No. 681,403. Patented Aug. 27, 1901.

C. A. SVENSSON.

ALARM CLOCK.

(Application filed Nov. 26, 1900.)

(No Model.)

Fig. 1.

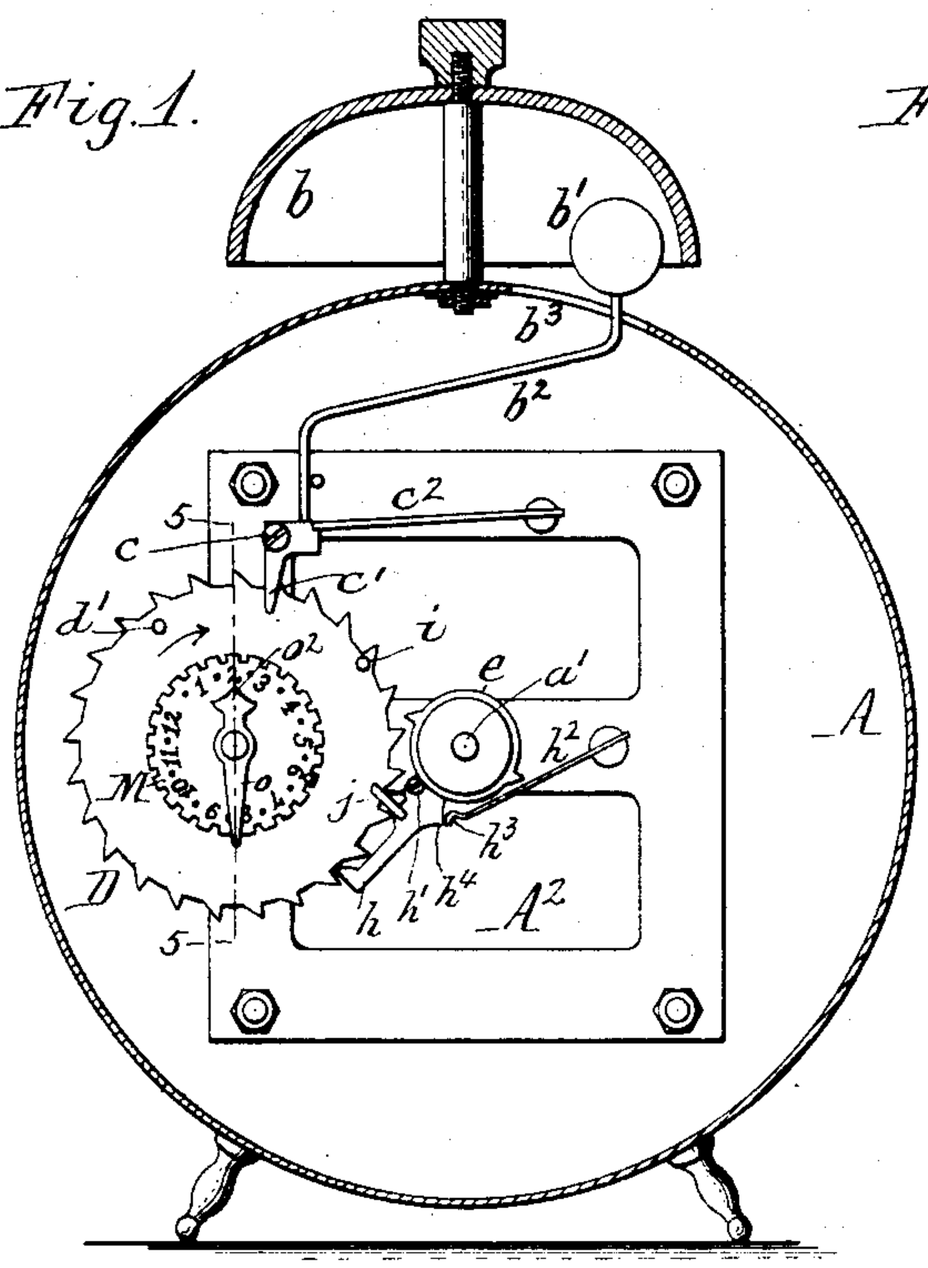


Fig. 2.

