(No Model.)

4 Sheets—Sheet 1.

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ELECTRIC CIRCUIT CLOSER.

No. 454,816. Patented June 23, 1891.

Fig. 3.

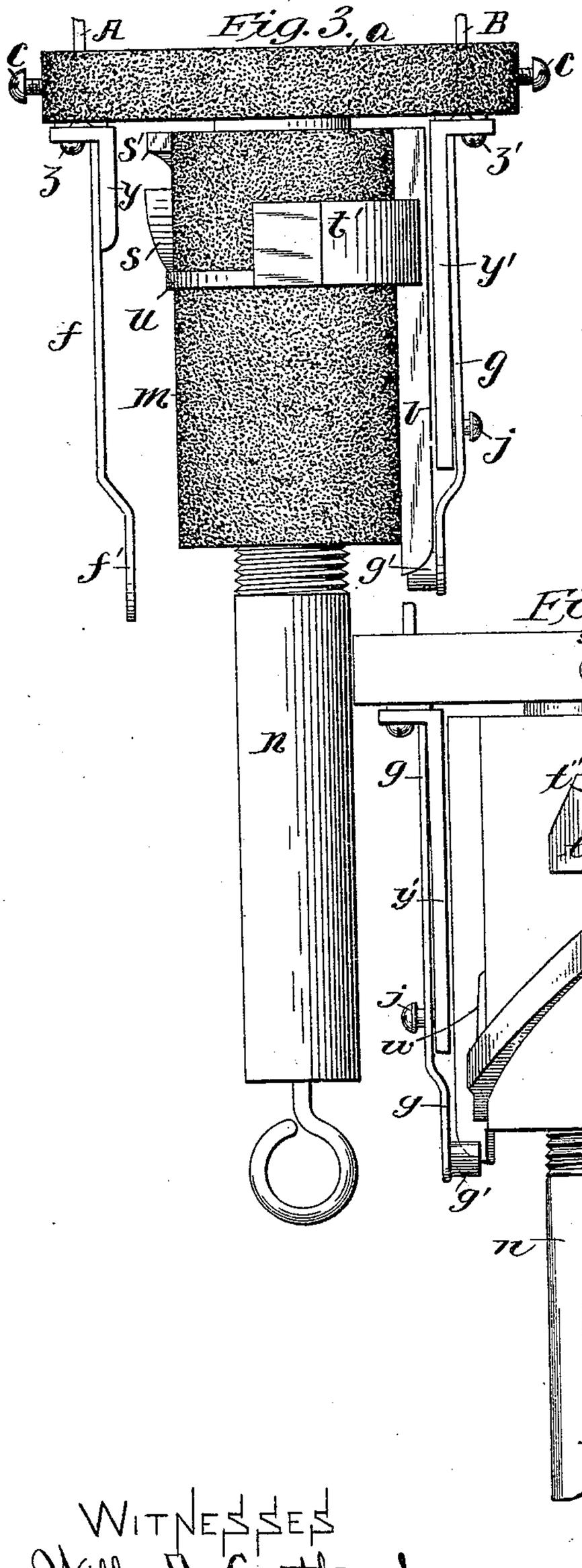


Fig. 2.

