

(No Model.)

4 Sheets—Sheet 1.

J. P. TIRRELL.

ELECTRIC SIGNALING APPARATUS.

No. 370,831.

Patented Oct. 4, 1887.

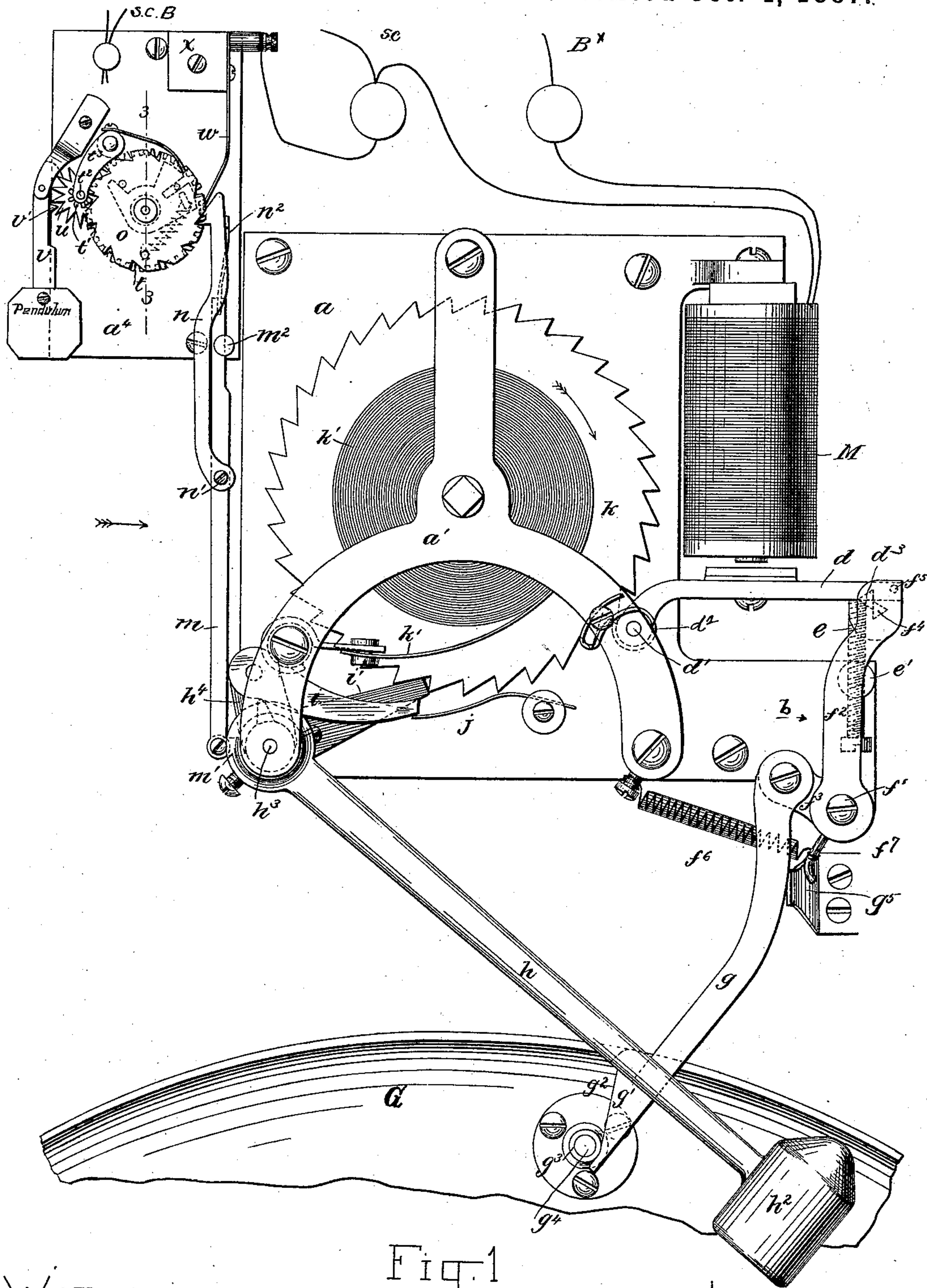


Fig. 1

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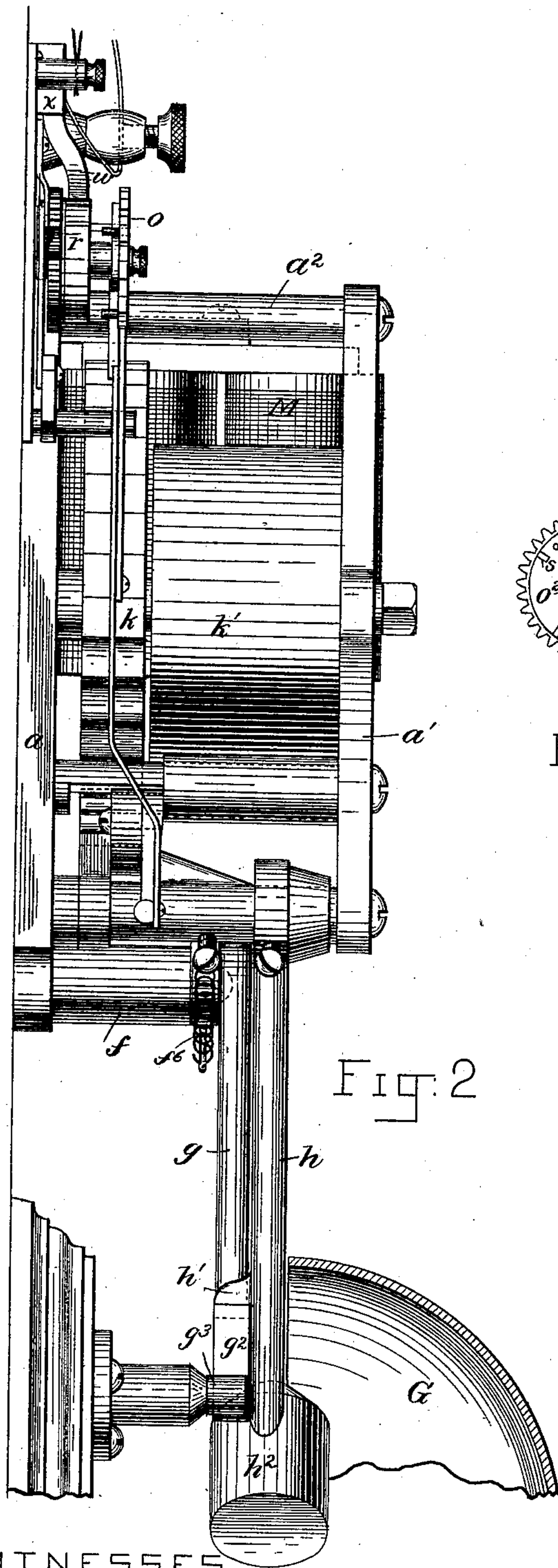


