

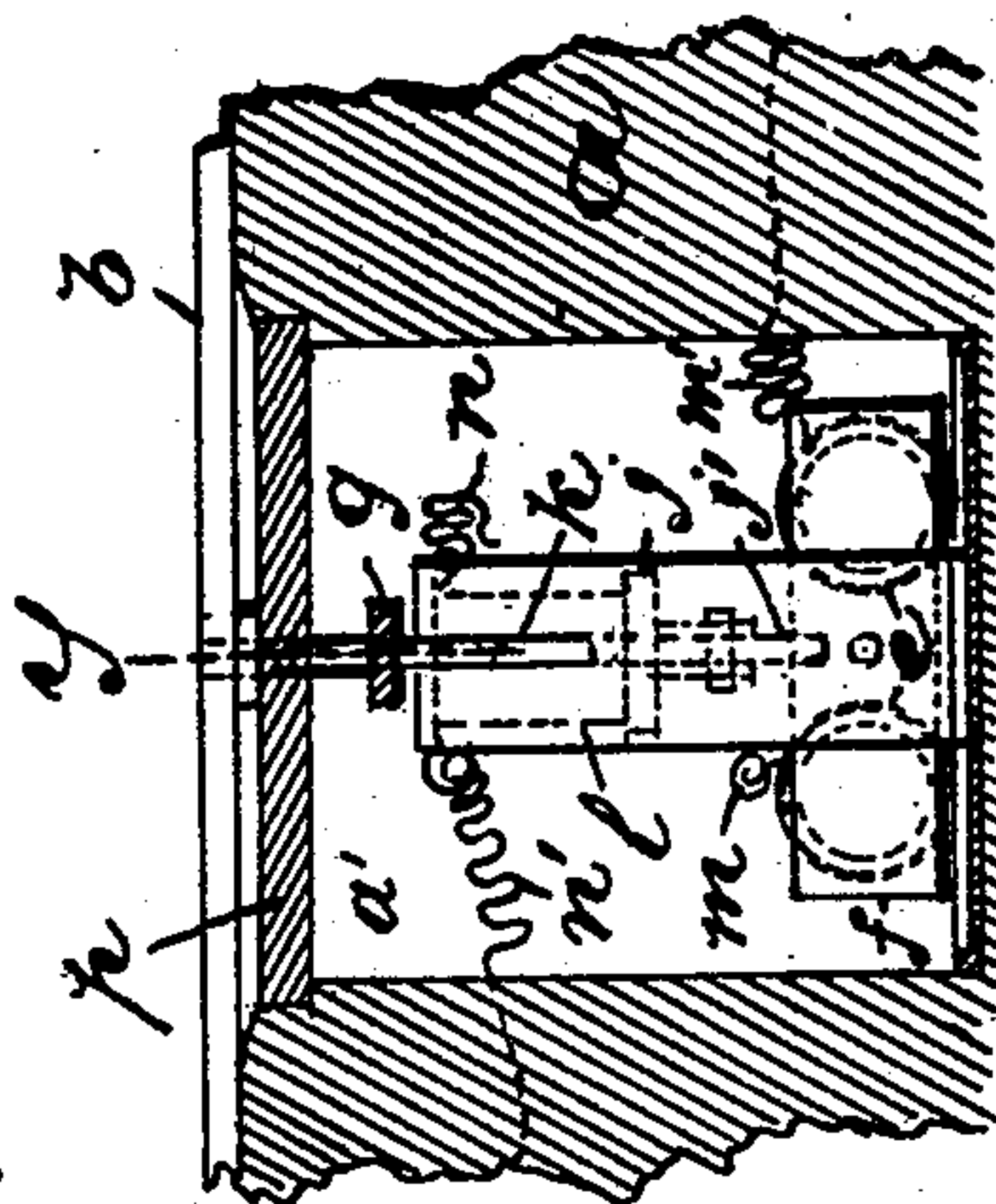
