

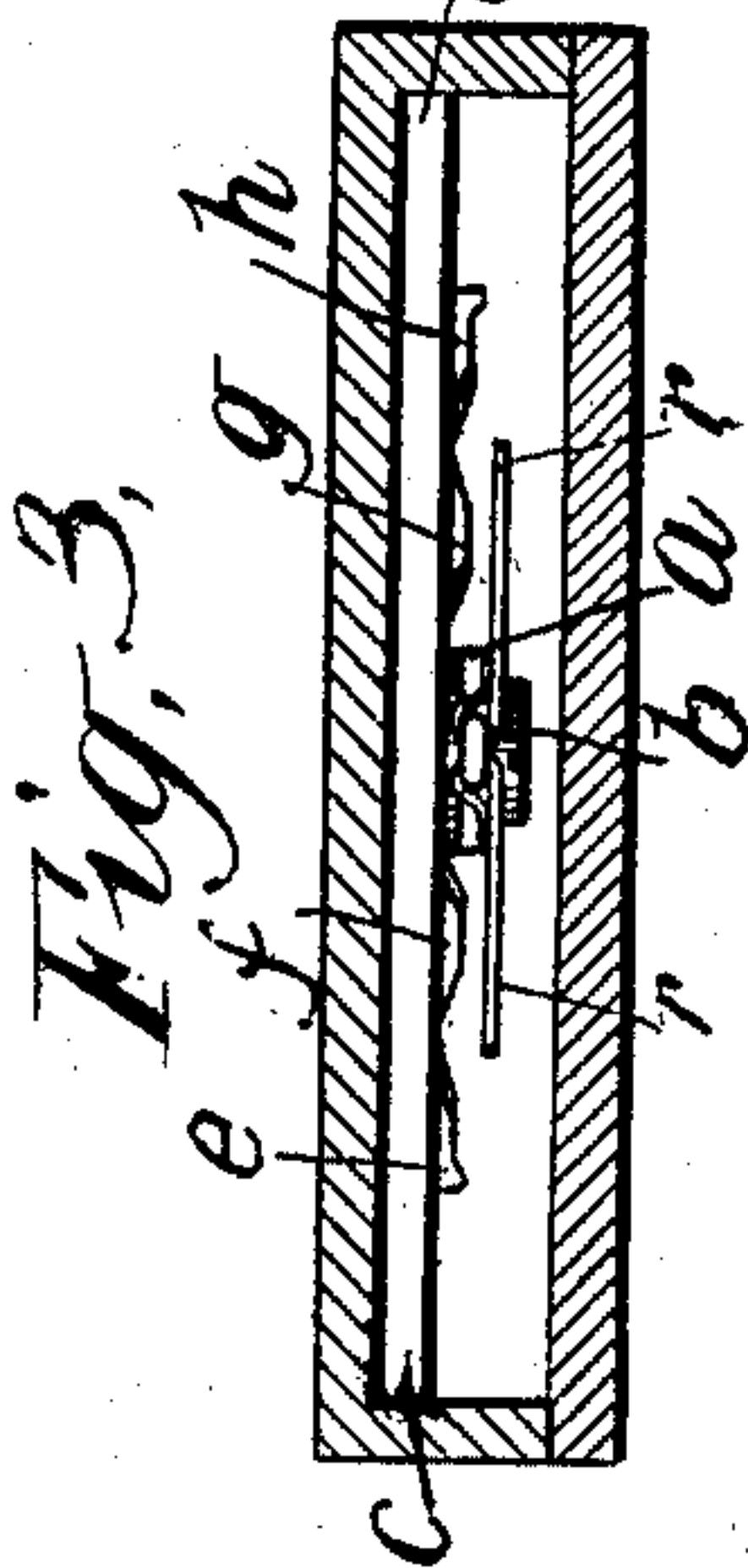
