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Patented Jan. 28, 1902.

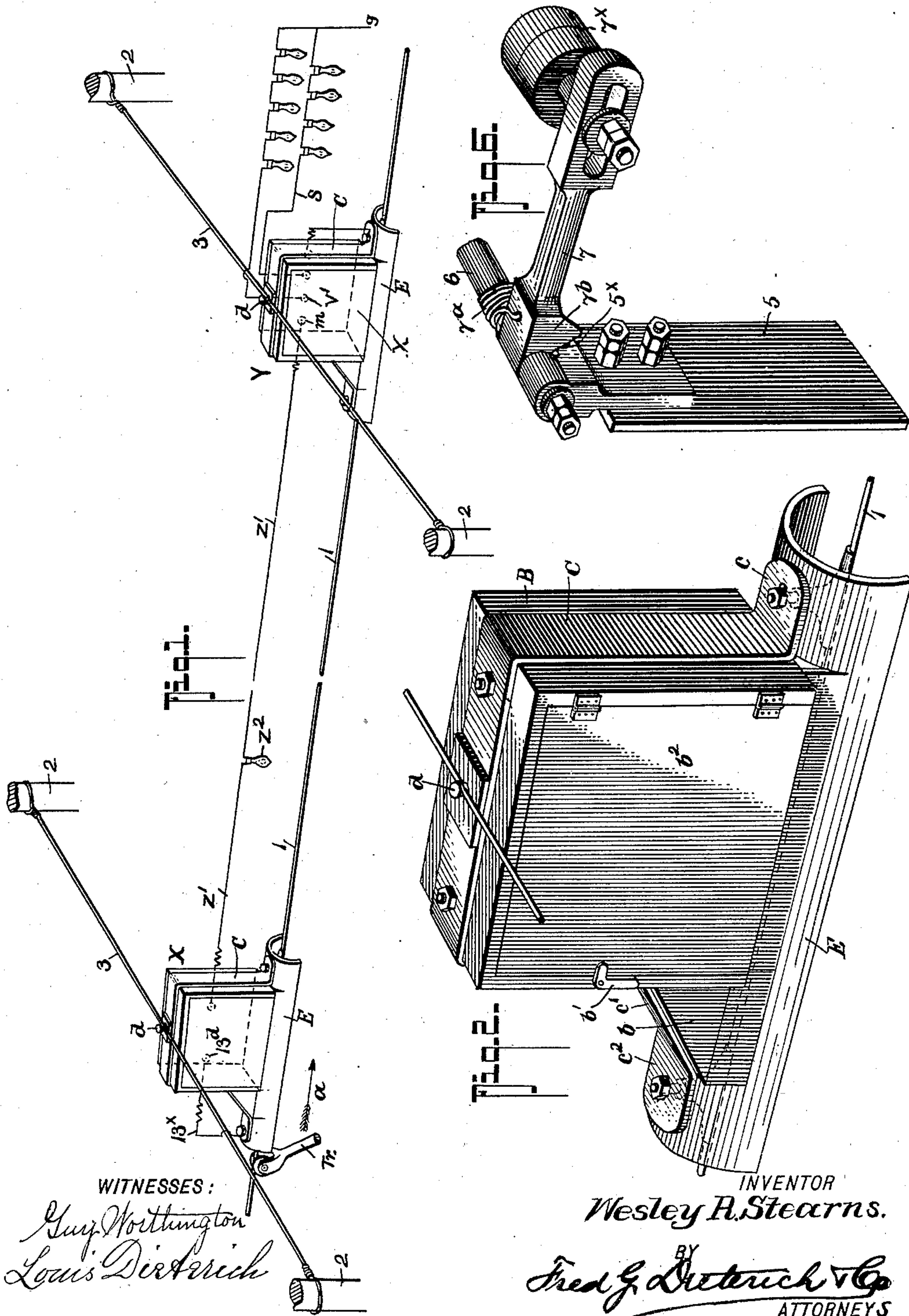
W. R. STEARNS.

ELECTRIC SIGNAL MECHANISM FOR OVERHEAD TROLLEY SYSTEMS.