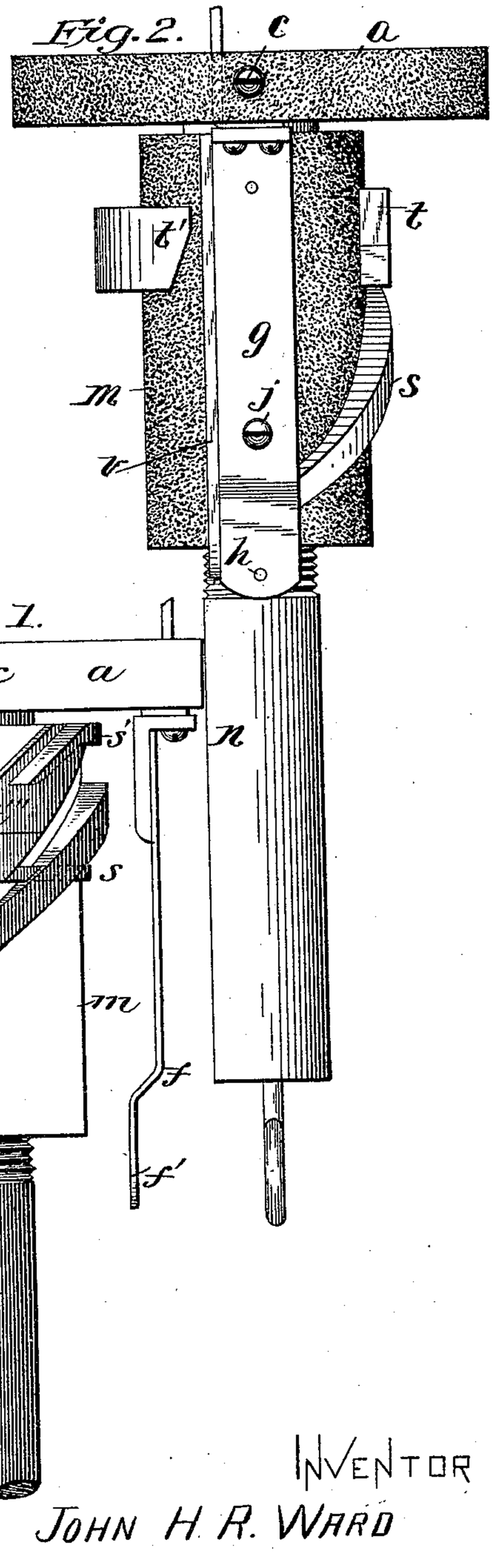
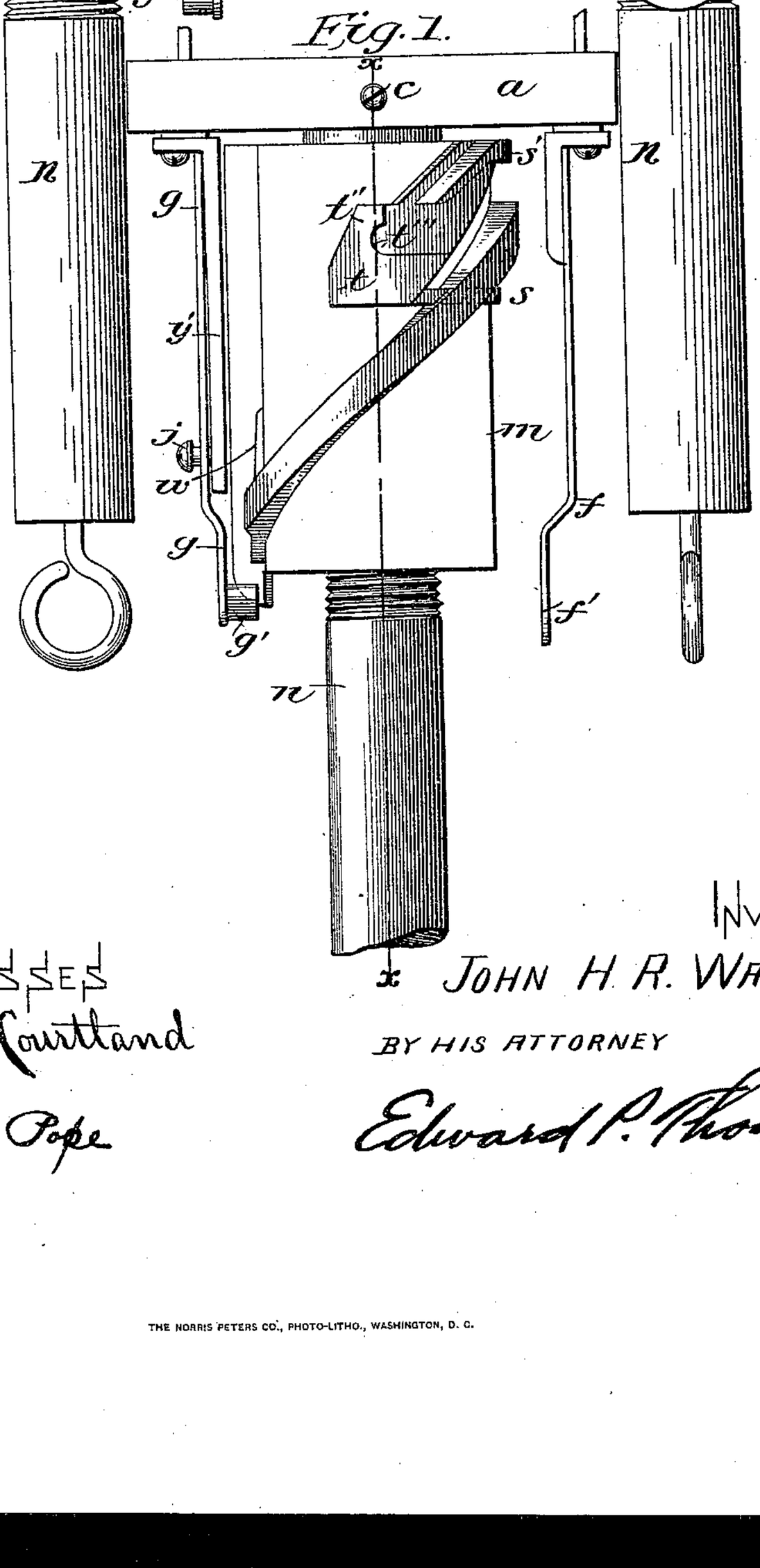


Fig. 1.



