

No. 641,475.

Patented Jan. 16, 1900.

E. TORRES.
REPEATING CLOCK.

(Application filed July 29, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

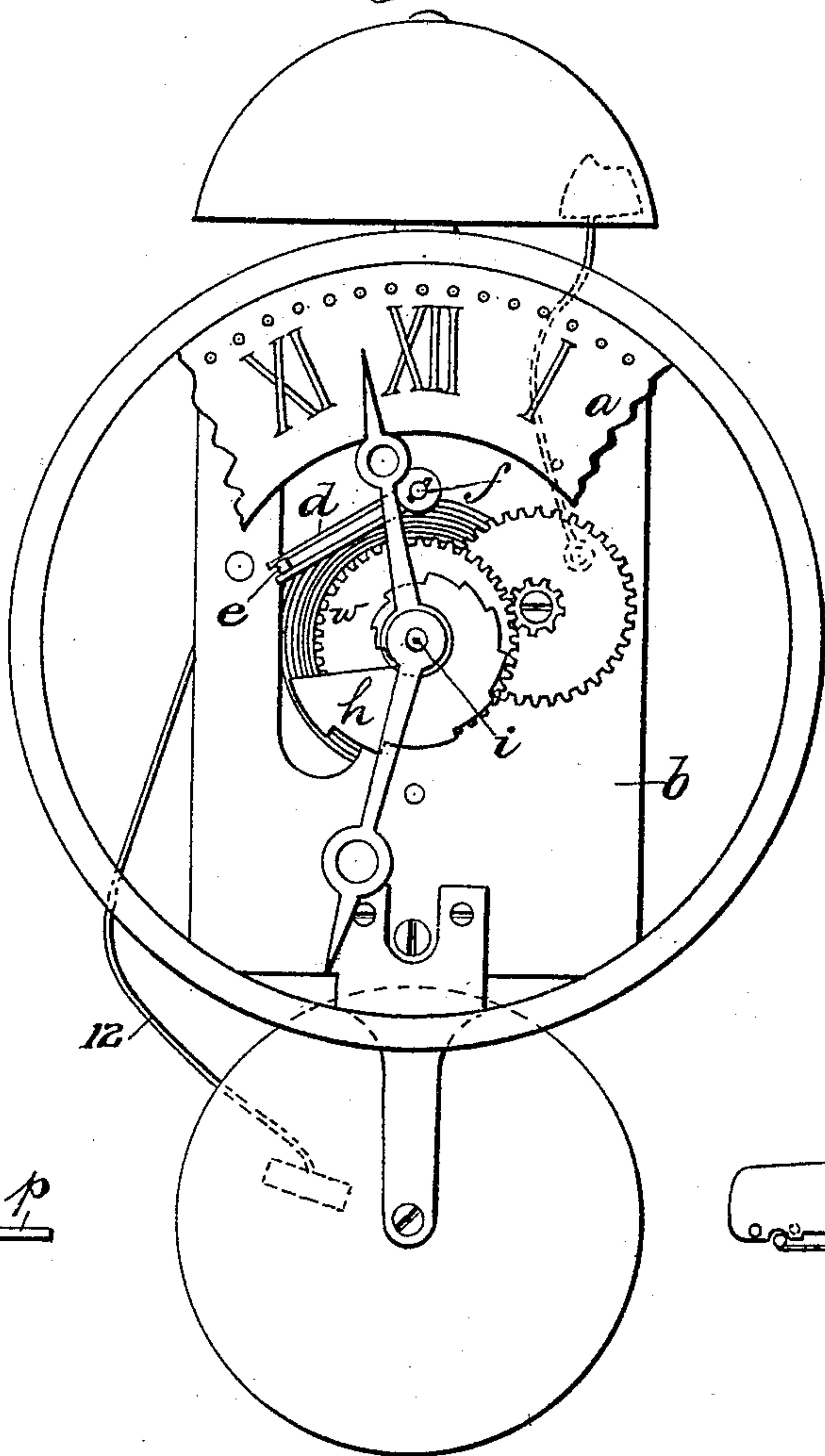


Fig. 3.

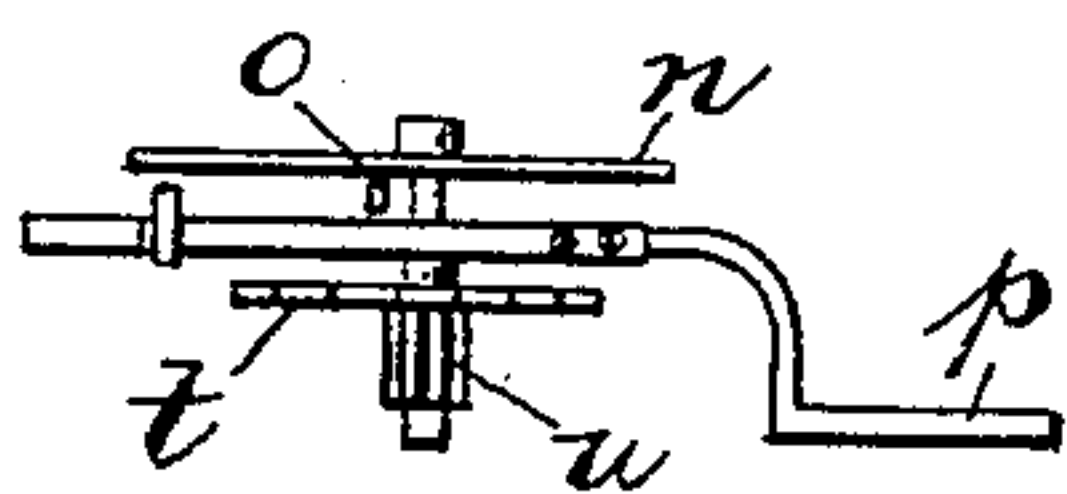


Fig. 4.