Fig. 2

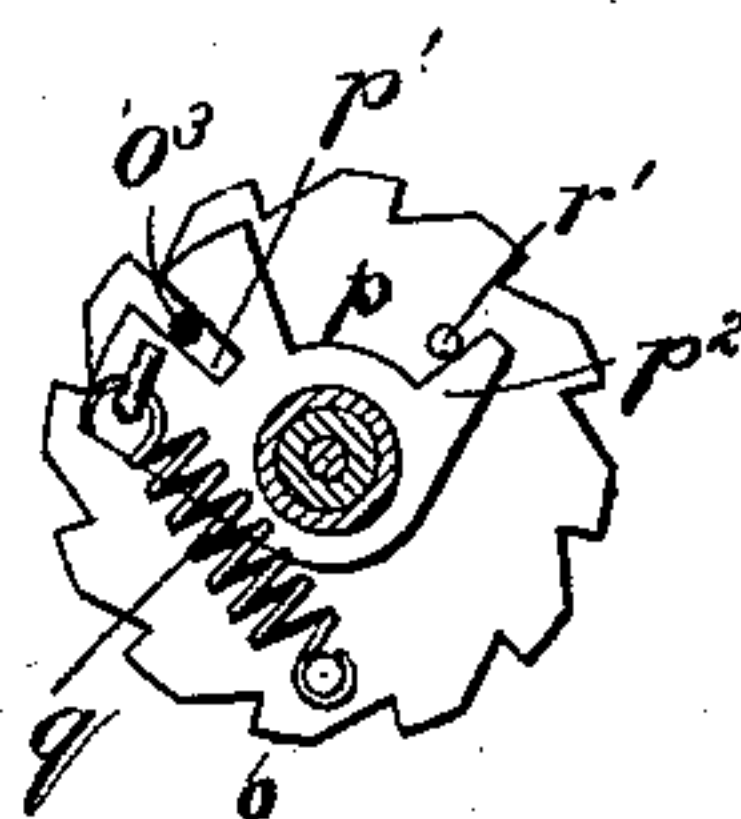


Fig. 4

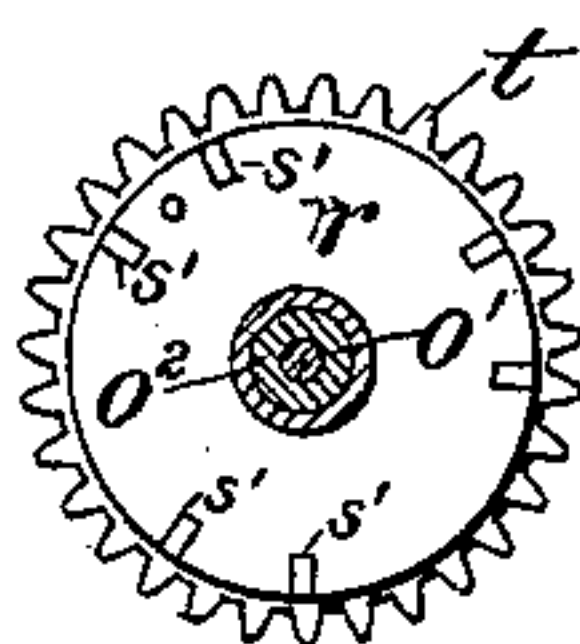


Fig. 5

