

(No Model.)

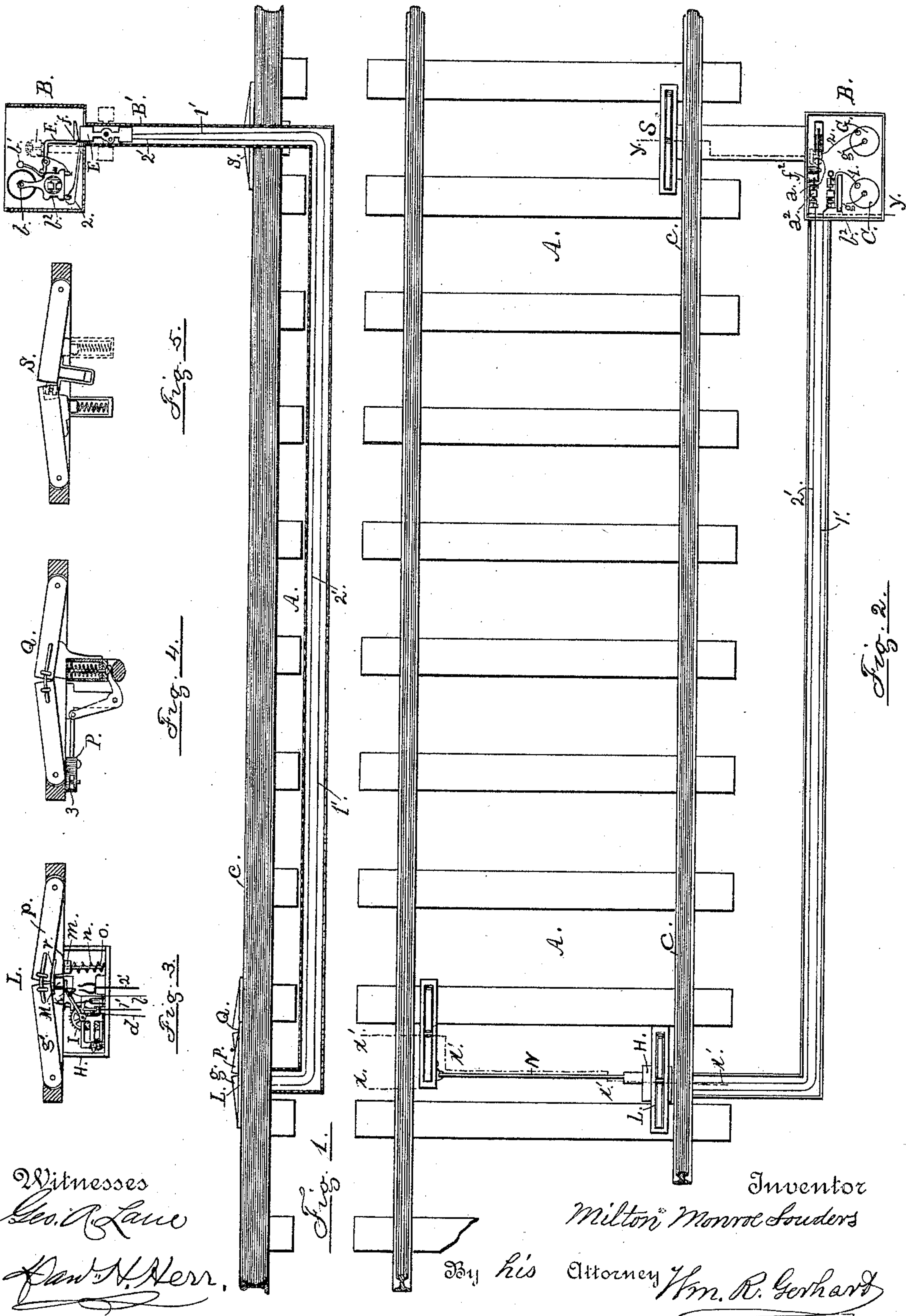
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M. M. SOUDERS.

AUTOMATIC RAILWAY ALARM AND SIGNAL.

No. 421,983.

Patented Feb. 25, 1890.



