

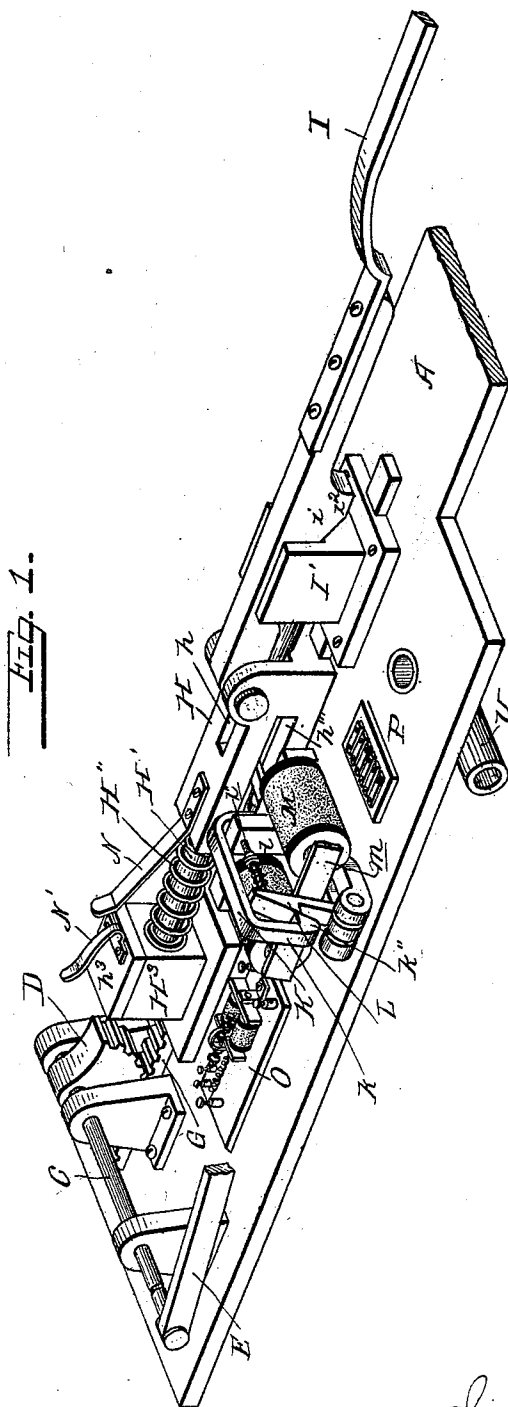
(No Model.)

4 Sheets—Sheet 1.

I. L. GREEN.
ELECTRICAL RAILWAY SIGNAL.

No. 516,596.

Patented Mar. 13, 1894.



WITNESSES,
Walter Sammaris,
Jesse Heller.

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Fig. 2.

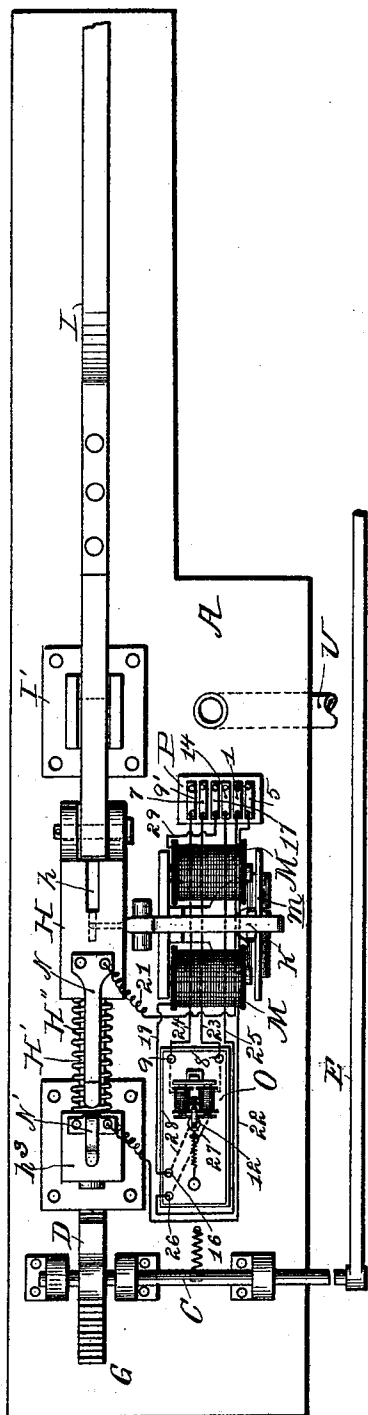
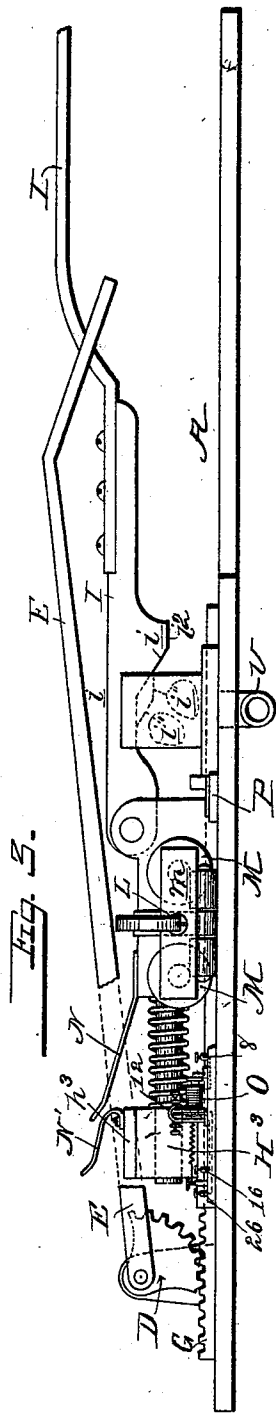


