(No Model.) 5 Sheets—Sheet 1.

# F. TERSTEGEN.

## STEM WINDING AND SETTING WATCH.

No. 498,494. Patented May 30, 1893.

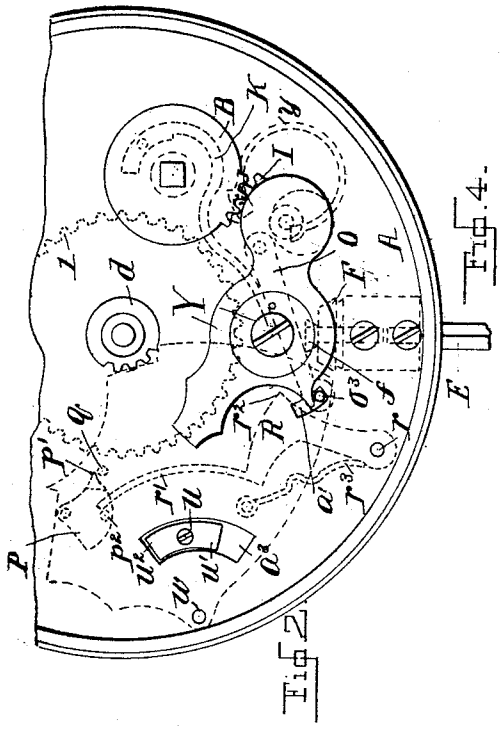

Fig. 2.

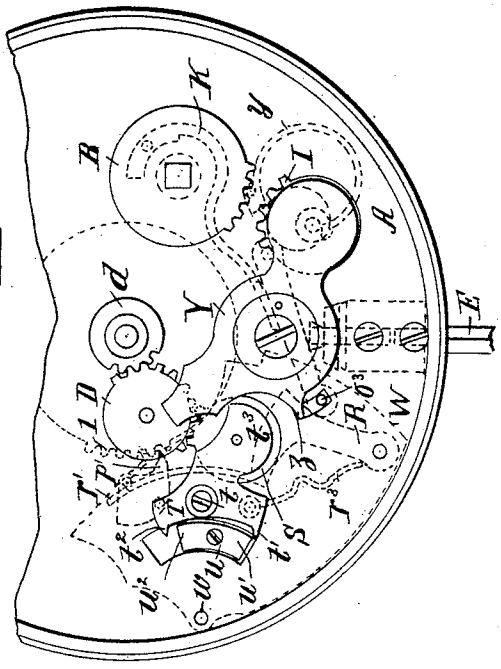

Fig. 4.

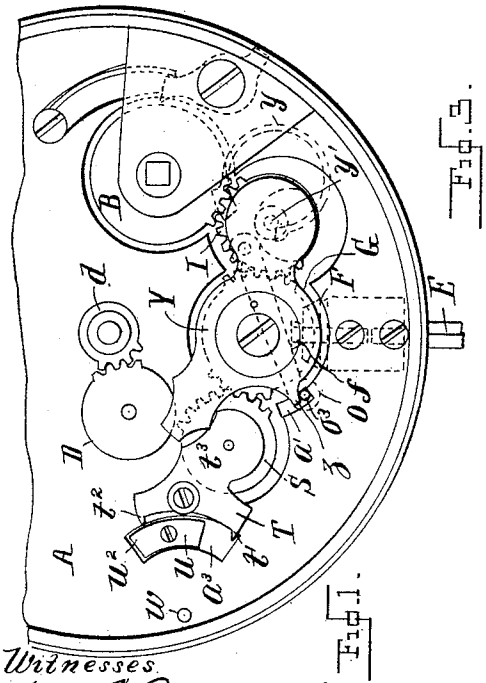

Fig. 1.

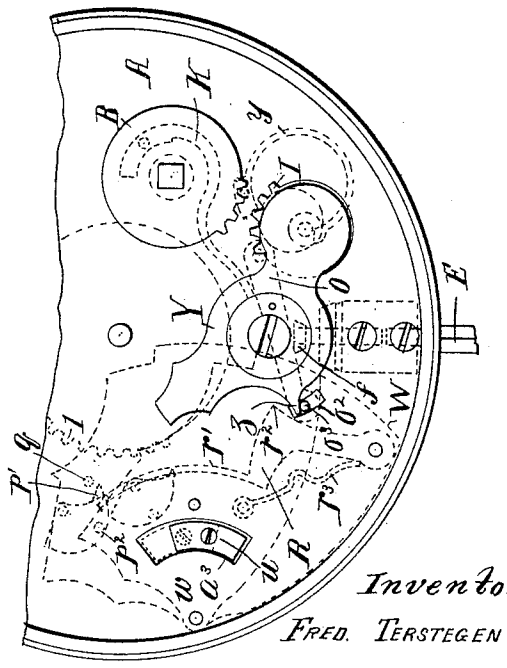

Fig. 3.

Witnesses.
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# F. TERSTEGEN.

## STEM WINDING AND SETTING WATCH.

No. 498,494. Patented May 30, 1893.

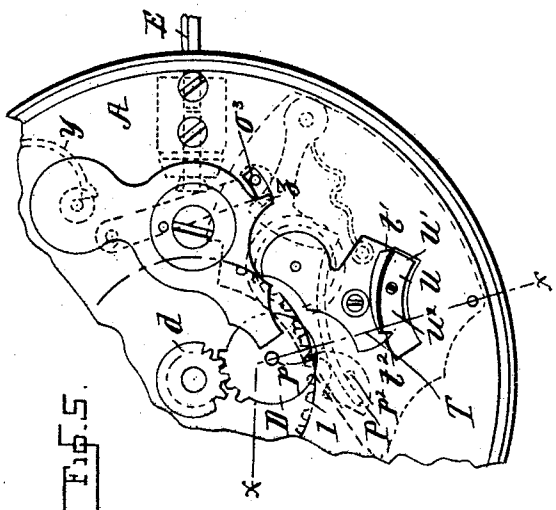

Fig. 5.

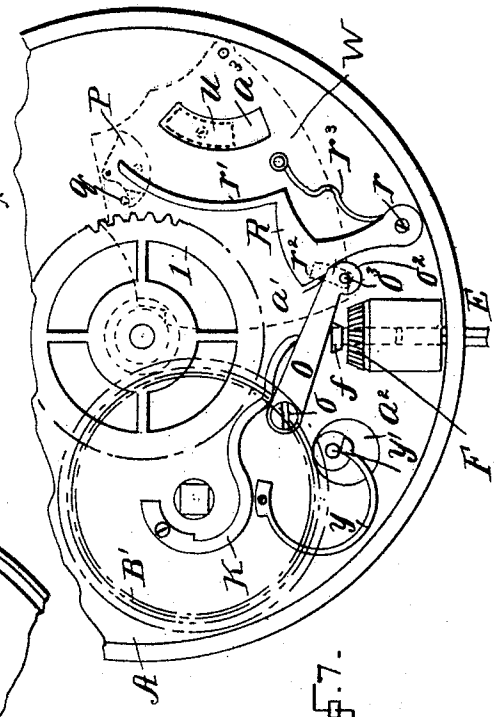

Fig. 7.