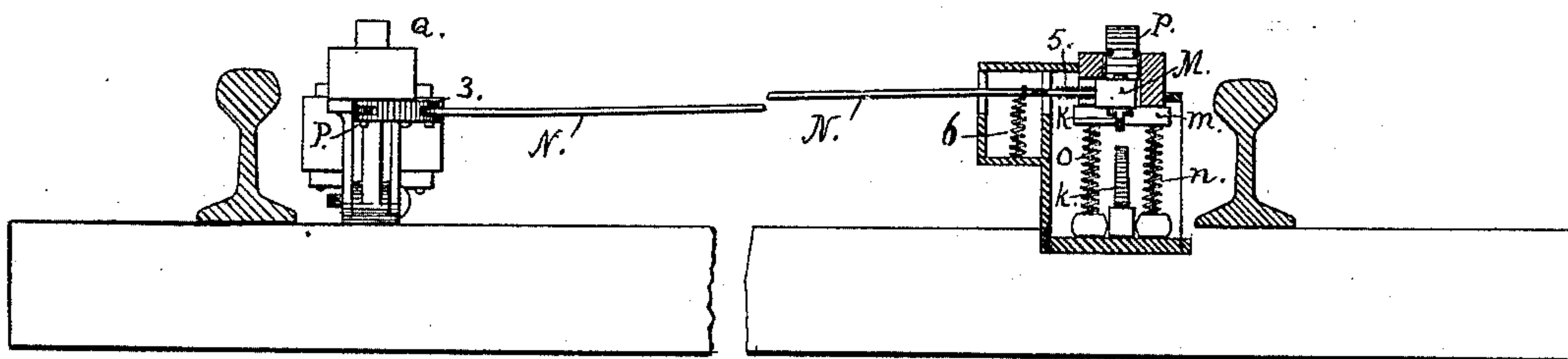
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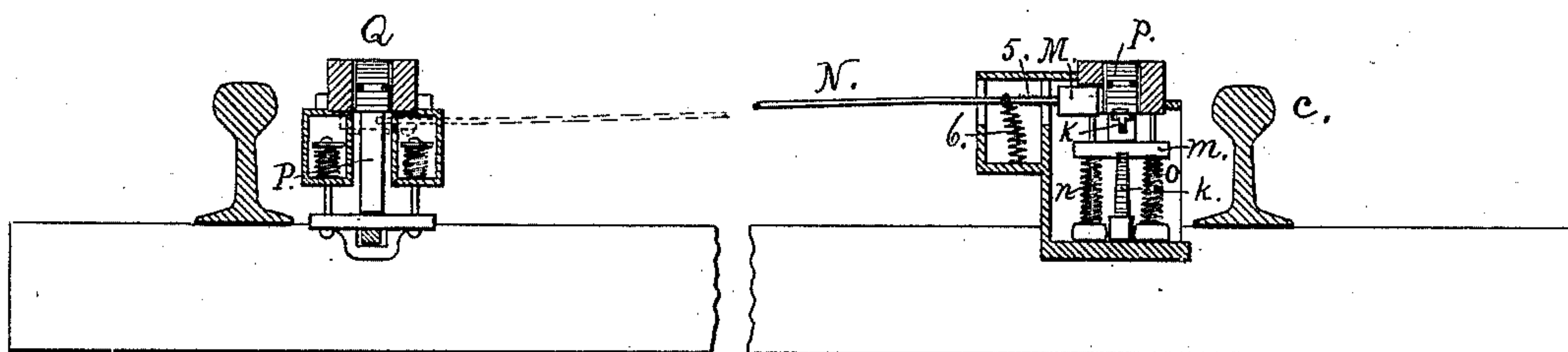
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