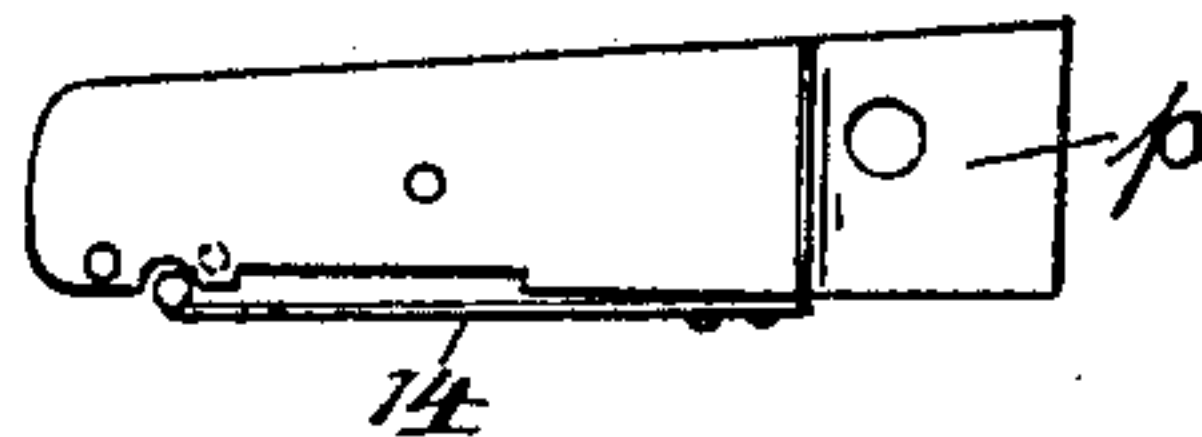
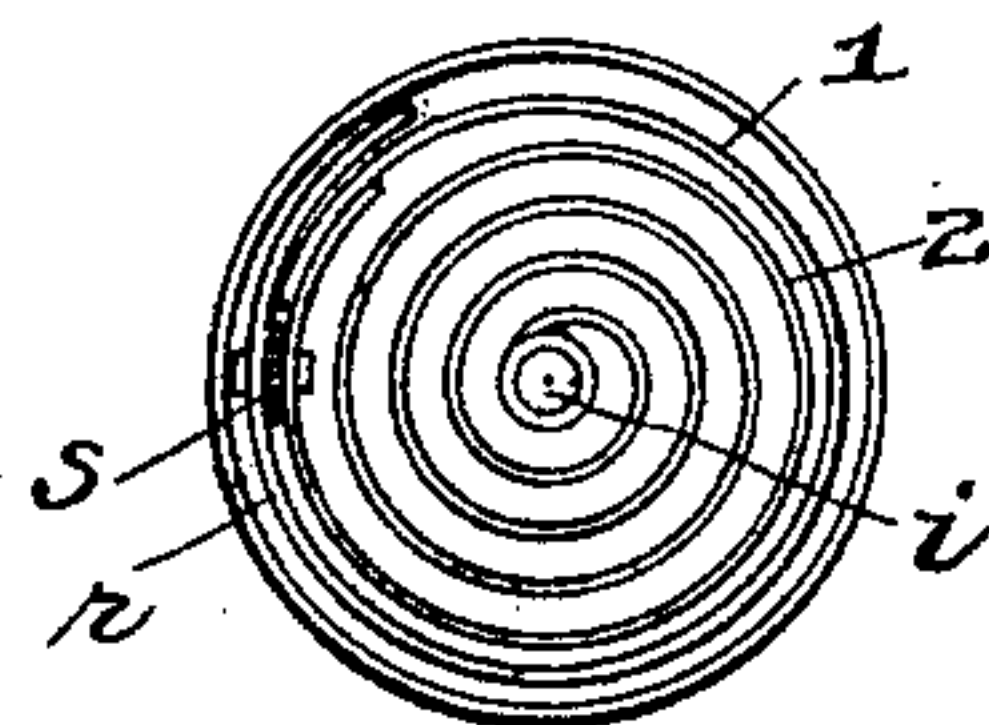


Fig. 5.



Witnesses

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2 Sheets—Sheet 2.

Fig. 6.