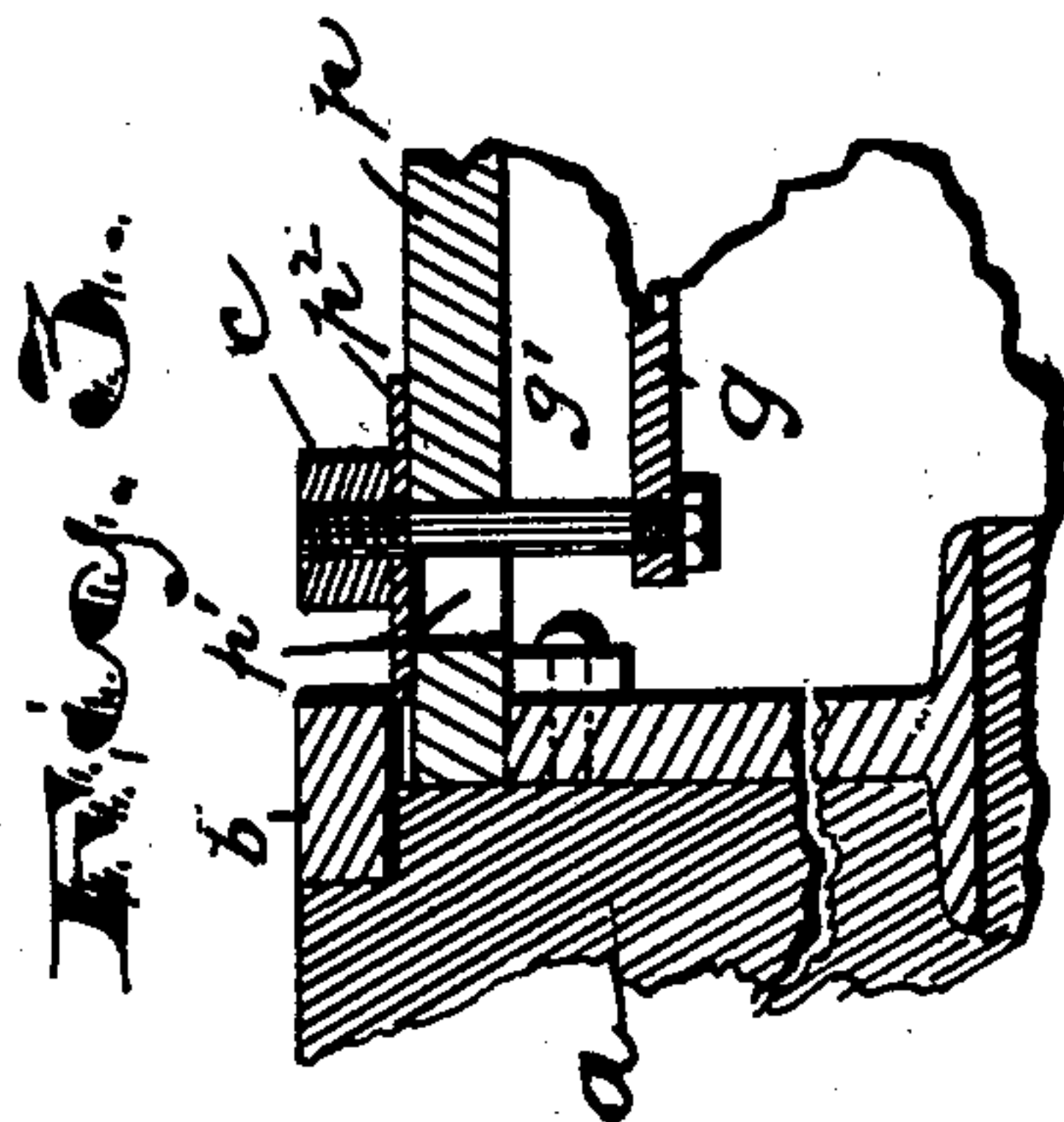