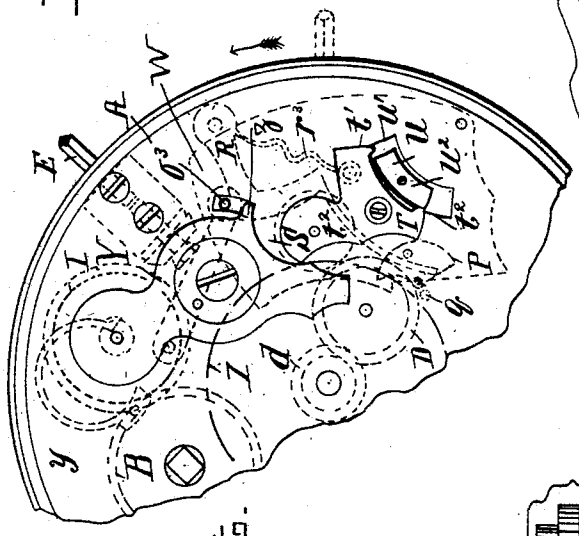

Fig. 6.

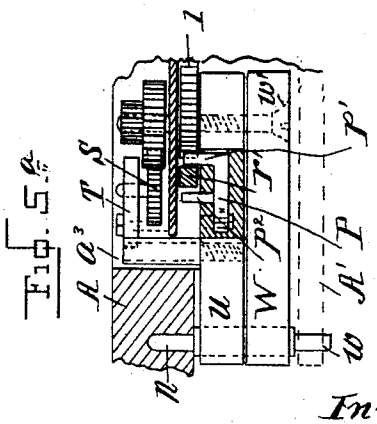

Fig. 5a.

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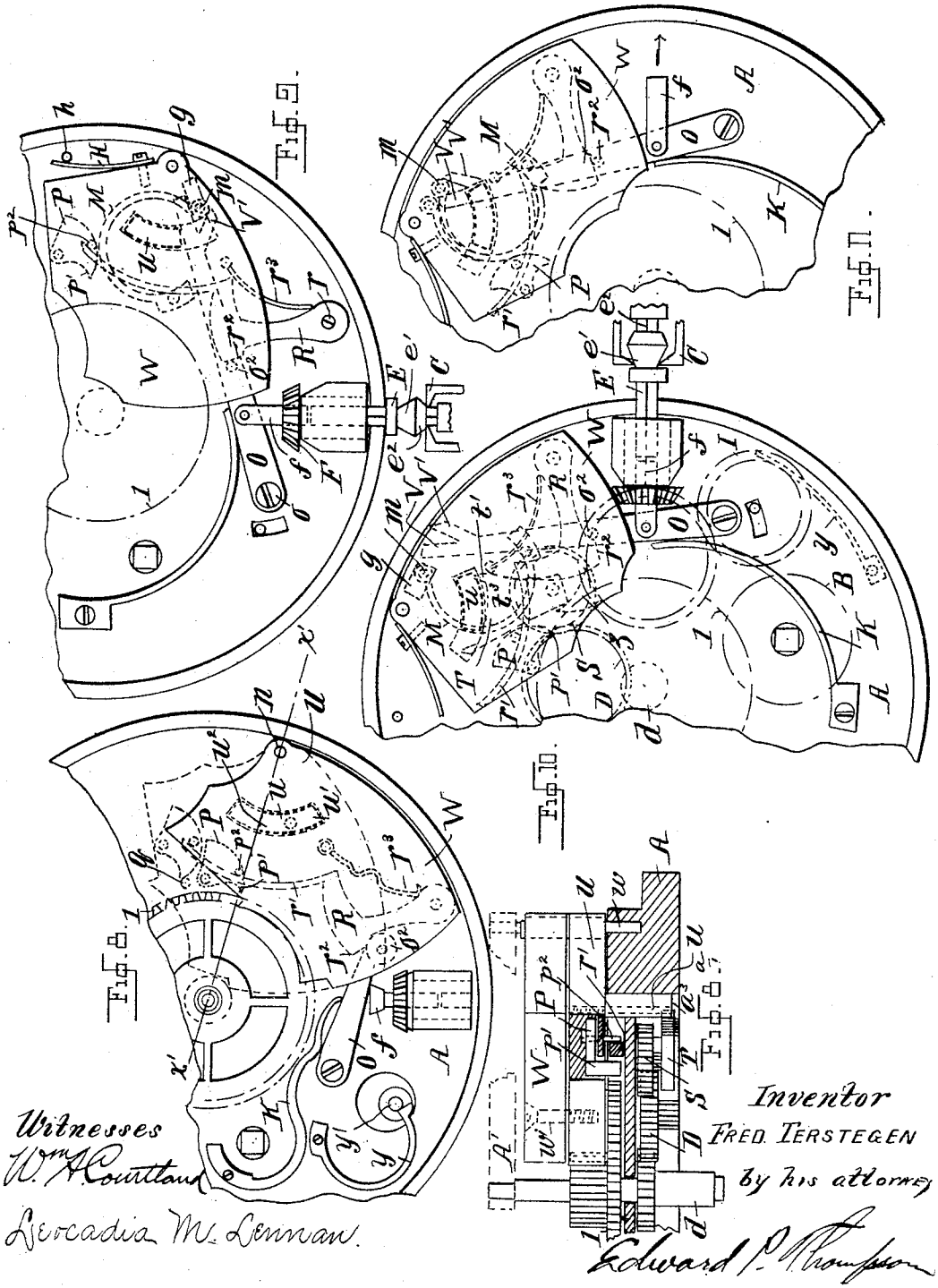
## STEM WINDING AND SETTING WATCH.

No. 498,494. Patented May 30, 1893.



Witnesses
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(No Model.) 5 Sheets—Sheet 4.

# F. TERSTEGEN.

## STEM WINDING AND SETTING WATCH.

No. 498,494. Patented May 30, 1893.

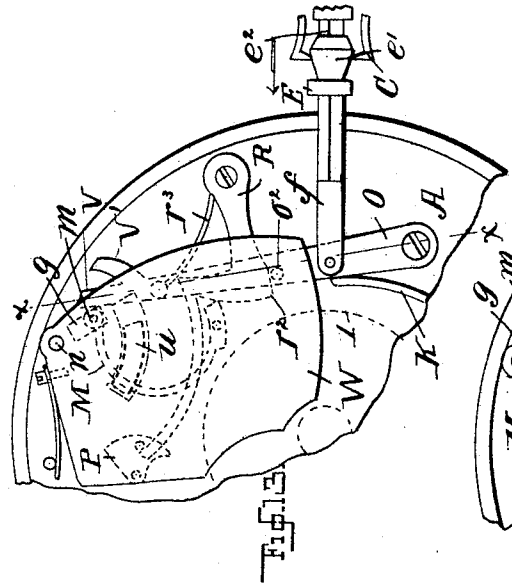

Fig. 13.

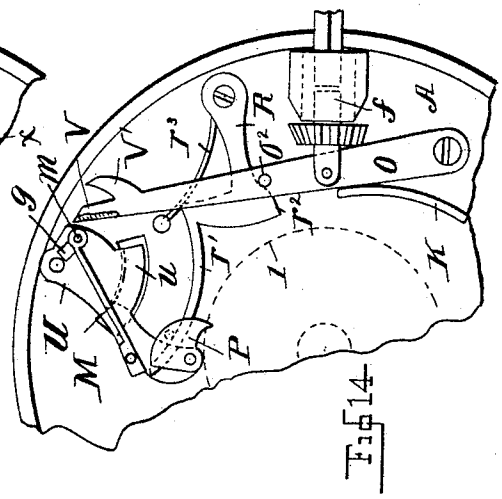

Fig. 14.