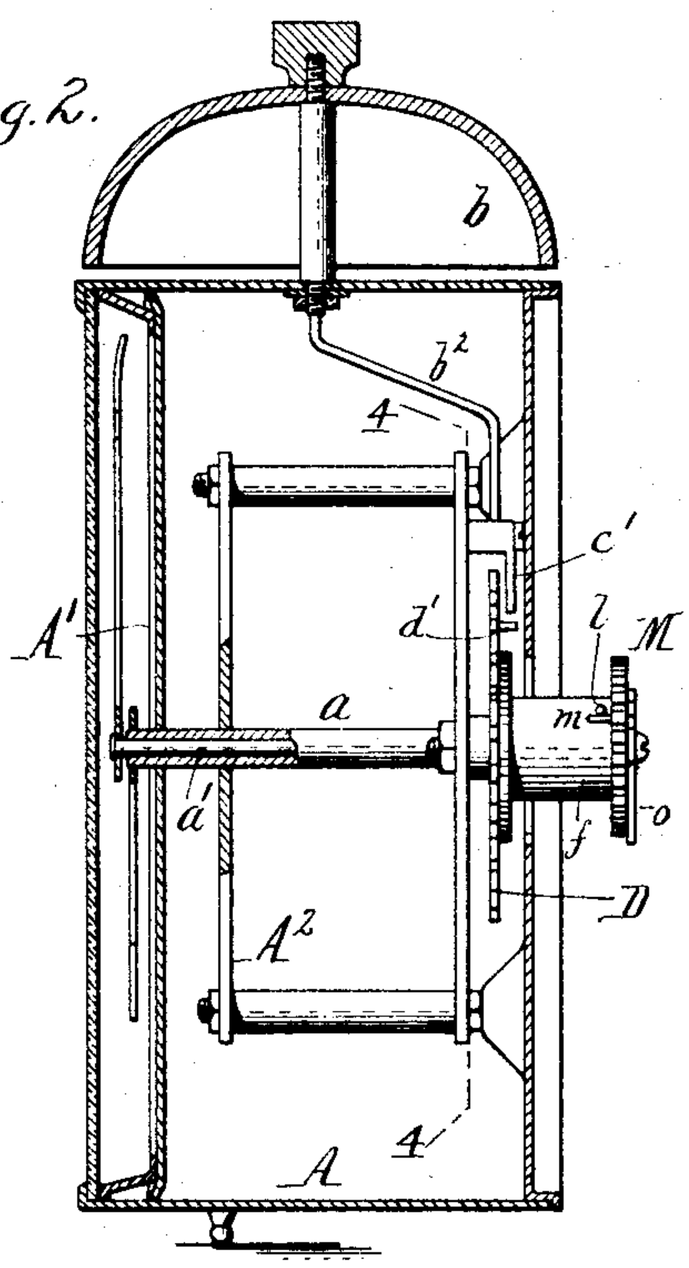


Fig. 3.

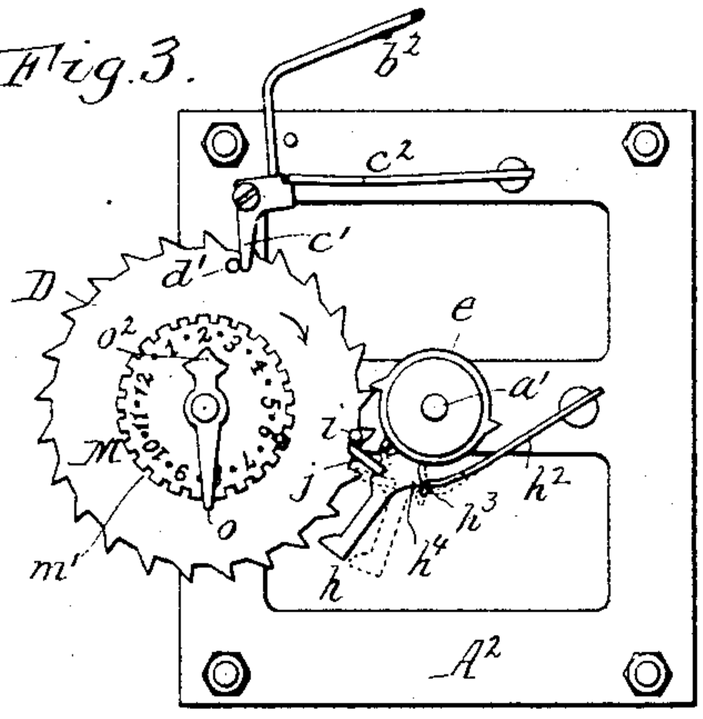


Fig. 4.