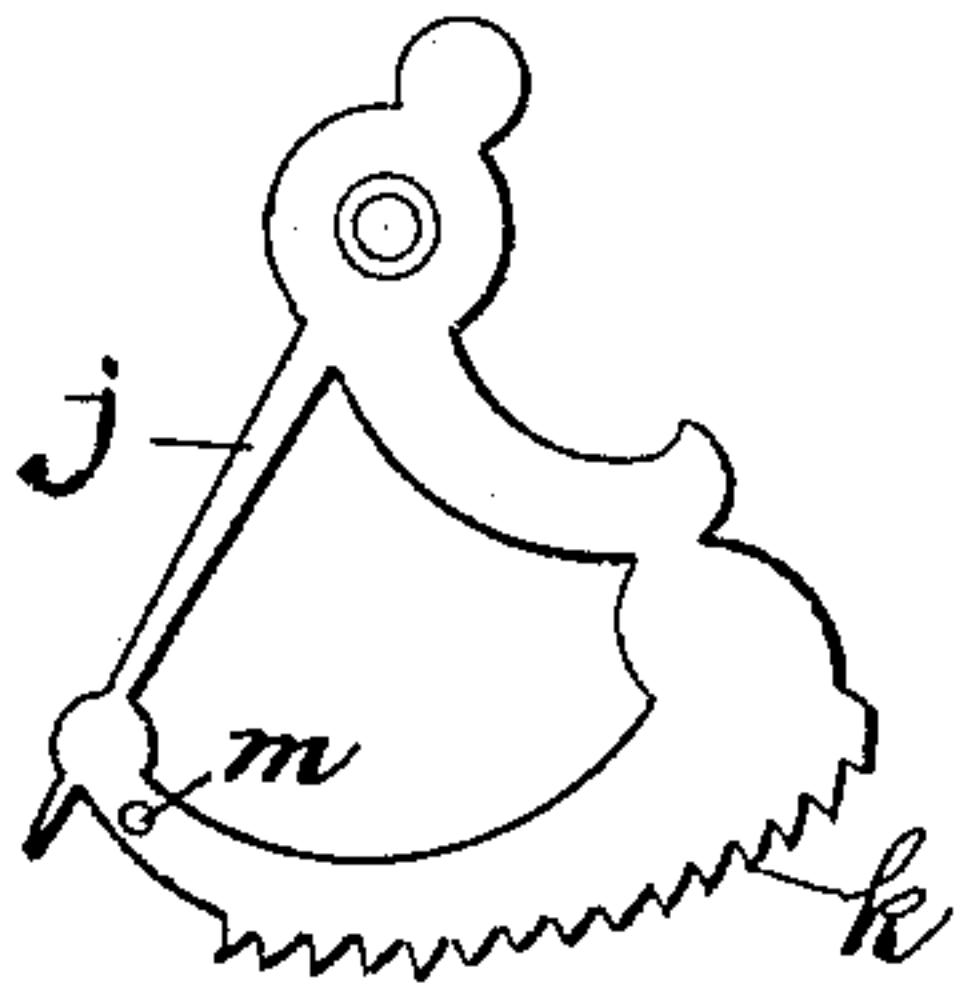


Fig. 2.

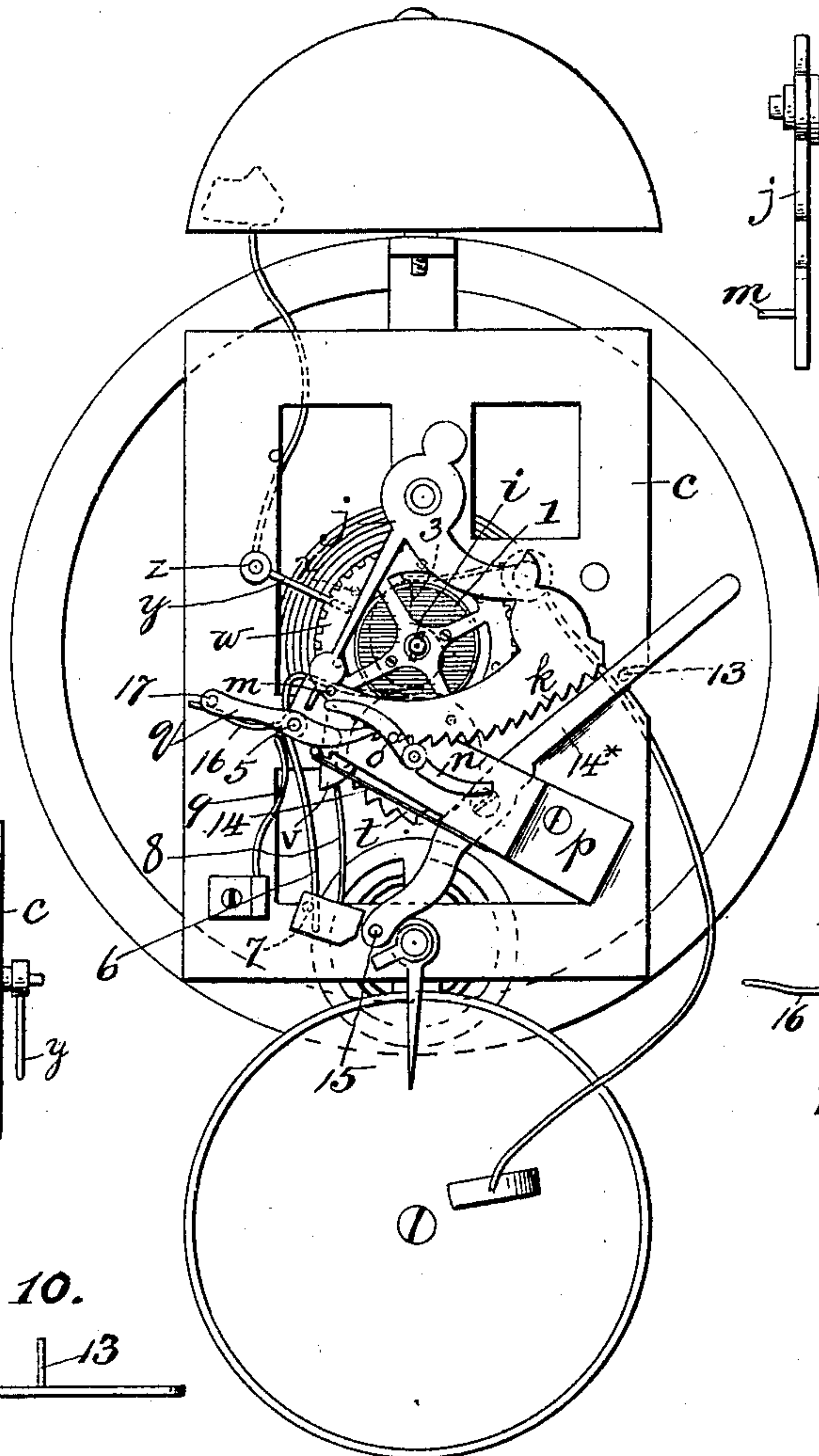


Fig. 7.