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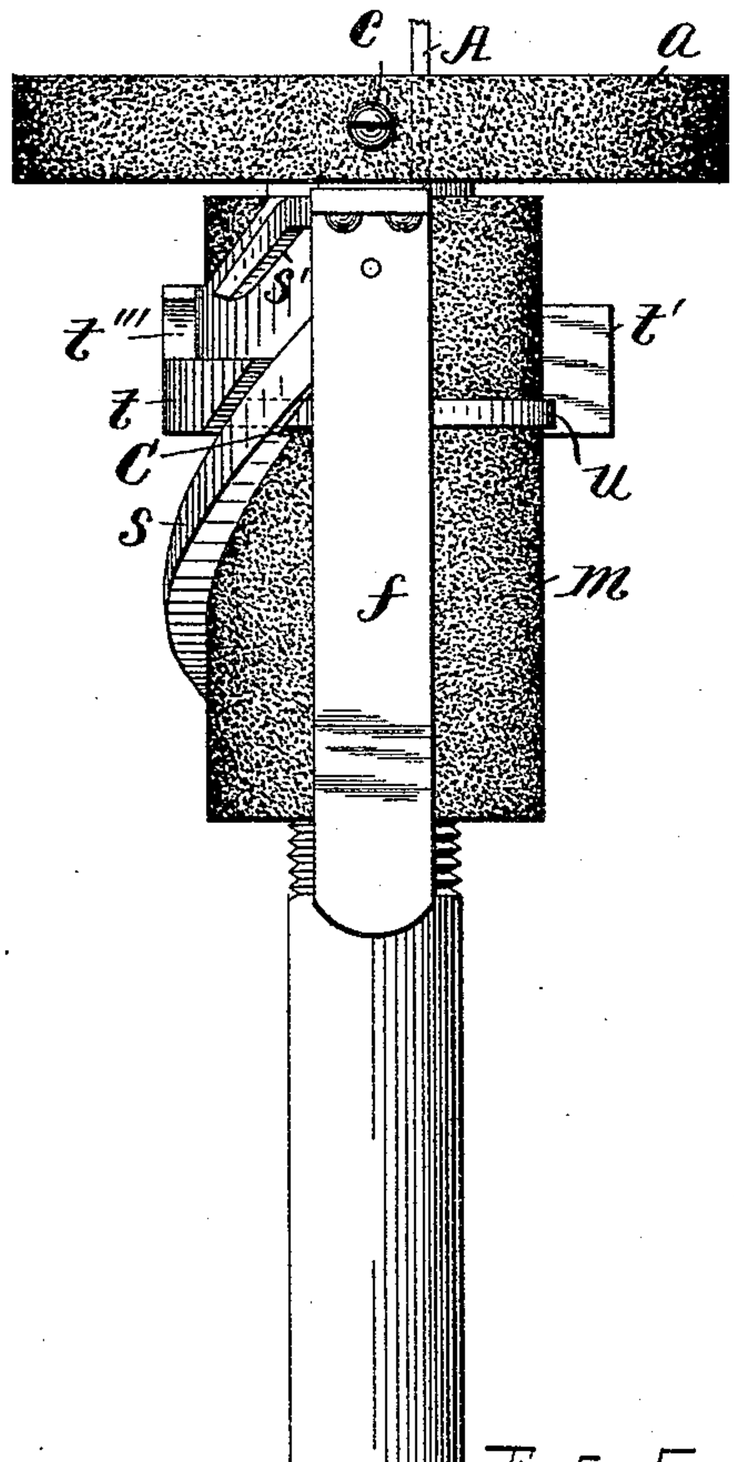

Fig. 5.