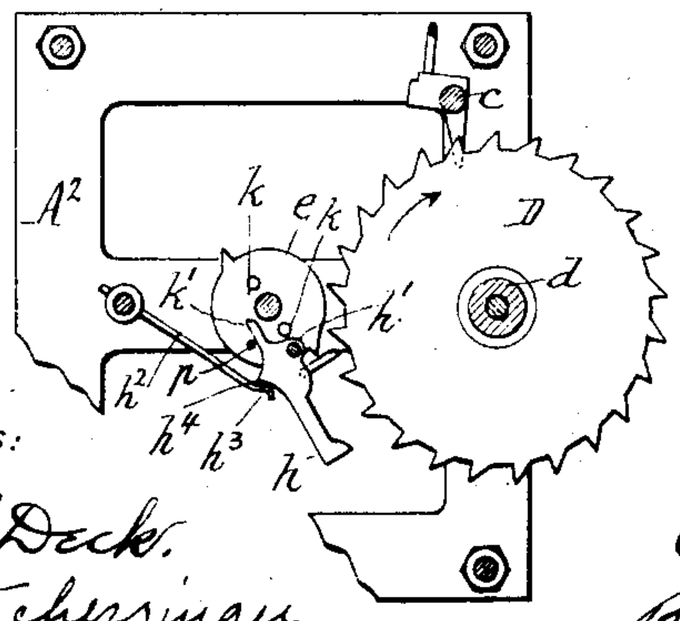


Fig. 5.

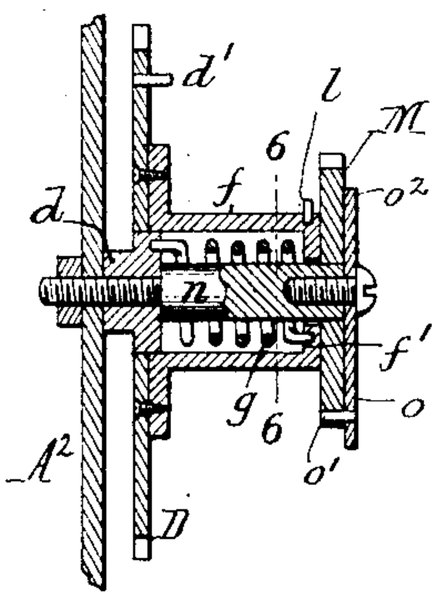


Fig. 6.

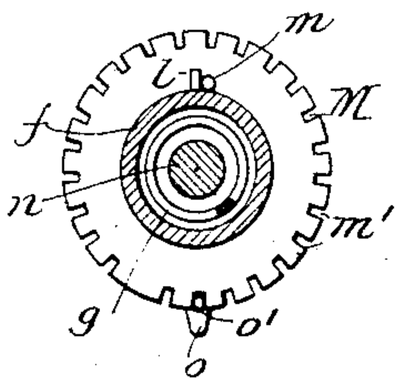


Fig. 7.

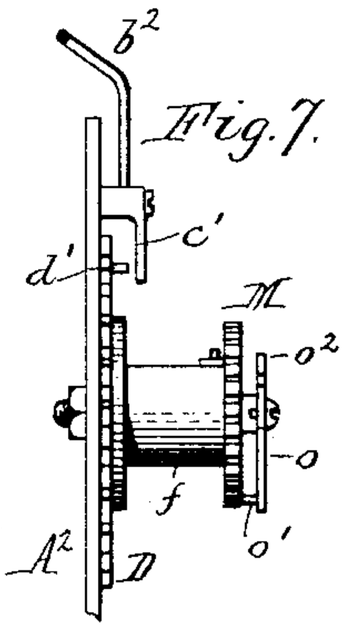
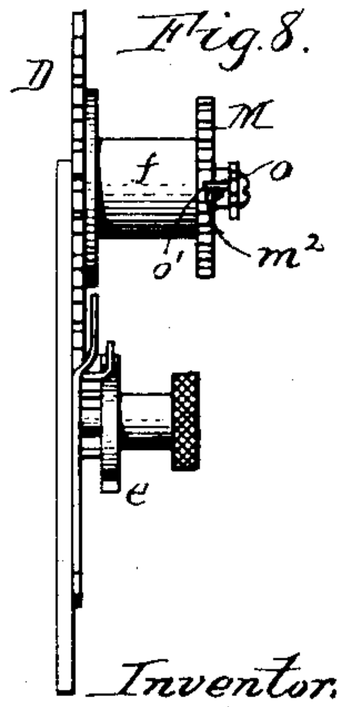