Fig. 3.



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Fig. 4.

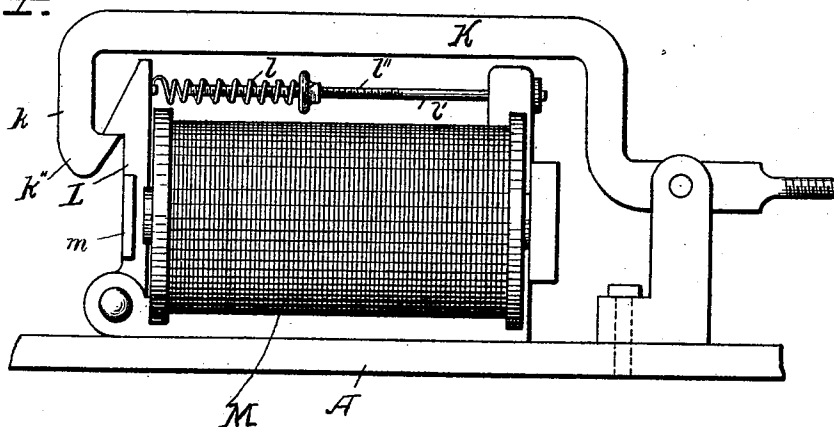


Fig. 5.

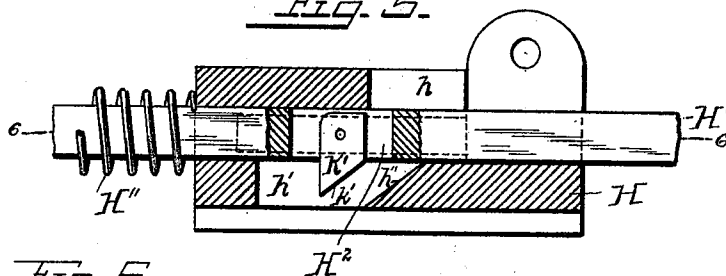


Fig. 6.

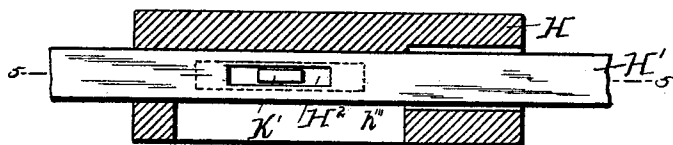
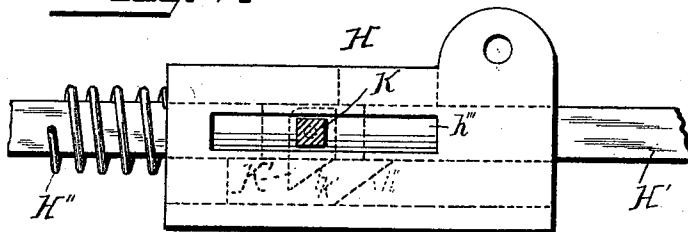


Fig. 7.



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(No Model.)