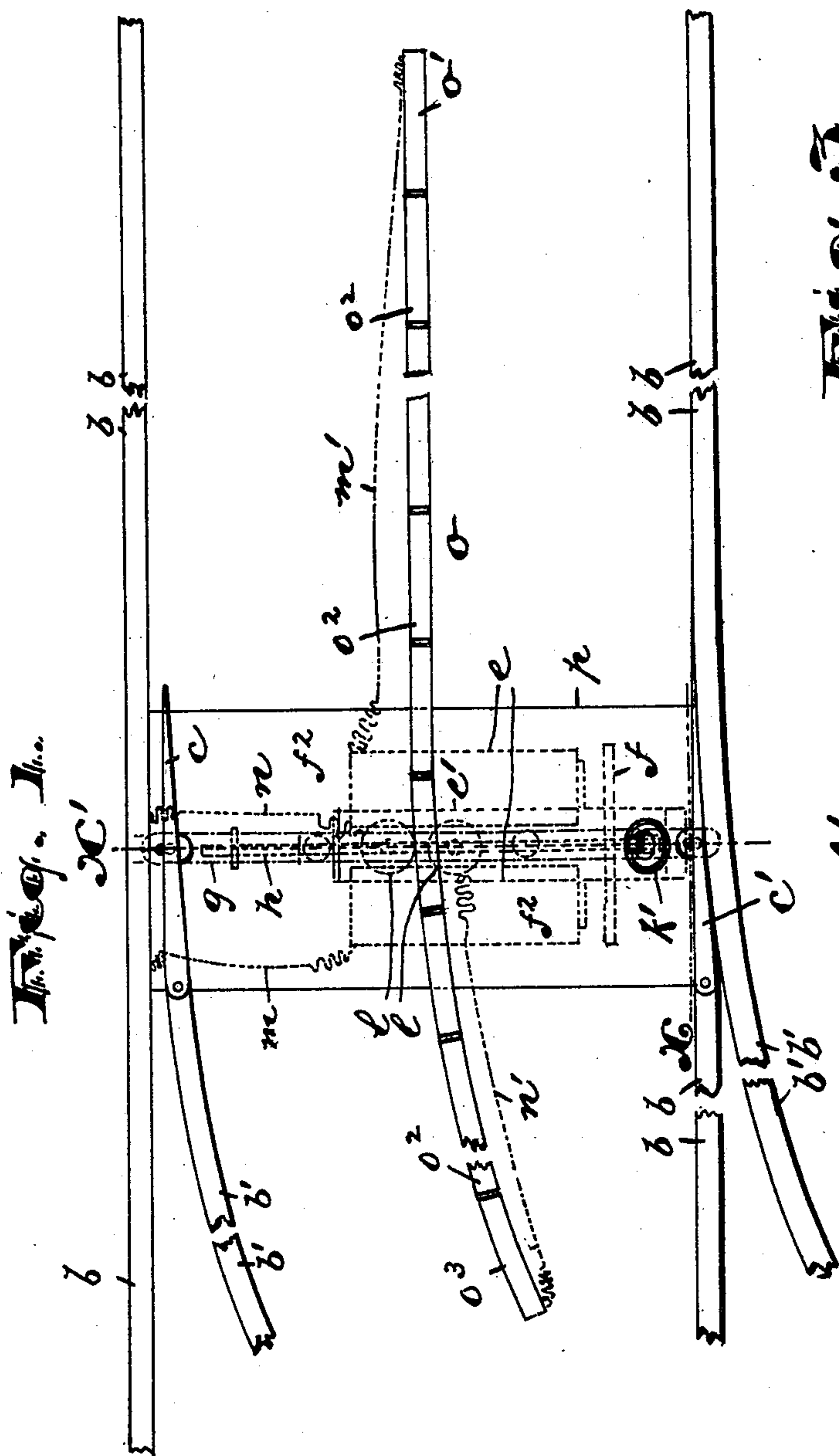
No. 677,778.