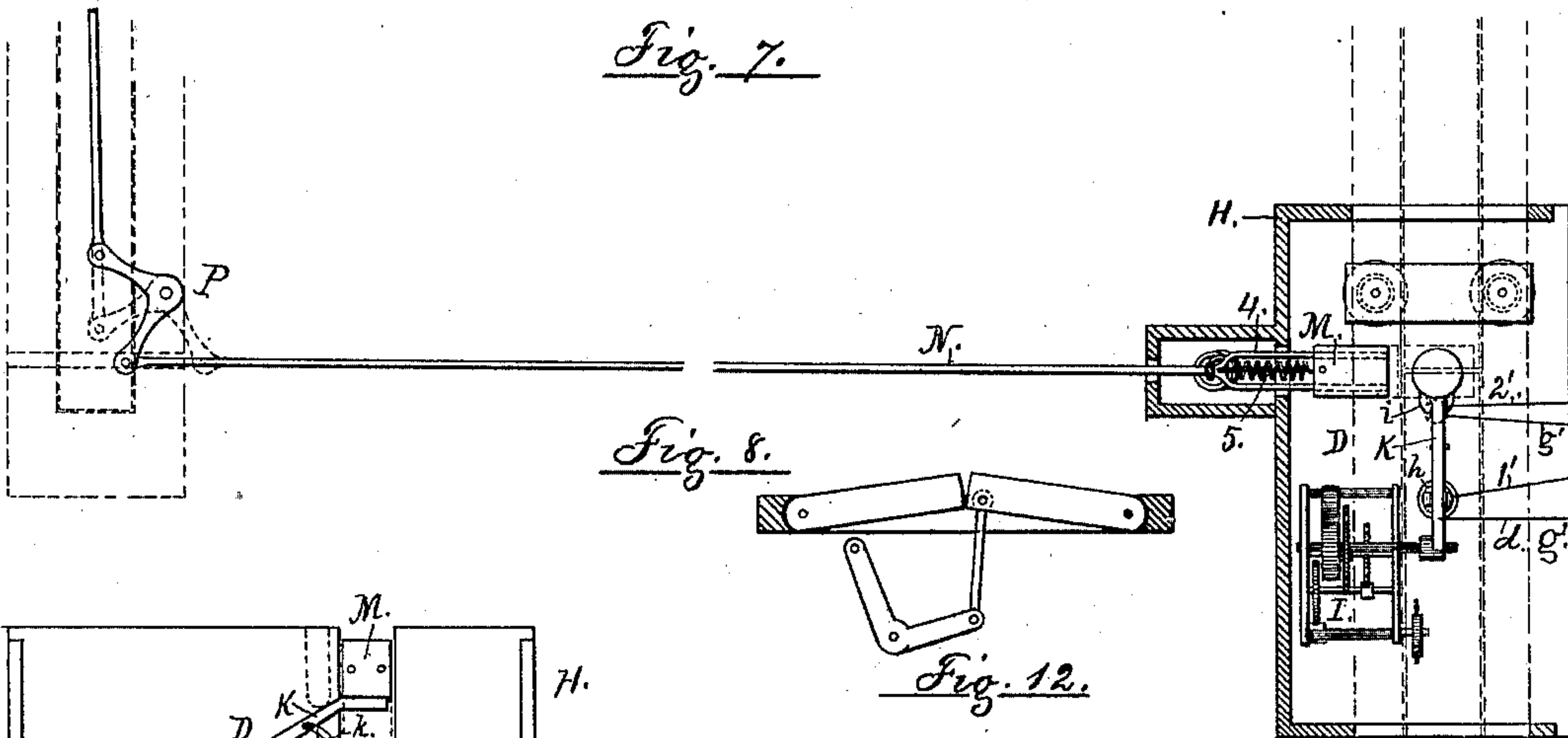
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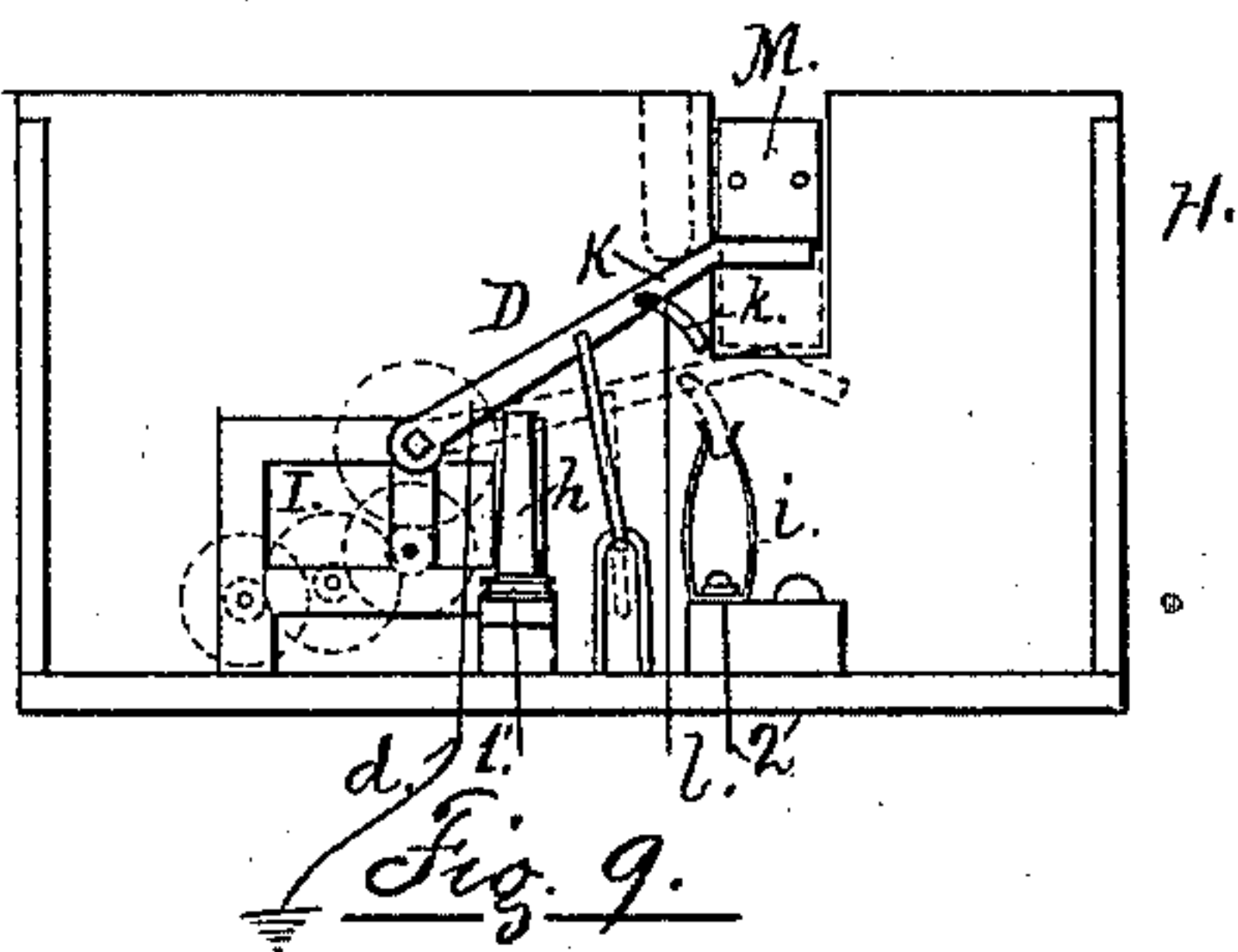
*Fig. 6.*