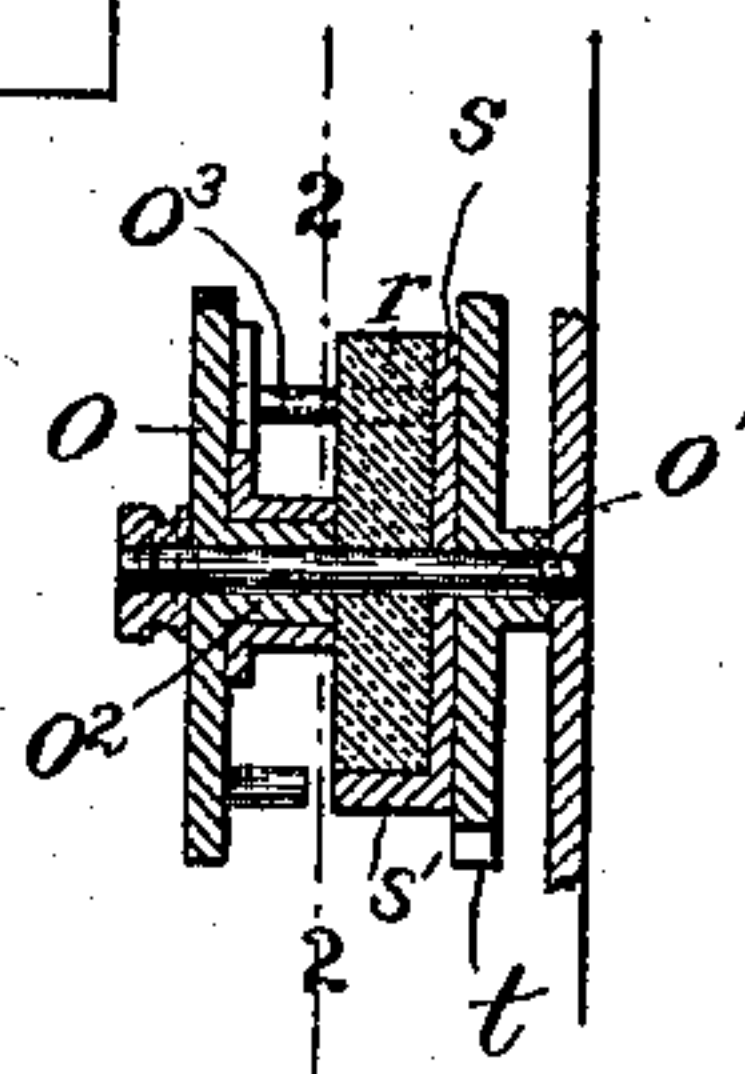


Fig. 3

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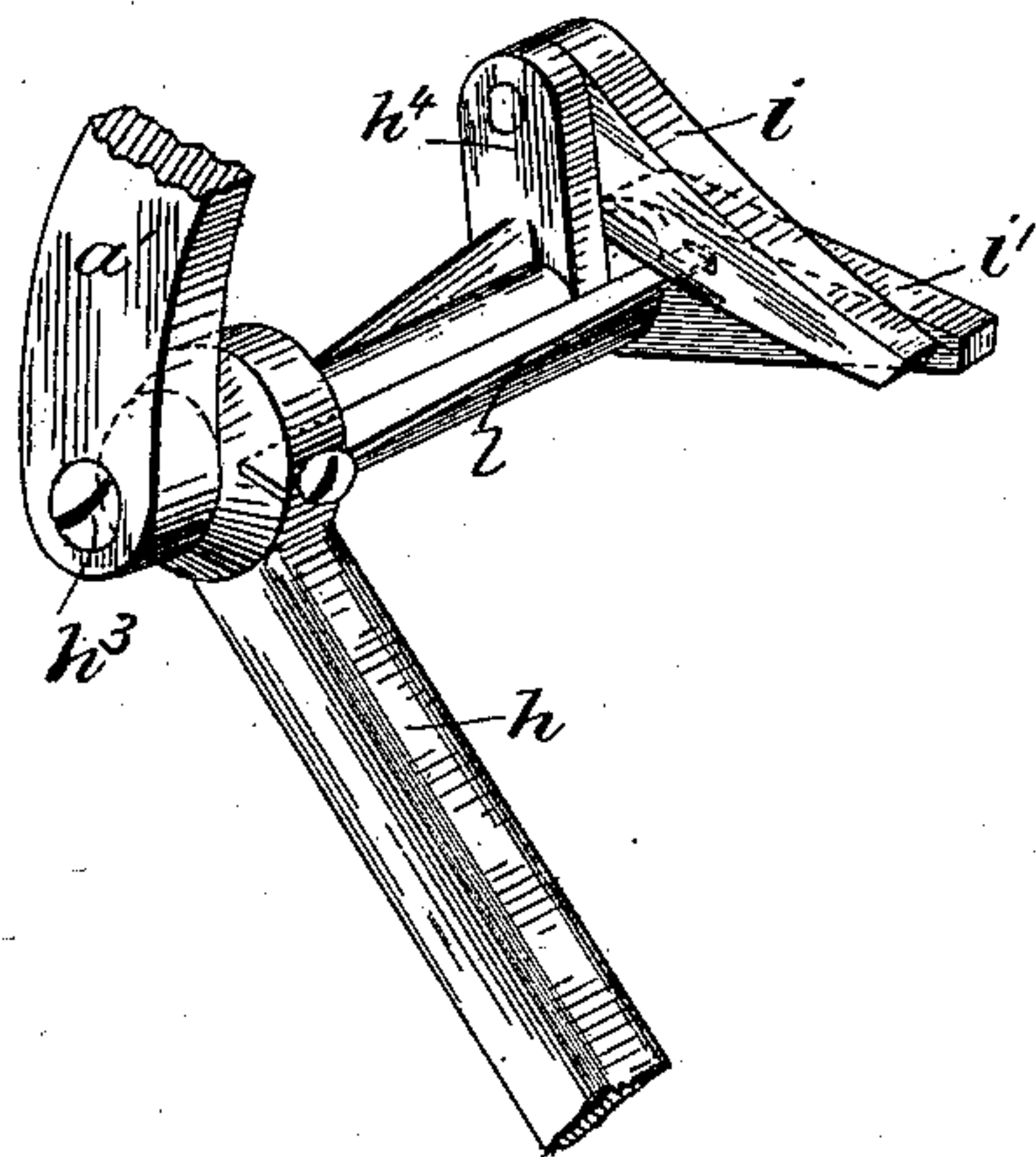