Patented July 2, 1901.

A. L. HATFIELD.
ELECTRIC SWITCH RAILWAY.
(Application filed June 20, 1900.)

2 Sheets—Sheet 1..

(No Model.)



WITNESSES:

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2 Sheets—Sheet 2.

Fig. 4.

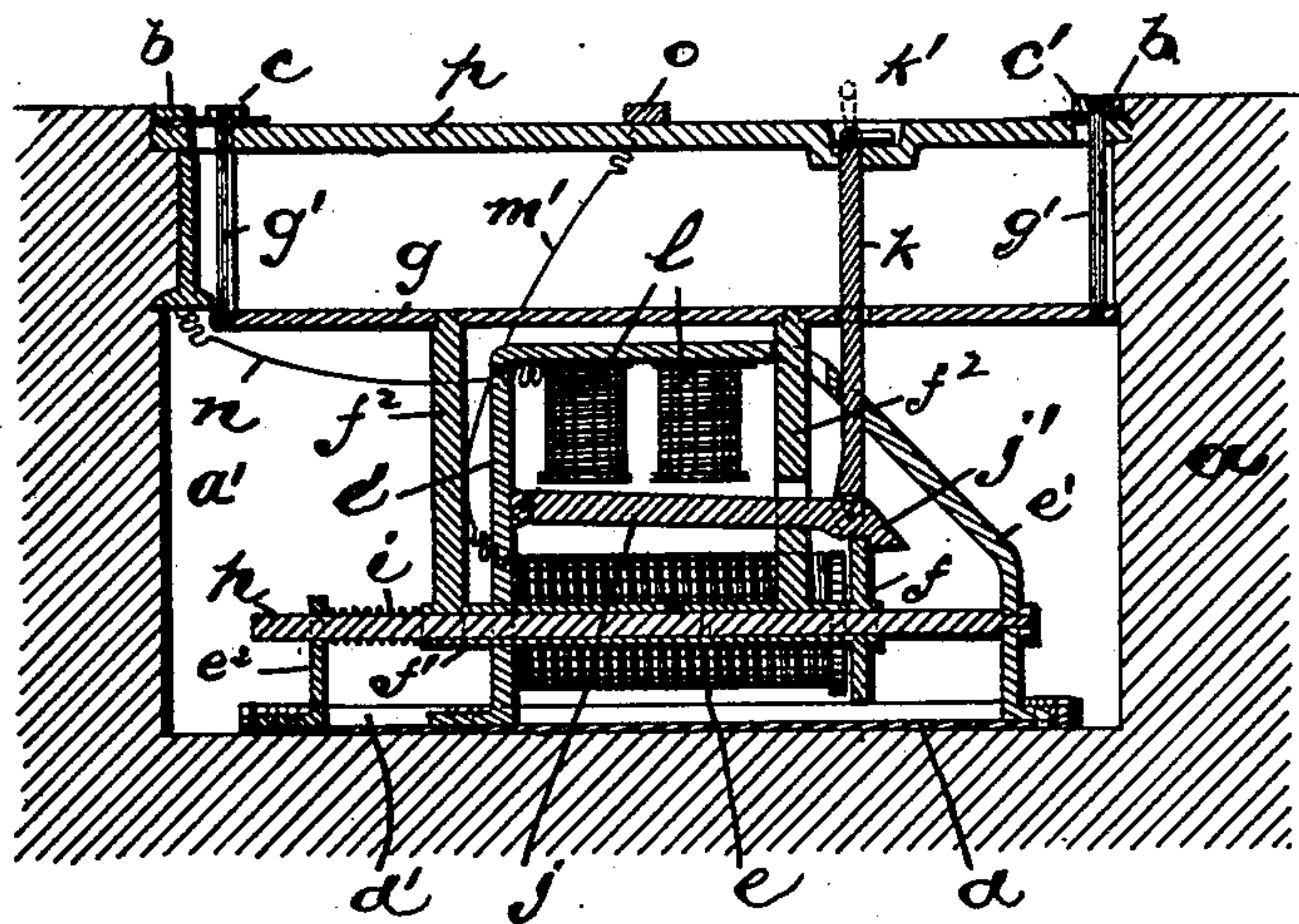


Fig. 5.