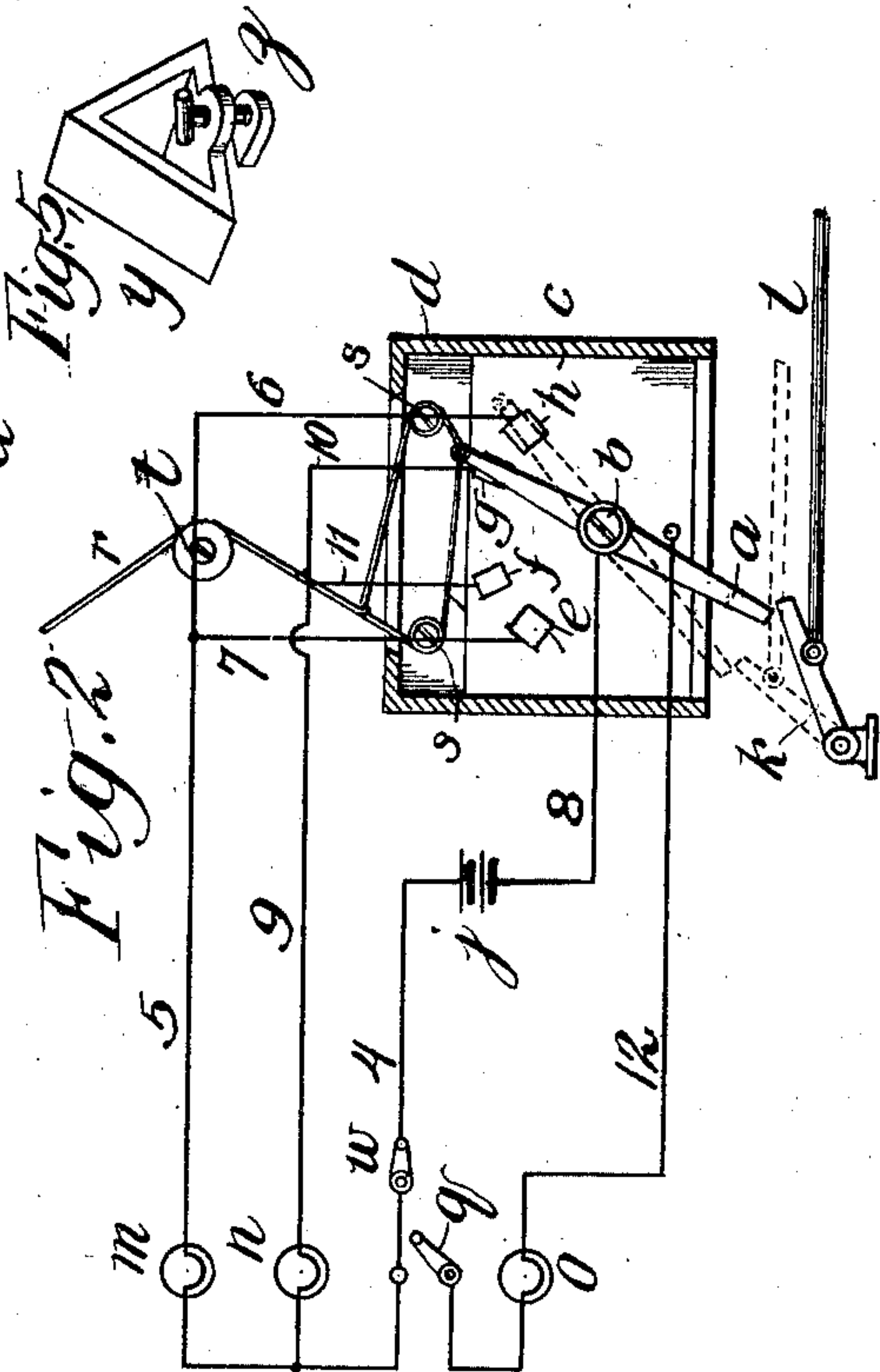