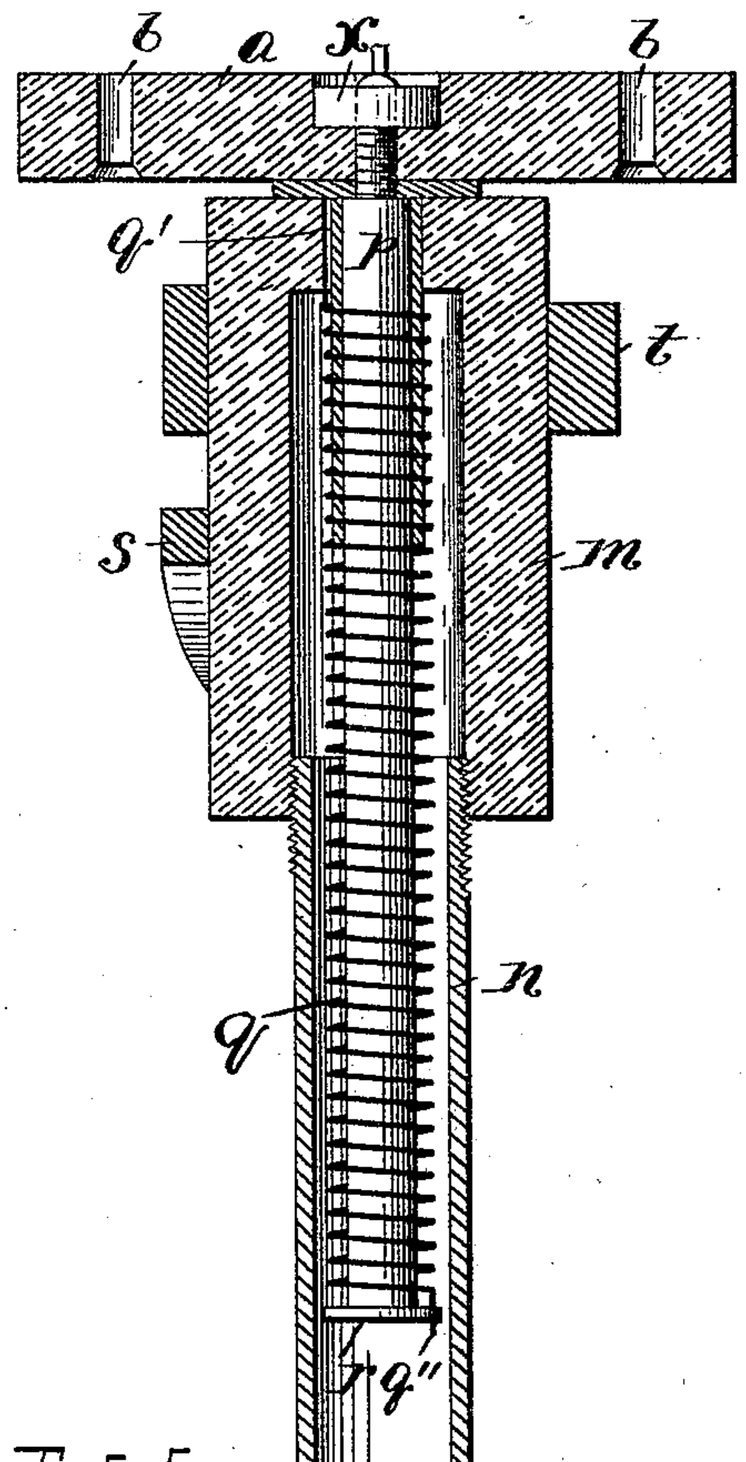

Fig. 6.