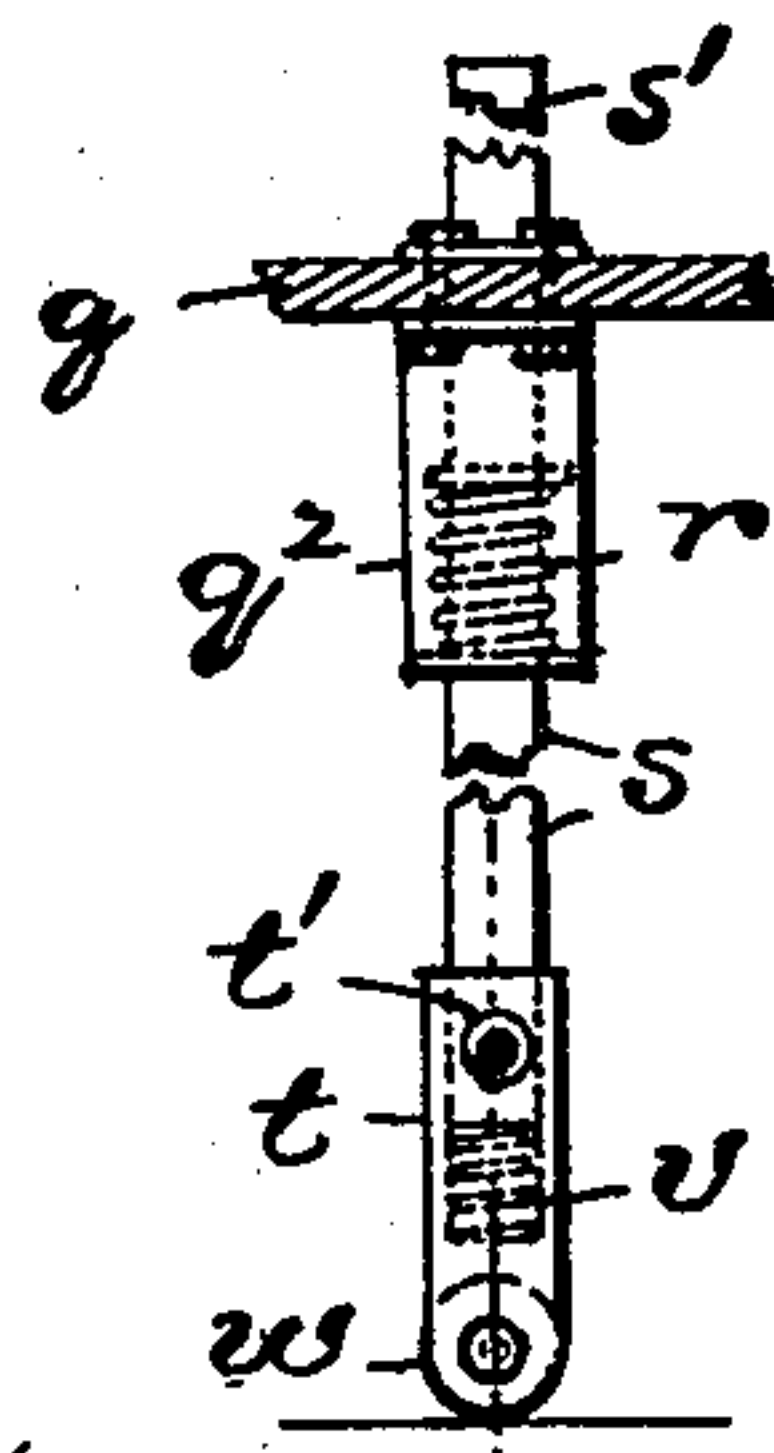