Fig. 8.



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UNITED STATES PATENT OFFICE.

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ALARM-CLOCK.

SPECIFICATION forming part of Letters Patent No. 681,403, dated August 27, 1901.

Application filed November 26, 1900. Serial No. 37,731. (No model.)

To all whom it may concern:

Be it known that I, CLAES A. SVENSSON, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Alarm Clocks or Watches, of which the following is a specification.

This invention relates to an alarm clock or watch intended more especially for notifying patients and nurses at predetermined recurring intervals when medicine is to be taken or administered.

The object of my invention is the production of a simple alarm mechanism which can be conveniently set for giving an alarm at the prescribed intervals and which can, if desired, be applied to an ordinary alarm-clock or other timepiece without requiring a reorganization of the same.

In the accompanying drawings, Figure 1 is a sectional rear elevation of an alarm-clock embodying my invention, the clock-movement being omitted. Fig. 2 is a sectional side elevation of the same. Fig. 3 is a detached rear view of the clock-frame and the alarm and setting devices, showing the parts in a different position from that illustrated in Figs. 1 and 2. Fig. 4 is a vertical section in line 4 4, Fig. 2, looking rearwardly. Fig. 5 is a fragmentary vertical section, on an enlarged scale, in line 5 5, Fig. 1. Fig. 6 is a cross-section in line 6 6, Fig. 5. Fig. 7 is fragmentary side elevation of the setting devices, showing the alarm mechanism thrown out of gear with the clockwork. Fig. 8 is a bottom plan view of said devices.

Like letters of reference refer to like parts in the several figures.

A is the casing of the clock; A′, the dial; A^2, the stationary frame which supports the clockwork; *a*, the hour-spindle, and *a′* the minute-spindle. These spindles may be turned by a clockwork of any suitable or well-known construction, and as the clockwork forms no part of my invention the same is not shown in the drawings.

b is a bell or gong arranged at the top of the clock-casing, and *b′* a swinging hammer adapted to strike the bell and carried by an arm b^2, which passes through a slot b^3, formed in the casing, as shown in Fig. 1. This hammer-arm is pivoted to the rear side of the frame A^2 by a horizontal stud *c* and is provided below its pivot with a depending trip-finger *c′*.

c^2 is a spring which bears at its free end upon a shoulder of the trip-finger *c′* and which is deflected when said finger is tripped and by its reaction throws the hammer *b′* against the bell for sounding the same.

D is a ratchet or trip wheel arranged on the rear side of the frame A^2 on one side of the minute-spindle *a′* and turning loosely on a horizontal arbor *d*, which projects from the rear side of said frame, as shown in Fig. 5. This trip-wheel is provided on its face with a pin or projection *d′*, which is arranged to trip the finger *c′* of the hammer-arm b^2 during the forward rotation of said wheel. This trip-wheel is preferably provided with twenty-five equidistant ratchet-teeth, as shown, and is turned the distance of one tooth every half-hour by an actuating-pinion *e*, secured to the projecting rear end of the minute-spindle *a′* and having two diametrically opposite teeth which engage with the trip-wheel. The latter is provided with a rearwardly-extending hub *f*, which is rigidly secured to the same and which is provided at its outer end with an inwardly-extending flange *f′*, as shown in Fig. 5.

g is a spring arranged in the hub *f* and secured at its inner end to the arbor *d* and at its outer end to the flange *f′* of said hub. This spring is strained by the forward rotation of the trip-wheel D and tends to turn the same backwardly.

