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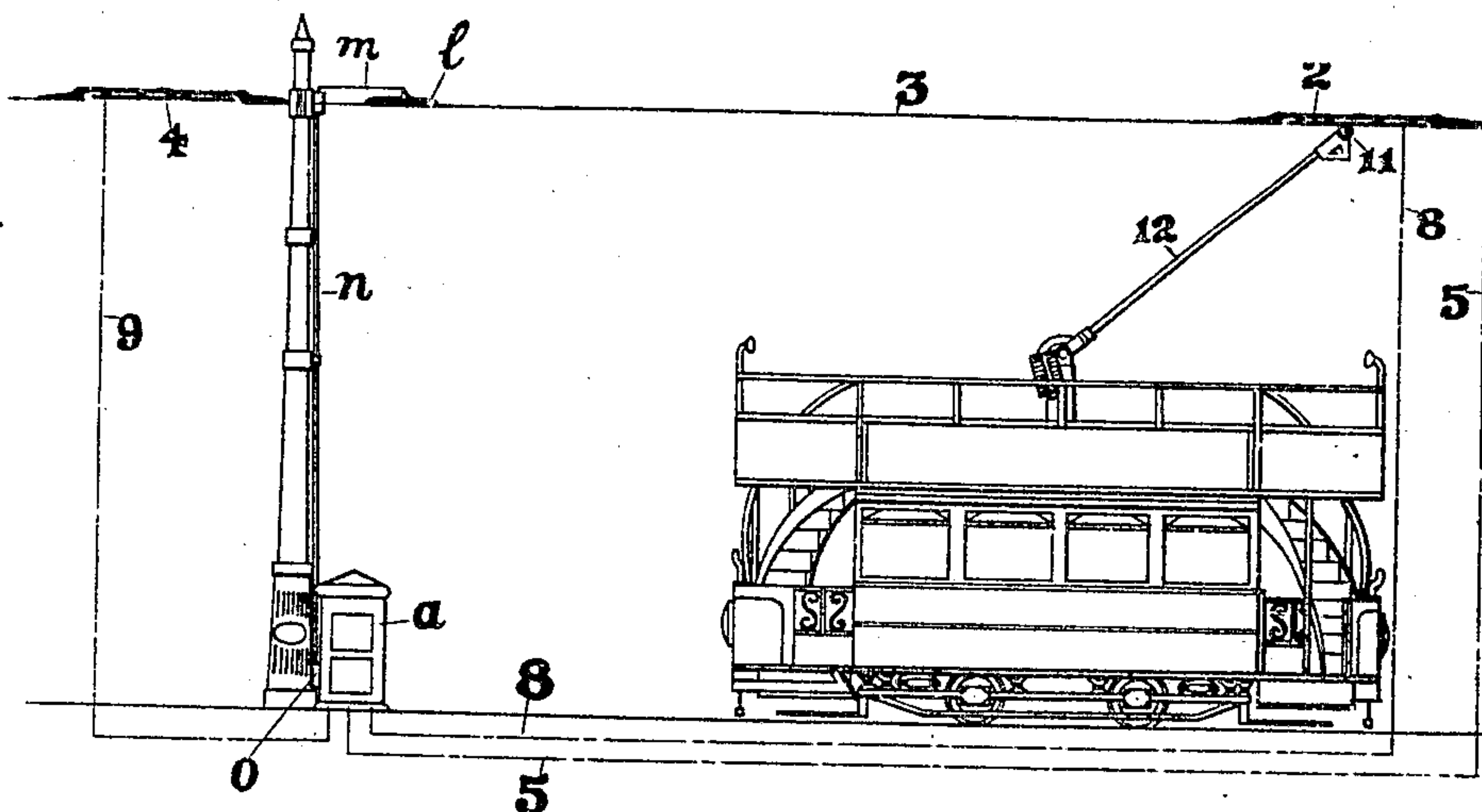
W. H. TURNER, R. E. DIXON & T. B. STEWART.

AUTOMATIC APPARATUS FOR CONTROLLING AND OPERATING THE POINTS  
OF ELECTRIC RAILWAYS AND TRAMWAYS.

APPLICATION FILED JULY 27, 1906.

2 SHEETS—SHEET 1.

FIG. 1.