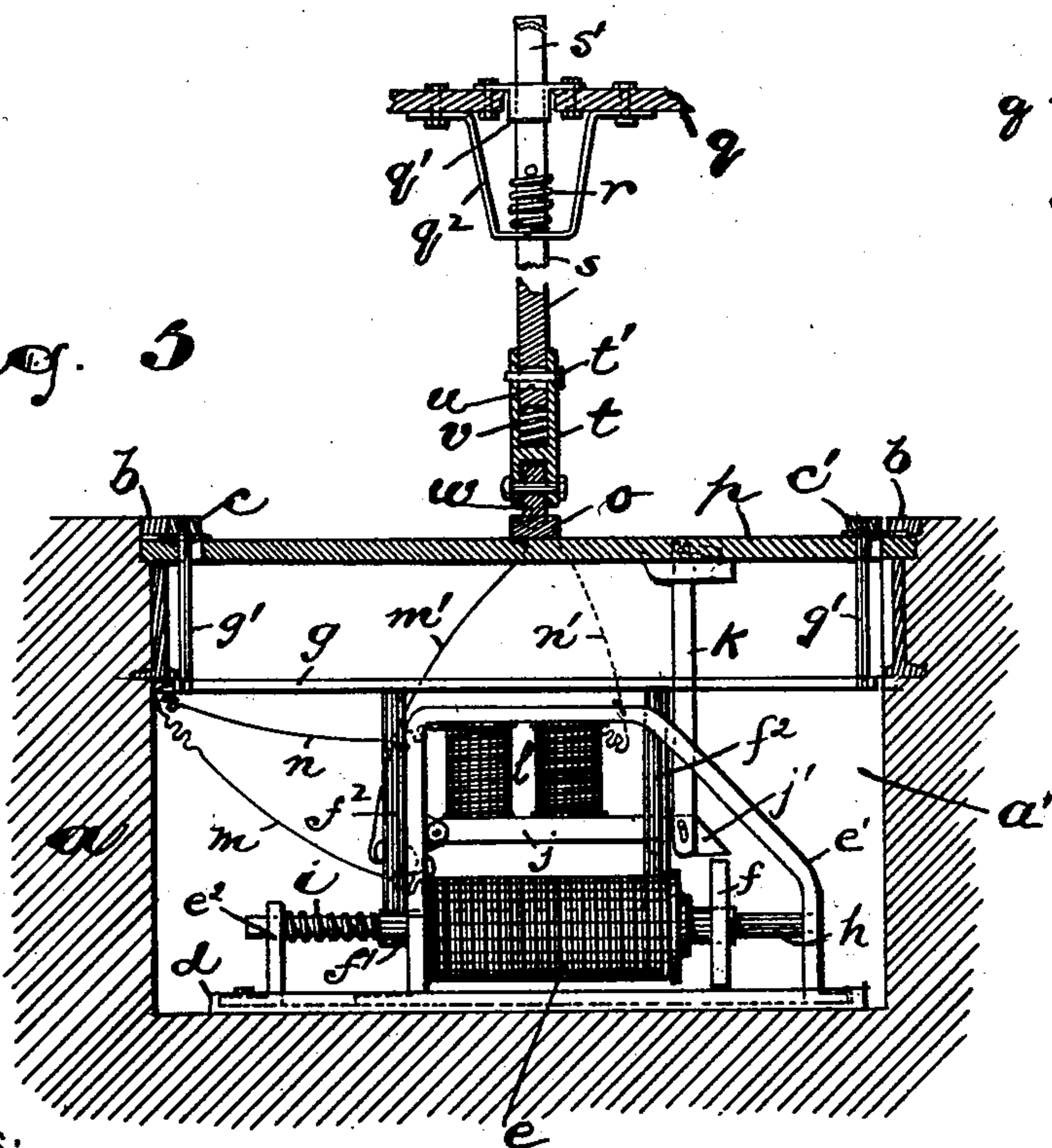