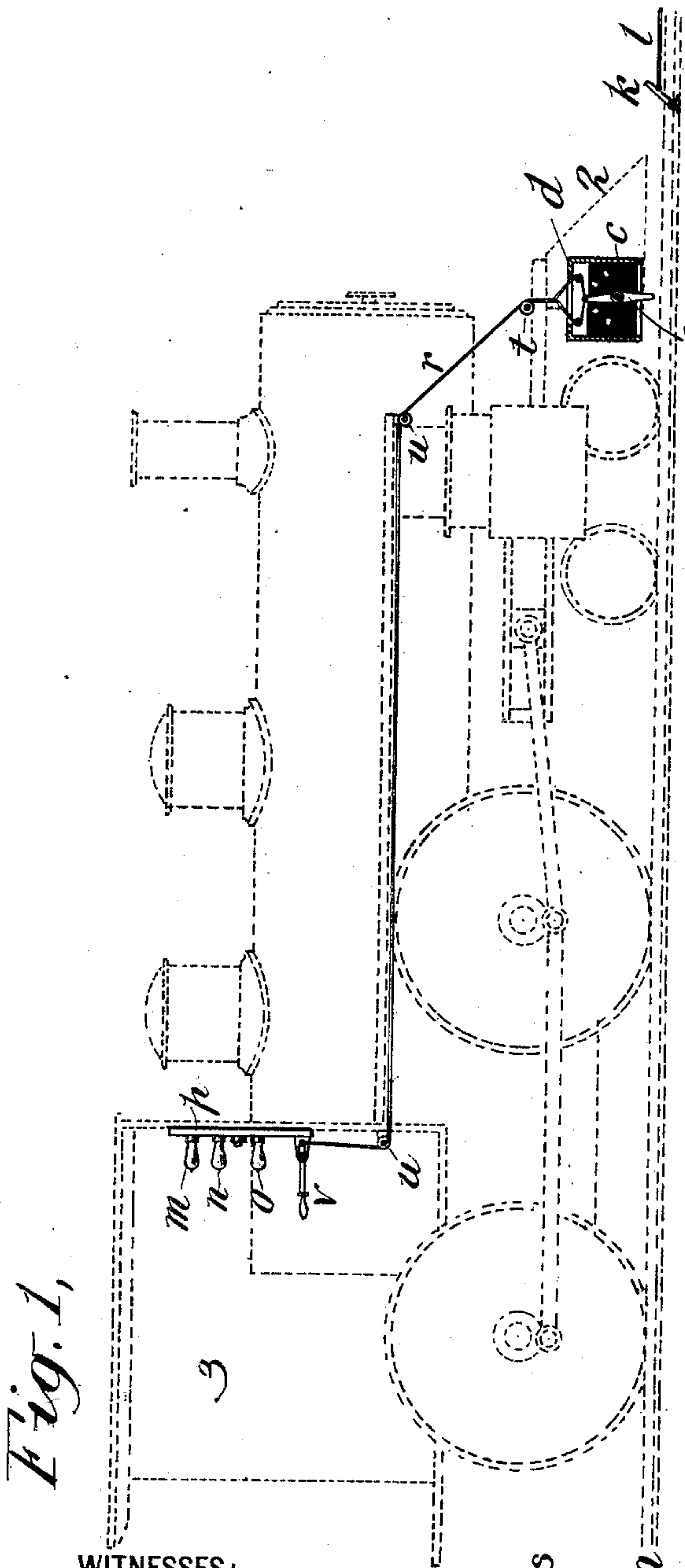
No. 703,145.