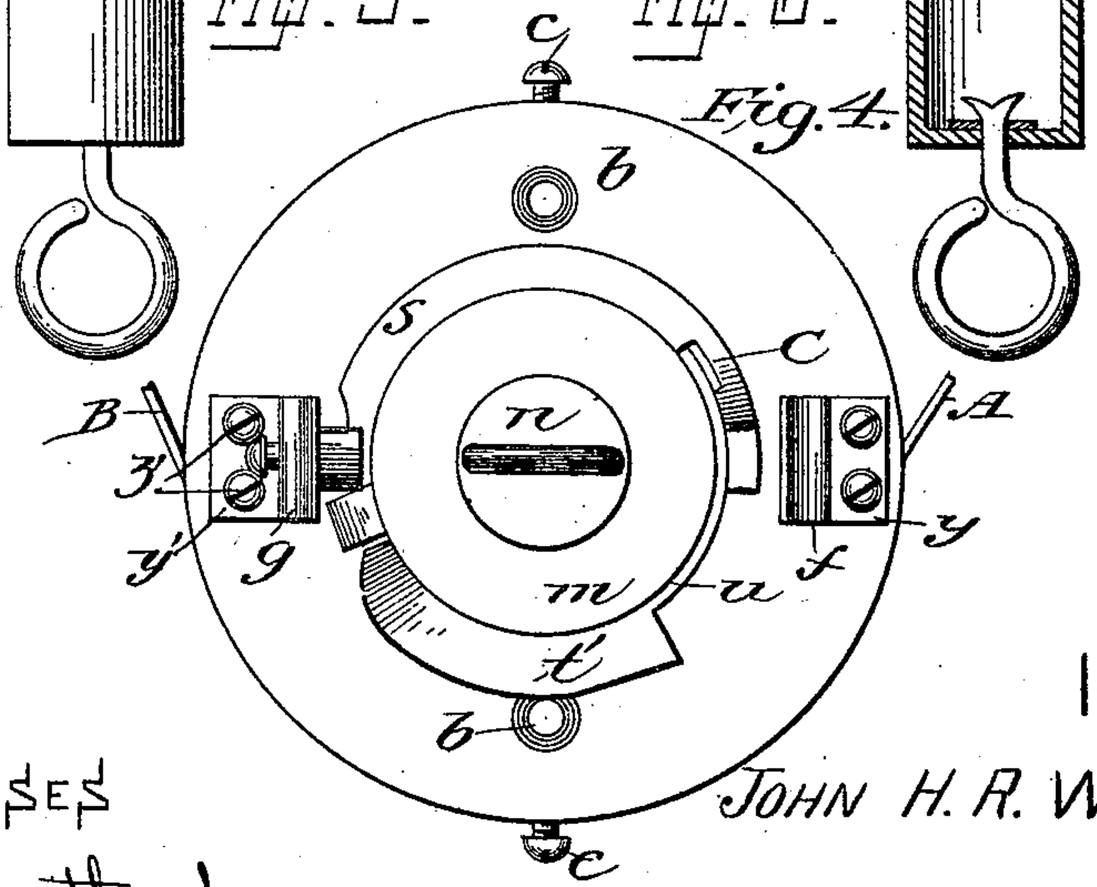

Fig. 4.

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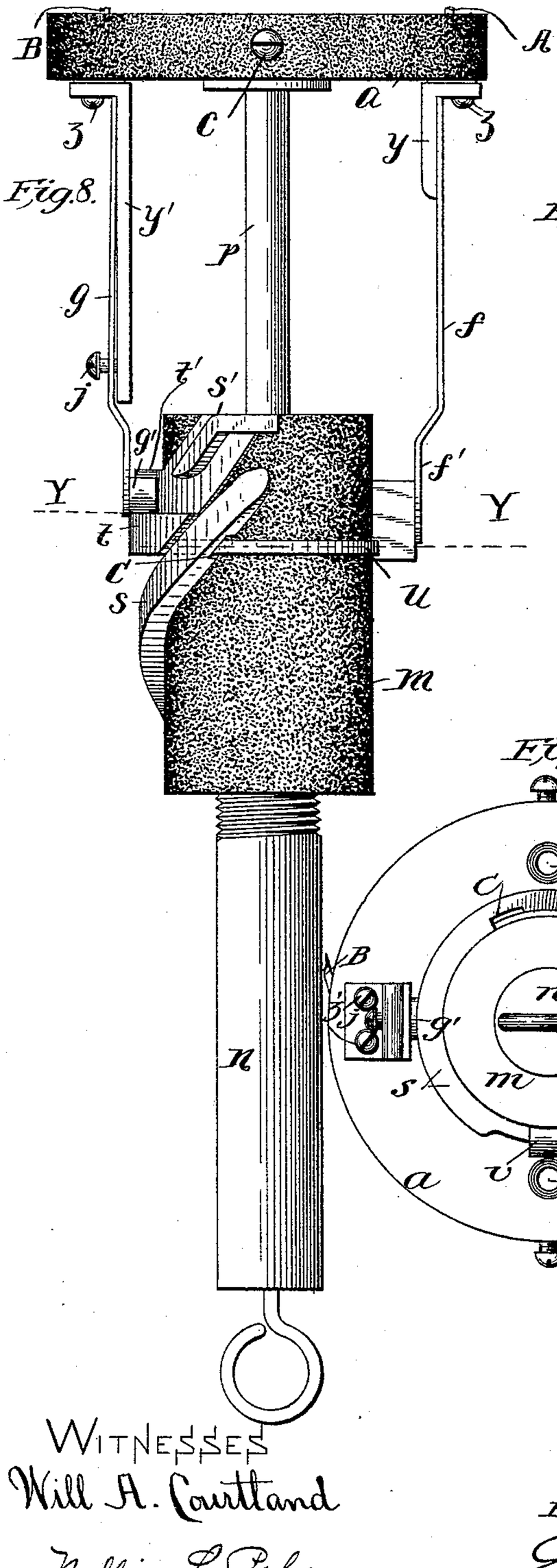

Fig. 8.