(Application filed Sept. 14, 1901.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:

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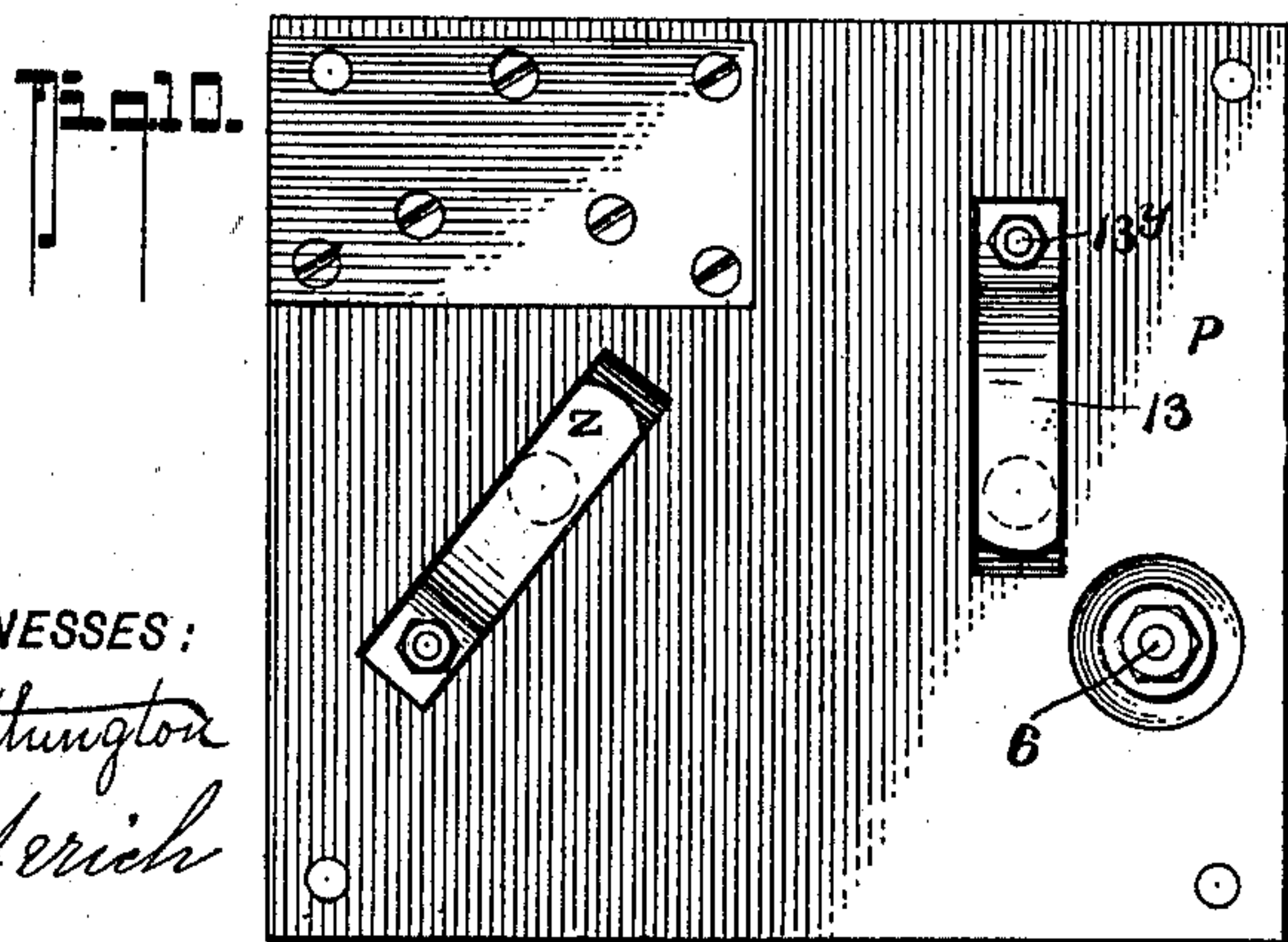