WITNESSES:

*Allan Bennett*  
*Samuel Burgess*

INVENTORS:

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ROWLAND EDWARD DIXON.  
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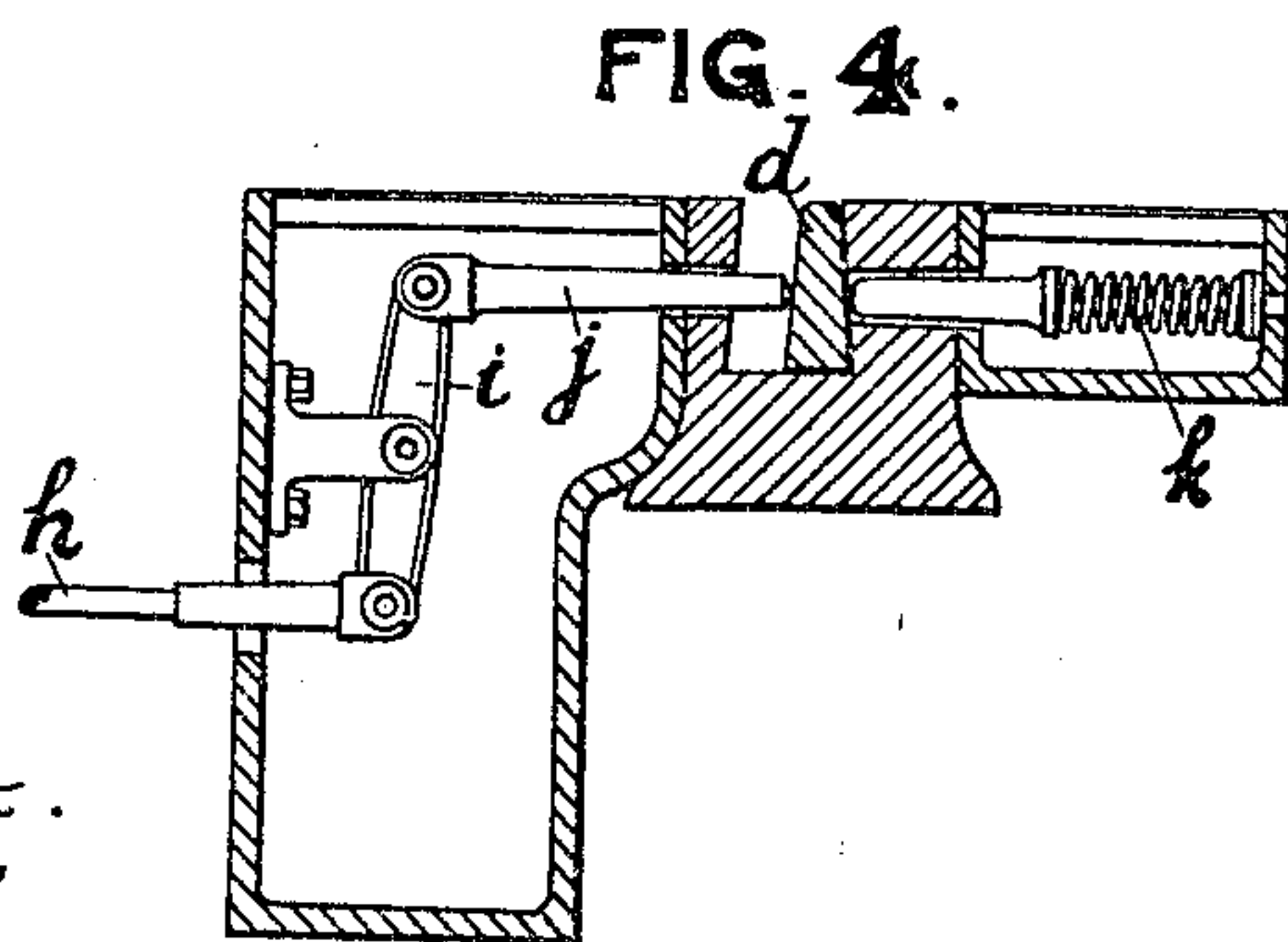
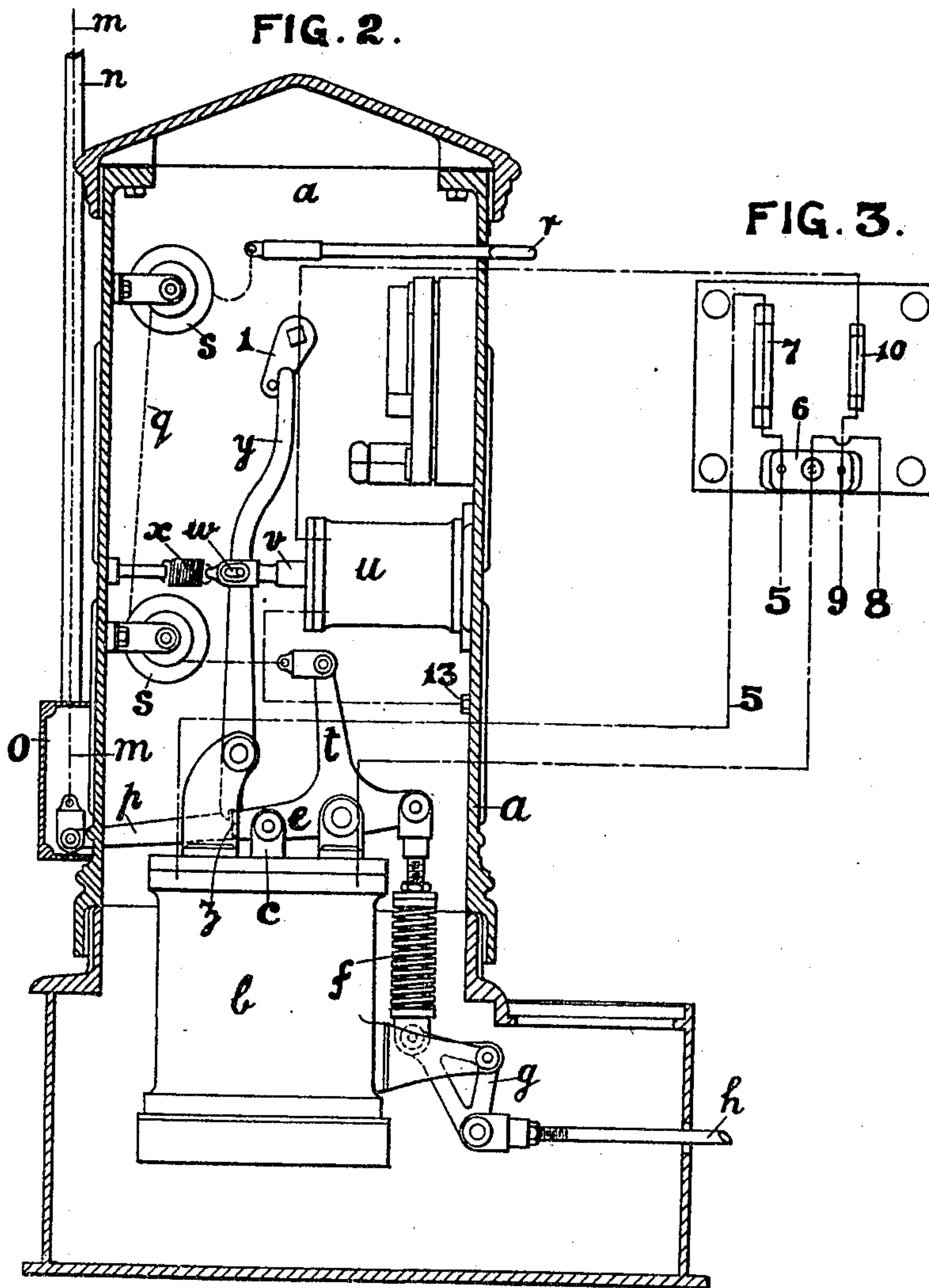
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# UNITED STATES PATENT OFFICE.