Patented June 24, 1902.

F. C. MÜLLER.
ELECTRIC RAILWAY SIGNAL.

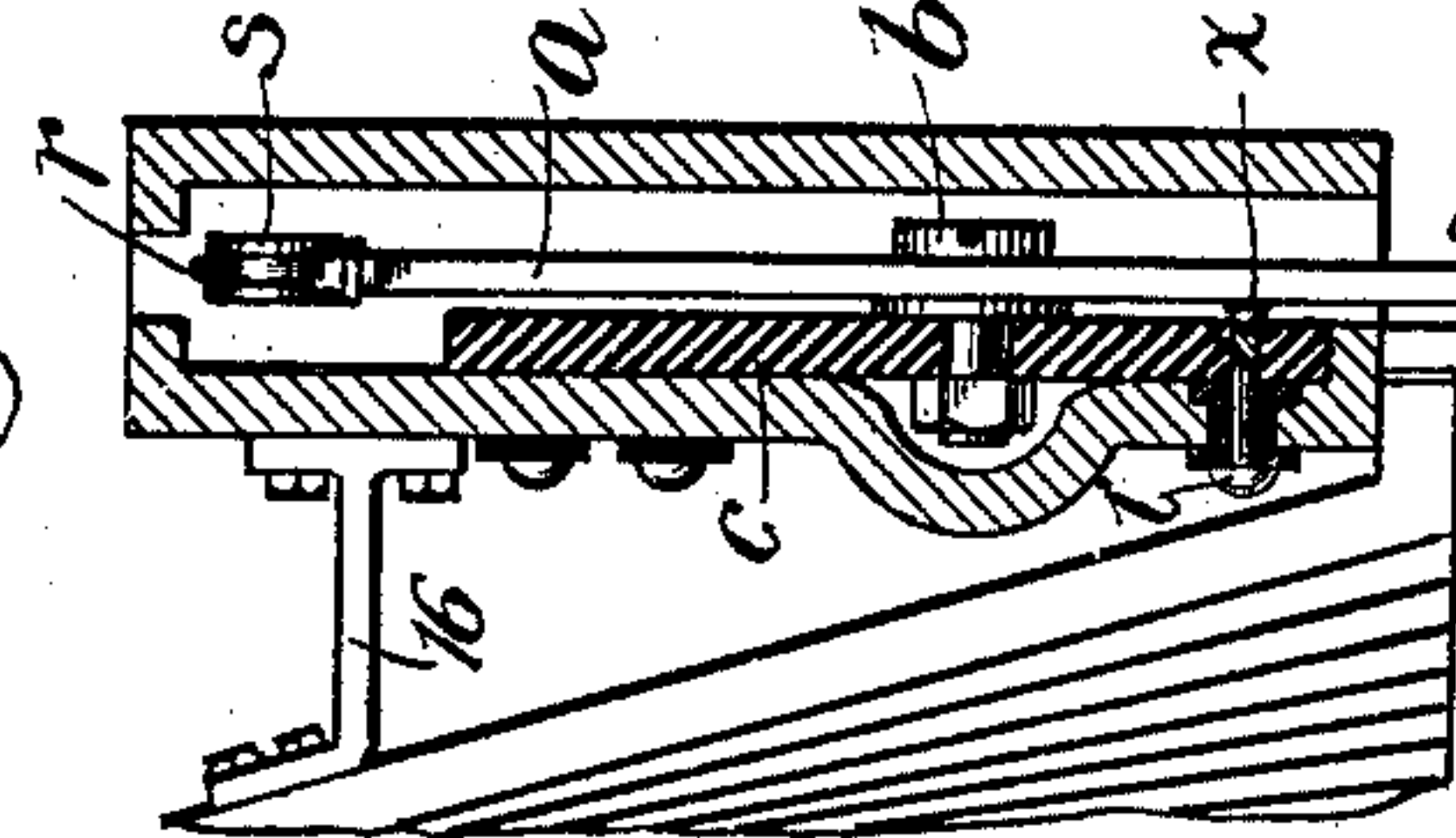
(Application filed Mar. 10, 1902.)

(No Model.)



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ELECTRIC RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 703,145, dated June 24, 1902.

Application filed March 10, 1902. Serial No. 97,517. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK C. MÜLLER, a citizen of the United States, residing at the borough of Brooklyn, city of New York, in the county of Kings and State of New York, have invented certain new and useful Improvements in Electric Railway-Signals, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to railway-signals, and particularly to the class of such signals in which indications are given in the cab or motor controlling part or compartment of the locomotive or motor-car.

My invention has for its objects simplicity of construction, economy in operation, the provision of ready means for testing the condition of the device, and other advantageous features hereinafter fully set forth.