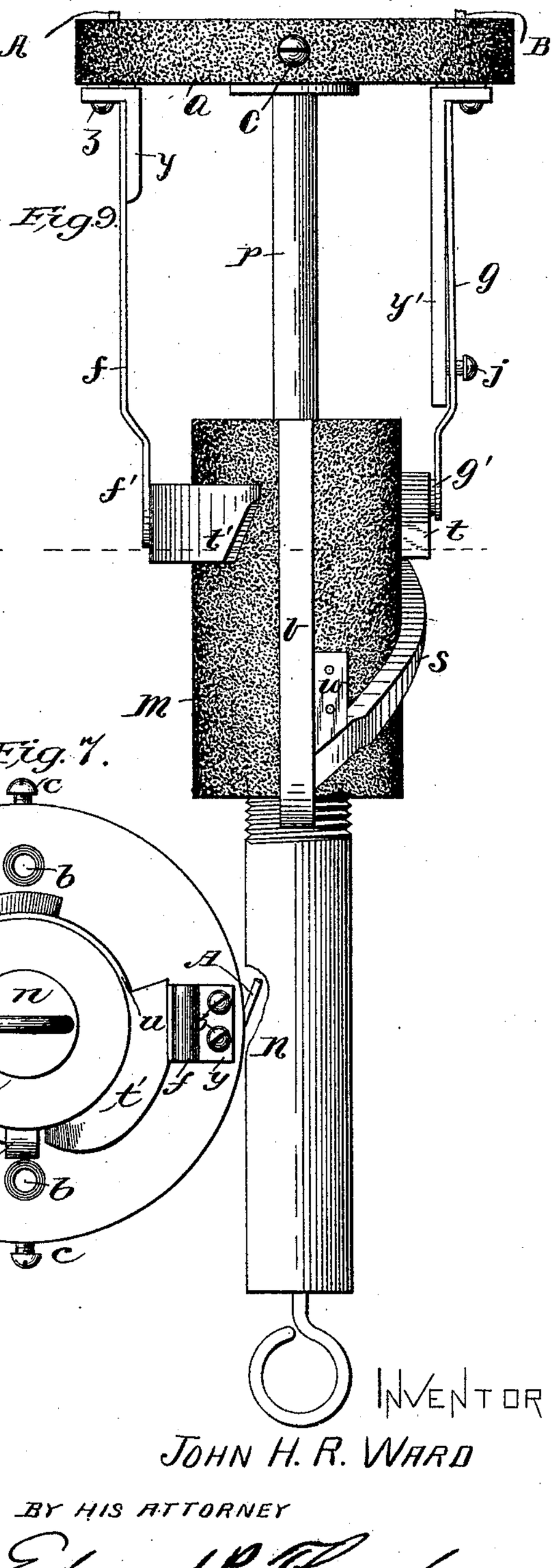

Fig. 9.

Fig. 7.

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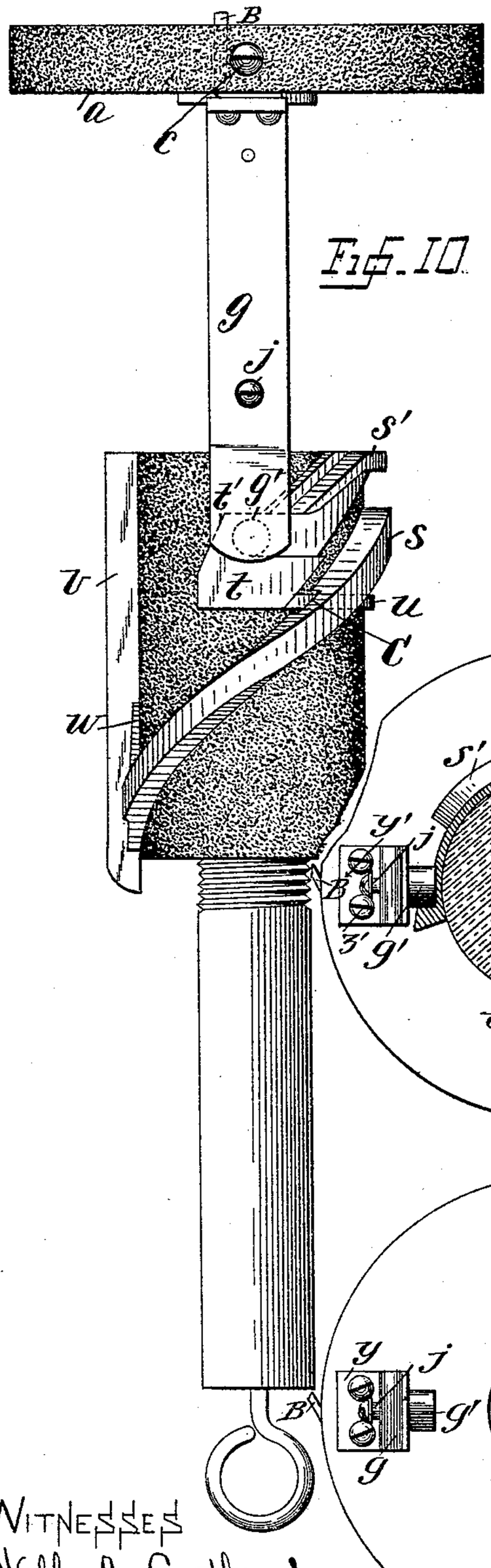

Fig. 10.