WILLIAM HERBERT TURNER, ROWLAND EDWARD DIXON, AND THOMAS BELL STEWART, OF LEEDS, ENGLAND.

AUTOMATIC APPARATUS FOR CONTROLLING AND OPERATING THE POINTS OF ELECTRIC RAILWAYS AND TRAMWAYS.

No. 837,522.

Specification of Letters Patent.

Patented Dec. 4, 1906.

Application filed July 27, 1906. Serial No. 328,050.

*To all whom it may concern:*

Be it known that we, WILLIAM HERBERT TURNER, ROWLAND EDWARD DIXON, and THOMAS BELL STEWART, subjects of the King of Great Britain and Ireland, residing at Leeds, in the county of York, England, have invented a new and useful Automatic Apparatus for Controlling and Operating the Points of Electric Railways and Tramways, of which the following is a specification.

This invention relates to apparatus for automatically controlling and operating the points of overhead-cable electric railways and tramways, and is a further development of or improvement upon the apparatus shown and described in the specifications of our prior patents, Nos. 747,795 and 747,796, dated December 22, 1903, and No. 792,741, dated June 20, 1905.

Figure 1 is a front elevation illustrating the general arrangement of our improved apparatus. Fig. 2 is a side elevation, partly in section, of the street-box *a* hereinafter referred to, showing details of the electromechanical switching devices contained therein for operating the points. Fig. 3 is a detached front elevation of the fuse-board shown in Fig. 2. Fig. 4 is a side elevation in section of the rail-point *d* and its connections.

Similar letters and numerals of reference are employed to indicate corresponding parts throughout the several views.

