watch, the face of the watch being removed. Figs. 10 and 12 are views quite similar in character and use to illustrate in section and side elevation the complete grouping of the parts necessary to complete my indicator, to be considered in connection with Fig. 5. Fig. 11 represents the preferred way of securing the indicator-wheel to the inner side of the face of a watch or clock. Fig. 13 shows a modified construction of the indicator-wheel illustrated in Fig. 6, the same being designed for use upon clocks having an escapement-wheel upon the outside of the face, the advantages of such a wheel being hereinafter particularly pointed out. Figs. 14 and 15 are respectively a section and a perspective view of one of the parts of my indicator mechanism. Fig. 16 shows a detail view of a portion of the controlling mechanism employed in my indicator. Fig. 17 is a vertical section taken through the indicator mechanism.

In order to conveniently refer to the details of my invention and their cooperating accessories, figures will be employed, it being understood that the same figure will be used to designate a similar part throughout the views. While I have shown in Fig. 2 the indicator-wheel as being properly graduated to designate twenty-four hours, it will be understood that any numbers may be used, as it may be desirable to so graduate said wheel that the numerals from one to thirty-six may be employed, as it is well known that most so-called "twenty-four-hour clocks" will run a maximum of thirty-six hours, more or less. The same may be said with respect to the graduations upon the wheel illustrated in Fig. 6—as, for instance, the numbers from one to ten or more may be written upon the wheel; but it will be understood that the numbers from seven upward should be written in red, the other numbers being preferably written in black. In like manner I would prefer to have the numbers from twenty-three upward written or printed in red, the object being to enable the person whose duty it is to wind the clock or watch to determine at once when the

red numbers are seen that it is nearing the time when the winding process should be performed.

Inasmuch as my invention may be readily applied by means of suitable modifications for use upon a watch, as shown in Figs. 5 and 9, I will confine the major portion of my description to that form of adaptation thereof which fits the mechanism for use upon a clock constructed in the usual manner common to clocks now in general use.

Referring in detail to the several parts of my invention and necessary elements required to place the same in operation, 1 indicates the dial of a clock of the usual or any preferred construction, which is provided with a radial slot 2, preferably located beneath the pivot-point of the hands, though it will be understood that said slot may be located above said point, if preferred, as in the case of a watch, it being understood that the numbers must be read from left to right. Upon the left of slot 2 I prefer to write the words "I've been running," while upon the right side of said slot I place the word "hours," thus enabling the person to see how long the clock has been running since wound, inasmuch as the numerals visible through said slot will complete the sentence—as, for instance, in Fig. 1 can be read "I've been running 23½ hours."

To the inner side of the dial 1 I permanently or fixedly secure the hub or tubular lug 3, through which loosely extends the shaft 4, upon the outer end of which I secure the hands of the clock in the usual manner, while upon the outer surface of said hub I rotatably mount the sleeve 5, which is secured to or forms an integral part of the indicator-wheel 6, the peripheral face of which is provided with a series of teeth or cogs designed to mesh with the controlling-gear 7, which is secured to the shaft 8, the latter extending outward through the rear wall of the clock after passing loosely through the tubular casing or sleeve 9, as shown in Fig. 8. The wheel 6 may be constructed either as shown in Fig. 4 or in Fig. 13—that is to say, said wheel may have a cross-bar through the central portion, by which it is mounted in place, or said bar may extend inward only to the central or pivot point or hub, thus providing a wheel with but one spoke, if the wheel is designed to cooperate with that style of clock or watch having an escape-wheel upon the outside of the dial, the absence of the other spoke being to accommodate the shaft of the escape-wheel. (Shown in Fig. 13 and indicated by the numeral 10.) It will be understood that the graduations may be placed directly upon the outer face of the wheel 6, though I prefer to provide a separate plate for this purpose, as shown by the numeral 11, said plate being ring-like in shape and attached to the outer face of the wheel 6 by the rivets or screws 12. It will be understood that the character indicating "0" may be

placed before the numeral "1" and also that the intervening space between each numeral may be divided into quarter or half hours. It will be furthermore observed that the small rod, as indicated by the numeral 13, may be disposed in the exact center of the slot 2, thus enabling a person to see the true initial or starting point and to read the characters visible through said slot accordingly.