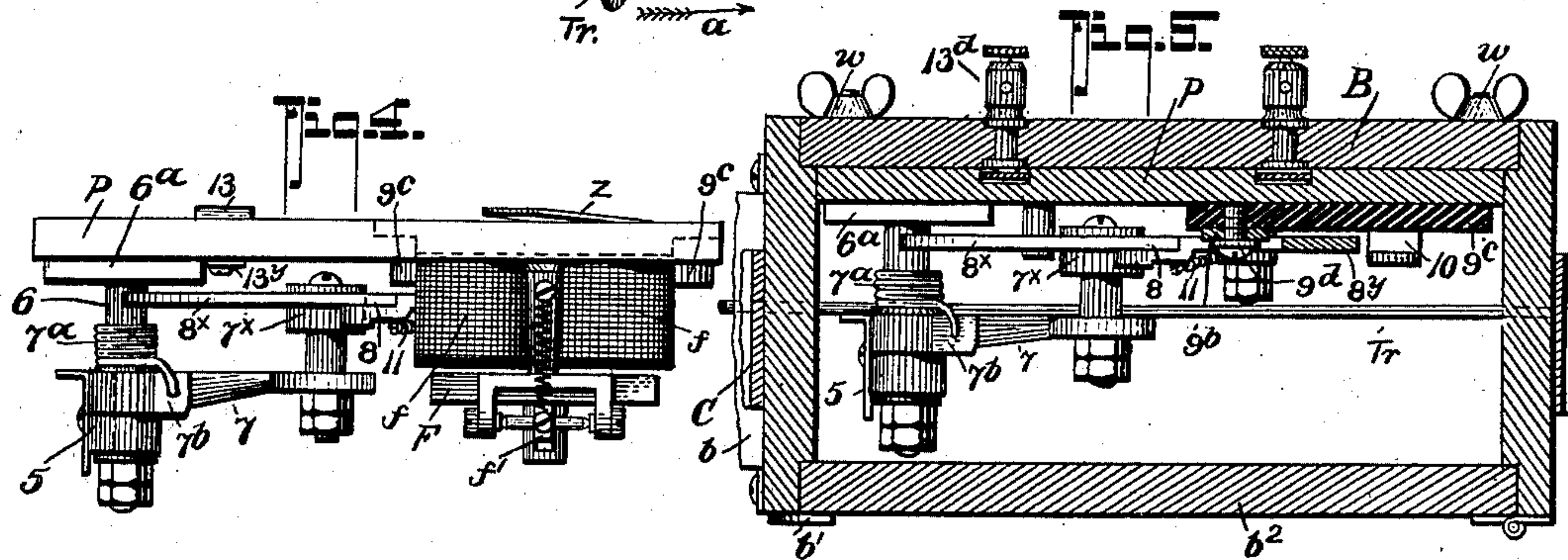
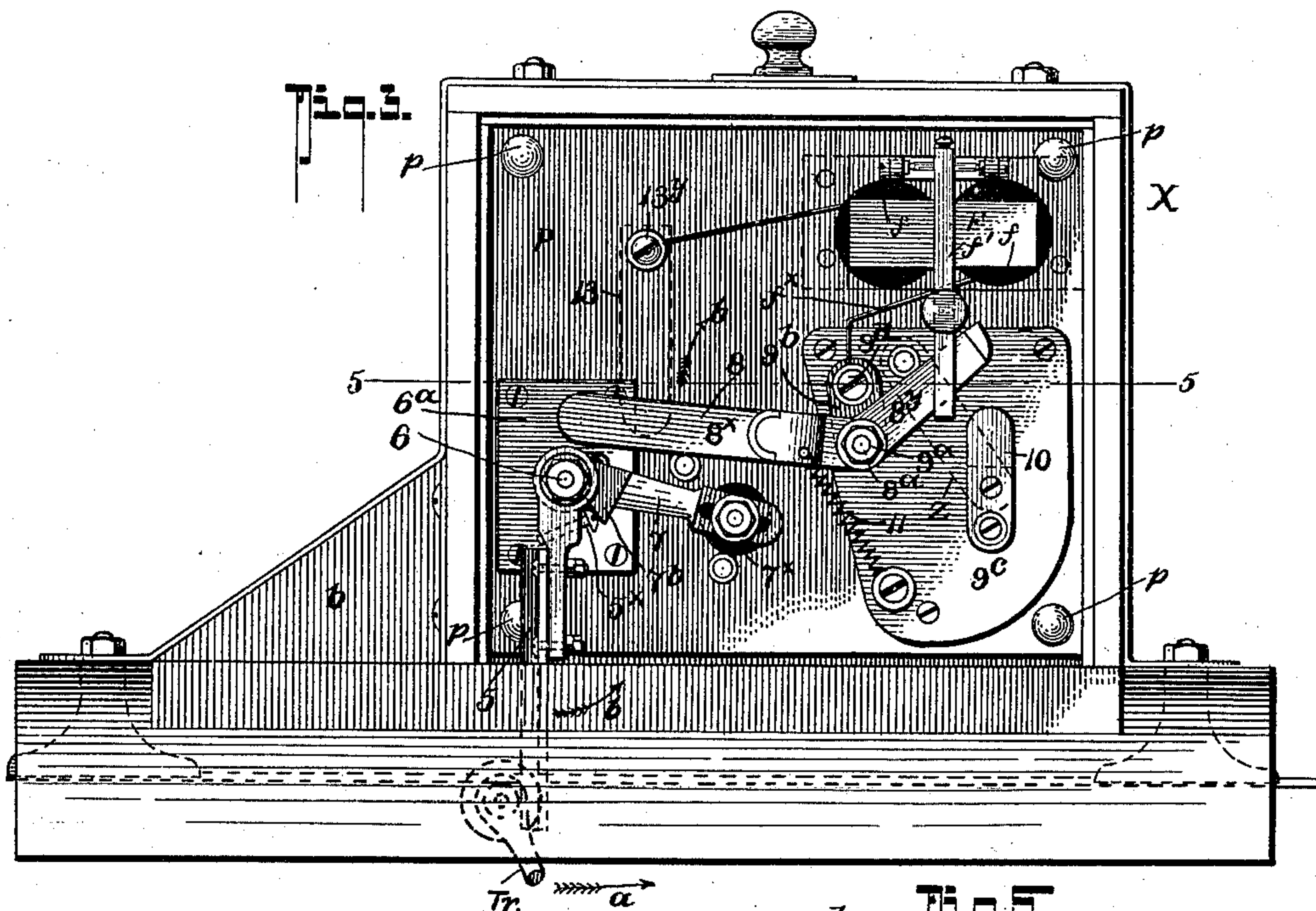
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3 Sheets—Sheet 2.