Fig. 6

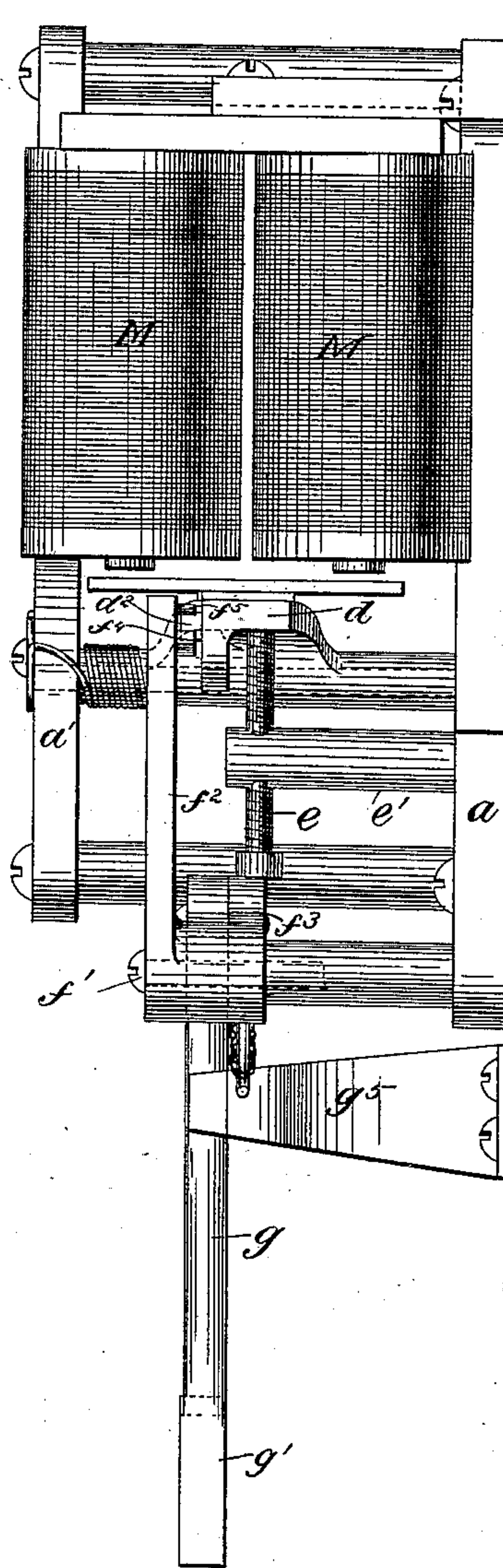


Fig. 7

WITNESSES

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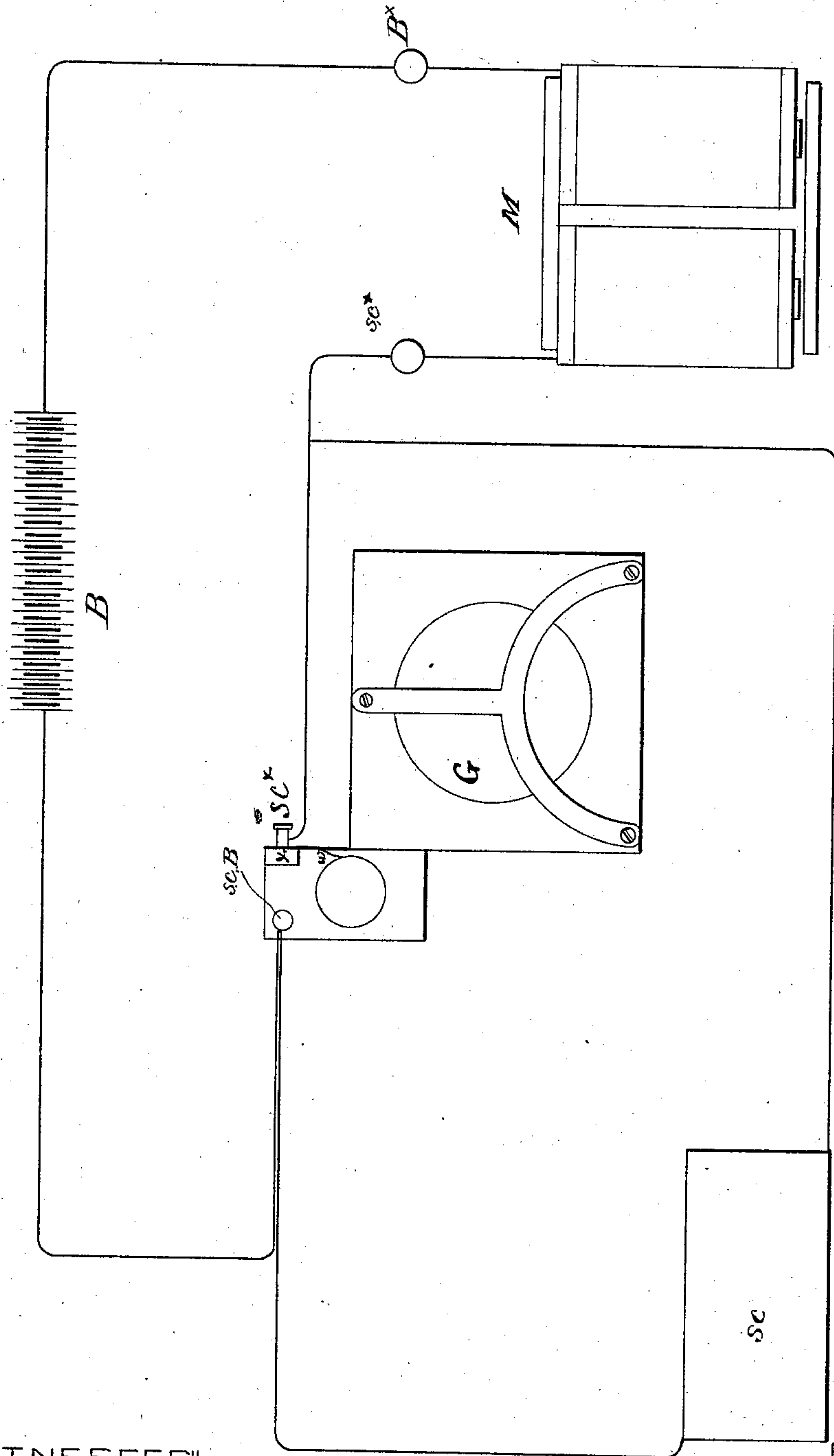


Fig. 8

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UNITED STATES PATENT OFFICE.

JACOB P. TIRRELL, OF BOSTON, ASSIGNOR TO JAMES F. EMERSON, OF WAKEFIELD, GEORGE O. CARPENTER, OF BOSTON, AND JOHN W. CARTER, OF NEWTON, MASSACHUSETTS.

ELECTRIC SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 370,831, dated October 4, 1887.

Application filed December 27, 1886. Serial No. 222,582. (No model.)

To all whom it may concern:

Be it known that I, JACOB P. TIRRELL, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Electric Signaling Apparatus, of which the following is a specification.

My invention relates to electric signaling apparatus, and particularly to contrivances in that class of devices for effecting the striking of a gong to signal the starting of a train from a railway-station.

My invention has for its object to provide a simple and effective device connected with a clock or similar time mechanism, whereby a circuit may be automatically closed at a particular moment to give, say, "three bells" as a warning-signal that the train is soon to start, and by a like operation effecting the closing of a circuit to give "one bell" as a signal of the starting of the train.

To these ends my invention consists in the contrivance which I will now proceed to describe and claim.