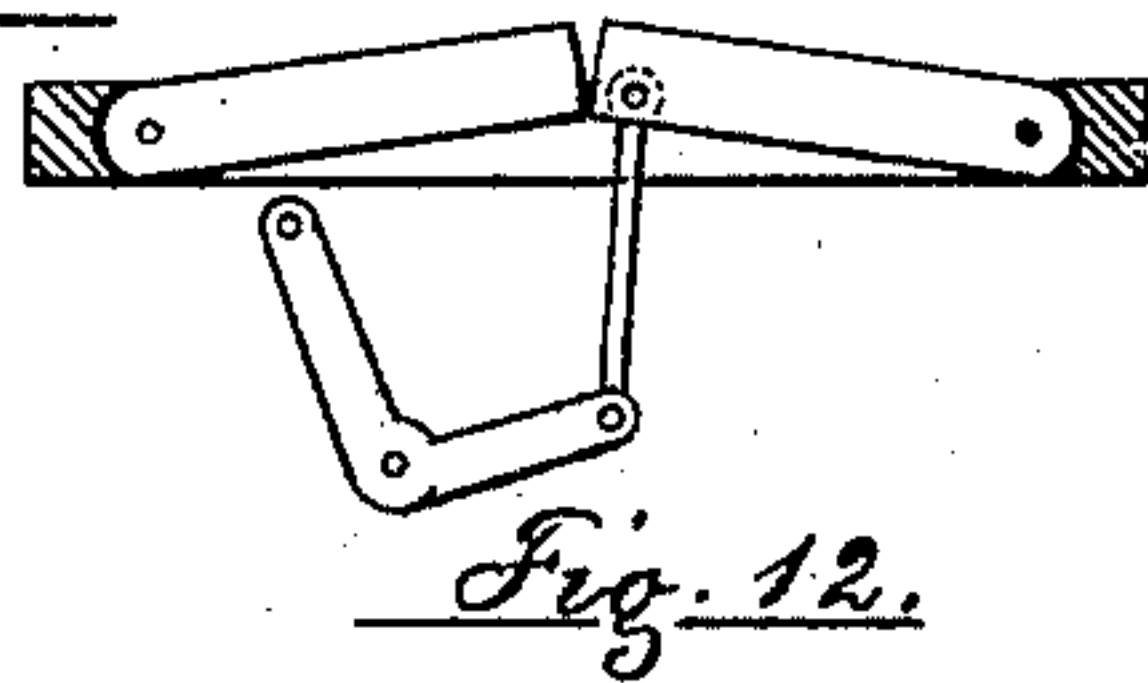
*Fig. 7.*



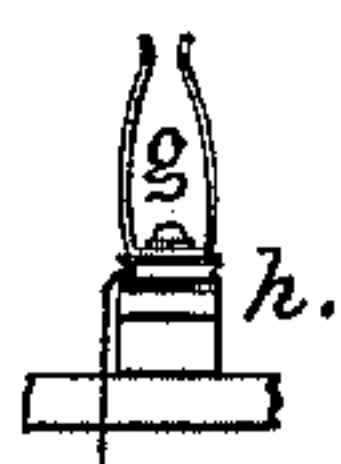
*Fig. 8.*



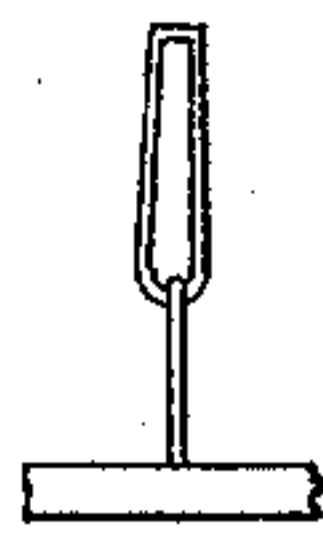
*Fig. 9.*



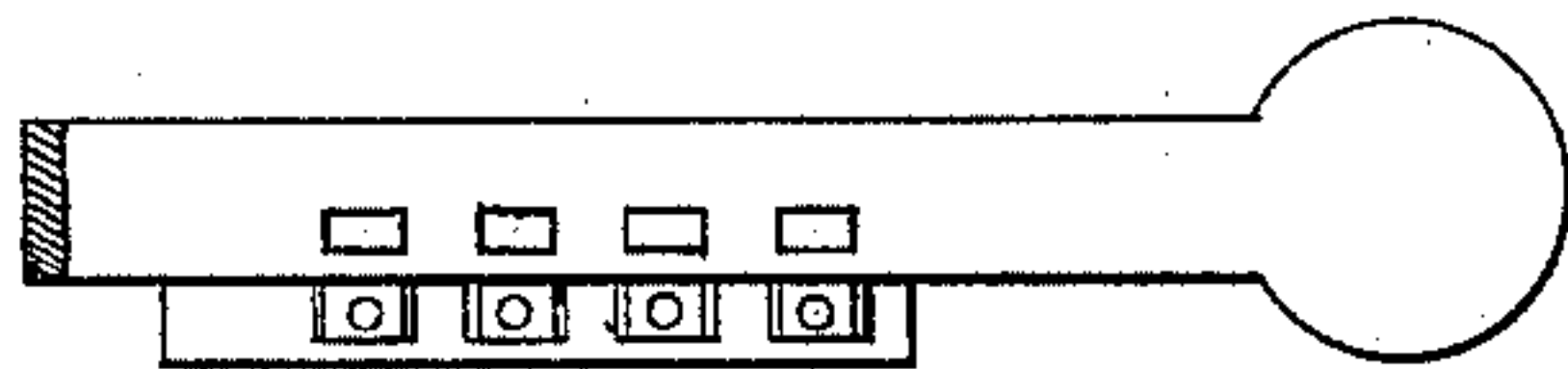
*Fig. 12.*



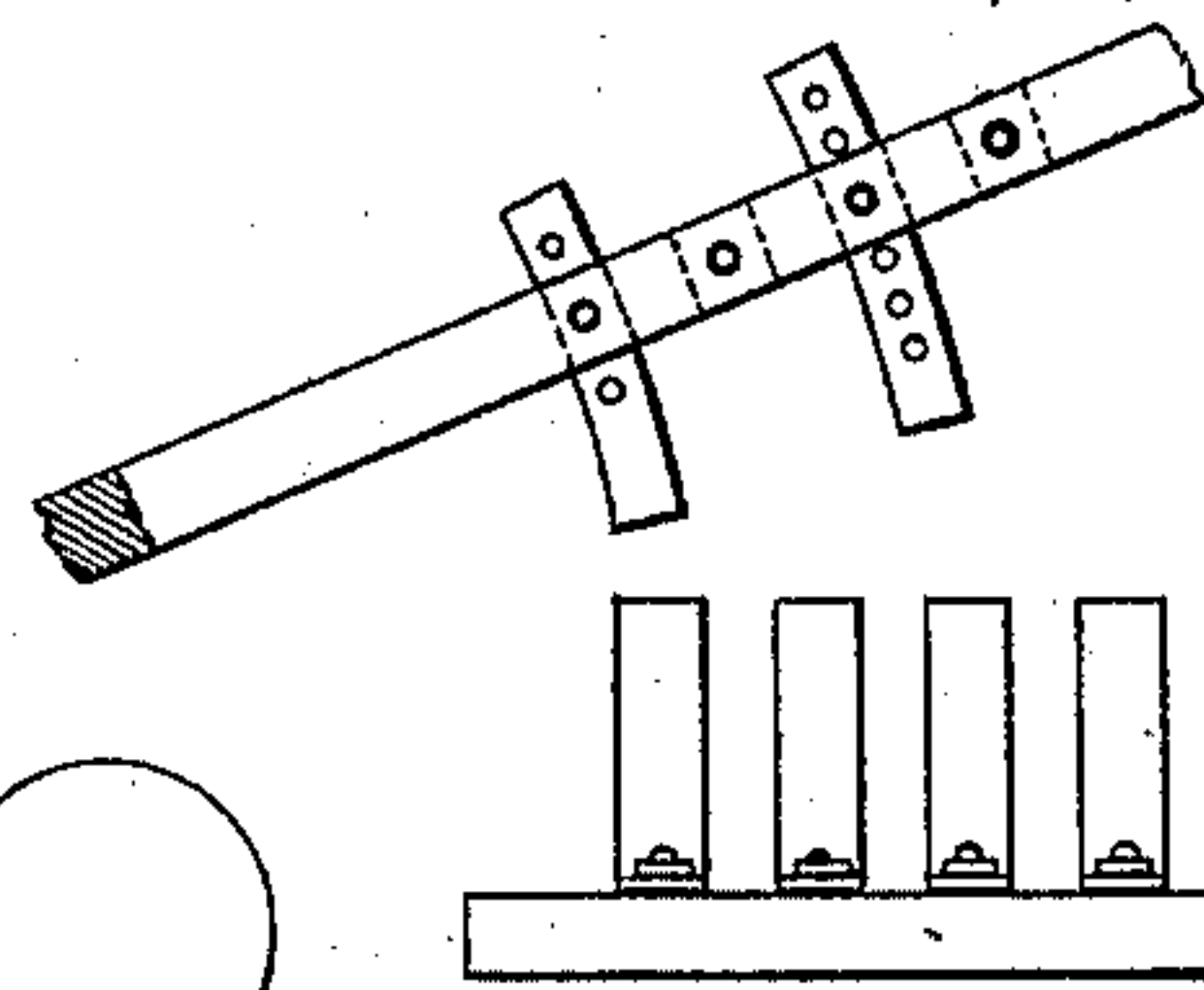
*Fig. 10.*