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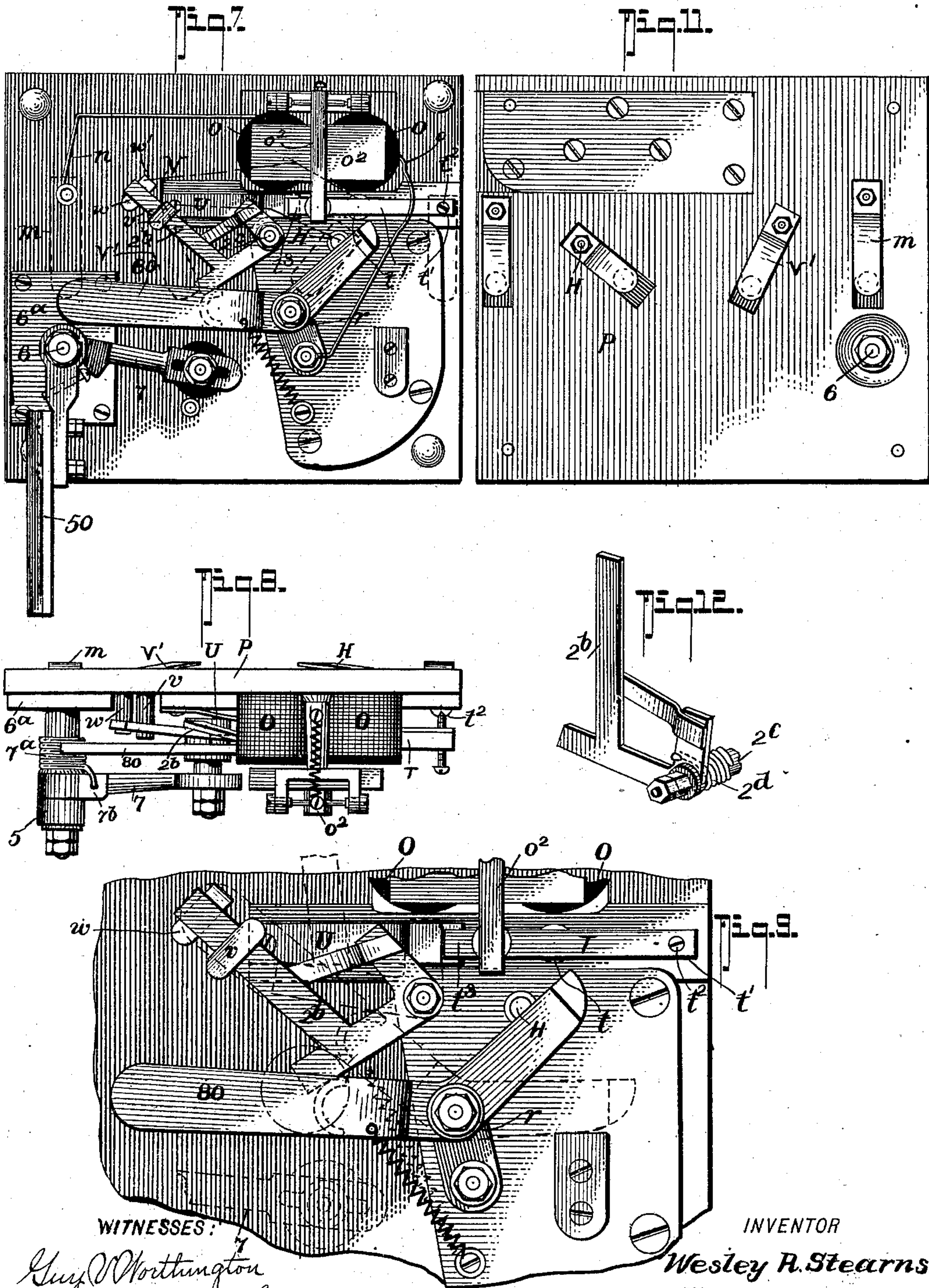
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3 Sheets—Sheet 3.