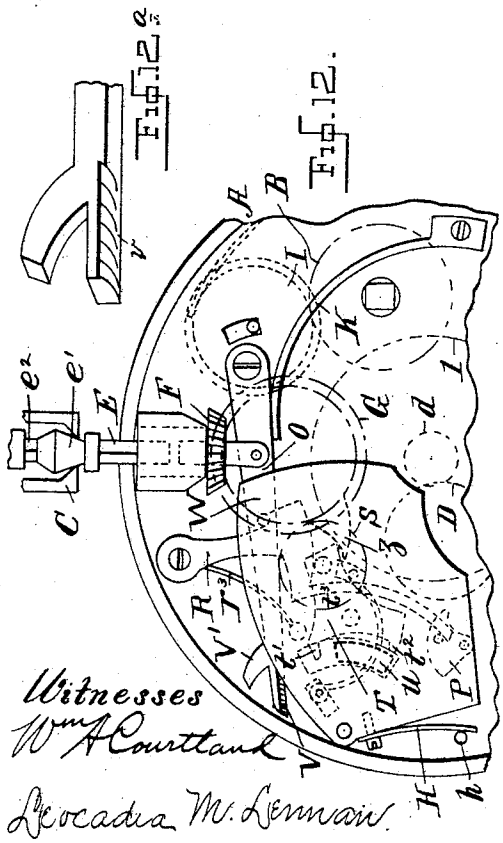

Fig. 12a.

Fig. 12.

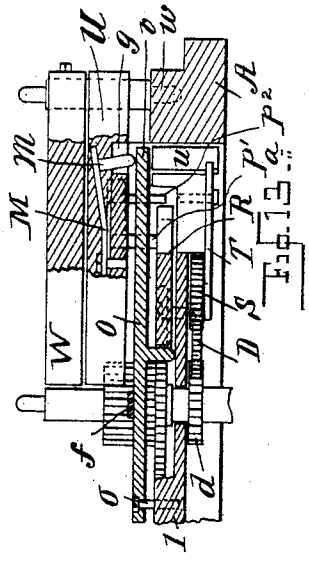

Fig. 15.

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(No Model.) 5 Sheets—Sheet 5.

# F. TERSTEGEN.

## STEM WINDING AND SETTING WATCH.

No. 498,494. Patented May 30, 1893.

Fig. 15.

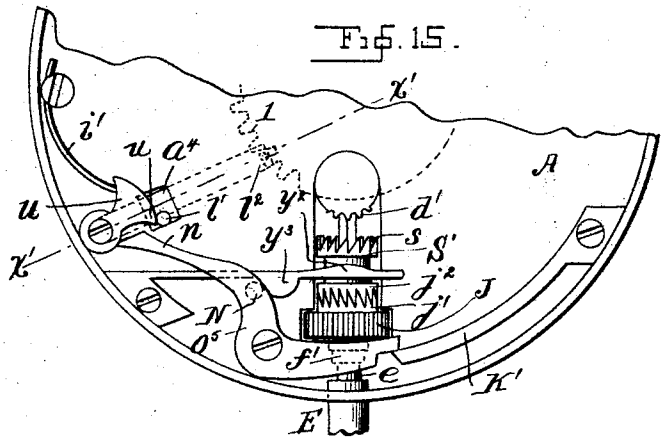

Fig. 15a.

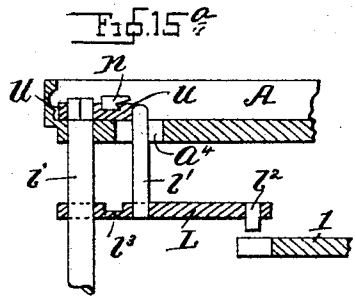

Fig. 16.

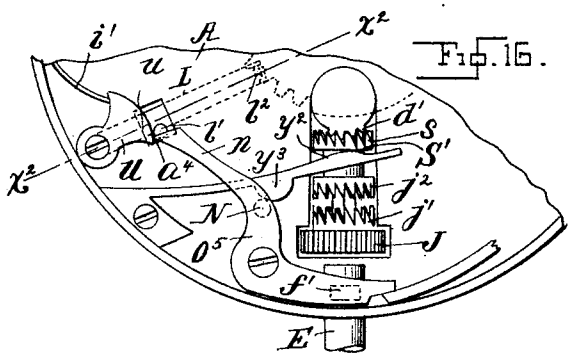

Fig. 16a.

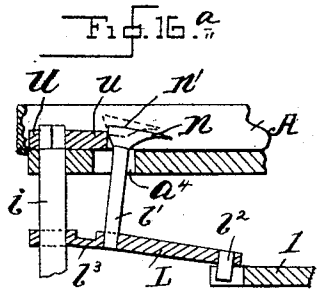

Fig. 17.

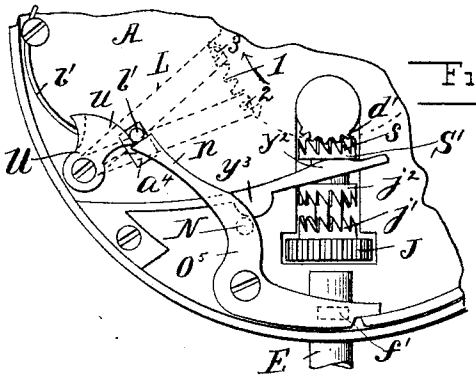

Fig. 18.

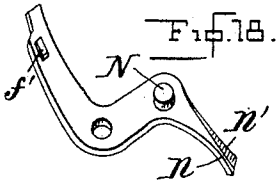

Fig. 19.

Witnesses
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# UNITED STATES PATENT OFFICE.

FRED TERSTEGEN, OF ELIZABETH, NEW JERSEY.

## STEM WINDING AND SETTING WATCH.

SPECIFICATION forming part of Letters Patent No. 498,494, dated May 30, 1893.

Application filed May 3, 1892. Serial No. 431,746. (No model.)

*To all whom it may concern:*

Be it known that I, FRED TERSTEGEN, a citizen of the United States, and a resident of Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Stem-Setting Watches, of which the following is a specification.

This invention relates to watches in which the stem driven train is adapted to have its engagements changed with the winding and time adjusting mechanism and consists of means controlled by the time driven train, for changing the relative positions of the stem driven train, and the time train.

It further consists in providing a weighted part tending to fall by the action of gravity in connection with the stem driven train for changing the position of the same, and a device engaged with the time driven train to return the weighted part to its normal position.

My invention is such that should the bearer of the watch forget or for any reason neglect to push the stem inwardly or to hold the watch in a vertical or proper position other than inverted or horizontal, the watch will, as may be stated in striking language, take care of itself, *i. e.*, it will automatically perform the same useful function as that performed by the operator or by the weight in whatever position the watch may be held. Let it be inverted, horizontal, vertically upright, or in continual motion as a whole while for instance in one's pocket, yet the stem arbor will be automatically changed from engagement with the dial wheel to that with the barrel wheel, and in such a manner as not to change the indicated time after once set, and without any attention from the bearer. He simply sets the hands to indicate the proper time, by turning the stem arbor, after it has been geared to a dial wheel and then lays the watch on a shelf, or puts it into his pocket or otherwise, as the watch will not stop for it will disengage the dial wheels from the setting mechanism automatically.

My invention relates, also, to certain modifications to show that the general nature of the invention admits of as many specific inventions as an ordinary mechanic could devise or that any number of inventors could devise and yet be infringers of the patent I seek to obtain.