h is a detent-pawl engaging with the trip-wheel D and pivoted at *h′* to the rear side of the frame A^2. This pawl is held either in or out of engagement with the trip-wheel by a spring h^2, secured at one end to the frame A^2 and provided at its free end with a V-shaped nose h^3, which is adapted to bear against one or the other side of a correspondingly-shaped nose h^4, formed on the rear side of said detent-pawl.

i is a supplemental trip-pin arranged on the face of the trip-wheel D and arranged to strike a releasing-finger *j*, which projects forwardly from the detent-pawl *h*, so as to move the latter out of engagement with the trip-

wheel, as shown in full lines in Fig. 3. This outward movement of the detent-pawl causes the nose h^3 of the spring h^2 to mount the nose h^4 of the detent-pawl, as shown in said figure, and the releasing-finger j of this pawl is made so long that the supplemental trip-pin i swings the pawl outwardly beyond the dead-center, so that this spring bears against the lower face of the nose h^4 and by its reaction continues the outward movement of the pawl to the position shown by dotted lines in Fig. 3 and by full lines in Fig. 4. The detent-pawl is returned to its operative position by one or the other of two pins k, which project from the inner side of the actuating-pinion e and which are adapted to engage against an arm k', arranged on the detent-pawl on the inner side of its pivot, as shown in Fig. 4. The return-pins k are so arranged that the head of the pawl is swung toward the trip-wheel D soon after the pin d' of the latter has tripped the hammer b'. These pins move the detent-pawl inwardly beyond the dead-center, and the spring h^2, by bearing against the upper face of the V-shaped nose h^4 of said pawl, completes the inward movement thereof. The two trip-pins d' and i are so arranged that the detent-pawl is moved out of engagement with the trip-wheel D a moment before the finger c' of the hammer b' is tripped, so as to release the trip-wheel and allow the spiral spring g to return said wheel to its initial position preparatory to giving the next alarm. The return movement of the trip-wheel is limited by a radial pin or projection l, arranged on the hub f of said wheel and extending into the path of a pin or stop m, which projects inwardly from a setting-wheel M, as shown in Fig. 2, and which is arranged in line with the hammer trip-pin d'. This setting-wheel is mounted loosely on an arbor n, which projects rearwardly from the frame A^2 and which passes axially through the hub f and the spring g, as shown in Figs. 5 and 6. The setting-wheel is confined between the outer end of the wheel-hub f and a fixed arm o, secured radially to the outer end of the arbor n, and is locked against turning by a pin or catch o', secured to said arm and engaging in one of a series of notches m', formed in the edge of the setting-wheel, as shown in Figs. 5 and 6. The setting-wheel is yieldingly held in engagement with the catch o' by the spring g, which acts not only as a torsion-spring for turning the trip-wheel D backwardly, but also as a compression-spring, which forces the trip-wheel and the setting-wheel M rearwardly or away from the frame A^2. In order to release the setting-wheel, the same is simply pushed inwardly until it clears the catch o', when the same can be turned to a different position. After adjusting the setting-wheel as desired the same is released to allow said catch to engage with the opposing notch of the wheel. The setting-wheel has as many notches as there are teeth on the trip-wheel D, and twenty-four of these notches indicate half-hour intervals, which represent together a day or period of twelve hours. These notches are numbered consecutively, as shown, and the catch-arm o is preferably provided at its upper end with an index or pointer o^2, which is traversed by the numbers of the setting-wheel and which facilitates the adjustment of said wheel. In the drawings every other notch of the setting-wheel is numbered, so that the numbered notches indicate intervals of one hour and the intermediate notches intervals of half an hour.