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ELECTRIC SIGNAL MECHANISM FOR OVERHEAD-TROLLEY SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 692,085, dated January 28, 1902.

Application filed September 14, 1901. Serial No. 75,407. (No model.)

To all whom it may concern:

Be it known that I, WESLEY R. STEARNS, residing at Portland, in the county of Multnomah and State of Oregon, have invented a new and Improved Electric Signal Mechanism for Overhead-Trolley Systems, of which the following is a specification.

This invention is in the nature of an improved automatically-operating electric signaling mechanism particularly adapted for single-track overhead-trolley railways having turnouts or switches, and the same more especially relates to improvements on the signaling mechanism or system disclosed in my Patent No. 639,202, dated December 12, 1899.

My present invention seeks to render my patented system the more effective and positive in its operation and to simplify the construction of the several parts, whereby they may be economically manufactured and adjusted and set up for use without requiring skilled labor to assemble the parts thereof.

Generally, my present invention comprehends a certain novel correlative arrangement of parts whereby in operation a positive block both ahead and behind a car can be maintained, even if the entire line or signal wire between the point signaled from and the point signaled to should come down or be cut out, or, in other words, the signal is not put out of operation by power leaving the system, the trolley-wire breaking or burning out, or by other breakages in the current-transmitting means such as are liable to happen in present construction of signaling devices of this character.

My invention also includes in the make up a special construction of holder for sustaining all of the working parts of the circuit closing or opening devices detachably within the housing or box sustained on the wire or supports in such manner that in case of an accident to the apparatus the said working parts can be removed by an inexperienced man and replaced by a duplicate set of such devices without causing any appreciable interruption of the signaling service.