My invention also consists of a setting mechanism, arranged to be connected with the dial wheels and also arranged to be connected with a part of the time driven train, whereby the said mechanism is controlled as to a limited time in contact with the said dial wheels and then to be disengaged therefrom.

In order that a general idea may be obtained as to what the various figures relate to, they are briefly reviewed by stating the direction in which they are looked at, whether they are sectional or exterior, and alluding to the functions and relative phases of the device in the several views.

Where a part or parts are broken off, the figure is finished by a free hand and crooked line or lines. In the matter of surface shading, it may be stated that it is entirely omitted because the same would only add more lines of which there are only too many now for the purpose of following the outline of the individual elements and their operation. In the preparation of the drawings, a model successfully operative was employed and reproduced in the figures. The sections which are shown are made in a plane perpendicular to the face of the watch and are central, but it may be noticed that some of the parts such as arbors and wheels are not shown in section as they are more intelligible when shown in full exterior. Again, sometimes any single element is partly in exterior and partly in section.

Figure 1 is an exterior view of the device as it appears when the dial is removed. The phase is that in which the arbor stem is engaged through the intermediate winding wheel to the barrel arbor wheel. Figs. 2, 3, 4, 5, 6, are similar exterior views, *i. e.* supposed to be looked at from the same side of the plate A. Figs. 7 and 8 are from the opposite side of the said plate. Figs. $5^a$ and $8^a$ are sections. In said Figs. 2, 3, 4, 5, 6, 7, 8, different phases of the elements of the watch are shown, so as to assist in the understanding of the operation as well as of the construction. Figs. 9, 10, 11, 12, 13, show different views and phases of a modification. Fig. $13^a$ is a section of said modification. Fig. 14 shows another modification. Figs. 15, 16, 17, show an application

of the invention to that class of watch called the Swiss. Figs. $15^a$, and $16^a$, are cross-sectional views respectively of Figs. 15 and 16. The setting lever and cam $u$ are visible. Figs. 18, 19, show slight details which are taken from Figs. 15, 16, 17.

The figures have all been drawn, with but one or two exceptions, to about double the scale of the model from which they were mostly taken, but of course the size has nothing to do with the nature of the invention. The parts have been enlarged so as to avoid confusion.

Where convenient and often, where possible, the letters of reference have been chosen in relation to the things they represent, by taking the initial. On account of the fact that certain groups of elements have the same initial letter this plan could not be carried out uniformly. I have taken W to indicate the weighted cam, O, the operating lever, Y, the yoke, D, and $d$, the dial wheels, &c., specially in connection with the more novel features of this and my former inventions.

In order to describe the invention systematically, and with as little confusion as possible, I first set forth the exact mechanical construction of the leading style of construction as set forth in Figs. 1, to 8, inclusive, and subsequently, the operation of this type, and finally the same is done to the modifications set forth in Figs. 9, to 19 inclusive.

A represents the front plate of a watch movement, and A′, the back or top plate of the same.

E, is the stem arbor, one end of which enters into and engages the tubular stem of a winding pinion F, that is journaled in a suitable bearing under the plate A and has a portion of its toothed periphery projecting through an opening, provided for it in said plate and is thus caused to mesh with or engage the teeth of the crownwheel G journaled on the plate. This arrangement is of such a nature as to permit the crownwheel to be rotated in either direction by means of the stem arbor. The yoke Y is pivoted to a suitable bearing on the front plate and held in place by a cap and screw as usual. At one end of the yoke is pivoted an intermediate winding wheel I, which when the yoke is in its winding position, transmits the motion of the crownwheel to the barrel arbor wheel B.

D, is the minute wheel and $d$ the cannon pinion, these wheels being called the dial wheels.

S is the intermediate setting wheel for transmitting the motion of the crown wheel to the dial wheels, when the yoke is in its setting position.

The above described mechanism of a stem setting and stem winding watch is of well known construction and does not differ in operation from similar mechanism found in watches, except as modified in the manner hereinafter described by the mechanism and modes of operation peculiar to my invention.

I will now describe in detail my novel devices for moving a stem driven train out of engagement with the barrel arbor wheel B or out of its winding position to its setting position and into engagement with the dial wheels and also the means by which the stem driven train is caused to disengage the dial wheels and re-engage the barrel arbor wheel.

Figs. 1 to $8^a$ inclusive illustrate that form of my invention, in which a weight or weighted part is arranged to operate a setting lever for adjusting the setting wheel of the stem driven train in engagement with a dial wheel and for disengaging the same therefrom, when the watch is placed in a certain position by causing the weight to gravitate and in Figs. 2 to $8^a$ inclusive is also shown a device or mechanism by which the weighted part is brought in contact with a wheel of the time train which by its motion received from the main spring of the watch moves the said weighted part always out of engagement and thereby disconnecting the setting wheel from the dial wheel when the watch is placed in such positions, in which the weighted part or weight can not change its position by the force of gravity to do the said disengagement itself.

W is a weighted part or weight, secured to a cam U by a suitable screw $w'$, (see Figs. 2, 8 and $8^a$) but may be arranged so as to form one solid part with the said cam. The cam U is pivoted at $w$, and arranged to swing freely between the watch-plates A and A′ and carries the weight W or weighted part, whereby it can be caused to move by the force of gravity, when the watch is placed in various positions. The cam U is provided with a pawl P pivoted loosely thereon, that has from its under side a projecting part $p'$ and pin $p^2$. The said cam U, is also provided with a segmental shoulder $u$ projecting therefrom, (see Figs. 2, 8 and $8^a$) and arranged to move in an elongated hole $a^3$, formed in the watch-plate A, through which the said shoulder projects and comes with its ends $u'$ and $u^2$, (see Figs. 1, 4 and 6) in contact with one or the other arm $t'$ or $t^2$ of a setting-lever T, pivoted at $t$ to the plate A by a suitable stud or shoulder-screw, so as to turn freely thereon. The said lever has another arm $t^3$ carrying on its under side a setting-wheel S pivoted thereto and that is caused by the lateral motion of the setting-lever to be brought in and out of engagement with a dial wheel D, pivoted to the watch-plate A. When the cam U by the weight W has been caused to drop as shown in Fig. 4 by placing the watch with its stem downward the said cam is moved toward the edge of the watch and its shoulder $u$ with the end $u'$ is in contact with the lever-arm $t'$, of the setting lever, whereby the setting wheel S on the said lever is moved and held in engagement with the dial-wheel D; but when the weight is caused to drop in the opposite direction as in Fig. 6, by turning the watch with its stem in the upward position, the weighted cam is caused by the force of gravity to move away

from the edge of the watch and to move the same inwardly, whereby its shoulder $u$ at the end $u^2$ comes in contact with the lever-arm $t^2$, of the setting lever and turns the same and the setting wheel S thereon out of engagement with the dial-wheel D. The weighted cam drops until the pawl P which is pivoted to the said cam, comes in contact with a pin $q$ attached to the watch plate A and in such position that the said pawl can drop behind the said pin, whereby the weighted cam is held and prevented from swinging back when the watch is turned or placed with its stem directly downward, as shown in Fig. 2, the weighted cam being now in its normal position.

I will now describe the manner and mechanism whereby the weighted cam is released so that it can drop and bring the setting wheel in gear with the dial-wheel D. In the hollow winding pinion F, (see Figs. 2 and 7) is placed a sliding-pin $f$ in position to be engaged by the longitudinally movable and rotary stem-arbor E.