Fig. 6.

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UNITED STATES PATENT OFFICE.

ANDREW L. HATFIELD, OF NEWARK, NEW JERSEY, ASSIGNOR TO
FREDERICK N. RIGGS, OF SAME PLACE.

ELECTRIC-SWITCH RAILWAY.

SPECIFICATION forming part of Letters Patent No. 677,778, dated July 2, 1901.

Application filed June 20, 1900. Serial No. 20,914. (No model.)

To all whom it may concern:

Be it known that I, ANDREW L. HATFIELD, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Electric Switches for Railways; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The objects of this invention are to provide an electric-switch-operating mechanism for railways which shall be more certain and effective in its operation, to remove the danger incident to inadvertent contact with the third rail while in a charged condition, to enable the switch to be worked by hand from the surface in event of a break in the circuit, to secure simplicity and cheapness, and to obtain other advantages and results, some of which may be referred to hereinafter in connection with the description of the working parts.

The invention consists in the improved electric switch for railways and in the arrangements and combinations of parts of the same, all substantially as will be hereinafter set forth and finally embraced in the clauses of the claim.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in each of the several views, Figure 1 is a plan of a railway track and switch to which my invention has been applied. Fig. 2 is a vertical section of the same on line *x*, Fig. 1; and Fig. 3 is a detail sectional view on line *y*, Fig. 2. Fig. 4 is a vertical cross-section of the track and switch-operating devices taken on line *x'*, Fig. 1, and showing the switch closed. Fig. 5 is a similar view, in side elevation, of the same parts in open position and showing the plunger carried upon the car and by means of which contact is made with the third rail; and Fig. 6 is a side elevation of said plunger.

In said drawings, *a* indicates the road-bed of a railway, *b b* the rails of the main line, and *b' b'* the rails of a switch or side track.

c c' indicate the usual switch-tongues of a street-railway, pivoted at their larger ends and adapted at the smaller ends to lie close to or away from the rails, according as the switch is open or closed. Either one or two of these switch-tongues may be used in my invention. These switch-tongues slide upon a top plate *p*, lying between the rails and covering the working parts of my device, uprights *g'* extending downward through said plate to the top bar *g* of a laterally-sliding frame, which carries the switch-tongues with it. Said uprights *g'* pass through elongated apertures *p'* in the plate *p* to allow of movement, and covers *p''*, sliding with the uprights, conceal said apertures.

Below the plate *p* and bar *g* and at or near the bottom of a chamber *a'*, formed in the road-bed *a*, I arrange transversely of the track a powerful electromagnet *e*, which is preferably of the horseshoe type. The armature *f* for said magnet is fixed upon a long sleeve *f'*, which slides upon a rod *h*, extending between the two arms or poles of the magnet. Standards *f''* extend upward from said sleeve *f'* to the bar *g*, before described, and thus the movements of the armature *f* are communicated to the switch-tongues *c c'*. The rod *h* is supported at one of its ends in the main supporting-frame *e'* for the parts and at the other end by a post *e''* or in any other suitable bearings. Said frame *e'* and post are upon a base-plate *d*, which has an upturned rim *d'*, forming a shallow receptacle for oil or the like when required by excessive moisture. A spring *i*, arranged between the post *e''* and adjacent end of the sleeve *f*, serves to normally hold the parts with the armature *f* away from the magnet when the latter is demagnetized. One end of the circuit-wire, as *m'*, from the electromagnet *e* is connected to the rail *b*, and the other end, as *m*, extends back from the switch to a point on the third rail *o* suitably distant. This third rail is adapted to be engaged by a plunger on the car, whereby electrical connection is made to complete the circuit through the electromagnet *e* to throw the switch.

Instead of having the circuit remain closed while the car travels through the switch and the switch-tongue being thus held in position

by the continued attraction of the magnet, I have provided a locking-lever *j*, hinged at one end above the magnet *e* and having the other end *j'* hooked to catch the armature *f* as soon as it is drawn to the magnet *e* and prevent it from being thrown away again by the spring *i*. This enables me to apply the electric current for only a moment of time and then discontinue it, leaving the switch held in position by the lever *j* while the car passes through. To this end an end portion *o'* of the third rail *o*, to which the wire *m'* is connected, is insulated from the rest, and thus as soon as the plunger on the car passes off the section *o'* said section is no longer charged. This renders it entirely harmless should any person inadvertently come in contact with it, and inasmuch as the car covers the end section while charged there can be no danger therefrom. The middle portion of the third rail is furthermore divided by insulation in short lengths, so that no part of it which may project from under the car will be receiving current from the car.