Again, my present invention seeks to provide a simplified adjustably-held trolley-engaged means for throwing the cut-in and cut-out switches, whereby to allow for freedom

of movement of the trolley-wheel without effecting the proper position of the throw-arm.

In its more subordinate features my invention consists of certain novel details of construction and peculiar combination of parts, all of which will hereinafter be fully described, and specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a diagrammatic representation illustrating the general arrangement of my invention. Fig. 2 is a perspective view of one of the switch-holding boxes and illustrating the means for sustaining it upon the wire. Fig. 3 is a front elevation of the "cut-in" switch mechanism in the box. Fig. 4 is a top plan view of same removed from the box. Fig. 5 is a horizontal section on the line 5 5 of Fig. 3. Fig. 6 is a detail perspective view of the trolley-engaged throw arm or lever. Fig. 7 is a front view of the cut-out switch mechanism detached from the box. Fig. 8 is a plan view thereof. Fig. 9 is a section on the line 9 9 of Fig. 7, the supplemental circuit-controlling switch devices being in an open or locked position. Fig. 10 is a rear elevation of the cut-in back plate, and Fig. 11 is a similar view of the "cut-out" back plate. Fig. 12 is a detail view of the supplemental switch devices 2^b.

In my present invention I employ two sets of switch mechanism, which are coöperatively mounted upon the trolley-wire at suitable distances apart, and one of these sets I shall hereinafter term the "cut-out" X and the other the "cut-out" Y, and at this point I deem it proper to state that a cut-in is placed at one end of the block, and a cut-out at the other end of the block for signaling in one direction. To signal in both (opposite) directions, another double set of switch mechanism is used.

The switch mechanisms X and Y are controlled by the main or feeder current, as in my patent referred to; but in the present construction I utilize a reserve-circuit in the manner and for the purpose hereinafter explained. This mechanism may be used double, using two boxes instead of four, if desired.

Referring now to the accompanying drawings, in which like characters indicate like

parts in all the figures, 1 designates the trolley or feed wire, 2 a set of supporting-poles, and 3 a cross-wire support, of the usual construction.

5 The cut-in and cut-out mechanisms are detachably sustained within a box B, the construction of which is best shown in Fig. 2, by reference to which it will be seen said box consists of a rectangular body open at the
10 bottom and made fast to a band iron or strap C, which extends over the top and ends of the box. At one end it has a right-angled slotted footpiece c , and at the other or front end it has an angle portion c' , that fits over the
15 metal housing or extension b' at the front end of the body b , the reason for which will hereinafter appear, and the said portion c' terminates in a flat-apertured foot c^2 .

Centrally the top member of the band C has
20 an internally-threaded boss to receive an insulating-bolt d for engaging the cross-wire 3, attached to the poles, as shown. E designates the curved trolley-wheel guard-plate, which is pendently secured to the members c^2 and c of
25 the strap C, as shown, and to provide for quick access to the interior of the box B one side is hinged to form a swinging door b^2 , normally held closed by a gravity-catch b' .

By suspending the box in the manner described the same can be easily put up or removed.

Referring now more particularly to Figs. 3, 4, and 5, which illustrate the cut-in, P designates a back-plate which is detachably se-
35 cured to the back of the box by the four corner screw-bolts p and the winged nuts w , such relation of parts being provided that, in case of breaking or disarrangement of any of the internal circuit-controlling mechanism,
40 the entire mechanism can be instantly removed and replaced with a new set by unskilled labor and thereby avoid putting out of operation for any length of time the signaling mechanism.

45 To make the action of the cut-in X readily understood, the operation of the same will be explained as the several parts are described in detail.