I will now describe the signaling mechanism embodying my invention illustrated in the accompanying drawings, and will thereafter point out my invention in claims.

Figure 1 is a side elevation, partly in section, showing the complete device with the outlines of a locomotive and track in broken lines. Fig. 2 is an enlarged elevation with the signal-box in section and showing the circuits and signaling devices diagrammatically. Fig. 3 is a further enlarged horizontal section of the signal-box and parts therein, taken on the line 3-3, Fig. 2. Fig. 4 is a vertical central transverse section of the same, showing the attachment to the locomotive-pilot. Fig. 5 is a perspective view of a stationary striking device adapted to be carried on the train and to be attached at any point along the road.

The parts of my signal carried by the locomotive or motor-car comprise the signal-indicating means, the striker and circuit-controller, the connecting-circuits, and the means for restoring the striker to normal position.

The striker and circuit-controller or switch comprises a single lever *a*, shown as pivoted about medially of its length and so as to turn with considerable friction on a pivot-stud *b*, secured in the switchboard *c*, and this lever is arranged within the signal-box *d* with its lower or striking end projecting out there-through. The signal-box *d* is located near the front end of the locomotive or motor-car,

and I prefer to secure it upon the pilot 2, and as it is of small width it may be advantageously mounted upon the horizontal flange of the pilot, as shown, and may be suitably secured thereto, as by clamping-lugs 15 and a brace 16. (See Fig. 4.) The lever *a* performs the function of an electric switch, its upper end coacting with the contact-pieces *e*, *f*, *g*, and *h* on the switchboard *c*, with which it comes in contact in different positions of inclination, and its lower portion coming in contact with the contact-pin *i* shortly below its pivot when the lever *a* is in normal vertical position, the lever *a* having a projection *x*, which will come in contact with this pin *i* only when the lever *a* is in normal position. This lever is of metal or other conductive material and is shown as connected with one terminal of the battery *j* at its pivot. (See Fig. 2.) The switchboard *c* is of suitable insulating material.

The signal-indicating means comprise electric lamps located within the cab 3 of the locomotive and preferably directly in front of the position occupied by the engineer or motorman, as on the board *p*, so that the engineer or motorman cannot fail to see them. Three of these indicating-lamps are provided, the upper lamp *m* giving a red light and indicating "home danger," and a second light *n* just below it giving a green light and indicating "distant danger" or one block clear. A third light *o* is located below these danger-indicating lamps and gives a white light indicating "safety," and is connected in a test-circuit which may be closed at the will of the operator to indicate to him that the device is intact and operative and that the lever *a* has not been moved from the safety position. The circuit for the danger-lamp *m* is from the battery *j* through wire 4, including hand-switch *w*, lamp *m*, wire 5, and either wire 6 and contact *h* or wire 7 and contact *e*, and when the lever *a* is against either of these contacts through the lever *a* and wire 8 back to battery. The circuit for the caution or distant-danger lamp *n* is from the battery *j* through wire 4, including hand-switch *w*, lamp *n*, wire 9, and either wire 10 and contact *g* or wire 11 and contact *f*, and when the lever *a* is against either of these contacts through the lever *a* and wire 8 back to battery. The test-circuit for the safety-lamp *o*

is from battery *j* through wire 4, including hand-switch *w*, and through the hand-switch *q* when closed, lamp *o*, wire 12, and contact-pin *i*, and when the lever *a* is in normal position and against the contact *i* through the lever *a* and wire 8 back to battery. If the lever *a* should by any possibility have become bent or broken, the safety-signal cannot be obtained and the derangement is indicated to the engineer or motorman. The switch *w* is a hand-switch, and its function is to throw the entire device out of service when in daylight and open-country track or road signals are in use and may be plainly perceived.