It will be understood that the tubular shaft 9, Fig. 8, has attached to it in the usual manner the master-wheel and spring, as it is by said shaft the spring of the clock is wound, and in order to enable the operator to wind the mechanism proper of the clock without disturbing the indicator-wheel 6 I will call attention to the construction shown in Fig. 8, wherein it will be seen that the gear 7 is rigidly attached to the shaft 8; but in Fig. 12 the gear 7 is disposed as an idler on the reduced end of the shaft 9 and is provided upon its outer face with a pin 14 or the equivalent thereof, said pin being designed to hold the said gear from casually slipping off said reduced end.

By reference to Figs. 10 and 12 it will be seen that the section 15 represents a portion of the framework, and within a suitable aperture provided in said section I rotatably mount the tubular shaft 9, while similarly disposed is the hand-carrying shaft 4, previously referred to. Upon the inner end of the shaft 9 I movably mount the wheel 16, which wheel is illustrated in detail in Figs. 3 and 16.

By reference to Fig. 16 it will be observed that a central aperture 17 is provided, which is cut away upon each side to form the lateral recesses 18. In order to cause the shaft 9 to turn with the wheel 16, I provide the pins 19, which are designed to play loosely within the recesses 18 until the wheel 16 moves sufficiently to bring said pins in engagement with the walls of said recesses. By this construction it is obvious that the shaft 9 will not instantly start to rotate with the wheel 16, and I utilize this pause, as will be hereinafter specified.

Upon the upper surface or that surface adjacent to the dial I erect upon the wheel 16 guiding-fingers 20, which may be made as shown or struck up from the material of the wheel itself and radially disposed upon said wheel with respect to each other and may be formed in any preferred way, their office being to slightly raise the friction-wheel 21 and force said wheel into contact with the pinion or gear 7, and thus induce the rotation thereof. In order that the wheel 21 may have the requisite longitudinal play upon the shaft 9 to enable it to move into contact with the gear 7, I loosely secure it upon said shaft by means of the square or angular aperture 22, it being understood that this portion of the shaft 9 is also squared and of proper size to be loosely received by said aperture. Within the edge of the wheel 21 I have formed at regular intervals the recesses 23, the walls

forming each end of said recesses being beveled, as indicated by the numeral 24, said recesses being of proper extent to receive one of the fingers 20, and thus enable the wheel 21 to lie closely in contact with the wheel 16. By the arrangement thus described it is obvious that during the beginning of the rotation of the wheel 16 the wheel 21 will be caused to ride upon the inclined fingers 20 until said wheel is brought into engagement with the gear 7, at which instant the pins or lugs 19 will engage the walls of their recesses and induce the rotation of the shaft 9, when all of said parts will rotate in sympathy with each other. It is desirable to thus cause the simultaneous rotation of the shaft 9, the pinions 7 and 16, and the wheel 21 during the process of winding the watch, since by such action of said parts the wheel 6 will be caused to rotate, and thereby reverse the movement of the indicator wheel or plate 12 until it is restored to the initial position or until "1" or "0" is brought under the rod 13, shaft 9 being held in the usual manner against reverse rotation, as by a ratchet-wheel and a suitable pawl.

In Fig. 9 I have illustrated my invention as applied upon an ordinary stem-winding watch, wherein it will be seen how the parts shown in Figs. 5 and 12 are assembled in coöperative relationship. The pinion 7 is never positively operated except during the winding process, as said pinion acts as an idler during the time the watch is running. I have explained how the indicator is restored to its initial position through the coöperation of gears 6 and 7 while the watch is being wound, inasmuch as the wheel 21 will ride upon the inclined guiding-pins 20, and thus be forced into frictional contact with the gear 7, thereby inducing the rotation thereof. After the winding has been completed it will be seen that the indicator has been restored, so as to indicate "0" through the slotted aperture in the dial. While the watch is running the gear 34, which is in connection with the master-wheel 26 and is driven thereby, will induce the rotation of shaft 35, properly mounted in the frame, and thereby cause the pinion 36 to rotate with said shaft, and since the pinions 34 and 36 are properly graduated with respect to the movement of the master-wheel the rotation thereof will insure that the wheel 6, carrying the indicator-plate, will be rotated in sympathy with the expiring strength of said spring and cause said indicator to truly designate the condition of said spring, since said plate is properly graduated, as previously set forth.