*Fig. 11.*



*Fig. 13.*



*Fig. 14.*

Witnesses  
*Geo. A. Lane*  
*Sam. H. Kerr.*

Inventor  
*Milton Monroe Souders*

By his Attorney *Wm. R. Gerhardt*



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Fig. 20

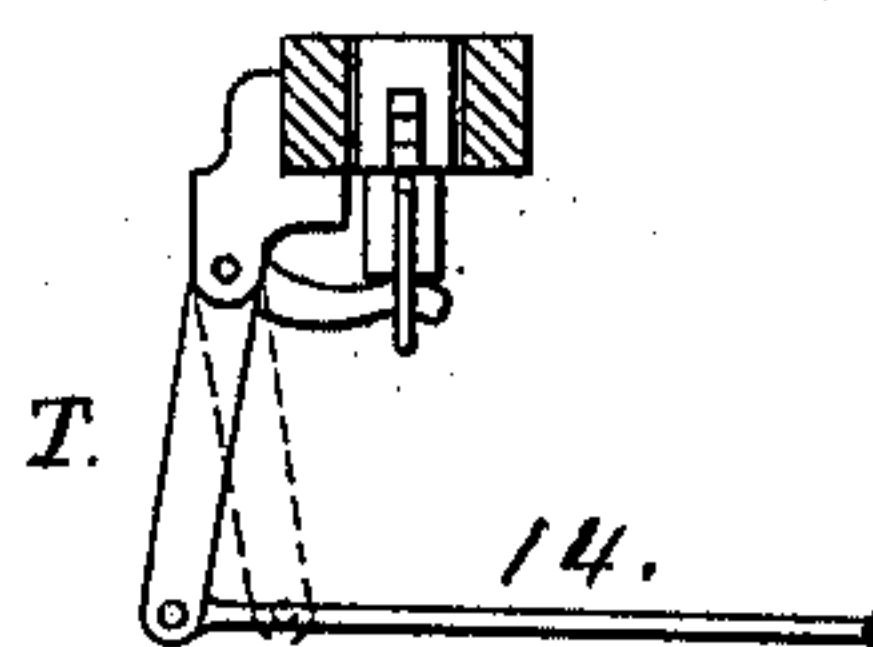


Fig. 21.