Of the drawings hereunto annexed and forming a part of this specification, Figure 1 represents a front elevation of an electric gong-striking apparatus embodying my invention. Fig. 2 is an end view thereof, looking in the direction of the arrow. Fig. 3 represents a section on the line 3 3, Fig. 1. Fig. 4 represents a section on the line 2 2, Fig. 3, looking in a direction opposite to the flight of the arrow z . Fig. 5 represents a section on the same line, looking in the direction of the flight of the arrow. Figs. 6 and 7 are detail views herein-after referred to. Fig. 8 is a diagram representing the arrangement of the battery, magnet, and time and gong striking mechanism.

Similar letters of reference indicate similar parts.

a a' a^2 represent the frame of the gong-striking device, which may be of the form shown or of any other suitable for supporting the various parts.

M represents an electro-magnet of ordinary character and construction capable of being energized from the battery B .

d indicates an armature pivoted at its inner end on a shaft, d' , extending between the parts

a a' of the frame, and resting at its outer end on an adjusting-screw, e , passing through a stud, e' , secured to the frame. A spring, d^2 , coiled around shaft d' and having one end secured to the armature and the other to the frame, operates as a tension to hold the armature down on the upper end of screw e . A sleeve, f , adapted to turn on a stud, f' , is provided with two arms, f^2 f^3 , constituting an elbow-lever, the first of which arms, when the device is in its normal position, stands nearly vertical, and the other extends inward and upward from stud f' . Arm f^2 is provided on the inner side of its upper end with a triangular lug, f^4 , and a round stud, f^5 , the adjacent face of the end of armature d' being provided with a triangular stud, d^3 .

A latch-lever, g , is pivoted at its upper end to the end of arm f^3 , and is provided at its lower end with an offset or hook, g' , adapted to catch over a lug or projection, h' , of hammer-lever h . Latch-lever g is beveled from the offset-point g' to its lower end, as represented at g^2 , and this beveled face rests against an anti-friction roller or sleeve, g^3 , adapted to turn on a stud, g^4 , secured to the wall or frame. A stout spring, g^5 , secured to the wall or frame is adapted to barely touch latch-lever g , preferably at its most outwardly-bowed point, as shown, so that when the device is operated and latch-lever g is lowered spring g^5 will not affect this movement, and yet it will effectually operate to hold the inclined face g^2 of the latch-lever against anti-friction roller g^3 , so that the hook or offset g' will catch over the stud h' of hammer-lever h .

A spring, f^6 , attached at one end to the frame and at the other end to a stud, f^7 , projecting downward from stud f' , performs a function to be presently explained.

Hammer-lever h , provided with hammer-head h^2 , is rigidly secured at its rear or upper end on a pivot pin or axle, h^3 , the latter being provided with a heel, h^4 , extending upward from said pivot pin or axle, to the upper end of which there is pivoted a detent or pawl, i , having its forward free end resting on a spring-plate, j , secured to the frame, as shown in Fig. 1. Pivoted loosely on the pin or axle h^3 at a point inward beyond the point at which ham-

mer-lever *h* is pivoted thereto is a pawl or dog, *i'*, adapted at its free end to engage the teeth of a ratchet-wheel, *k*, impelled by a spring, *k'*, in the direction of the arrow marked thereon in Fig. 1. Said dog *i'* is caused to engage with the teeth of the ratchet-wheel *k* by a spring, *l*, secured at one end to the hub of hammer-lever *h*, and having the other end extending into a hole formed in the dog or pawl, so that when said hammer-lever is in its normal position, which is the position in which it is represented in Fig. 1, the tendency of said spring *l* will be to press the free end of dog or pawl *i'* into engagement with the teeth of ratchet-wheel *k*; but when said hammer-lever is released by locking-lever *g* and drops downward spring *l* will be so operated as to have a tendency to move pawl or dog *i'* out of engagement with the teeth of the ratchet-wheel.

m indicates a lever pivoted at its lower end to a stud, *m'*, projecting outward from the hub of hammer-lever *h*, and guided at its upper end by a notched stud, *m''*, secured to the frame or bed-plate *a'*. A pawl, *n*, is pivoted at *n'* to lever *m* and engages with the teeth of ratchet-wheel *o*, turning on a stud, *o'*, secured to bed-plate *a'*, said pawl *n* being held in engagement with said ratchet-wheel *o* by a spring, *n''*, secured at one end to lever *m* and having its free end resting on said pawl, as shown.