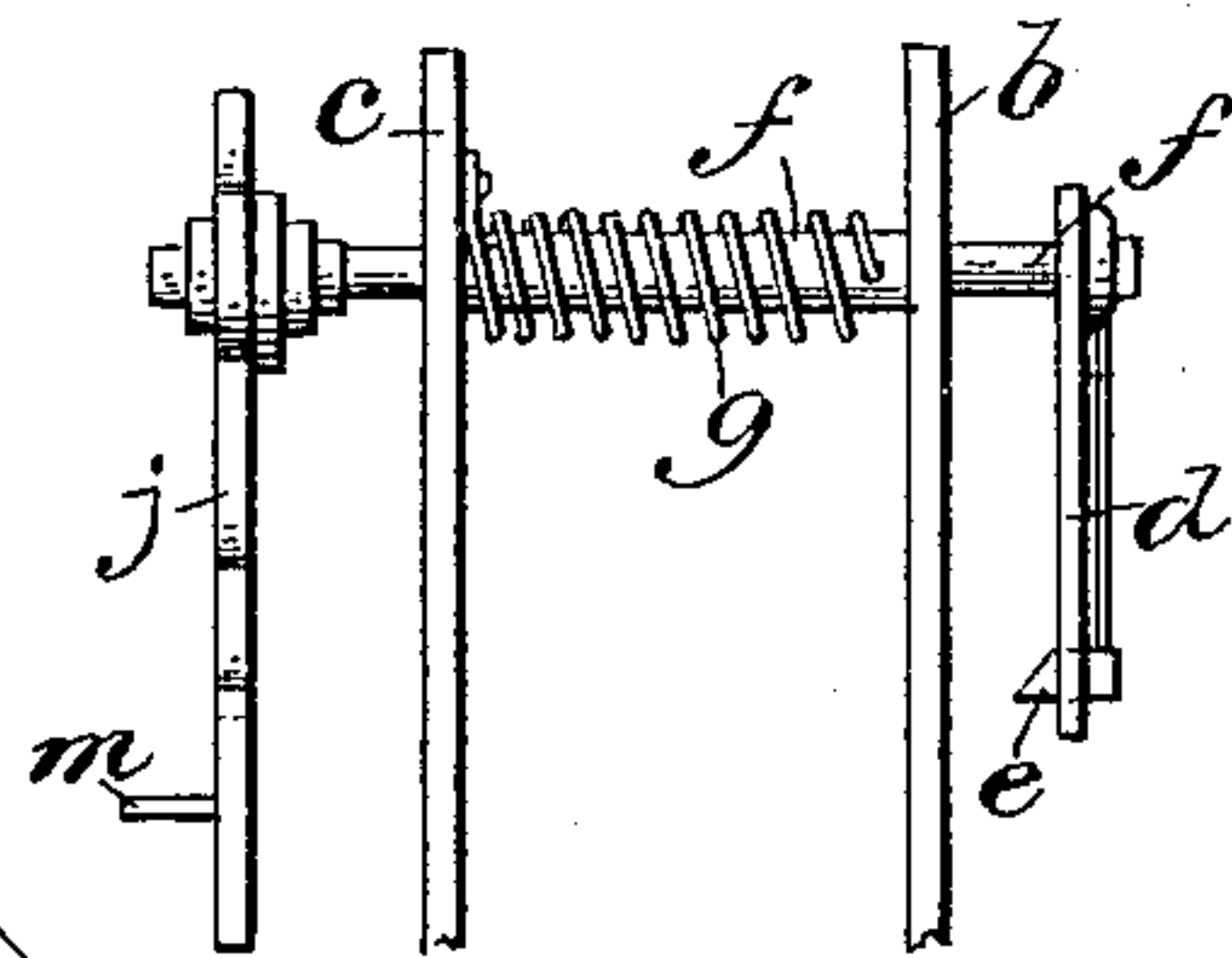


Fig. 8.

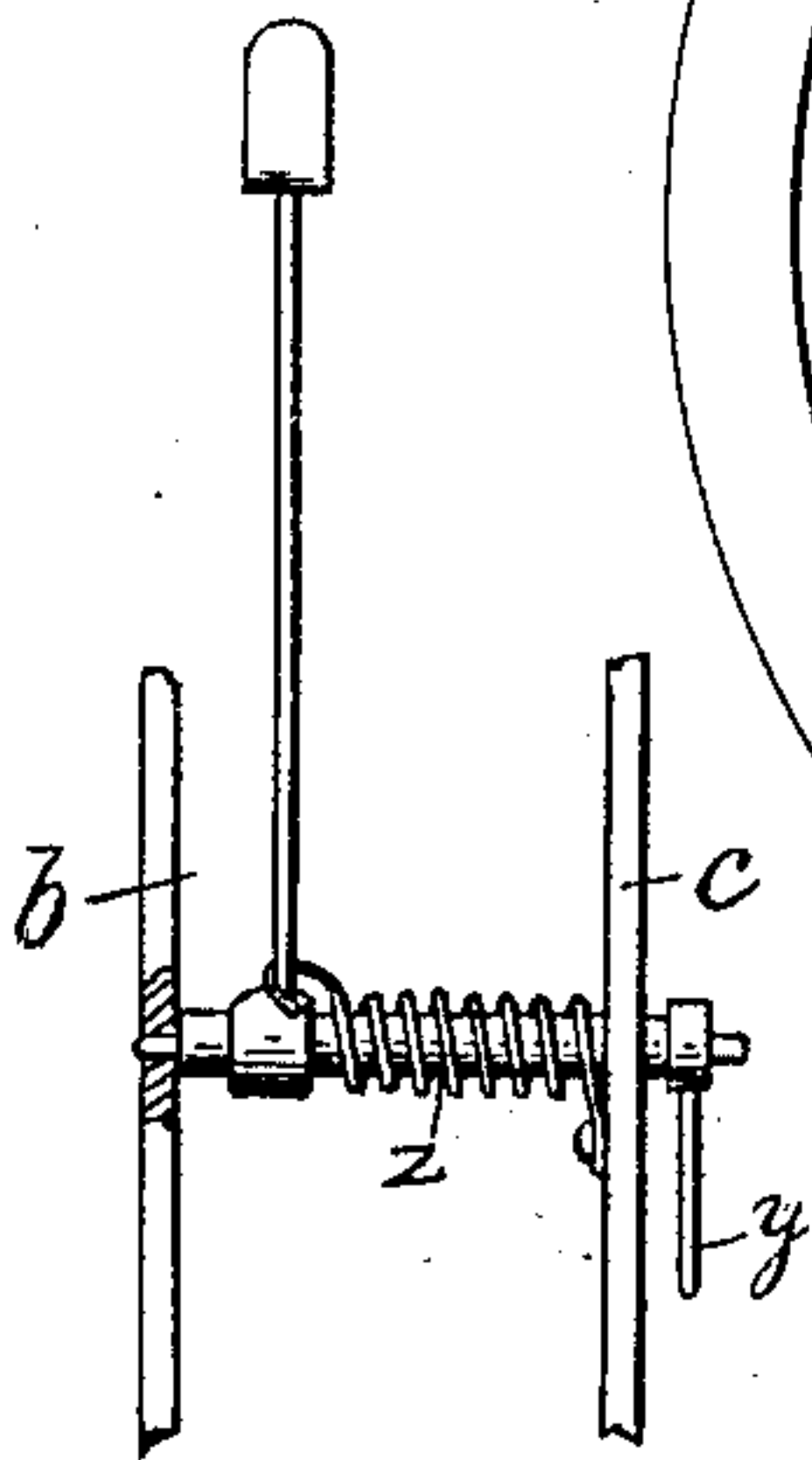


Fig. 9.