The means for restoring the lever *a* to normal position comprise a flexible cord *r*, having a loop secured to the upper end of the lever *a* and passing over guides or guide-rollers *s s*, one at each side of the upper end of the lever *a*, so as to permit the lever *a* to be moved to the extreme position of inclination against the contact *h* (indicated by broken lines in Fig. 2) or the opposite extreme position against the contact *e*, the looped portion of the cord *s* being centrally joined to a single portion thereof passing over the centrally-arranged guide or guide-roller *t*, so that tension upon the cord *s* will restore the upper part of the lever *a* to normal, vertical, and central position, as shown in Fig. 1, and if the lever is intact and unbent this will bring the projection *x* at lower portion thereof against the contact-pin *i* and the device will be ready to give a safety indication whenever the test-circuit is closed at the switch *q*. The cord is shown as guided rearwardly over rollers *u u* to the cab and may be inclosed in a pipe or other protecting-casing, (not shown,) and is secured at its rear end to an operating-lever *v*, pivotally mounted on the board *p*, and by the actuation of this operating-lever the engineer or motorman applies the necessary tension to the cord *r* to restore the lever *a* to normal position.

The lever *a* is actuated to give the danger indications by a stationary device on the road-bed, and such stationary device is shown in Figs. 1 and 2 as comprising a pivoted striking-plate *k*, which may be connected to a road-signal or signal mechanism in any suitable manner, as by a rod *l* and other suitable mechanism, so as to be raised to highest position, as indicated by the broken lines in Fig. 2, when the home road-signal is at "danger" or the conditions of traffic require a home-danger indication, and to a lower raised position, as shown in full in Fig. 2, when the distant road-signal is at "danger" or the caution or one-block-clear signal is required by the conditions of traffic, and to be flat or clear of contact with the striking-lever *a* when the signals are at "safety" or the conditions of traffic permit a safety indication to be given. When the striking-plate *k* is in highest position, it will force the lever *a* to extreme inclined position or into contact with the conductive piece *h*, thereby closing a circuit for

the red or home-danger lamp *m*, or should the locomotive or motor-car be moving backward will force the lever *a* into contact with the conductive piece *e*, thereby also closing a circuit for the red or home-danger lamp *m*. When the striking-plate *k* is in the lower raised position shown by the full lines, it will force the lever *a* against the conductive piece *g*, as shown, thereby closing a circuit for the green or caution lamp *n*, as above described, or if the locomotive or motor-car is moving backward will force the lever *a* against the conductive piece *f*, thereby also closing a circuit for the same lamp *n*. As above described, the lever *a* moves with considerable friction, and, further, the contacts *e, f, g*, and *h* project out and have inclined faces, as shown in Fig. 3, so that the lever *a* is sprung outward at these contacts, and thus encounters additional resistance to movement at the contacts, so that there is no possibility of its passing over and beyond a contact unless positively forced to do so by the stationary striking device.

It will be noted that the danger indications are persistent and will compel the attention of the engineer or motorman and will continue until the engineer or motorman actuates the operating-lever *v* to restore the striking-lever *a* to normal position. It is of course obvious that the visual indications may be supplemented by oral indications, such as the ringing of a bell or by other visual indications, and that other forms of indicating devices may be employed.

For the purpose of giving a signal to another approaching train in the event of the stoppage of a train I provide a striking device, which may be carried on a train and placed by the rear brakeman at a suitable distance in rear to actuate the striking-lever of an approaching train, such device consisting of the triangular prismatic piece or block of suitable dimensions to actuate a striking-lever to give the home-danger signal and which may be provided with a clamp *z* (see Fig. 5) for attachment to the flange of a rail.

It is obvious that various modifications may be made in the construction shown and above particularly described within the spirit and scope of my invention.

What I claim, and desire to secure by Letters Patent, is—

1. A railway-signal comprising electrically-controlled signal-indicating means upon a car, a striking device upon the road, and a single lever-striker and electric switch upon the car pivoted so as to move under friction and to retain the position to which it is moved until positively moved therefrom and adapted to be actuated by the striking device upon the road to control the circuit of the signal-indicating means.

2. A railway-signal comprising electrically-controlled indicating means upon a car, a striking device upon the road, and a combined striking-lever and circuit-controller

upon the car adapted to be moved into different positions under the same direction of movement of the car by contact with the striking device upon the road to cause different indications at the signal-indicating means.