When my invention is applied to a watch, as above described, the slotted opening 2 will be located above the pivot-point of the hands, thereby necessitating that the figures upon the indicator-plate shall be so arranged as to be properly read through said slot. Since the gear 36 must move upon its shaft while the watch is being wound, (inasmuch as the indi-

cator is restored to the initial position during the winding process,) it becomes necessary to so mount said gear 36 upon its shaft that it will be held against casual rotation by a frictional grasp of spring 37, which is clearly set forth in Fig. 5. By this arrangement the frictional grasp of the spring 37, disposed around the shaft 35 and bearing against the wheel 36, will insure while the watch is running that the wheel 36 will have sufficient power imparted to it by its shaft and said spring to cause the rotation of the indicator-wheel 6. When the watch is being wound, however, the wheel 36, being only frictionally mounted upon its shaft, will be free to rotate upon its shaft when the indicator-wheel 6 is turned by gear 7.

I am aware that in some clocks the construction is such that the shaft carrying the mainspring and master-wheel is so connected to said parts that it rotates with the master-wheel as the spring expends itself. In clocks constructed in this manner it will only be necessary to connect the gear 7 rigidly to the inner extended end of the shaft carrying the master-wheel, and thus dispose it directly in mesh with the gear 6, and it is obvious that as the clock runs down the indicator will be rotated to designate such condition, while during the winding process the gear 7 will be directly rotated by the shaft upon which it is secured, and thus cause the positive rotation of gear 6 and the incident restoration of the indicator-plate to the initial point. I deem it unnecessary for the purpose of this application to illustrate this construction.

In Fig. 6 I have illustrated how a varied movement may be imparted to the indicator-wheel 6 by means of the gear 35, which can be readily accomplished by interposing between said wheel an idler 38, properly mounted in position, and thereby rendering the wheel 6 ready for use upon an eight-day clock.

In Fig. 2 I have disposed the gear 39, which corresponds to the gear 7 in Fig. 12, so that it will be secured directly to the stem or end of the shaft in those clocks which are wound from the face, and since said shaft rotates in sympathy with the exhaustion of the spring it follows that the indicator-plate is so moved that it will truly designate the condition of said spring and will be restored to the initial point during the winding process. In clocks of this variety which are wound from the face side I prefer to form an aperture in the end of the shaft, as indicated by the square aperture shown in the gear 39, said aperture being adapted for the reception of the key instead of reducing said end, so that it will be received by an aperture provided in the key, inasmuch as said gear 39 must necessarily be located directly on the end of its shaft.

In Fig. 14 I have illustrated the central portion of the wheel 21 as being covered with a cushion of some clinging material, as rubber, said part being designated by the numeral 25. The rubber disk or cover 25 is brought to bear by the operation of the parts

just described upon the gear 7, thus positively inducing the rotation thereof. The contacting face of the gear and also the inner face of the winding handle or key 30 may be suitably corrugated or roughened in order to insure more perfect frictional contact. It may be stated that the indicator-wheel 6 is only loosely mounted or secured in position upon the tubular lug 3, therefore permitting the indicator-wheel to be rotated and restored to the initial point in the manner specified without disturbing the position of the hands.

In order to hold the indicator-wheel in position, I slightly reduce the inner end of the tubular lug or hub 3, and thereby adapt it to receive the retaining-cap 28, which is provided with a flange or collar arranged to slip over said reduced end and when in such position insure that its outer surface will rest flush with the outer surface of the hub 3. The cap 28 may be held in place by threads formed upon the reduced end of the hub 3 or may be held thereon by frictional contact, as will be readily understood. By reference to Figs. 7 and 8 it will be seen that the tubular shaft 9 is fixedly secured to the disk 29, which is designed to lie upon the outside of the rear part of the clock-casing. Said disk has pivotally secured thereto the winding-handle 30, which is provided with the operating-bail 31, and since the outer end of the shaft 8 is provided with the head 32 it is readily apparent that when the winding-handle 30 is pressed inward during the act of winding the clock the free end of said winding-handle will come in contact with the stop 33 and also with the head 32, and thereby induce the rotation of the shaft 8. It is thought that better results will follow when the outer face of the head 32 is covered with some frictional substance, as rubber or the equivalent thereof.

It is believed that the operation of my invention will be readily apparent in view of the foregoing description and accompanying drawings, though it may be stated that after the parts are assembled in their respective operative positions the clock may be wound in the usual manner by turning the bail 31 after forcing the handle 30 inward against the head 32. After the clock has been wound the indicator-wheel 6 will be rotated by the master-wheel and the gears 34 and 35, and the condition of the spring may be determined at any time by a glance through the slotted opening 2, wherein some of the figures upon the plate 11 will appear, according to the condition of the mainspring.