Ratchet-wheel *o* is provided with an elongated hub, *o''*, extending inward from its inner face, and a segment, *p*, is constructed so as to turn on said hub. Segment *p* is provided with a slot, *p'*, into which a pin or stud, *o'''*, projecting outward from the inner face of wheel *r*, extends. *q* represents a spiral spring connected at one end with segment *p* and at the other with ratchet-wheel *o*. Segment *p* is also provided with a finger, *p''*, between which and the side of the segment a stop-pin, *r'*, projecting inward from ratchet-wheel *o*, extends. Wheel *r*, which is adapted to turn loosely on stud or shaft *o'* and has a broad plain periphery, is composed of insulating material, and has a disk, *s*, of brass or other suitable conducting material, secured to its inner side. Extending across and set into the periphery of wheel *r* are electrodes or contacting strips or pieces *s'*, of brass or like metal, arranged at suitable intervals and contacting or connecting with disk *s*, as shown in Figs. 3 and 5. Connected to the inner side of disk *s* is a toothed wheel, *t*, engaging with a pinion, *t'*, secured to a shaft, *t''*, extending between and journaled in a bracket, *t'''*, and bed-plate *a'*. A star-wheel, *u*, is also secured to shaft *t''* and engages with a V-shaped lug, *v'*, on pendulum *v*.

In Fig. 8 I have shown a diagram representing the arrangement of the several parts or groups of devices comprising my invention. In said diagram, S C represents a signal-clock, which may be the same as that shown and described in the patent granted to me December 1, 1885, No. 331,463, which clock or time mechanism is adapted to close and break an electric circuit properly connected therewith. B

represents the battery, M electro-magnets, and G the gong-striking apparatus.

S C B indicate a binding-post with which wires connected with both the signal-clock and battery connect with said binding-post and bed-plate *a'*.

S C^x indicate a binding-post from which wires extend to the signal-clock and magnet M and another connects said post with a spring, *w*, (see Fig. 1,) secured at one end on a block, *x*, electrically connected to bed-plate *a'* and having its other end resting upon the periphery of disk *r*.

B^x indicates a binding-post having wires connected therewith running to the battery B and magnet M. The binding-posts are also indicated in Fig. 1.

The operation of my invention may now be described as follows: By energizing magnet M by closing the electrical circuit connected therewith armature *d* will be attracted thereto, causing lug *d''* to slip from engagement with lug *f''* on the upper end of arm *f'*, which latter device, by the gravity of hammer-lever *h* and its attached hammer *h''*, operating on latch-lever *g*, will be moved in a direction opposite to the flight of the arrow *b*, carrying lug *f''* against lug *d''* on the armature. The circuit being now broken, armature *d* will fall back to its normal position, freeing lug *f''* from lug *d''*, when arm *f'* will be permitted to swing still farther in a direction opposite to the flight of the arrow *b* and permit hammer-lever *h* to drop, which will bring pawl *i* into engagement with the teeth of ratchet-wheel *k* and turn the same slightly against the tension of the spring which impels the same, which will effect the release of pawl *i'*, and the spring *l*, operating thereon, will throw it out of engagement with the teeth of ratchet-wheel *k*. Immediately after the release of hammer-lever *h* from locking-lever *g* spring *f''*, the influence of which was overcome by the gravity of the hammer-lever, operates to draw arm *f'* back in the direction of arrow *b*, and the inclined face of lug *f''*, meeting the similarly-formed face of lug *d''* on armature *d*, passes by and falls behind it, as represented in Fig. 1, locking said parts in the position in which they were before the circuit was closed. Meanwhile spring-actuated ratchet-wheel *k* will have suddenly moved in the direction of the flight of the arrow marked thereon, and so actuated hammer-lever *h*, through the medium of pawl *i*, pivoted on heel or stud *h'*, and pivot pin or axle *h''*, as to cause said lever to be brought suddenly back to its former position and the hammer caused to strike a blow on gong G. In this operation lug *h'* on the hammer-lever will engage the inclined face *g''* of the latch-lever, held against anti-friction roller *g'''*, and ride up said face, pushing the latch-lever back against its spring *g'''*, and catch over offset *g''*, where it will be held, as before, and as represented in Fig. 1. As hammer-lever *h* was brought back to position, spring *l* was so operated as to cause pawl or dog *i'* to again engage the teeth of ratchet-wheel *k*, as before.

In the operation of the parts as mentioned lever *m* will have been drawn down, causing its attached pawl *n* to move ratchet-wheel *o* the distance of one tooth, or, as here represented, one-twelfth of a revolution. This operation will put spring *q* under tension in such manner as to cause it to turn segment *p*, and with it wheel *r*, in the same direction with the ratchet-wheel *o*; but by reason of the engagement and operation of star-wheel *u* with lug *v* of pendulum *v*, and the connection of said star-wheel with wheel *r* by the train of mechanism hereinbefore described, said wheel *r* and segment *p* will be turned at a comparatively slow rate of speed, and will stop when stop-pin *r'* of ratchet-wheel *o* comes in contact with finger *p*² of the segment.