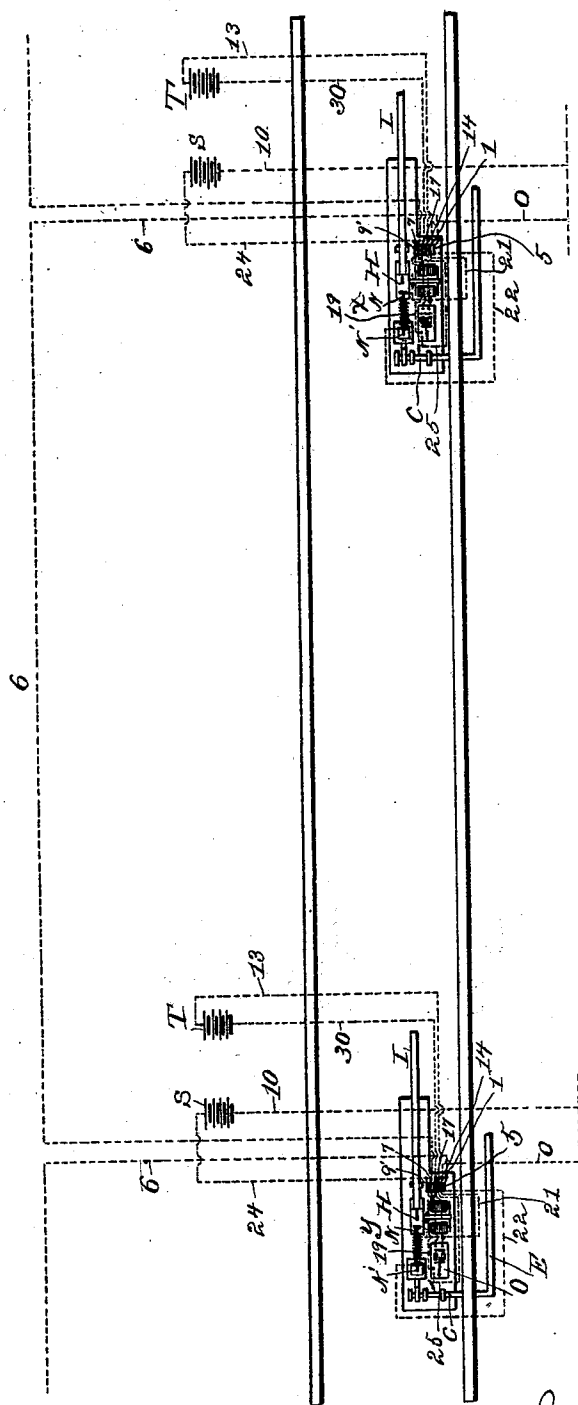
4 Sheets—Sheet 4.

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Fig. B.



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UNITED STATES PATENT OFFICE.

IRA LLOYD GREEN, OF KITTANNING, PENNSYLVANIA, ASSIGNOR OF FIVE-SIXTHS TO GEORGE M. FOX, WYTHINGTON REYNOLDS, AND CHRISTOPHER C. SHADLE, OF SAME PLACE, AND MARCUS D. WAYMAN, OF FORD CITY, AND JAMES M. PATTERSON, OF SHARPSBURG, PENNSYLVANIA.

ELECTRICAL RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 516,596, dated March 13, 1894.

Application filed July 22, 1893. Serial No. 481,215. (No model.)

To all whom it may concern:

Be it known that I, IRA LLOYD GREEN, a citizen of the United States, residing at Kittanning, in the county of Armstrong and State of Pennsylvania, have invented certain new and useful Improvements in Electrical Railway-Signals; 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.

This invention has particular reference to the track instrument of the electrical railway signal patented to me January 24, 1893, (No. 490,626.) In my said patented signal a train entering a block engaged and depressed a lever, E, which through mechanical connections therewith, elevated the outer end of an arm, I, into position to engage a mechanism carried by a locomotive of a train entering the block and to close an electric circuit through an alarm in the cab of said locomotive, thereby notifying the engineer that the block is already occupied and causing him to stop until said arm is lowered, which latter is accomplished by the first-mentioned train as it passes out of the block causing closing of an electric circuit from the track instrument at the entrance to the block which it is just entering through the track instrument at the entrance to the block which it is just leaving, thereby unlocking the arm of the latter instrument and permitting a proper means thereof to force said arm to its original position.

The objects of my present invention are, first, to so improve the mechanism of my said patented track instrument as to reduce the time required and make more positive the setting of said arm I into its downward position as the train leaves the block, second, to simplify and cheapen the construction of the contact mechanism for completing the circuit through the magnet of the preceding instrument to cause the release or unlocking of the arm thereof, and, third, to otherwise improve the construction of the details. These objects are accomplished by the construction

illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of a track instrument embodying my improvements. Fig. 2 is plan view thereof. Fig. 3 is a side elevation of the same with parts removed. Fig. 4 is a side view of the electro-magnet and part of the locking mechanism for the arm, drawn to a larger scale than the preceding figures. Fig. 5 is a longitudinal vertical section through the sleeve and its supporting rod, taken on the line 5—5 of Fig. 6. Fig. 6 is a horizontal section of the same mechanism, taken on the line 6—6 of Fig. 5. Fig. 7 is a side view of the sleeve and its supporting rod, showing a trigger and the interior construction of said sleeve in dotted lines. Fig. 8 is a diagrammatic view, showing two blocks and the wires extending from one to the other.

The same letters and numerals of reference are used to designate the same parts in the several figures.