The construction of our improved apparatus is as follows: The cast-iron street-box *a* contains a powerful electromagnet or solenoid *b*, which is wound with specially-insulated wire of sufficient size to take safely the total car-current. The soft-iron core *c* is of a suitable size and stroke to pull over both the rail and the overhead points and is connected to the rail-tongue *d* by means of beam-lever *e*, compensating spring-rod *f*, crank *g*, rod *h*, lever *i*, and push-pin *j*, which latter pushes the said tongue *d* over against a compression-spring *k*. The tongue of the overhead frog *l* is also connected to the core *c* by means of a flexible steel cable *m*, which extends from the frog *l* down a steel tube *n* into a box *o* and which is attached to an extension *p* of the beam-lever *e*, so that in all cases the overhead frog *l* is operated simultaneously with the rail-tongue *d*. A flexible steel-roller chain *q* from hand pull-lever *r* is connected by means of multiplying-pulleys *s* s

to an arm *t* of the beam-lever *e*, so that in case of emergency the points can be pulled over by hand. The small magnet *u* has a core *v*, which is loosely connected at *w* (against the pull of a spring *x*) to a ratchet-lever *y*, which latter is adapted to engage with a catch *z* on the beam-lever *e*. The emergency release-handle 1 is provided for the purpose of releasing the points in the event of a motorman taking his car onto the wrong track. A half-turn of this handle 1 releases the catch *z* of the beam-lever *e* from the ratchet-lever *y*, permitting the points to be returned to their normal position.

The electrical connections are as follows: At a point approximately forty-five feet in advance of the point-tongue *d* an insulated contact-plate or switch 2 is fixed on the overhead-trolley wire 3. A second insulated contact-plate 4 is also fixed on the overhead-trolley wire 3 on the branch route some two or three feet past the frog *l*. A cable 5 is run from some convenient part of the live trolley-wire 3, down the pole-bracket, and into the box *a*, and is connected to the left-hand terminal of the danger-plug 6, and through the fuse 7, large magnet-winding *b*, back to the middle terminal of the plug 6, and thence by a cable 8 to the contact-plate 2. A cable 9 is similarly run from the contact-plate 4, down the pole-bracket, and into the box *a*, and is connected to the right-hand terminal of the plug 6 through the fuse 10 and magnet-coil *u*, and thence to earth or rail at 13.

The action of the apparatus is as follows: A motorman approaching a junction and not wishing to enter the branch route will on nearing the contact-plate 2 switch his motor-controller off and coast through the said contact-plate 2, thereby not interfering with the points in any way. Should he, however, wish to turn into the branch route, he would on approaching the contact-plate 2 keep his motor-controller on, and current would then flow from the line 3 by way of cable 5, plug 6, fuse 7, through the magnet-coil *b*, back through plug 6, cable 8, contact-plate 2, trolley-wheel 11, and down by way of trolley-boom 12 through the car-motors to rail. The electromagnet *b* would thereby become energized and pull down its core *c*, causing the beam-lever *e* (by means of its catch *z*) to engage with the ratchet-lever *y*, these move-



ments simultaneously actuating both the rail and overhead points and locking them securely and effectually in position (independent of the electrical circuit) for the car to pass through into the branch route. The car having passed the points now comes to the releasing contact-plate 4. The unlocking and reversal of the points is effected absolutely automatically and is independent of the motorman. The trolley-wheel 11, making contact with the plate 4, allows current to flow from the trolley-wire 3 by way of the said contact-plate 4, cable 9, plug 6, fuse 10, through the magnet-coil *u*, and thence to earth or rail at 13, thus drawing in the core *v* of the said magnet *u* and releasing the points, which return to their normal positions under the influence of the rail-spring *k*.

We claim—

1. In an electromechanical apparatus for controlling and operating the points of overhead-cable electric railways and tramways, the combination, with a solenoid *b* arranged in circuit with the trolley-wire 3 and with an insulated contact-plate or switch 2 thereon and having point connections comprising beam-lever *e*, compensating spring-rod *f*, crank *g*, rod *h*, lever *i*, push-pin *j*, compression-spring *k*, and flexible cable *m* so as (under control of the motorman) to actuate the points on the approach of a car, of the locking devices comprising ratchet-lever *y*, catch

*z*, and emergency release-handle 1 by which the points are locked securely in such position (independent of the said electrical circuit) for the passage of the car into the branch route, the reversing-magnet *u* having core *v* and spring *x* arranged in connection with the said locking devices and in circuit with a second insulated contact-plate or switch 4 upon the trolley-wire 3 so as to automatically release the points after passage of the car into the branch route, and the emergency actuating mechanism comprising hand pull-lever *r*, flexible chain *q*, arm *t*, and multiplying-pulleys *s s*, substantially as herein described with reference to the accompanying drawings.

2. The combination, with the trolley-wire provided with an insulated contact-plate and a frog, and the rails provided with a switch; of a solenoid arranged in circuit with the said trolley-wire and contact-plate, intermediate operating devices connecting the core of the said solenoid with the said frog and with the said switch, a pivoted locking-lever which normally prevents the said core from sliding, and means for moving the said lever on its pivot to release the said core.

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