O is the operating-lever, pivoted at one end to the watch plate A, as shown at $o$, the other end $o^2$ being provided with a pin $o^3$, which projects through a slot $a'$, formed in the said plate, so that the said pin comes in contact with the said yoke Y.

K is a spring, one end of which is secured to the plate A and the other end engages with and acts upon the operating-lever O.

R, is a releasing-lever having a longitudinally bowed arm $r'$ in engagement with and for operating the pawl P pivoted to the weighted cam U. The releasing-lever R is pivoted at $r$ to the plate A and is provided with a curved face $r^2$ by which it is engaged to the operating lever O, when the same is acted upon by the sliding pin $f$ and stem arbor E, shown in Figs. 3 and 8. The releasing-lever is controlled by a hair spring $r^3$. On the other side of the plate A is the yoke Y (see Figs. 1 to 6) provided with a projection $z$ in a position to be engaged by the pin $o^3$ of the operating-lever O. The said yoke carries on its stud $y'$ the intermediate winding wheel I. $y$ is the yoking-spring, secured by one end to the other side of the watch plate A, (see Fig. 7) and the other end engages the said stud $y'$ of the yoke, that projects through a hole $a^2$ formed in the said watch-plate and the yoke spring exerts a constant effort to hold the intermediate wheel I in engagement with the barrel-arbor wheel B, (as shown in Figs. 1, and 2.)

In Fig. 1, the stem-arbor E, for sliding the pin $f$ into the winding pinion F and the operating lever O (in dotted lines) with its pin $o^3$, to engage the yoke, are shown in the normal position of rest and the stem driven train is in its winding position; that is, when the yoke is held with its intermediate wheel I by the yoke spring in contact with the wheel B.

The setting wheel S is held out of engagement with the dial-wheel D by the shoulder $u$, of cam U, which is held engaging the lever arm $t^2$, of the setting lever T and locked thereby, so that it is impossible for the setting wheel to connect with the dial wheel as long as the lever arm $t^2$, of the setting lever is engaged by the shoulder $u$ of the weighted cam, the weighted cam being held invariably in the watch by the pawl P locked behind the pin $q$ in the normal position, as shown in Fig. 2.

In order to release the weighted cam, the stem E is pressed inwardly as shown in Figs. 3 and 8, whereby the sliding-pin $f$ is moved and bearing against the operating lever O, causes the same by its pin $o^3$ to engage the projection $z$ of the yoke (see Fig. 3) and turn the yoke with its wheel I out of contact with the wheel B or the stem driven train out of the winding position. At the same time, the operating lever, by means of its end $o^2$, bearing against the curved face $r^2$, of the releasing-lever R presses the same aside. The arm $r'$, in contact with the pin $p^3$, of the pawl P turns and disengages the said pawl away from the pin $q$ in the watch-plate A, thereby releasing the weighted cam in its position, and holds the said pawl also away from the teeth of center-wheel I (see Figs. 3, 8 and $8^a$), so that the weighted cam can fall toward the edge of the watch until its shoulder $u$ touches the end of the slot $a^3$, in the watch-plate. This causes the weighted cam to stop in this position, when the watch is held with its stem downward.

In Fig. 4, the cam is shown as dropped to its farthest position toward the edge of the watch and illustrates the changed position of the setting lever T, which is with its arm $t'$, engaged now to the end $u'$ of the shoulder $u$ of the weighted cam, and thereby turned on its pivot, so that the upper arm $t^3$, of the said setting lever is moved toward the dial-wheel D, thereby connecting the setting-wheel S with the same.

The arm of the setting lever T, when moved aside by the end $u'$ of the shoulder $u$, rests on the curved surface of the said shoulder, thus causing the locking of the said lever in the setting position. The arm $t^3$ of the setting lever bearing against the yoke $y$, which has been turned by the operating lever O out of the winding position as before described, holds now the said yoke and stem driven train in the setting position, when the pressing of the stem ceases, as shown in Fig. 4. Simultaneously, the spring K which has been placed under tension by the upward movement of the stem, will return the operating lever O to its normal position and in so doing the releasing-lever R, will be pressed back by its hair-spring $r^3$, so that the arm $r'$ of the lever is moved toward the center-wheel I and will bear against the head $p'$, of the pawl P on the weighted cam, thereby engaging the same with the teeth of the said center-wheel which forms a part of the time train. The stem

driven train now in its setting position in engagement with the dial wheel, can be operated by rotating the stem in either direction and the watch can be held with its face in a horizontal position conveniently for setting the hands, as shown in Fig. 5.

When the setting of the hands has been completed, the watch is held with its stem upwardly about as shown in Fig. 6, whereby the weighted cam is caused to fall from the edge of the plate A and the end $u'$, of the shoulder $u$, of the weighted cam is moved away from the arm $t'$ of the setting-lever. At the same time, the engagement of the other end $u^2$, takes place with the other arm $t^2$, of the setting-lever T, so that the setting-wheel S is disconnected from the dial wheel D. When the weighted cam thus falls, its pawl P with its curved face controlled by the releasing lever R and its spring $r^3$, slips over the teeth of the center-wheel I; and in case the weighted cam should swing in the opposite direction again, it would be caused by the abrupt face of the pawl P in coming in engagement with a tooth of the center-wheel to stop immediately, and thereby preventing its shoulder $u$, from acting upon the arm $t'$, of the setting lever. There is also another preventive for the return motion of the said setting lever, viz: the yoke spring $y$, which (as soon as the shoulder $u$ of the weighted cam releases the arm $t'$, of the said lever) presses the yoke Y back, which bears against the lever-arm $t^2$, whereby the same is turned and its setting wheel is pressed and held out of engagement with the dial-wheel D. Thus it will be understood, that the shifting of the dial-wheels and hands cannot take place, and when the watch, by its bearer, is placed with its stem in the upward direction, as is done by putting the watch into the pocket, the disengagement of the stem driven train from the dial wheel takes place by the action of gravity. But if the watch after the hands are set, should be directly laid down on its face or back, or placed with its edges in a horizontal position, or should be placed with its stem downwardly without first causing the weighted cam to gravitate to unlock or to disengage the setting-wheel S from the dial-wheel as shown in Figs. 4 and $5^a$, the pawl P on the weighted cam by its abrupt face in contact with the center-wheel I, will be engaged by the nearest tooth of the said wheel (see Fig. 4) and moved thereby, causing the segmental shoulder $u$, of the weighted cam, to move away from the arm $t'$, of the setting lever (see Fig. 5) and when released thereby, the yoke-spring $y$, as before stated, presses against the yoke, which in turn moves the setting-lever with its setting-wheel out of engagement with the dial-wheel. The said pawl on the weighted cam in contact with the center-wheel, is moved thereby out of engagement with the same wheel (as shown in dotted lines in Fig. 7) the said center-wheel receiving its power or being rotated by the barrel-wheel B′ by the force of the mainspring or driving power of the watch.

When the watch is held with its stem upward, the cam by its weight W is directly moved by the force of gravity, until its pawl P drops behind the pin or projection $q$ on the watch-plate A and is held thereby in the normal position of rest. Therefore, it is absolutely necessary that the watch should be held inverted preparatory to adjustment for the setting (as in Figs. 1 and 2) and then the stem is pressed inwardly to release the weighted cam from its normal position (as shown in Figs. 3 and 8). Thus it will be seen, that the shifting of the dial wheels and hands and the stopping of the same or the stopping of the watch entirely, is an impossibility by the cause of inattention of the wearer or operator in forgetting the releasing of the stem driven train in the setting position, as that is automatically done with the application of these novel devices.