Assuming the trolley Tr to be passing in the
50 direction of the arrow a , in passing cut-in X it engages a throw-arm 5, which hangs pendently from the box B. This arm 5 is pivotally hung on a stud 6, forming an integral part of the plate 6^a , and is free to swing back-
55 ward under the housing b when engaged by the trolley-wheel passing in the opposite direction. 7 designates a lever-arm, also pivoted on the stud 6 and spring-held to its downward or normal position by the coiled spring
60 7^a . The arm 7 has a heel portion 7^b , with which the adjustable stop 5^x on the throw-arm engages. 8 designates an angle-lever fulcrumed at 8^a on a stud 9^a , mounted on the plate 9^b , connected to the insulated block 9^c .
65 The lever or switch 8 has an arm 8^x , with which the arm 7 coöperates, said arm 7 having a roller-bearing 7^x to engage arm 8^x and a con-

tact-making member 8^y , adapted when the lever 8 is tilted in the manner presently described to engage the contact-plate 10, and
70 the said lever 8 is held to its normal position by the coil-spring 11, one end of which connects with the lever 8 and the other with the insulated plate 9^c .

13 designates a spring-plate-contact member on the rear side of the block-plate P, adapted when the parts are assembled for operation to engage the contact 13^d , with which the feed-circuit joins.

When the trolley moves the arm 5 up in the
80 direction indicated by arrow b , the lever 8 will be swung to bring its contact-making end into engagement with the part 10, which cuts in the circuit.

The wiring of the cut-in mechanism will be
85 best understood by referring to Figs. 1 and 3, by reference to which it will be noticed the line of signal-wire 13^x is connected to the trolley-wire and extends back to the binding-post 13^d and plate 13, the stud 13^y of which extends
90 to the inside of the back plate or board, and with it connects the current-wire to the magnets f , from which the current passes into wire f^x , which joins with the stud 9^d on the plate that carries the lever 8.
95

The contact-plate 10 joins with the spring-plate Z, from which the current (when arm 8 is down in contact with member or plate 10) passes out to the next siding through line-wire
100 Z' and pilot-signal, one lamp Z² being shown in such line. The line-wire Z' in practice is strung on poles or other permanent supports adjacent the track.

The magnet f , before referred to, has its armature F formed with a lever extension f' ,
105 which acts as a detent to hold the lever-arm down against the contact-piece 10 until the car has passed the cut-out devices and the magnet deenergized, which operation is affected by the action of the cut-out Y in the
110 manner presently described.

The line-wire from the cut-in X connects with spring-plate m of the cut-out devices Y, and the circuit-wire n passes from the plate
115 m to the magnet O and from thence through the wire o to the post r , upon which is fulcrumed the switch-lever 80, constructed the same as the lever 8 of the cut-in devices X, and from thence to the post H, having spring-
120 contact plates, which connect through the line or signal wires with ground-rail. (See Fig. 1.)

The cut-out devices also include a pivoted lever 5, having arm connection 6, the same as the cut-in X has. The construction of the
125 parts as designated being in their normal position, the car as it engages the cut-in X shifts the lever devices thereon and shunts a current from the feeder or trolley wire through the said cut-in X into the line-wire between
130 it and the cut-out Y, through the cut-out Y to the line s , to return in ground, thereby setting the signals. During this operation a safety device within the cut-out Y, which

forms a part thereof and also an essential feature of my present invention, is brought into action, the construction of said safety device and its operation being as follows: To the armature o^2 of the magnet O is attached a lever T, which is fulcrumed at t to lock in a plane at right angles to the bar o^2 , and at one end this lever has a contact-maker t^2 and at the other end it has a footpiece t^3 , that engages a spring catch-plate or detent U, adapted to hold up a supplemental switch 2^b , fulcrumed on a post 2^c , it having a coiled connection 2^d for automatically moving it to contact with a post v , having a spring-plate V for engaging with a main-current lead-post V' and also with a second contact w , joined by the wire w^x with the fulcrum part of lever T. By reason of the correlative arrangement of the supplemental switch 2^b with the magnets O when current is shunted into said magnets by the closing of circuit through the cut-in X the energizing of the magnets O will rock lever T and cause its end t' to rise from contact with its mate and its footpiece t^3 to engage and depress the detent U, which action releases the supplemental switch, which by its spring 2^d is swung down to close in the contact-post v and contact w , closing in the reserve-circuit and at the same time cutting out the circuit through the contact-maker f^2 . The car-trolley engages the pendent throw-arm 50, said arm engages lever 80 and moves the lever 80 out of contact with post H, cuts out circuit through the cut-in X, and at the same time moves the switch 2^b out of electrical connection with parts w and v and cuts out the reserve or supplemental circuit from main feed-wire. Now in case of an accident to the line-wire or for any reason the current leaves the signals or lamps burn out after the car has passed the cut-in X and is in the "block" the cut-in magnets f will release switch-lever 8 and at same time release the magnets O in the cut-out Y. This releases the armature of magnet O, which by its spring connection rises up and rocks the lever T, which then releases the supplemental switch 2^b , which instantly closes against contacts v w , and thus shifts the circuit from feed-wire through the reserve and out to the line-wire to the ground. This action through reserve-circuit and supplemental switch will also take place should power leave the system when the car is in the block.