It is obvious that the mechanism herein set forth may be easily adapted to any of the various uses for which such a device would be desirable, as upon clocks of various kinds and also upon watches. Believing that the advantages and use of my invention have been made fully apparent from the foregoing specification, I will dispense with further description thereof.

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

1. In watches or clocks an indicator-wheel loosely mounted upon a hub secured to the inner side of the face-plate and carrying an indicator-plate, having graduations visible through a slotted opening in the face and suitable means to move said plate in sympathy with the movements of the spring whereby when said spring shall become partially or wholly exhausted, such condition will be registered through the said slotted opening, and additional means to automatically restore said indicator-plate to the initial point as the spring is wound, substantially as specified and for the purpose set forth.

2. In clocks and watches an indicator comprising a face having a slotted aperture; a graduated wheel so mounted beneath said face that the graduations thereon will be visible through said opening; suitable means connecting said graduated wheel to the winding-axle whereby said wheel will be restored to the initial point when the clock is wound; and additional means for operatively connecting said graduated wheel to the master-wheel which will result in so moving the graduated wheel that it will move in sympathy with and thus indicate the condition of the movements of the mainspring, all combined as specified and for the purpose set forth.

3. In an indicator of the character specified, the combination with the watch or clock mechanism of the usual or any preferred construction of a gear-wheel 16, operatively connected with the winding mechanism as set forth and having a series of inclined guides 20 and further provided with the laterally-extending slots 18; a controlling-wheel 21, having recesses 23 designed to cooperate with said guiding-pins and thereby establish a connection between the indicator-wheel and the winding-axle during the process of the winding as specified and for the purpose set forth.

4. In an indicator of the character specified, an indicator-wheel 6 having a graduated plate; a hub secured to the inner side of the face adapted to carry said wheel; a winding-shaft; an idler-pinion mounted on said shaft disposed in mesh with said indicator-wheel; a master-wheel 16, having a central aperture and lateral recesses mounted on said axle; controlling-pins 19 designed to play in said recesses whereby said master-wheel will have a momentary pause on said shaft before beginning to move therewith; an idler-pinion disposed on the inner end of said winding-shaft; a series of guiding-pins carried by said master-wheel, and a controlling-wheel 21 having a frictional face and adapted to cooperate with said pins and adapted to be forced by said pins into engagement with said idler and thereby induce the rotation of said idler during the time the mainspring is being wound, though permitting said idler to remain free

to revolve after said winding has been completed, all combined substantially as specified and for the purpose set forth.

5 In an indicator of the character specified, a movable clutch comprising of wheel 21 having a series of peripheral recesses, a frictional face formed of rubber or the like, said recesses being adapted to cooperate with the inclined fingers 20, substantially as specified and for
10 the purpose set forth.

6. In an indicator of the character specified, a watch-face having a hub 3; an indicator-wheel having a flange or sleeve 5 adapted to receive said hub and rotate thereon; a cap 28
15 fitting the said hub and adapted to retain the indicator-wheel in place, in combination with an indicator-plate secured to the said wheel and suitable means connecting said wheel with the driving mechanism whereby said
20 wheel will be rotated in sympathy with the expiring strength of the mainspring, and additional means for restoring said indicator-wheel to the initial point during the process of winding the watch, all substantially as
25 specified and for the purpose set forth.

7. In an indicator of the character specified, a master-wheel having a central aperture adapted to loosely receive the winding-shaft and further provided with lateral recesses
30 upon each side of the aperture; controlling-

pins secured to said shaft and designed to play in said recesses; the guiding-fingers 20 carried by said wheel and the controlling-wheel 21 designed to cooperate with said fingers and be moved thereby into engagement 35 with the driving-wheel of the indicator and induce rotation thereon as long as said controlling-wheel is so disposed, all combined as specified and for the purpose set forth.

8. The herein-described indicator for de- 40 termining the running condition of clocks and watches, comprising a tubular winding-shaft 9; a shaft 8 loosely mounted therein; an idler 16 mounted upon said shaft in the manner specified; a series of inclined fingers 20 car- 45 ried by said gear; a controlling-wheel 21, cooperating with said fingers, said controlling-wheel being so mounted on said shaft that it will move therewith and will have a longitudinal movement thereon in combination with 50 a dial having a slotted opening, and an indicator-wheel being designed to mesh with gear 7, all combined substantially as specified and for the purpose set forth.

In testimony whereof I affix my signature 55 in presence of two witnesses.

JOHN AUBREY SAUNDERS.

Witnesses:

W. T. FITZ GERALD,
GEORGE HILTON.