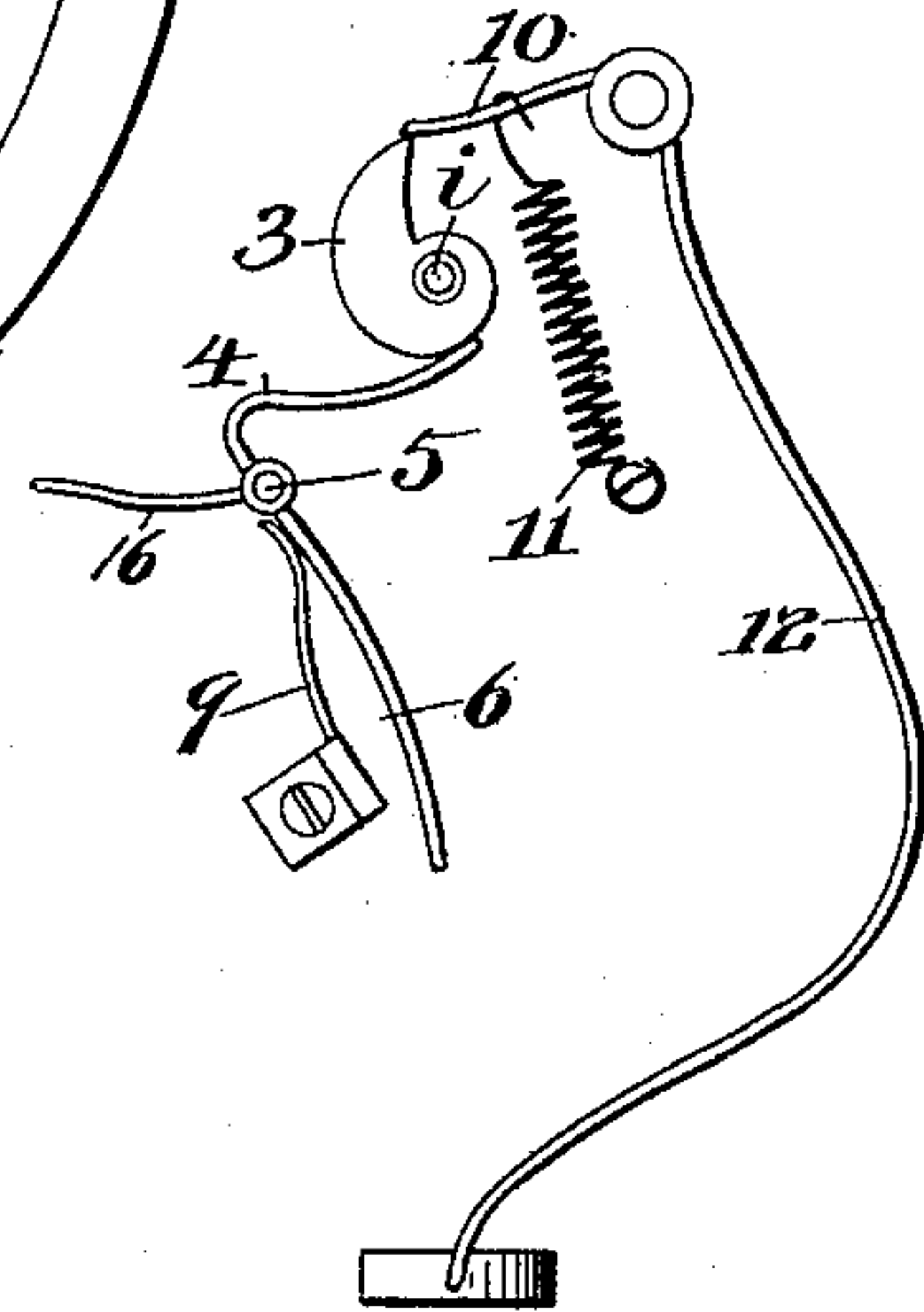


Fig. 10.

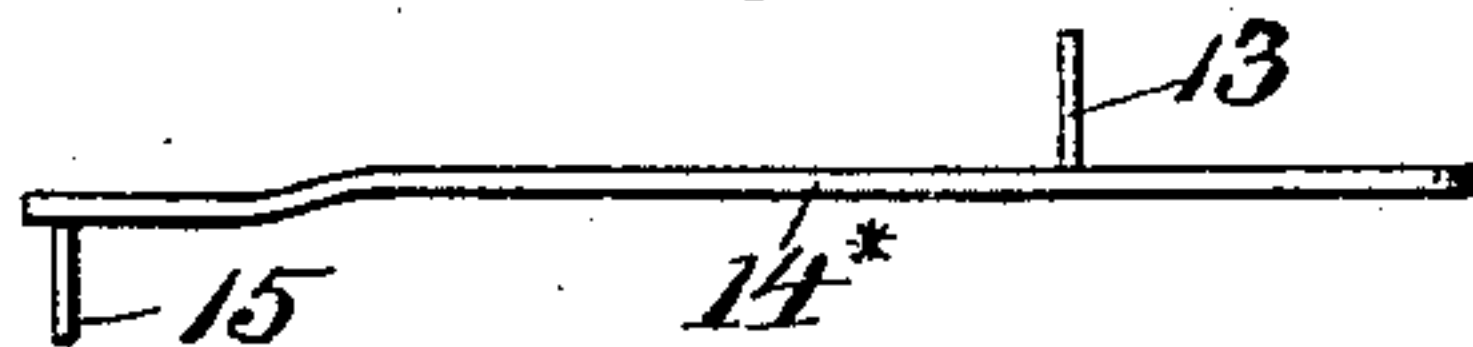


Fig. 11.