By reason of the construction and the operation just described should another car come to the point signaled from and it be noticed that one lamp or pilot signal was not set and it be considered that there was a clear track ahead said car could not set the pilot-signal, as the current at this time will be shunted through cut-out devices. Car No. 2 seeing that signal was not properly set would then proceed with caution.

The switch-lever 80 where it engages the switch 2^b is insulated.

Having thus described my invention, what

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

1. An electric signal apparatus for the purposes described, comprising a separate line-wire connected with the feeder or trolley wire, normally out of electrical circuit therewith, a device for cutting in the circuit, controlled by the passing trolley, a separate device for cutting out the circuit, operating in harmony with the cut-in devices governed by the passing trolley, the cut-in devices including trolley-engaged levers and electromechanical means for automatically returning said levers to their normal position, set in operation by the deenergization of the cut-in devices, as set forth.

2. In an electric signaling apparatus as described a line or signal wire connected to the trolley-wire and to a return, signals in said wire, a cut-in device at one end and a cut-out device at the other end, said devices having levers adapted to be set by the trolley, a separate or reserved circuit for maintaining the signal at the cut-out end, normally energized from the trolley-wire and a switch mechanism for cutting out said circuit governed by the action of the cut-in and cut-out devices substantially as shown and described.

3. In a signaling apparatus of the character described; a line having signals thereon fed from the trolley or main feeder, means for cutting the current at one end, a separate means for cutting out the current from one part of the signal-line and for sustaining the current in the other part of the said line for the purposes specified.

4. An electric signaling apparatus having a main trolley-wire, lateral signals on said lines, and set by the energization thereof; of trolley-engaged devices for cutting in the current to the lines said devices including independent but coöperatively-held switch mechanisms, for maintaining the "block" or signals behind and in front of the passing car substantially as shown and described.

5. In a trolley-controlled electric signal apparatus of the character described the combination with the signal-line wire; of a box mounted over the wire, said box having binding-posts for connecting with the feeder-wire, a current-controlling switch mechanism, a base or plate carrying said mechanism said plate including contacts for engaging the binding-posts, and means for detachably supporting said plate with the mechanism thereon within the box for the purpose described.

6. The combination with the housing D open at the bottom, one side being removable and binding-posts supported on the other side; of current-controlling devices, a base-plate for sustaining said devices said plate being detachably supported on the stationary side of the housing, said devices including spring-plate contacts for engaging the binding-posts, and a trolley-engaged lever hung pendently through the open bottom of the housing as specified.

7. In an electric signaling apparatus; current-controlling devices, said devices including a box open at the bottom, switch mechanism sustained within the box and including
 5 a pendent trolley-engaging member; a metal band extended over the top and end of the box and connected there to said band having a threaded socket in the top, and apertured footpieces and means for connecting the foot-
 10 pieces with the trolley-wire substantially as described.

8. In an electric signaling apparatus of the character described; a signal-line taking current from the trolley-wire, and a trolley-operated means for shunting the current into
 15 said line; in combination with a cut-out mechanism comprising a switch normally closed,

a trolley-engaged lever for operating said switch; a supplemental trolley-wire in said circuit, a magnet forming a part of the cut-out
 20 mechanism in said circuit, a double and alternately-acting armature-lever coöperating with the magnet, a supplemental switch in said circuit normally open and automatically
 25 released by the action of the armature-lever when its coacting magnet is energized and moved to close in the supplemental circuit to maintain the signal substantially as described.

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Witnesses:

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