In the construction shown in Figs. 9 to 13 inclusive of the drawings, the stem-driven train is brought positively into the setting position by the action of the spring K, bearing against the operating-lever and which moves the weighted cam from its normal position, when the longitudinally movable stem-arbor E is pulled outward. In this case, the watch has a long operating-lever O, provided near its outer end with a claw or short curved arm V′, and its outer end V has a beveled edge $v$, as shown in detail in Fig. $12^a$. About midway of the lever is a pin $o^2$, projecting downward, that engages the curved head $r^2$, of the releasing-lever R, that is placed below the same. The releasing-lever R, is pivoted at $r$, and has a curved arm $r'$, and is also controlled by its hairspring $r^3$, as described in the former figures. The cam U is also provided with a weight or weighted part W as shown in detail in Fig. $13^a$. To the cam is secured a curved spring M, which has on its free end a downward projecting pin $m$, that passes through a slot $g$, formed in the cam, and projects therefrom a little. The cam is otherwise of the same arrangement as before described, and provided with the movable pawl P and the segmental shoulder $u$ projecting therefrom.

In Fig. 9, the stem-arbor E is shown provided with annular grooves $e'$, and $e^2$, and the clamp-springs C in contact with the same, the said clamp-springs being a part of the pendant of the case and are arranged and operated in the usual manner and therefore not fully shown. When the stem-arbor E is pressed inwardly, so that its groove $e^2$, is engaged by the clamp-spring C, it presses against the sliding piece $f$, that is loosely pivoted to the operating-lever O, and brings the said lever to the position as shown in Fig. 9. The operating-lever by its claw V′, holds the weighted cam inwardly, and prevents the same from moving or swinging toward the edge of the

plate A. The pin $o^2$, bears against the curved head $r^2$, of the releasing-lever R, which is held with its curved arm $r'$, in contact with the pin $p^2$, of the pawl P of the weighted cam, thereby holding the said pawl out of engagement with the center-wheel I.

When it is desired to adjust the watch for setting, it is held with its edge in a horizontal position as in Fig. 10, and the stem is pulled outward, so that the clamp-springs C engage its groove $e'$. The sliding piece of the operating-lever O, now being released, the spring K acts upon the said lever and presses the same with its sliding-piece $f$, toward the stem-arbor. At the same time the outer end V, of the said operating-lever, is engaged with the pin $m$ of the spring M of the weighted cam, presses the said weighted cam toward the edge of the plate A or to its farthest position as shown in Fig. 11, and as the spring K, is stronger than the spring M, of the weighted cam, the pin of the said lighter spring in engagement with the operating-lever, is pressed aside by the inclined end of the said lever as shown in Fig. 11, and being released, the operating-lever is pressed toward the edge of the plate A, by its spring K, as shown in Fig. 10. The lighter spring M, of the weighted cam immediately after the said edge-wise pressure, resumes its former normal position, and as the operating-lever O with its pin $o^2$, has moved from the curved head $r^2$, of the releasing lever R, the latter by its spring $r^3$, is pressed with its curved arm $r^2$, against the projecting head $p'$, of the pawl P, and turns the same into engagement with the center-wheel I of the time train. The weighted cam being brought in position as shown in Fig. 10 with its shoulder $u$, in engagement with the arm $t'$, of the setting-lever T shown in dotted lines, has turned the latter with its setting-wheel S in engagement with the dial wheel D, and locks it in the setting position with the dial-wheel D. At the same time the arm $t^3$, of the setting lever T, in contact with the yoke at $z$, has turned the same with its wheel I out of engagement with the wheel B, so that the said stem-driven train is brought by the action of the spring K, to its setting position. The disengagement of the stem driven train from the dial wheel D, is done in three different manners. It may, for instance, be done by placing the watch with its stem in the upward position as shown in Fig. 12, for then the cam by its weighted part, will drop at once or move inwardly by the force of gravity, and its pawl P by its beveled face, will slip over the teeth of the center-wheel in the manner as described before with the figures of the drawings on Sheet 1 and 2. When the weight drops to the farthest position, a spring H attached at one end to the weight is engaged to come with its face out in contact with a stud $h$, attached to plate A to soften the noise of the fall of said weight. The said weight in gravitating to its normal position acts with its shoulder $u$, upon the arm $t^3$, of the setting-lever T, and turns the same and the setting-wheel S out of engagement, and away from the dial-wheel D. At the same time the yoke-spring $y$ acts upon the yoke, which being released from the setting-lever, now returns the said yoke and stem driven train to its winding position. In case the weight is swung in the opposite direction again, it would be caused by the abrupt edge of the pawl P, to come in engagement with a tooth of the center-wheel of the time driven train, and stopped thereby immediately, thus preventing its shoulder $u'$ from coming in contact with the arm $t'$ of the setting-lever T, so that the setting-wheel S can not engage with the dial-wheel. The second step, to disengage the setting-wheel from the dial-wheel, is obtained by pushing and pressing the stem inward whereby the watch may be in any position. If the stem is pushed inwardly, as shown in Fig. 13, by the arrow, the said stem will come with the case clamps C, in engagement with its groove $e^2$, and its end bearing against the sliding-piece $f$, of the operating-lever O presses the latter inwardly, and its claw V', away from the edge of the plate A. The beveled edge $v$ of the operating lever comes in contact with the pin $m$, of the spring M of the weighted cam, and bearing against the same, turns the weighted cam inwardly to its farthest position as shown in Fig. 13, and the stem being pressed farther inwardly presses the operating-lever O with its beveled end V, bearing against the pin $m$ of the spring M, to cause the said spring to bend upward, so that its pin $m$, rides over the said bevel face $v$, of the operating lever, as shown in Fig. $13^a$ and the said operating lever being further pressed backward until the pin $m$, of the spring M passes over the said end V of the operating lever, and is pressed by its spring into and against the said claw V' of the operating lever and engaging the same thereby, holds the weighted cam in its normal position, as shown in Fig. 9. The stem is pressed inward until its groove $e^2$, is in engagement with the clamp springs C, and held thereby in place. When the weighted cam is thus caused to be moved away from the edge of the plate A, as before described, its shoulder $u$, by coming in contact with the arm $t^3$, of the setting lever, turns the same, and the setting wheel S out of engagement with the dial wheel D, and in this manner the connection is broken positively, or by the operator himself. In the third instance, the disconnection of the setting wheel is done by the time train itself, and in the following manner: The pawl P, on the weighted cam (see Fig. 10) being brought in contact with the center wheel I by the releasing-lever R and its spring $r^3$, as before described, will be engaged with its abrupt face by the nearest tooth of the said center-wheel, and will be moved thereby, causing the segmental shoulder $u$, of the weighted cam to move away from the arm $t'$, of the setting lever (as shown in Fig. 5) and when released

thereby, the yoke-spring $y$, as before stated, presses against the yoke which in turn moves the setting lever with its setting wheel out of engagement with the dial wheel.

It must be understood, that a watch constructed as shown in Figs. 9 to 13 inclusive, can only be put in adjustment for setting, when the stem has been first pressed inward, to make a positive connection of the operating lever with the weighted cam, and then the stem is pulled outward.

In the construction shown in Fig. 14, the cam U is arranged without a weight or weighted part, and its form modified. The said weight or weighted part as described and shown in Figs. 9 to 13ª inclusive, was solely provided for the return motion of the cam U; *i. e.*, to actuate the same by the force of gravity, when the watch so constructed is placed with its stem in an upward position.