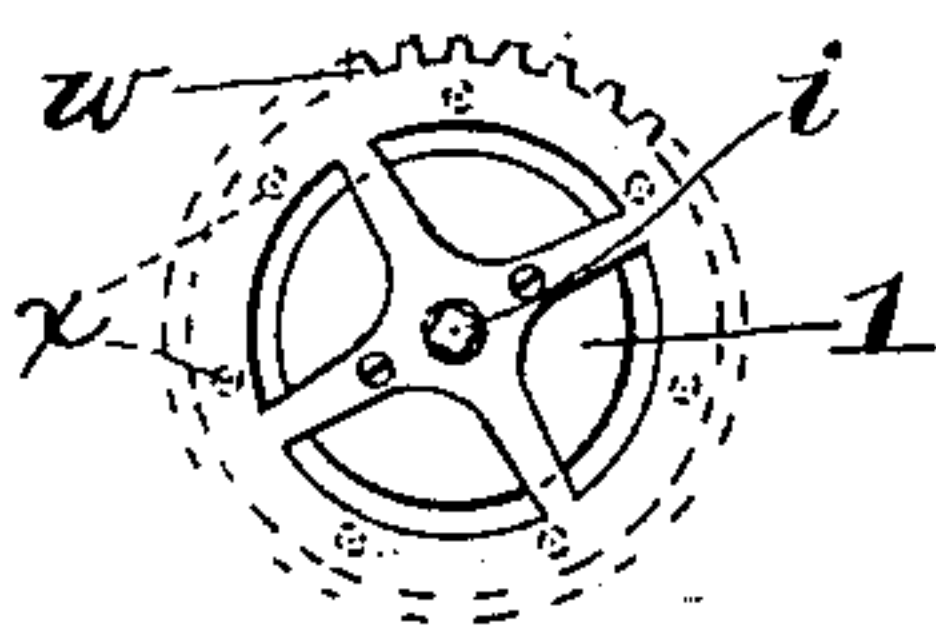


Fig. 12.

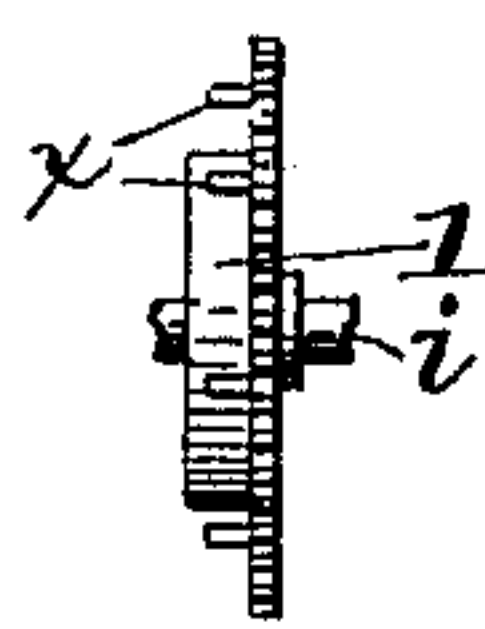


Fig. 13.

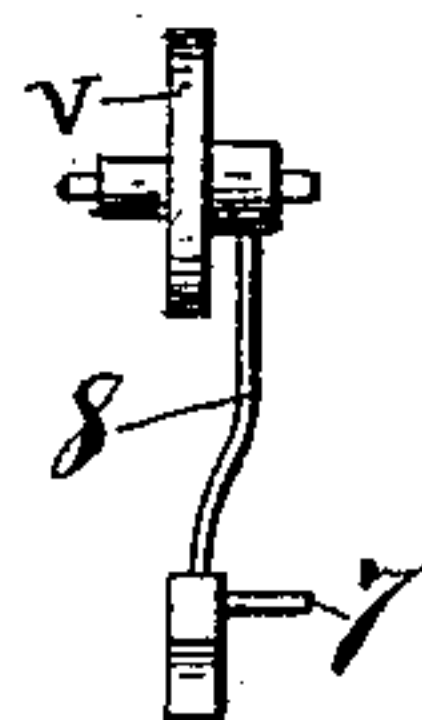
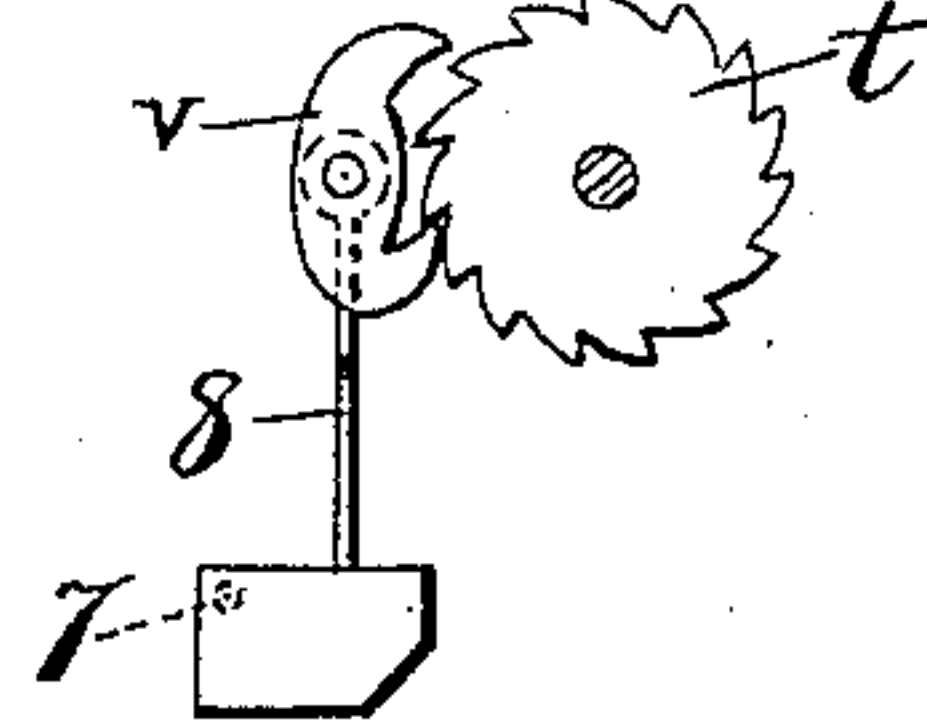


Fig. 14.