The electrodes or contact-strips *s' s'* of wheel *r*, as here shown, are arranged in pairs corresponding to the position of the teeth on ratchet-wheel *o*—that is, there is a space between each two corresponding to a tooth on said ratchet-wheel, with a longer interval between the pairs—this arrangement being for the purpose, as has been explained, to strike first three blows on the gong *G* and subsequently one blow, and this is effected as follows: It being supposed that the lower end of spring *w* is resting upon the periphery of wheel *r* just beyond a pair of electrodes or contact-strips *s' s'*, and that the circuit is closed and in a moment broken in the time mechanism *S C*, the magnets *M* will be energized, with the effect of giving one bell, as hereinbefore explained, and at the same time ratchet-wheel *o* will have been actuated so as to put spring *q* under such tension as to cause it to turn slowly wheel *r*, bring one of the pair of electrodes or contact-plates under, and carry it past the end of spring *w*, which will result in closing the circuit through said contact-plates, disk *s*, and the bed and frame of the device, resulting in the striking of another blow, when wheel *r* will be operated as before, again closing the circuit through the other contact piece or plate *s'* and connected parts, striking another blow; but in this last operation, as spring *w* will be kept insulated from disk *s*, no further operation of the gong-striking mechanism will take place until the circuit is again closed in the time mechanism *S C*, which takes place at the proper moment to give one bell as the signal for the starting of the train. This operation will leave the free end of spring *w* in position on the periphery of wheel *r* with respect to a pair of electrodes or contact-strips *s' s'* as before the operation of striking three blows, as hereinbefore explained, was commenced.

By the construction and arrangement of the parts as described it will be seen that a single closing of the circuit in the time mechanism effects the striking of three blows, and that a like closing of the circuit is required to effect the striking of one blow.

While I have been particular in my description of the construction and relationship of the various parts, it is obvious that their form

and arrangement may be varied without departing from the nature or spirit of the invention.

What I claim is—

1. An electric signaling apparatus consisting of a striking mechanism, and circuit-closing devices whereby said striking mechanism is set in operation to sound one bell, and mechanical devices operated by said striking mechanism to effect the closing of the circuit again and the setting in operation of the striking mechanism in the same manner that it was first set in operation to sound another or other bells, as set forth.

2. An electric signaling apparatus consisting of a striking mechanism, an electro-magnet, its armature, and circuit-closing devices whereby the armature may be attracted to the poles of the magnet and the striking mechanism set in motion to sound one bell, and mechanical devices operated by said striking mechanism to effect the closing of the circuit again and operate said armature in the same manner as before to set in motion the striking mechanism to strike another or other bells directly after the first bell is struck, as aforesaid, substantially as described.

3. The combination, with circuit-closing devices and a striking mechanism, of a time mechanism for closing the circuit to set in operation the striking mechanism, and devices, substantially as described, adapted to be operated by the striking mechanism to close the circuit one or more times to again permit the striking mechanism to be actuated, substantially as and for the purposes hereinbefore set forth.

4. The combination, with circuit-closing devices and a striking mechanism, of devices actuated by the striking mechanism and consisting of ratchet-wheel *o*, provided with pin *r'*, segment *p*, provided with the slot *p'* and finger *p*², disk *r*, provided with pin *o*³ and electrodes *s'*, disk *s*, spring *q*, tooth-wheel *t*, the pendulum mechanism, spring *w*, and bed-plate *a*⁴, all as and for the purposes hereinbefore set forth.

5. The combination, with the armature *d*, of elbow-lever *f*² *f*³, stud *f'*, latch-lever *g*, provided with the inclined or beveled face *g*², stud *g*⁴, roller or sleeve *g*³ thereon, and spring *g*⁵, substantially as hereinbefore set forth.

6. The combination, with latch-lever *g*, of stud *g*⁴, roller or sleeve *g*³ thereon, spring *f*⁶, and spring *g*⁵, substantially as hereinbefore set forth.

7. The combination, with hammer-lever *h*, of ratchet-wheel *k*, spring *k'*, pawl *i*, plate or rest *j* therefor, pawl *i'*, and spring *l*, all substantially as and for the purposes hereinbefore set forth.

8. The combination, with ratchet-wheel *k*, of spring *k'*, hammer-lever *h*, its pivot-pin or axle *h*³, heel or stud *h*⁴ on said pin or axle, pawl *i*, pivoted to said heel or stud, pawl *i'*, and spring *l*, substantially as and for the purposes hereinbefore set forth.

9. The combination, with the hammer-lever

h, provided with the laterally-projecting lug
h', of stud g^4 , provided with the sleeve or anti-
friction roller g^3 , latch-lever g , provided with
the offset g' , inclined or beveled face g^2 , and
5 spring g^5 , substantially as and for the purposes
hereinbefore set forth.

10. The combination, with lever m and slot-
ted stud m^2 , of pawl n , pivoted at n' to lever
 m , spring n^2 , and ratchet-wheel o , substantially
10 as hereinbefore set forth.

In testimony whereof I have signed my name
to this specification, in the presence of two sub-
scribing witnesses, this 20th day of October,
A. D. 1886.

JACOB P. TIRRELL.

Witnesses:

THOMAS HAVENS,

ARTHUR W. CROSSLEY.