3. A railway-signal comprising electrically-controlled signal-indicating means upon a car capable of indicating danger and safety, a striking device upon the road, a combined striking-lever and circuit-controller upon the car adapted to be actuated by the road striking device to control the circuit of the signal-indicating means to cause a danger indication, and means for closing a test-circuit to cause a safety indication of the signal-indicating means when the combined striking-lever and circuit-controller is in normal position.

4. A railway-signal comprising electrically-controlled signal-indicating means upon a car, a striking device upon the road, and a single lever-striker and electric switch upon the car pivoted so as to move under friction and to retain the position to which it is moved until positively moved therefrom and adapted to be moved into different positions under the same direction of movement of the car by contact with the striking device upon the road to cause different indications at the signal-indicating means.

5. A railway-signal comprising electrically-controlled signal-indicating means capable of indicating danger and safety, a striking device upon the road, a single lever-striker and electric switch upon the car adapted to be actuated by the striking device upon the road to control the circuit of the signal-indicating means to cause a danger indication, and means for closing a test-circuit to cause a safety indication, of the signal-indicating means when the striker and electric switch is in normal position.

6. A railway-signal comprising electrically-controlled signal-indicating means upon a car, a striking device upon the road, a single lever-striker and electric switch upon the car adapted to be actuated by the striking device upon the road to control the circuit of the signal-indicating means, and manual means upon the car for restoring the striker and switch to normal position.

7. A railway-signal comprising an electrically-controlled indicating means upon a car, a striking device upon the road, a combined striking-lever and circuit-controller upon the car adapted to be actuated by the striking device upon the road to control the circuit of the signal-indicating means, and a manually-operated tension device connected to the combined striker and circuit-controller for restoring the same to normal position.

8. A railway-signal comprising electrically-controlled indicating means upon a car, a striking device upon the road, a combined striking-lever and circuit-controller upon the car adapted to be moved into different positions by contact with the striking device upon

the road to cause different indications of the signal-indicating means, and a manually-operated tension device connected to the combined striker and circuit-controller for moving the same to normal position from any one of such different positions.

9. A railway-signal comprising electrically-controlled signal-indicating means upon a car, a striking device upon the road, a single lever-striker and circuit-controller upon the car adapted to be moved into different positions under the same direction of movement of the car by contact with the striking device upon the road and a plurality of stationary electric contacts arranged in the path of such movement of the striker and circuit-controller, and circuit-completing means connected to the striker and circuit-controller and signal-indicating means and stationary contacts.

10. A railway-signal comprising a home-danger-indicating device and a distant-danger-indicating device upon a car, a striking device upon the road, a single lever-striker and circuit-controller upon a car adapted to be moved into different positions under the same direction of movement of the car by contact with the striking device upon the road, an electric contact in the path of the striker and circuit-controller and connected to the distant-danger-indicating device, another electric contact at a different point in the path of the striker and circuit-controller under the same direction of movement of the car and connected to the home-danger-indicating device, and circuit-completing means connected to the striker and circuit-controller and to the signal-indicating means.

11. A railway-signal comprising a home-danger-indicating device, a distant-danger-indicating device and a safety-indicating device upon a car, a striking device upon the road, a single lever-striker and circuit-controller upon a car adapted to be moved into different positions by contact with the striking device upon the road, an electric contact in the path of the striker and circuit-controller and connected to the distant-danger-indicating device, another electric contact at a different point in the path of the striker and circuit-controller and connected to the home-danger-indicating device, an electric contact located so as to make contact with the striker and circuit-controller when the striker and circuit-controller is in normal position and connected to the safety-indicating means, and circuit-completing means connected to the striker and circuit-controller and to the signal-indicating means, the circuit for the safety-indicating means including a circuit make-and-break device.

In testimony whereof I have affixed my signature in presence of two witnesses.

FREDERICK C. MÜLLER.

Witnesses:

HENRY D. WILLIAMS,
JOHN H. BARNES.