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UNITED STATES PATENT OFFICE.

ENRIQUE TORRES, OF GUADALAJARA, MEXICO.

REPEATING CLOCK.

SPECIFICATION forming part of Letters Patent No. 641,475, dated January 16, 1900.

Application filed July 29, 1899. Serial No. 725,497. (No model.)

To all whom it may concern:

Be it known that I, ENRIQUE TORRES, a citizen of the Republic of Mexico, residing at Guadalajara, State of Jalisco, Mexico, have
5 invented a new and useful Clock, (Case A,) of which the following is a full, clear, and exact specification, such as will enable others skilled in the art to which it appertains to make and use the same.

10 My invention relates to clocks, and more particularly to a clock designed to strike the hours and half-hours by separate bell-hammers and bells having distinctive sounds.

The objects of my invention are to simplify
15 and improve the construction of clocks of this character; to provide a power-spring for the striking mechanism independent of the mainspring in operation, but having its power stored up by the action of the mainspring; to
20 provide means for preventing said spring of the striking mechanism from being wound too tightly; to provide a simple and novel releasing mechanism for the striking part of the clock; to provide means for preventing the
25 operation of the striking mechanism when desired, and to so mount and arrange the parts of the clock that they will occupy but a small space.

The invention is illustrated in the accompanying drawings, in which—

30 Figure 1 is a front elevation of a clock; Fig. 2, a rear elevation, both with the outer casings removed; Fig. 3, a detail of the bridge carrying a pinion, engaging spur, and rotary lever; Fig. 4, a front detail view of said
35 bridge and attached spring for controlling a ratchet-pawl; Fig. 5, a detail of coiled spring and connected sliding band of the striking mechanism; Fig. 6, a detail of rocking frame
40 and segmental rack; Fig. 7, a detail in side elevation of hour-snail lever, spring-actuated rod, and swinging segmental rack on end of said rod; Fig. 8, a detail in side elevation of
45 hour-striking hammer, its spring-actuated rod, and tripping-finger; Fig. 9, a front detail of half-hour-striking hammer, tripping-lever, and connection therewith of tripping-finger, rocking shaft, pawl-tripping rod, escapement-lever, and its tripping-finger; Fig.
50 10, a detail of lever for arresting the striking mechanism; Fig. 11, a detail front view of toothed wheel with laterally-extending pins

on spring-drum, and Fig. 12 an edge view of the same; Fig. 13, an edge view of governing or escapement lever and spur; and Fig. 14, a
55 front elevation of same, with connected operating-snail.

My clock is of the class in which the time-train and striking-train are connected and move together and derive their power primarily from a single mainspring, whereby the
60 two trains always act in conjunction and the striking of the clock is always in accordance with the time indicated.

Having reference to the drawings, the working mechanism of my timepiece is connected
65 with the dial-plate *a* and the inner frames *b* and *c*.

d is a lever armed at its lower end with a spring-tooth *e* and secured to the outer end
70 of a spring-actuated spindle *f*, which turns in the frames *b* and *c*.

g is the spring referred to, and is secured at one end to the frame *c*, then coiled upon and
75 secured at its opposite end to the spindle *f*.

The lever *d*, by its tooth *e*, is adapted to engage with the teeth of an hour-cam snail *h*, secured to a sleeve carrying the hour-hand, and which sleeve is mounted on a central
80 minute-arbor *i*. The snail *h* is provided with twelve steps.

On the inner end of spindle *f* back of the frame *c* is secured a rocking frame *j*.

k is a segmental rack constituting a part of the frame *j* and provided with a row of teeth.
85 The function of the rocking frame is to control the bell-striking mechanism, and the function of the spring *g* is to hold the frame and segment in their normal position when not in action. The rack *k* is also provided near
90 one of its ends with a rear extending pin *m* in close proximity.

n is a gathering-pawl provided near its center with a pin *o*, adapted to engage with the teeth of the rack *k* and move it tooth by tooth,
95 while one end of the said pawl is adapted at a certain time in its rotation to engage with the pin *m* on rack *k* and to be then and thereby locked from further rotation. The return movement of the rocking frame and
100 rack is prevented, as it is being carried in the one direction by the pawl *n* against the spring action, by a spring-controlled pawl *q*, pivoted on the end of a rocking shaft 5 on

support *p* and *c*. The pawl *q* normally holds the rack locked by action of a spring-bar 14. The gathering-pawl *n* is carried by a short arbor mounted on the bridge *p* and frame *c*, and between which bridge and frame this arbor carries a thin spur-wheel *t* and pinion *u*. The spur-wheel is adapted to engage with the pallets of escapement *v* and the pinion with a toothed wheel *w*. The wheel *w* is mounted loosely on the inner end of the minute-arbor *i* and is provided on the rim of one face with seven laterally-extending pins *x*. These pins are adapted to engage with a spring-lever finger *y* on a bell-hammer spring-actuated rod *z*. Mounted on the same arbor and secured to the said wheel is a drum 1, containing a spiral actuating-spring 2, which drives the striking mechanism.