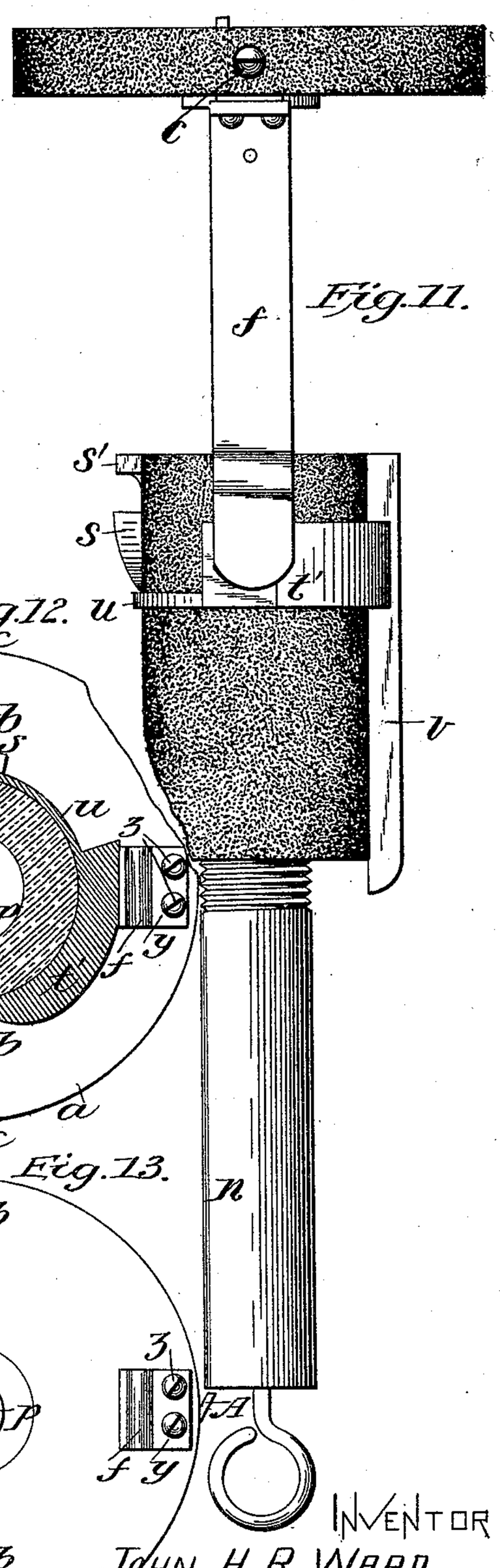

Fig. 11.

Fig. 12.

Fig. 13.

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UNITED STATES PATENT OFFICE.

JOHN H. R. WARD, OF NEW YORK, N. Y.

ELECTRIC-CIRCUIT CLOSER.

SPECIFICATION forming part of Letters Patent No. 454,816, dated June 23, 1891.

Application filed January 8, 1891. Serial No. 377,091. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. R. WARD, a citizen of the United States, and a resident of New York, county and State of New York, have invented certain new and useful Improvements in Electric-Circuit Closers, (Case 6,) of which the following is a specification.

My invention relates to the mechanical construction of an electric-circuit closer of the class provided with a suspending operating chain or cord and with means for attachment to a ceiling.

The details of construction and different phases assumed during the operation are represented in the accompanying drawings.

Figure 1 is a vertical elevation in outline of one side of a portion of the device. Fig. 2 is a view similar to Fig. 1, except that the device has been rotated through an angle of ninety degrees. It is as if Fig. 1 were viewed from the left. Fig. 3 is a view of the opposite side of Fig. 1. Fig. 4 is an inverted plan of Fig. 1. It shows how Fig. 1 would appear in looking toward the ceiling to which the device is attached. Fig. 5 is a rectangular view of Fig. 1. It is as if Fig. 1 were looked at from the right. Fig. 6 is a vertical section of Fig. 1 at the line X, the section shown being that on the left of line X. Fig. 7 is an inverted plan of Fig. 8. Fig. 8 is a vertical elevation of the device in that phase in which the circuit is closed through the device. Fig. 9 is a view of the opposite side of Fig. 8. Fig. 10 is a rectangular view of Fig. 9. It is as if Fig. 9 were looked at from the right. Fig. 11 is a rectangular view of Fig. 9 as the latter appears when viewed from the left. Fig. 12 is a horizontal section of Fig. 8 at the line Y. Fig. 13 is an inverted plan of the insulated piece for attachment to the ceiling, the principal parts of the device being omitted.