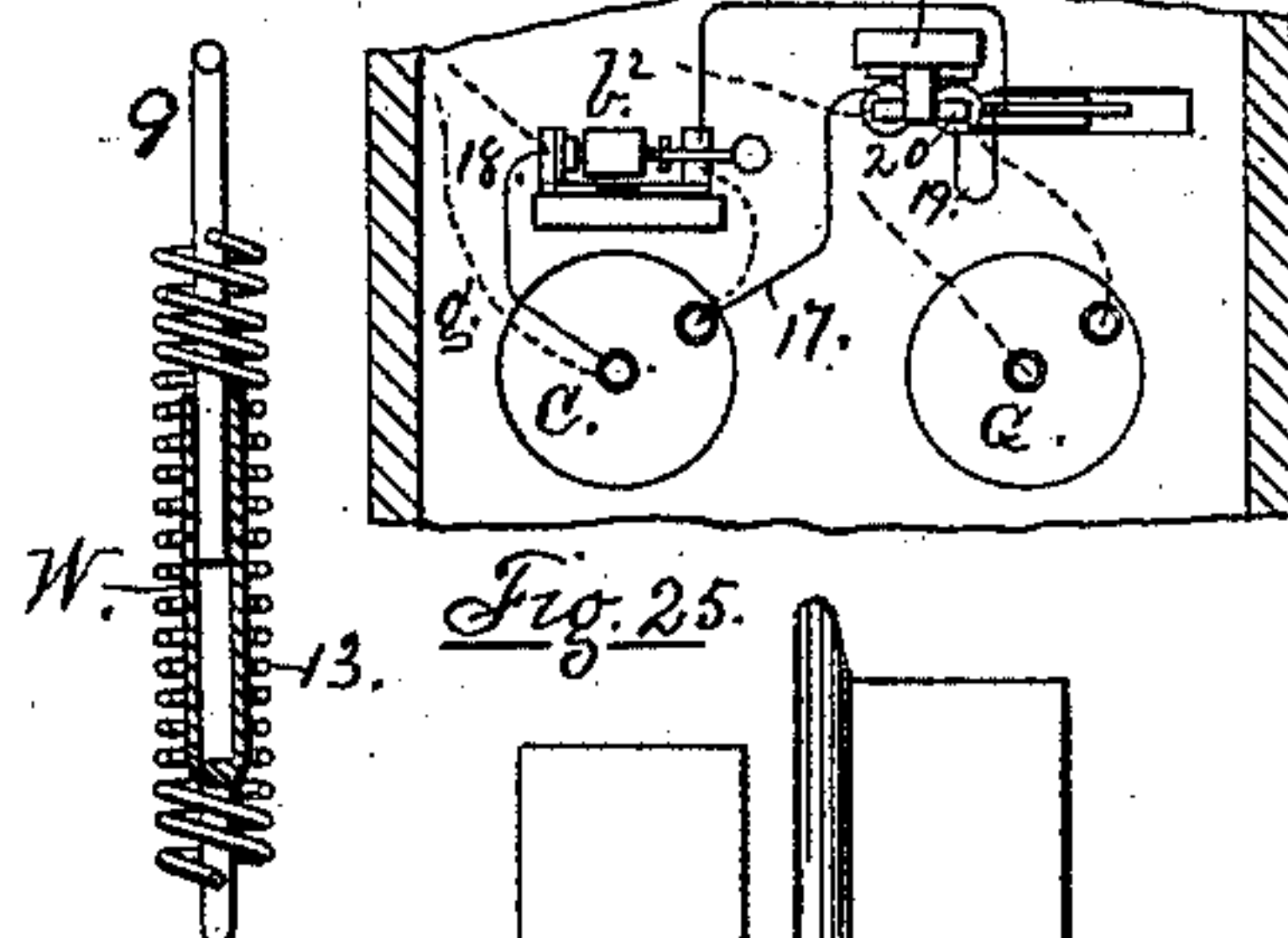


Fig. 22

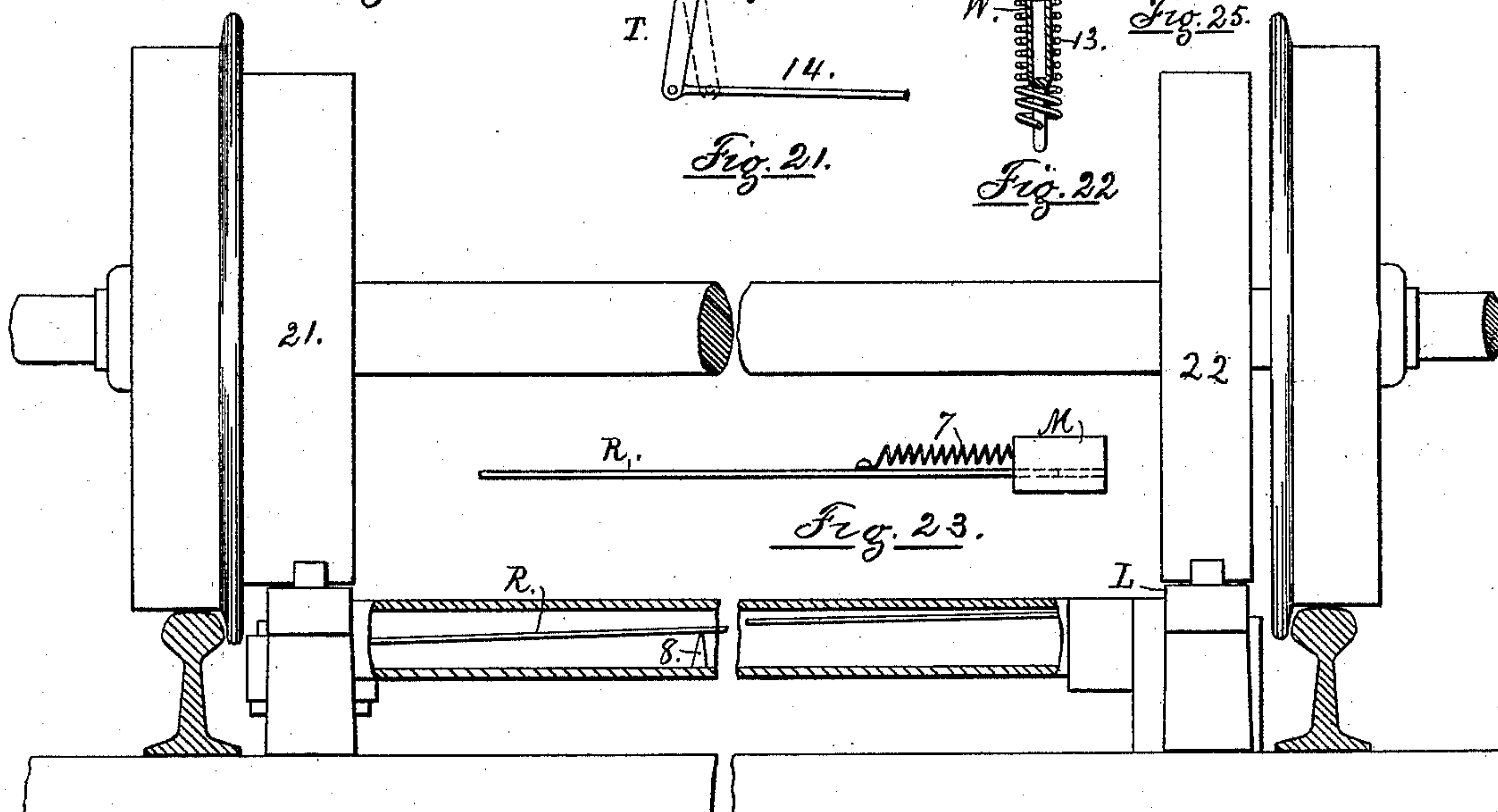


Fig. 23.

Witnesses  
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Fig. 24.

Inventor  
Milton Monroe Souder  
By his Attorney Wm. R. Gerhart



# UNITED STATES PATENT OFFICE.

MILTON MONROE SOUDERS, OF LITIZ, PENNSYLVANIA, ASSIGNOR OF FORTY-FIVE ONE-HUNDREDTHS TO JOHN L. KIEHL AND PETER G. RINGER, BOTH OF SAME PLACE.

## AUTOMATIC RAILWAY ALARM AND SIGNAL.

SPECIFICATION forming part of Letters Patent No. 421,983, dated February 25, 1890.

Application filed May 11, 1889. Serial No. 310,468. (No model.)

*To all whom it may concern:*

Be it known that I, MILTON MONROE SOUDERS, a citizen of the United States, residing in Litiz, in the county of Lancaster and State of Pennsylvania, have invented certain Improvements in Automatic Railway Alarms and Signals, of which the following is a specification.

This invention relates to improvements in that class of railway alarms and signals operated by electric apparatus; and my object is to automatically close a circuit, whereby an alarm is sounded and a signal displayed by the action of an attachment to one of the wheels or axles of the locomotive-tender, and again open the circuit to discontinue the alarm and withdraw the signal.

The invention can be used wherever signals are to be sounded or shown—at a road-crossing, signal-tower, or station—and the parts can be made to act separately or together.