As shown in Fig. 5, the inner end of spring 2 is secured to the arbor, but its opposite end is connected to a segmental spring-band *r* of the same width and thickness of the spring 2. Both pieces are riveted together at that end with a rivet *s* between them to keep them apart, but are disconnected from the drum, so that the united parts are free to move together within the drum. When the coil is wound up and the winding action increases, it causes the band *r*, on which the coil is, to slide around the wall of the drum, and thus, however close the coil may be wound, it is relieved from all undue tightness and breaking strain by the sliding of the band on the wall of the drum, while at the same time the tension of the coil is maintained. All pins, screws, hooks, or other projections which are usually employed for securing the coil are thus avoided, and the same is easily placed and replaced. The inner end of the band *r* bears against the rivet *s*. By this arrangement the spring and band cannot be wound beyond a certain tension. This prevents breaking and makes it possible to employ a light spring. It will be seen that coil 2 is continually tightened as the central arbor rotates. On the central arbor *i* in front of the drum 1 and frame *c* is secured a cam 3 with a single tooth. In contact with this cam 3 is a finger 4, secured to a short spring-controlled rocking shaft 5, mounted loosely in frame *c* and bridge *p*. Also secured to said shaft 5 is a downwardly-extending tripping-rod 6, adapted to contact with a pin 7 on escapement-lever 8. Escapement-lever 8 is weighted at its lower end and its upper end is rigidly secured to the same rocking shaft that carries the escapement *v*. Rods 4 and 6 are controlled by a spring presser-bar 9, secured to frame *c*. Also in contact with cam 3 is a two-armed lever hung on a boss in the inner face of plate *c*, one arm 10 of which is held in contact with said cam by a coiled spring 11 hooked at one end to said arm and at its opposite end to plate *c*. The other arm 12 of said lever constitutes the striking-hammer of the half-hour bell, and it bears against a pin 13 on the lever 14*. The lever 14* is

for the purpose of stopping all striking. This lever is pivoted centrally to the frame *c* and at its lower end is provided with a laterally-projecting pin 15, which is adapted to contact with the weighted end of escapement-lever 8. When this lever is operated to make such contact, the lever 8 throws the escapement *v* against the teeth of the spur-wheel *t*, locking the latter, and the leafed pinion and the spur locks the rotating lever *n* on the same shaft against the teeth of segmental rack *k*, by which means the bell-hammer is held from striking.

The operation of the clock may be summarized as follows: At the beginning the tooth *e* of the lever *d* is held away from engagement with the hour-snail *h* and the striking mechanism is at rest. As the time mechanism moves on in its regular course the rotation of the central minute-arbor winds up the strike-actuating spring 2 in the drum 1 and rotates the single-toothed cam 3 on said arbor. When the minute-hand reaches the half-hour point, the spring-arm 10 of the half-hour bell-hammer 12, which bears on the snail 3, escapes from the tooth of the snail and is drawn down by the force of spiral spring 11. The same action throws up the hammer 12 against its bell and denotes the half-hour by a single stroke. As the movement of the minute-hand and snail 3 continues the spring-controlled finger 4 on rocking shaft 5 is gradually raised by said cam until a rod 16 on shaft 5 strikes a pin 17 on the toothed lever *q* and releases the latter from engagement with the rack *k*. The rack *k* is then thrown back by the action of the spring *g* on the rod *f*, to which rod the rack-frame is secured until the tooth *e* of lever *d* engages with a tooth on the hour-snail *h*, which snail-tooth corresponds to the hour to be struck and until the rack *k* reaches a tooth corresponding in number to the same hour. At this movement the proper designated rack-tooth engages with the lateral pin *o* of the rotating lever *n*, and the hour-striking mechanism is ready for operation. When the minute-hand reaches the hour termination at the dial-figure 12, spring-holding finger 4 passes off the cam 3, and the spring-finger 6 is secured, as heretofore explained, to a spring-actuated rod acting against the pin 7 of the governing escapement-lever and releases the hold of the escapement *v* upon the spur *t* and permits the wheel *w*, actuated by the drum-spring 2, to rotate rapidly the pinion *u*, the connected rotating lever *n*, and the rack *k*. As the wheel *w* revolves each of its pins *x* comes successively in contact with the finger *y* on the end of the rocking bell-hammer rod 2, which serves to cause that hammer to strike the hours. A convenient relative arrangement of pins and teeth is to give the wheel *w* seven pins and fifty-six teeth, the pinion eight leaves, and the spur twenty-one teeth.

Having thus described my invention, what I claim is—

1. In a clock of the character herein de-

scribed, the combination with a time mechanism and mainspring, of an independent striking mechanism, and an independent power-spring for said striking mechanism, 5 said latter independent spring consisting of a coiled spring and a spring-band, one end of the coil secured to the band, a rivet connecting said spring and band, one end of said band bearing against said rivet, a drum with- 10 in which said band and coil are placed, a central minute-hand arbor extending through said drum, one end of the coil secured to said arbor, the opposite end of the coil and the connected band adapted to slide within the 15 drum as the coil is tightened by the rotation of said arbor, substantially as described.

2. The drum provided with the sliding band and the coiled spring connected at one end to such band, a rivet connecting such 20 parts, and the free end of said band bearing against said rivet, substantially as described.

3. In a clock of the character described, the combination with a time mechanism and mainspring, of an hour-snail carried upon 25 the hour-hand sleeve and central arbor, and an independent striking mechanism connected with said snail and consisting of a toothed lever engaging with said snail, a spring-actuated rocking rod to which said lever is connected, a swinging frame hung at the end of 30 said rod and provided with a segmental rack, a gathering-pawl provided with a pin for engaging with and moving said rack, a spur-wheel, pinion, and escapement mechanism to 35 which said gathering-pawl is connected, a spring-controlled pivoted pawl, engaging with and holding said rack at the point turned by

said gathering-pawl, a spring-controlled rocking frame carrying said pawl, said rocking frame provided with a finger, a cam on the 40 central time-arbor by which said finger is operated to rock the said frame, a toothed spring-actuated time-wheel on the same arbor, said wheel provided with trips at intervals, and a spring-actuated rod carrying a 45 bell-striking hour-hammer, adapted to connect with and be operated by said tripping time-wheel, substantially as described.

4. In a clock of the character described, bells and hammers for striking the hours and 50 half-hours, a controlling-cam common to both hammers, and mounted on the main arbor, a hammer-vibrating mechanism for the hours-hammer, a spring for driving said hammer-vibrating mechanism, an escapement con- 55 trolling said vibrating mechanism and said cam controlling said escapement, substantially as described.

5. A pivoted lever on the framework in combination with the hour and half-hour 60 striking mechanisms, an escapement controlling said hour-striking mechanism, one end of said lever adapted to engage with the escapement and the opposite end with the half-hour-striking mechanism, whereby the striking mechanism may be arrested or prevented, 65 substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ENRIQUE TORRES.

Witnesses:

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JOS. H. BLACKWOOD.