In the construction as in Fig. 14, the parts are shown in the setting position, and the stem withdrawn. The return motion of the said cam is solely relied upon the operator or bearer of the watch pressing the stem inwardly and against the sliding-piece $f$, after the watch has been set. This operation is of substantially the same manner and arrangement as described with the said former figures. The spring M on the cam U, is shown in a straight form, instead of being a curved or round one. In case the operator forgets or neglects this operation; namely, to push or press the stem-arbor inwardly again, in order to return the setting mechanism to the normal position of disengagement from the dial-wheel, then the said cam U, provided with the pawl P, and actuating mechanism for connecting the same with a wheel of the time train, as before described, is depended upon to return the said cam to its normal position, thereby disengaging the setting wheel from the dial-wheel, as fully described with reference to the former figures.

In the construction shown by Figs. 15 to 17 inclusive of the drawings, the watch is arranged with a stem-winding and setting mechanism as used and known in Swiss watches, and parts are shown as being modified in the manner with the application of my novel devices for the disconnection of the setting-wheel or stem driven train from a dial-wheel. A stem-winding wheel is in constant connection with the winding pinion J, upon the winding arbor E, and turned freely upon it. It has, as seen in Figs. 16 and 17, a counter click $j'$. In its teeth fit the teeth $j^2$, of a loose pinion S′, the latter being placed upon a square part of the arbor, movable only lengthwise. The teeth $s$, when connected with the setting parts, pitch into the teeth of a transmission wheel, $d'$, which is connected with the minute-wheel or dial-wheel as usual. The counter click-spring $y^2$, secured to the plate A, is provided near its free end with a beveled projection $y^3$, by which the same is operated by coming in contact with a stud N, secured to the rocking-lever $O^5$. Behind the stud N, the rocking lever is formed as a flat spring $n$, provided with the beveled edge $n'$, as shown in detail in Fig. 18. The said rocking lever $O^5$, is pivoted to the plate A, and is provided near its other end with a small projection $f'$, fitting into the groove $e$, of the winding arbor, as shown in Fig. 15. A spring K′, presses on the end of the said rocking lever to hold by the projection $f'$, the stem-arbor in its inward or winding position. At rest, Fig. 15, the click spring $y^2$, tends to hold the pinion S′, with its teeth $j^2$, into the teeth $j'$, of the winding-pinion J, and by turning it to the right, the watch is wound. In turning to the left, the clicks $j'$ and $j^2$, are in function. The arbor E, being pulled outward, the projection $f'$, will follow this motion of the arbor. This causes the rocking-lever $O^5$, to take the position shown in Figs. 16 and 17, its stud N, being moved against the projection $y^3$, of the click-spring $y^2$, thus causing the said spring to move the pinion S′, with its teeth $j^2$, away from the winding pinion J, and connecting its teeth $s$, with the teeth of the wheel $d'$. U, is the device or cam for holding or locking the said parts in the setting position. The cam U, is provided with the end edge $u$, which is beveled off, so as to be tangential to the segment of the circle in which it moves as shown in detail in Fig. 19. The said cam has a square hole by which the same is attached upon a square formed at one end of the staff $i$, and secured thereto by a screw. The said staff is pivoted through the watch-plate A, so as to turn freely as shown in detail in Figs. 15ª and 16ª, and its other end is pivoted to the back-plate or bridge of the watch in a usual manner and not shown. About midway of the staff is secured a spring-lever L, provided with a stud $l'$, projecting upward and passes through a slot $a^4$, formed in the plate A, and its end is in juxtaposition of the tangential end $u$, of the cam U, and on the said lever projecting from the opposite side and of its end thereof, is a short pin $l^2$. Between the stud $l'$, and the staff, the said lever is formed as a spring $l^3$, so that the end of the lever may be bent downward, and its pin $l^2$, moved toward and into connection with the teeth of the center-wheel I, of the time train of the watch as shown in Fig 16ª as will be hereinafter described. The lever has also an oscillatory motion when turned on its pivoted staff by the action of a spring $i'$, bearing with its face end on the cam U, upon the said staff, as shown in Fig. 17.

The operation of the parts is as follows: The cam U, on the staff $i$, is held by the spring $i'$, as shown in Fig. 15, as the spring-lever L, secured also to the said staff, is stopped by its stud $l'$, bearing against the end of the slot $a^4$, of the plate A. The pin $l^2$, on the end of the lever, is in proximity with the teeth of the center-wheel 1, of the time train as shown in Fig. 15ª. When the stem-arbor E, is pulled outward, the projection $f'$, will follow this mo-

tion of the said arbor and set the rocking-lever $O^5$ in the position shown in Fig. 16. Its spring end $n$, being moved, rides or slips over the face-end $u$, of the cam U, as shown in dotted lines in Fig. $16^a$, and being under tension, drops immediately and moves downward from the other side of the face-end $u$, which by its abrupt edge engages the same and is held thereby in place as shown in Fig. 16. At the moment the spring-end $n$, leaves the face-end $u$, it jumps down and presses upon the stud $l'$, of the spring-lever L, as shown in Figs. 16 and $16^a$. The said stud thereby being pressed downward bends the lever L, against $l^3$, downward so that its pin $l^2$, on the end of the said lever is moved against, and into the teeth of the center-wheel I, as shown in Fig. $16^a$. When the rocking-lever $O^5$, is brought in the position as shown in Fig. 16, its stud N, is moved against the projection $y^3$, of the click-spring $y^2$, and causes the said spring to move and hold the pinion S′, with its teeth $s$, in engagement with the teeth of the wheel $d'$, or the stem-driven train in the setting position.

To re-adjust the watch for winding, its stem is thrust in, whereby the rocking-lever with its spring end $n$, is forced away and jumps over the end $u$ of the cam U, thereby releasing the stud $l'$, of the spring-lever L, which being brought under tension, moves back, and moves its pin $l^2$, out of contact with the center-wheel as shown in Fig. $15^a$. At the same time by the return motion of the rocking lever, its stud N, is moved away from the projection $y^3$, of the click-spring $y^2$, which being released, moves the pinion S′, with its teeth $j^2$ in contact with the teeth $j'$ of the winding-pinion J, or the stem driven train in the winding position.

In case the operator forgets or neglects to push or press the stem inwardly again, to release the setting mechanism and restore the winding connection, then the lever L, being brought by the end $n$, of the rocking-lever $O^5$, in engagement with the center-wheel, as before described, will restore the watch to adjustment for winding as follows: The center-wheel moves by the power of the main-spring in the usual manner, and in the direction of the arrow as shown in Fig. 17, and the lever L in engagement with the said center-wheel is moved thereby from the point 2 to 3 as shown in dotted lines, through which distance the lever has turned the end $u$, of the cam U, toward the end $n$, of the rocking-lever $O^5$, and the said rocking-lever being released is brought to its former position by the action of the spring K′, and thereby carries the stem automatically inwardly by its projection $f'$, as shown in Fig. 15. At the moment the end $n$, of the said rocking-lever is moved aside and away from the stud $l'$, of the spring-lever L, the latter returns by the action of its spring $l^3$, to its former position, whereby the said lever withdraws the pin $l^2$, from the center-wheel I, as shown in Fig. $15^a$, and the spring $i'$, bearing against the cam U, turns the latter and the lever L, from the point 3, back to 2, shown in dotted lines in Fig. 17, or to the former position as in Fig. 15. Thus it will be seen, that the disconnection of the setting-wheel from a dial-wheel through the motion of the time train can be arranged in various ways, that it may consist of a spring-lever, or a movable pawl or arranged with a weighted part or weight that is disconnected directly or indirectly by the said time train, that the means of bringing such devices in connection with the time train are not dependent on a certain form or construction of mechanism, as I am enabled to adjust the same by pushing the stem inwardly, or use a weight or weighted part to gravitate in connection therewith, so that it will adjust only in a prearranged position or by pulling the stem outward, and connect positively. Also the means of bringing such devices out of connection with the time trains, by a longitudinal motion of the stem, or by the gravitation of a weight or weighted part, may be employed. I would therefore have it appear evident, that I do not limit myself to the exact construction of the parts in a stem setting mechanism, by which the same is arranged to connect with the time train. The nature of my invention is set forth accurately, and generically and specifically by the claims herein contained.