This invention consists in the construction and combination of parts, as hereinafter fully set forth in the description and pointed out in the claims.

In the accompanying drawings, which form a part of this specification, Figure 1 is a side elevation of my invention, the rail hiding the cut-off and the passage for the wires and the box containing the alarm and signal being shown in section. Fig. 2 is a plan view of a section of track, showing the treadles in place and the passage for the wires and the box containing the alarm and signal with their tops removed, the gong being also removed. Fig. 3 is a side elevation of the cut-off device and the treadle which operates it. Fig. 4 is a side elevation of the treadle the depression of which acts to prevent the closing of the circuit and the mechanism through which it acts. Fig. 5 is a side elevation of the treadle, with its immediate connections, which throws the exposed signal out of view. Fig. 6 is a transverse vertical section on the line  $x x$  of Fig. 2, showing the location and arrangement of parts by which the cut-off is prevented from closing the circuit in their normal posi-

tions. Fig. 7 is a similar view of the same on the line  $x x'$ , showing the sliding pressure-block in position when withdrawn to prevent the closing of the circuit on the right and the compression of the springs and the position of other parts of the treadle on the left. Fig. 8 is a top view of the cut-off mechanism, the case being in section and the pressure-block withdrawn to prevent the closing of the circuit. Fig. 9 is an enlarged side view of the cut-off mechanism, the springs supporting the treadle being removed from the box. Figs. 10 and 11 are views of one of the conductors and the stop-link, respectively, in the cut-off. Fig. 12 is a side view of one of the treadles and a bell-crank, which can be employed in place of those shown in the other figures. Figs. 13 and 14 are respectively a top and side view of a portion of the key-lever, having its connections arranged somewhat differently from that in Fig. 9. Fig. 15 is a sectional end view of the treadle-box opposite the signal, showing the lever and the springs in their normal position. Fig. 16 is a rear view of the lever for holding the signal in the box out of view, with its electrical connections, showing the signal held in the box, the latter being in section. Fig. 17 is a similar view, but showing the signal displayed. Fig. 18 is a side view of a modified form of the lever used under the treadle opposite the signal-tower. Fig. 19 is a vertical section through the line  $y y$ , Fig. 2, showing the connection between the treadle opposite the signal with the signal and the mechanism in the alarm box or tower. Fig. 20 is a top view of a modified form of the connection of the pressure-block and the rod operating it horizontally. Fig. 21 is a side view of the lever shown in Fig. 15, the treadle being depressed. Fig. 22 is an enlarged view of a part of the connecting-rod 9, Fig. 19. Fig. 23 is a side view of the modified form of the connection of the pressure-block and the rod operating it horizontally. Fig. 24 is a view showing the manner in which the treadles are actuated, and also the modified form of connecting-rod between the pressure-block



and the treadle by which it is moved horizontally. Fig. 25 is a top view of the wires and magnets when arranged to operate both the gong and the signal-board from one battery.

Similar letters indicate like parts throughout the several views.

In the drawings, A represents a section of railway-track.

B is a signal-tower having a gong *b* placed therein, the hammer *b'* of which is actuated by an electric current passing through the armature and magnets *b<sup>2</sup>*, connected with the battery C on one side of the tower by the line 1 and with the cut-off D by the line 1'. In addition to the gong, there is a signal-board E, pivoted in the shaft B' of the tower, which, when not displayed, is held in a vertical position by the lever-catch F, the heel *f* of which engages a rib *e* on an edge of the upper arm of the signal-board. The catch F has an elbow *f<sup>2</sup>*, which extends under a short arm *a*, as is shown in Figs. 2, 17, and 19, that is actuated by an electric current passing through the armature and magnets *a<sup>2</sup>*, connected with the battery G, located near battery C, by the line 2, and with the cut-off by the line 2'.

At a suitable distance from the tower B and in the direction from which the signal is to be given there is a box H, located inside of and below the rail *c*, wherein is placed the cut-off mechanism for opening and closing the circuit of the wires 1' and 2'. The mechanism regulating the cut-off of the wire 1' consists of clock-works I, the number and size of the wheels of which are regulated as may be desired. To the stem of the clock-works is fastened a key-lever K, with which is connected the ground-wire *d*. When the lever is depressed, as will be explained, it is received between the jaws *g* of the conductor *h*, to the base whereof wire 1' is secured. When forced down, the top of the key-lever sinks as low as the top of the jaws *g*. The rapidity of the movement of the key-lever is regulated by the clock-work, and as long as any part of its surface is pressed by the jaws *g* the circuit is kept up and the gong continues to sound.

By the side of the conductor *h* there is a similar conductor *i*, located in the box H, to the base of which the wire 2' is connected. Outside of the point of the key-lever, which engages with the jaws *g* of the conductor *h*, there is a conductor *k*, rigidly connected with but insulated from said key-lever. A ground-wire *l* is secured to the conductor *k*, and when the key-lever is depressed so as to be brought into engagement with the jaws *g* of the conductor *h* the conductor *k* likewise engages the conductor *i* and closes the circuit between the wire 2' and the ground-wire *l*, whereby the signal is released by the lever F and falls into a horizontal position.

Above the box H there is a treadle L, fixed

in a frame placed a short distance from the rail *c*, and divided into two parts at the center. Each part is pivoted at the outer end, and the center of one *p* rests upon a cross-bar *m*, supported by two springs *n*, resting upon the bottom of the box H and coiled about two guide-posts O. The centers of the parts are connected by a knuckle or link joint, a supporting-arm *r* extending from the part *p* beneath the part *g'*. Beneath the inner end of the part *g'* there is a pressure-block M, that rests upon the vibrating end of the key-lever K and presses it down when the center of the treadle is depressed.