The operation of my improved alarm-clock is as follows: The pinion e, being secured to the minute-spindle a', makes one complete turn every hour, and as the same has two equidistant teeth it turns the trip-wheel forwardly the distance of one tooth every half-hour. For example, if it is desired to give an alarm every two hours, the setting-wheel M is moved inwardly to release it from the catch o' and turned so as to bring its numeral "2" in line with the pointer o^2, as shown in Figs. 1 and 3, after which the setting-wheel is released and allowed to again interlock with the catch o'. By this rotary movement of the setting-wheel the trip-wheel D is allowed to turn backward under the action of the spring g and its trip-pins d' and i are set the distance of four teeth of the trip-wheel in rear of the trip-finger c' of the hammer b' and the releasing-finger j of the detent-pawl h, respectively, and the return-stop l of the trip-wheel is at the same time set back a corresponding distance to arrest the rearward movement of the trip-wheel beyond its starting position. It therefore requires two complete turns of the pinion e and four actuations of the trip-wheel to cause its pins d' and i to trip the hammer-actuating finger c' and the detent-pawl h. When this occurs, the bell is sounded, giving the alarm, and the detent-pawl is disengaged from the trip-wheel D, as shown in Figs. 3 and 4, thereby releasing said wheel and allowing the spring g to turn it backwardly until the stop-pin l of its hub f strikes the stop m on the setting-wheel M and arrests the trip-wheel at its starting-point. This wheel is now again intermittently turned forward until its pins d' and i trip the hammer b' and the detent-pawl h, and so on, at regular intervals. Immediately after the trip-wheel D has been released and returned to its initial position the leading pins k of the pinion e return the retracted detent-pawl to its operative position, thereby preventing retrograde movement of the trip-wheel during the time that its trip-pins d' and i are inoperative.

It will now be understood that in order to cause an alarm to be repeated at a given interval the setting-wheel is simply turned to bring the numeral thereof which indicates the desired interval in line with the pointer o^2.

In order to enable the alarm mechanism to be thrown out of gear with the clockwork the notch m^2, located between the numerals

"6" and "7" of the setting-wheel, does not extend from side to side of said wheel, but only part way into the same, so that upon interlocking said shallow notch with the catch-pin *o'* the trip-wheel is locked in a position in which its teeth stand inwardly beyond the path of the teeth of the pinion *e*, as shown in Fig. 8. To prevent the detent-pawl *h* from moving forwardly beyond its normal position and interfering with the outward movement of the trip-wheel D after the latter has been moved into its inoperative position, a stop-pin *p* is arranged on the inner side of the pinion *e* in rear of the pawl-arm, as shown in Fig. 4, so that said arm strikes against said stop-pin when the trip-wheel is moved out of gear with the pinion *e*.

My improved alarm device can be applied to existing clocks of ordinary construction without requiring a rearrangement of the same, and does not interfere in any way with the operation of the clockwork.

I claim as my invention—

1. The combination with a spindle operated by the clock or watch movement, of a loose trip-wheel which is turned intermittently from said spindle and provided with a pin or projection, a return device which tends to turn said trip-wheel backwardly, a stop arranged to limit the backward movement of said wheel, and a hammer arranged to be tripped by the pin of said trip-wheel, substantially as set forth.

2. The combination with a spindle operated by the clock or watch movement, of a loose trip-wheel which is turned intermittently from said spindle and provided with a pin or projection, a return-spring which tends to turn said trip-wheel backwardly, a movable stop capable of rotary adjustment and arranged to limit the backward movement of said wheel, and a hammer arranged to be tripped by the pin of said trip-wheel, substantially as set forth.

3. The combination with a spindle operated by the clock or watch movement, of a toothed trip-wheel actuated intermittently from said spindle and provided with a main trip-pin and a supplemental trip-pin, a spring which tends to turn said trip-wheel backwardly, a detent-pawl engaging with said trip-wheel and arranged to be moved into an inoperative position by said supplemental trip-pin, a return device for moving said pawl into engagement with said trip-wheel, a stop capable of rotary adjustment and arranged to limit the backward movement of said trip-wheel, and a hammer arranged to be tripped by the main pin of said trip-wheel, substantially as set forth.

4. The combination with a spindle operated by the clock or watch movement, of a loose trip-wheel which is turned intermittently from said spindle and provided with a trip-pin and a stop, a hammer arranged to be engaged by said trip-pin, a return-spring which tends to turn said trip-wheel backwardly, a setting-wheel provided with a stop arranged to intercept the stop of the trip-wheel, and means for locking said setting-wheel against rotation, substantially as set forth.

5. The combination with a spindle operated by the clock or watch movement, of a loose trip-wheel which is turned intermittently from said spindle and provided with a trip-pin and a stop, a hammer arranged to be engaged by said trip-pin, a return-spring which tends to turn said trip-wheel backwardly, a setting-wheel provided with a stop arranged to intercept the stop of the trip-wheel and having an annular series of locking-notches, and a catch engaging in one of said notches, substantially as set forth.