I claim as my invention—

1. In a watch, the combination with a time driven train, a suitable train for setting the time, and a setting wheel engaged therewith, of means connected with the time driven train and with said setting wheel, for causing a change in the position of the setting wheel.

2. In a watch, the combination with a time driven train, and a dial wheel, of hand-setting mechanism connected to both, and means engaged with the time train for disconnecting the setting mechanism from the dial wheel.

3. In a watch, the combination with a setting mechanism, a dial wheel engaged therewith and a wheel of the time driven train also engaged with the said setting mechanism, of means for disengaging the setting mechanism from the said wheel of the time train.

4. In a watch, the combination of a time driven train, hand-setting mechanism, a dial-wheel engaged therewith, and means for disengaging said setting mechanism from the dial wheel, consisting of a movable cam and an intermediate part driven by the time train for unlocking the said cam.

5. In a watch, the combination of a time driven train, hand-setting mechanism, a dial wheel engaged therewith, and means engaged with the time train for automatically disengaging said setting mechanism from the dial wheel, and consisting of a movable cam and a device engaged with the time train and controlling said cam.

6. In a watch, the combination of a time driven train, hand-setting mechanism, a dial wheel engaged therewith, and means for au-

tomatically disengaging said setting mechanism from said dial wheel consisting of a movable cam and a pawl carried thereby which is engaged with and moved by the said time train.

7. In a watch, the combination of a center wheel, a setting wheel, dial wheels engaged therewith and means for disengaging said setting wheel from the dial wheels, consisting of a pivoted cam, a projection on the same and forming the cam proper, a setting lever controlling said setting wheel and engaging with the said projection, in a locking position, whereby the setting wheel is held in engagement with the said dial wheels, and a pawl carried by said cam and having a projection which is engaged directly with the said center wheel.

8. In a watch, the combination with the winding mechanism, of a yoke carrying the winding wheel, a setting lever controlling a setting wheel, a movable cam engaged with the setting lever and locking the said setting wheel in the setting position in engagement with the dial wheels of the watch, and with the winding pinion, and means for unlocking the cam from engagement with the setting lever, consisting of a pawl carried by the cam and engaged with the moving center wheel and moved thereby, and a spring for returning the yoke into the winding position, when released from the setting lever.

9. In a watch, the combination of a time driven train, hand-setting mechanism, dial wheels engaged therewith, and means for disengaging said setting mechanism from said dial wheels, consisting of a movable weighted cam, a pawl carried thereby, which is engaged with said train and moved thereby, and a pin lying in the path of said pawl, for the purpose, as described, of holding the pawl out of engagement with said train.

10. In a watch, the combination of a center wheel, a setting wheel, dial wheels engaged therewith, a pivoted cam, a projection on the same, a setting lever controlling said setting wheel and engaged with the said projection in a locking position, a pawl pivoted to said cam, a projection upon the said pawl and located between the teeth of said center wheel, and a pin just escaping the center wheel and lying in the path of the said projection on the pawl, substantially as and for the purpose described.

11. In a watch, the combination of a center wheel, a setting wheel, dial wheels, a pivoted cam, a projection on the same, a setting lever controlling said setting wheel, and engaged with the said projection in a locking position or so relatively located as to be engaged in predetermined positions of the said cam, a stem arbor, an operating lever lying in the path thereof, a second lever lying in the path of the first and movable thereby, a pawl carried upon the said cam and adapted to be engaged with the center wheel, the said pawl having projections which lie on opposite sides of the said second lever, a fixed pin against which one of the projections rests for the purpose, as set forth, of holding the pawl away from the center wheel, a pinion and crown wheel engaged with the said stem and with said setting wheel respectively, a yoke carrying said crown wheel and the winding wheel, a spring holding said yoke against said setting lever, and a pin carried by said operating lever and bearing against the said yoke, whereby as described, the pressure upon the stem moves the winding wheel from the barrel arbor wheel, the pawl is unlocked from the pin, the cam falls and locks the setting wheel in engagement with the dial wheels, which are located in the path of the setting wheel, the said pawl being located between the teeth of the said center wheel, and the turning of the pinion operates the hands of the watch in either direction and to any extent.

12. In a watch, means for disengaging the setting wheel from the dial wheels, consisting of the combination with a wheel of the time driven train of a weighted cam or a weight tending to fall by the action of gravity, and a pawl engaged to one of the wheels in the time driven train and carried by the said cam, which is locked to the setting lever of the watch.

13. In a watch, means for disengaging the setting wheel from the dial wheels, consisting of the combination with a wheel of the time driven train of a weighted cam or weight tending to fall by the action of gravity and a pawl engaged with one of the wheels in the time driven train and carried by the said cam, whereby the said cam or weight is prevented from falling backward.

14. In a watch, the combination of a setting mechanism and dial wheels engaged therewith, and means for automatically disengaging said setting mechanism from the dial wheels, consisting of a weighted cam or weight and a pawl carried thereby, the said weighted cam being so supported as to gravitate by placing the watch in a pre-arranged position, and a pin or similar device lying in the path of said pawl and engaging the same and locking the weighted cam in the normal position.

15. In a watch, the combination of a wheel of a time driven train, a setting mechanism and dial wheels engaged therewith and means for automatically disengaging said setting mechanism from the dial wheels, consisting of a weighted cam or weight and a device carried thereby and engaged to one of the moving wheels in the time train.

16. In a watch, the combination with a setting mechanism, of a weight engaged therewith and tending to gravitate, and a spring H or other suitable cushion in the path of the weight for the purpose set forth to reduce the noise of the weight when falling backward.

17. In a watch, the combination of a time driven train, dial wheels, a hand-setting train, a longitudinally-movable and rotary stem ar-

bor, an operating lever engaged therewith, and a device arranged to be brought in or out of connection with the said time train by the said lever and respectively connect or disconnect the setting train with or from the dial wheels.

18. In a watch, the combination with a longitudinally-movable and rotary stem arbor, an operating lever, a cam for locking a setting wheel in the setting position and a suitable device in engagement with the time train for operating the said cam.

19. In a watch the combination with a setting mechanism, of a device for locking the same in a setting position, a driven part of the time train, and means engaged therewith for changing the relative positions of the setting mechanism and time train.

20. In a watch, the combination with a time driven train, a setting mechanism and means controlled by the said time train for changing the relative positions of the setting mechanism and time train.

21. In a watch the combination with a stem winding and setting mechanism, having a setting wheel, of means for moving the said wheel to the setting position, a time driven train, and a device engaged therewith for releasing and moving the setting wheel from its setting position.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 29th day of April, 1892.

FRED TERSTEGEN.

Witnesses:
S. R. OGDEN,
W. A. MORRELL.