The pressure-block is constructed to slide horizontally through an opening in the back of the box H, and has an elastic rod N yieldingly fastened to the outer end. This rod passes across the track and is pivotally secured in the jaws 3 of one arm of a bell-crank P, placed beneath and operated by a treadle Q, constructed in a similar manner to the treadle L. Pressure upon the treadle Q withdraws the pressure-block from over the end of the key-lever, and should the treadle L be depressed while the pressure-block is so withdrawn it would have no effect in closing the circuits. These treadles L and Q are so located that the wheels of a train approaching the tower will engage the treadle L before striking the treadle Q. The result is that the circuits are closed and the signals given; but the wheels engage the treadle Q before they leave the treadle L. For this reason the rod N is yieldingly secured to the pressure-block. The end 4 of that rod is forked, as shown in Fig. 8, the prongs entering openings in the block and sliding therein, the connection between the rod and block being maintained by the spring 5. A vertical-acting spring 6 supports the rod and throws it and the pressure-block back into place after the latter has been depressed by the treadle L.

In Figs. 20, 23, and 24 is shown a different form of connection between the pressure-block and the treadle Q. This is a flat plate R, of spring metal, one end being received in a slot in the block, as shown in Figs. 20 and 23, sliding therein in the same manner as the prongs 4, (shown in Fig. 8,) the connection between the block and plate being maintained by the spring 7. The center of the plate rests upon a support 8, and the elasticity of the plate lifts the pressure-block after it has been depressed, thus avoiding the use of the spring 6.

When a train approaches from the direction of the tower, it depresses the treadle Q first and withdraws the pressure-block from over the key-lever, preventing the closing of the circuit.

Opposite the tower or signal there is placed a third treadle S, the depression of which lifts the signal from a horizontal position to a vertical one and again throws it into engagement with the lever-catch F. This mechanism



ism is fully illustrated in Figs. 16, 17, and 19. Beneath the treadle is secured a bell-crank T, connected by a rod 14 with a similar crank t, which changes the direction of the force. The crank t is connected with the signal-board E by the rod 9. A loop 10 on the end of the rod 9 engages the crank-pin 11 at one side of the spindle 12 of the signal-board.

That the signal-board may drop quickly when released from the catch F, one of its heads is loaded at the side by weights w. To prevent strain upon the rod 9 by passing trains when the signal-board is in a vertical position, the center is made with a socket-joint W, the parts of which are connected by a coiled spring 13.

Both signals may be operated by the same battery, as illustrated in Fig. 25. In this case there is a post 16, erected to engage the horizontal portion of the lever F. A wire 15 connects the magnet of the bell with the horizontal part of the lever, the wire 19 connects the lever with a magnet 20, a wire 17 connects the magnet 20 with the battery, and a wire 18 connects the battery with the magnet of the bell again. In this construction the dropping of the lever completes the circuit and causes the bell to be sounded.

If necessary or preferable, but one of the signals—the gong or signal-board—need be used with the cut-off.

The treadles are depressed by circular projections 21, formed on each of a pair of wheels of the locomotive-tender; or there may be special wheels 22 affixed to the axle. It is essential that, with the relative location of the treadles as shown, both of the projections or special wheels should be placed upon the same axle.

I do not confine myself to the shapes of the various cranks and levers as herein described and illustrated, but others may be substituted for them. The various ways of making connections may also be varied as may seem desirable.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the key, of a treadle for operating said key and a block through which the treadle acts upon the key, removably interposed between the key and treadle, substantially as specified.

2. The combination, with a key placed near the rail of a railway-track, of a treadle constructed to actuate the key through a pressure-block, the pressure-block, and connections between the pressure-block and a treadle placed on the opposite side of the track, whereby the block can be removed from between the key and treadle, substantially as specified.

3. The combination, with a key placed near the rail of a railway-track, of a treadle constructed to actuate the key through a pressure-block, the pressure-block, a second treadle

placed on the opposite side of the track in position to be engaged by the wheels of a car before the first treadle is so engaged when the car approaches from one direction, and connections between the pressure-block and the second treadle, whereby that block can be removed from between the key and the first treadle, substantially as specified.

4. The combination, with a key placed near the rail of a railway-track, of a treadle L, constructed to actuate the key through a pressure-block, the pressure-block, a second treadle Q, placed on the opposite side of the track in position to be engaged by the wheels of a car before the treadle L is so engaged when the car approaches from one direction and to remain in engagement until the treadle L is also engaged, and connections between the pressure-block and the second treadle, whereby said block can be removed from between the key and the first treadle, substantially as and for the purpose specified.

5. The combination, with the key and the treadle L, by which it is operated, of the pressure-block, the treadle Q, and a connection between the treadle Q and the pressure-block, said connection being yieldingly attached to the pressure-block horizontally, substantially as and for the purpose specified.

6. The combination, with the key and the treadle L, by which it is operated, of the pressure-block, the treadle Q, and a connection between the treadle Q and the pressure-block, said connection being formed with a spring whereby it can raise the pressure-block after being depressed by the treadle L.

7. The combination, with signals connected with electric batteries, substantially as specified, of a key K, placed near a rail of the track and having ground-wires attached thereto, conductors adapted to be engaged by said key, wires connecting the conductors and signals, a treadle placed near the rail and adapted to actuate said key through a pressure-block, and a pressure-block removably interposed between the treadle and key, substantially as and for the purpose specified.

8. The combination, with signals connected with electric batteries, substantially as specified, of a key K, placed near a rail of the track, wires connecting the key and ground, conductors adapted to be engaged by said key, wires connecting the conductors and signals, a treadle placed near the rail and adapted to actuate said key through a pressure-block, the pressure block removably interposed between the treadle and key, and a gearing adapted to retard the disengagement of the key from the conductors, substantially as and for the purpose specified.

9. The combination, with signals connected with electric batteries, of a key K, placed near a rail of the track and having ground-wires attached thereto, conductors adapted to be engaged by said key, wires connecting the conductors and signals, a treadle L, placed



near the rail and adapted to actuate said key through a pressure-block, a pressure-block interposed between the key and the treadle L, a second treadle Q, located on the opposite  
5 side of the track and between the treadle L and the signals, and a connection between the treadle Q and the pressure-block, where- by said block may be withdrawn from between the treadle L and the pressure-block, substantially as and for the purpose specified. 10

MILTON MONROE SOUDERS.

Witnesses:

JEREMIAH RIFE,  
WM. R. GERHART.