The device embodying my invention consists of the combination of an insulating base-plate *a*, in the form of a disk provided with holes *b*, by which the same may be attached to the ceiling of a room by means of screws; electric spring terminals *f* and *g*, provided, respectively, with projections *f'* and *g'*, the two spring-terminals being located approximately diametrically opposite each other, and the projection *g'*, consisting of a roller carried by an arbor *h*, (see Fig. 3;) a standard *i*, carrying a screw *j*, whose head limits the motion of the spring *g;* a hollow insulating cylinder *m*, having a tubular projection *n*, to which the cord *o* is attached; a rod *p*, attached to and projecting from the base-plate *a*, extending through said cylinder *m;* a helical spring *q*, whose upper end *q'* is attached to the cylinder *m*, and whose lower end *q''* is attached to a disk *r* on the end of the rod *p*, the helical spring surrounding said rod; a spiral plate *s*, located upon the cylinder *m* and serving as a bearing for the roller *g'* when the cord pulls the cylinder *m* downward, and angular guide *s'*, located on said cylinder at the upper end thereof in such a position as to leave a passage-way between itself and the guide *s* for the movement of the roller *g'*, and a stop *t* for said roller *g'*, located below the said angular guide *s'*, the said stop *t* forming an electric terminal upon the said cylinder; a second electric terminal *t';* an electric conductor *u* connecting the terminals *t* and *t';* a linear guide-plate *v*, extending along the cylinder *m* throughout the whole length thereof and projecting from the lower end thereof and forming a continuation of the spiral guide *s*, and located between the terminals *t* and *t';* an inclined surface *w*, located between the guide *v* and the lower end of the guide *s*, being in contact with the guide *v*, and forming a guiding-surface for the end of the roller *g'* for the purpose of forcing it over the guide *s* when the cylinder *m* is having an upper movement, and other details hereinafter set forth. The rod *p* passes through the plate *a*, and has a nut *x* screwed upon the end of said rod, thereby holding it to the plate. The spring *f* is attached to a standard *y*, which is secured to the plate *a* by screws *z*. One electric conductor A connects with the standard *y*. The spring *g* is attached to the upper end of the standard *y'*, which is fastened to the plate *a* by the screws *z'*. The conductor B is connected to the standard *y'*. In order to keep the guide *s* out of contact with the conductor *u*, the former is provided with a slot C, which is larger than said conductor, so as not to come into contact with it.

The operation of the device may be described as follows: When the cord *o* is pulled as far as it will go, the cylinder *m* is moved in both a linear and circular direction; the

roller g' moves along relatively to the guide s, and then enters between the upper end of said guide and the angular guide s'; the roller g' then moves relatively to the angular guide s' and passes in between said angular guide and the stop t, then along said stop until it comes to a rest against the projection t'' of the stop, having a recess t'''. The projection f' of the spring f slides upon and finally rests upon the terminal t'. An electric current can now pass from the conductor A to the standard y, to the spring f, to the projection f', through the conductor u to the stop t, to the roller g', to the spring g, to the standard y', and out through the conductor B. Before the cord is released it should be allowed to go up gradually, so that the roller g can enter between the guide s and the guide s' and between the latter and the stop t. The force which is exerted upon the cord and which is resolved into a rotary motion by the guide s and roller g' causes the helical spring q to be wound up and also to be put under compression. To interrupt electrically a circuit between the conductors A and B, the cord is pulled downward until the roller g' escapes from the groove t''' and then let go. The uncoiling of the helical spring causes the cylinder m to rotate rapidly until the roller g' comes in contact with the linear guide v, while the extension of the spring q propels the cylinder m upward, while the roller g' moves relatively along the guide v, over the inclined surface w, and comes to rest against the projecting end of said guide v. Normally the spring is partially wound up under tension, so that the roller g' normally presses against the guide v. The above-named operation may be repeated indefinitely.

I claim as my invention—

An electric-circuit closer consisting of the combination of a cylinder m, movable rectilinearly and angularly, a spring acting in opposition to the rectilinear and angular motions, electric-contact terminals g and f', of which one g has a roller pressing against a rectilinear guide, a spiral guide leading from said rectilinear guide and from one end of said cylinder toward the other end, an angular guide s', leading from the upper end downward toward a stop t and at such a distance from the spiral guide as to leave room for the passage of said roller, the said stop being provided with a groove and being located at such a distance from the angular guide as to leave spaces for the entrance and exit of said projection to and from said groove, the said rectilinear guide extending throughout the length of said cylinder, the said spiral guide having an inclined surface w contiguous to the rectilinear guide, a terminal t', located upon said cylinder and in the path of the projection f', a terminal t, located upon said cylinder, insulated from the track s in the path of said roller g' and connected electrically to said terminal t', the said spring being helical and having one end stationary with respect to the terminals g and f' and the other end stationary with respect to said cylinder and fastened thereto, and a stationary rod p, passing through said cylinder and through said helical spring and fastened to said spring.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 31st day of December, 1890.

JOHN H. R. WARD.

Witnesses:
F. H. THATCHER,
F. A. DOLPH.