6. The combination with a spindle operated by the clock or watch movement, of a loose trip-wheel which is turned intermittently from said spindle and provided with a trip-pin and a stop, a hammer arranged to be actuated by said trip-pin, a setting-wheel capable of sliding lengthwise on its arbor and having an annular series of notches and a stop which stands in the path of the stop of said trip-wheel, a catch secured to the arbor of the setting-wheel and engaging with a notch of said wheel, and a spring which tends to turn said trip-wheel backwardly and which is arranged to hold said setting-wheel in engagement with said catch, substantially as set forth.

7. The combination with a spindle operated by the clock or watch movement, of a loose trip-wheel which is turned intermittently from said spindle and provided with main and supplemental trip-pins, and a hollow hub having a stop, said trip-wheel being capable of sliding lengthwise on its arbor, a hammer arranged to be actuated by the main pin of said trip-wheel, a detent-pawl engaging with said trip-wheel and arranged to be moved into an inoperative position by the supplemental pin of said trip-wheel, an arm secured to the arbor of said trip-wheel and provided with a locking-pin, a setting-wheel mounted loosely on said arbor between said arm and the hub of said trip-wheel and provided with a stop-pin which stands in the path of the stop on said hub, and with an annular series of notches adapted to receive said locking-pin, and a spiral spring arranged in said hub and interposed between a flange or shoulder of said wheel-hub and a stationary part of the clock, and secured at one end to said hub and at its opposite end to said stationary part, substantially as set forth.

8. The combination with a spindle operated by the clock or watch movement and having a toothed wheel or pinion, of a hammer having a trip-finger, a toothed trip-wheel actuated by said pinion and capable of sliding on its arbor for moving into and out of engagement with said pinion, said trip-wheel having a projection arranged to trip the finger

of said hammer, and a spring which tends to hold said trip-wheel in its operative position, substantially as set forth.

9. The combination with a spindle operated by the clock or watch movement and having a toothed wheel or pinion, of a hammer having a trip-finger, a toothed trip-wheel actuated by said pinion and capable of sliding on its arbor for moving into and out of engagement with said pinion, said trip-wheel having a projection arranged to trip the finger of said hammer, a spring which tends to hold said trip-wheel in its operative position, and a catch for holding said wheel in its inoperative position, substantially as set forth.

10. The combination with a minute-spindle of a clock or watch and an actuating-wheel secured to said spindle and having actuating-teeth and return-pins, of a trip-wheel arranged to be actuated by said teeth and provided with main and supplemental trip-pins, a return-spring which tends to turn said trip-wheel backwardly, a stop capable of rotary adjustment and arranged to limit the backward movement of said trip-wheel, a detent-pawl engaging with said trip-wheel and arranged to be engaged by said supplemental trip-pin and said return-pins, and a hammer arranged to be actuated by the main trip-pin of said trip-wheel, substantially as set forth.

11. The combination with the minute-spindle of a clock or watch and an actuating-wheel secured to said spindle and having actuating-teeth and return-pins, of a trip-wheel arranged to be actuated by said teeth and provided with main and supplemental trip-pins, a return-spring which tends to turn said trip-wheel backwardly, a stop capable of rotary adjustment and arranged to limit the backward movement of said trip-wheel, a detent-pawl engaging with said trip-wheel and arranged to be engaged by said supplemental trip-pin and said return-pins, a stop arranged on said actuating-wheel to limit the forward movement of said pawl, and a hammer arranged to be actuated by the main pin of said trip-wheel, substantially as set forth.

12. The combination with the minute-spindle of a clock or watch and an actuating-wheel secured to said spindle and having actuating-teeth and return-pins, of a trip-wheel arranged to be actuated by said teeth and provided with main and supplemental trip-pins, a return-spring which tends to turn said trip-wheel backwardly, a stop capable of rotary adjustment and arranged to limit the backward movement of said trip-wheel, a detent-pawl engaging with said trip-wheel and arranged to be engaged by said supplemental trip-pin and provided on its back with a V-shaped nose, a spring bearing against said nose, and a hammer actuated by the main pin of said trip-wheel, substantially as set forth.

Witness my hand this 22d day of November, 1900.

CLAES A. SVENSSON.

Witnesses:
CARL F. GEYER,
JNO. J. BONNER.