For unlocking the switch and leaving it in the same position as it was found after the car has passed I have provided a second electromagnet *l*, arranged on the upper part of the frame *e'* and adapted to attract the lever *j* as an armature when the circuit is completed. This releases the armature *f* of the main or lower magnet *e* and permits the spring *i* to act to throw the parts to their original positions. Said secondary magnet *l* is connected by its wires *n n'* to the side rail *b* and to an end section *o³* of the third rail, similar to the end section *o'* first described. When, therefore, the plunger on the car has traversed the middle section *o³* of the third rail, it engages the last end section *o³* and closes the switch behind the car. The said plunger carried by the car preferably comprises an upright plunger-rod *s*, sliding in bearings *q' q²* upon the floor *q* of the car. A spring *r* normally holds the said rod elevated, and the upper end *s'* is adapted to receive the motorman's foot. The lower end of the rod *s* enters the socketed top of a wheel-carrier *t*, and a transverse pin *t'* connects the parts. A compression-spring *v* is placed between the bottom of the socket and the end of the rod *s*, and the transverse aperture *u* for the pin *t'* is elongated to permit action of the spring *v* to ease the contact of the wheel *w* with the third rail.

In order that the switch may not be rendered entirely inoperative in event of a break in the magnet-circuits, I have provided a lifting-rod *k*, attached at its lower end to the hooked lever *j* and having at its upper end, above the top plate *p*, a handle *k'*. This enables the switch-tongues to be pushed either way by hand at the surface after the locking-lever *j* is lifted.

Having thus described the invention, what I claim as new is—

1. In a railway-switch-operating device, the

combination with a switch-tongue, of a sliding frame carrying said switch-tongue, a primary electromagnet for sliding said frame, a lever for locking said frame against sliding and a secondary electromagnet for operating said lever, substantially as set forth.

2. In a switch-operating device for railways, the combination with a switch-tongue, of a sliding frame connected to said switch-tongue, an electromagnet adapted to slide said frame, a spring for restoring said frame to normal position, a locking-lever for said frame, a secondary electromagnet for releasing said locking-lever, and means for completing the circuit through said electromagnets from the car substantially as set forth.

3. In a railway-switch-operating device, the combination of a transversely-sliding frame having at the top a bar to which the switch-tongue is pivoted and at the bottom a sleeve *f'*, having an armature *f*, thereon, a supporting-bar *h*, extending through said sleeve and upon which the frame slides an electromagnet for attracting said armature and sliding the frame, a locking-lever having a hooked end holding said armature to the magnet, means for releasing said lever, and a spring for throwing the frame to carry the armature away from the magnet, substantially as set forth.

4. In an electric-switch-operating device, the combination of a third rail, and a plunger carried by the car and adapted to engage the said third rail to transmit current thereto, said plunger having a socketed wheel-carrier at its lower end, a spring in said socket and a plunger-rod entering said socket against the spring and being held by a transverse pin working in an elongated aperture in the rod, substantially as set forth.

5. The combination with a railway-switch tongue, of an electromagnet for throwing said switch-tongue, a device for positively locking said switch-tongue when thrown, and a secondary electromagnet for releasing said locking device, a box or casing inclosing said electromagnets and locking device, and mechanically-operated releasing means extending from said locking device outside of the said box or casing, substantially as set forth.

6. The combination with a railway-switch, of an electromagnet for throwing said switch, means for automatically locking said switch in position when thrown, a secondary electromagnet for releasing said locking means, a casing containing said electromagnets and locking means, and a lever connected to said locking means and extending outside the casing, whereby the switch can be mechanically operated as well as electrically, substantially as set forth.

7. The combination with a railway-switch, of a sliding frame rigidly connected to the switch, an electromagnet adapted to slide said frame in one direction, a catch for locking said frame in the position given it by the electromagnet, a secondary electromagnet

adapted to release said locking-catch electrically, a lever by which the catch can be mechanically released, and a spring for restoring the sliding frame to initial position
5 when the locking-catch is released, substantially as set forth.

8. In a switch-operating device, the combination of a sliding frame rigidly connected to the switch, a bar *h*, upon which said frame
10 slides, an armature fast on said frame and projecting at opposite sides of said bar, stationary electromagnets at the sides of said bar and adapted to attract said armature to

slide the frame, means for locking the frame in position when slid, means for releasing said
15 locking means, and a spring for sliding the frame away from the electromagnets, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 16th day of
20 June, 1900.

ANDREW L. HATFIELD.

Witnesses:

CHARLES H. PELL,
C. B. PITNEY.