Referring to the drawings, A designates the bed plate; C a transverse shaft, which carries a toothed segment, D, and the lever, E; G the rack bar, which is engaged by said segment and moved rearward by depressing the free end of said lever E; H, a movable sleeve, which is moved rearward by said rack bar, and is formed on its top, near one end, with an opening, *h*, on its bottom, near its other end, with an opening, *h'*, having an inclined inner wall, *h''*, and on one side with an opening, *h'''*; H', is the supporting rod for said movable sleeve, said rod having an opening H². K' is the trigger, which is formed with an inclined surface *k'*, and operates to lock the sleeve in its rearward position during the occupancy of the block by a train, by being projected through the opening H² in the rod H' into the opening *h'* of the sleeve H as said sleeve is moved rearward; H'' is the coiled spring which forces the sleeve and the arm, I, attached to the sleeve to their forward or original positions, when the trigger is lowered to its normal position by the mechanism hereinafter described. All of the above parts are identical in construction, function and opera-

tion with the similar parts of my said patented track instrument, and a more particular description thereof is therefore considered to be unnecessary.

5 I' designates a stand, having an inclined surface i' , and i designates a lug on the under side of said arm, I, the under side of which lug is inclined and engages the inclined surface of said stand. The inclined
10 surfaces i and i' of the lug and stand coact to cause the free end of said arm I to be raised while being drawn rearward, as in my said original construction, but practical experience has demonstrated that with the latter
15 there is more or less tendency for said arm to lower if subjected to severe downward pressure, and to obviate this disadvantage I have formed the stand with a horizontal portion, i'' , at the base of said inclined portion, i' ,
20 which forms a seat for a corresponding horizontal portion, i^2 , of the lug on the arm, whereby said arm will not give to any downward pressure to which it is subjected in use.

K designates a pivoted transverse bar,
25 which passes into the sleeve H and rod H' and is provided on its inner end with the trigger, K', above referred to. L, designates a hook, which is pivoted at its lower end and is designed to engage said bar K, and M designates an electro-magnet. It will be noticed
30 that said bar K instead of terminating between the helices of the electro-magnet, M, extends beyond the outer end of the latter, and that it is formed with a depending portion, k , terminating at its lower end in an inwardly-extending hook k'' , which, as is obvious,
35 is located at the outer end of instead of between said helices. It will also be noticed that the electro-magnet faces outward, instead of inward, and that the armature, m ,
40 of the electro-magnet is secured directly to the hook L. This is an important advantage in that it increases the leverage of said bar, K, and causes the same to act much more
45 quickly in assuming the horizontal position in which it is engaged by the hook L and the sleeve locked in its rearmost position. The hook, L, is flexibly held in proper position by a spring, l , as in my said patented construction, but the present spring is coiled around
50 a rod, l' , which is threaded and engaged by a nut, l'' , whereby the tension of the spring may be adjusted and regulated, which is an important advantage of my improved construction.

55 N and N' designate contact plates, which, instead of being located beside the sleeve and having one part movable with the rod operated by the sleeve, are secured one, as N, to the upper surface of said sleeve and the other,
60 N', to an insulated portion, h^3 , of stand H³. This forms an extremely simple and at the same time practical means for closing the circuit through the magnet of the preceding track instrument and thereby causing said
65 magnet to draw upon its armature, m , and pull the hook, L, out of engagement with the end of bar K, thereby releasing the sleeve and

allowing the spring, H'', to force the same and the arm, I, to their original positions.

O designates a relay of the ordinary or any
70 suitable construction. This relay is of the utmost importance as it overcomes the resistance of the wires inseparably connected with the employment solely of main batteries and thereby prevents weakening of the magnets
75 to such an extent as to cause them to act slowly, or not at all, in drawing to them the armature, m , and hook, L.

P designates a connecting board, which consists of six straps 1, 5, 7, 9', 14 and 17.
80

The circuit in my approved apparatus is as follows, referring particularly to Fig. 8. The current starts from ground at instrument x and passes, by wire o , to strap 1 of connecting board; thence, over wire 21, to contact plate
85 N and to plate N'; thence, by wire 22, to strap 5; thence to main line wire, 6, and over said wire to strap 7 of instrument y ; thence by wire 23 to binding post 8 of relay; thence back to binding post 9; thence, by wire 24,
90 through strap 9' to one pole of battery S, and, by wire 10, from the other pole of said battery to the ground. The circuit being thus completed, by contact plate N and N', of instrument x , from said instrument x to instrument
95 y , energizes the magnet of the relays of the latter instrument, attracting the armature thereof and completing the circuit through magnet M, the current taking the following course: Starting from one pole of the local
100 battery, T, it passes over wire 13 to strap 14; thence, by wire 25, to binding post 26 of the relay; thence, by wire 27, to contact 12 of the relay and to the armature of the latter; thence, by wire 28 to the binding post 16;
105 thence, by wire 19 to magnet M and from said magnet, by wire 29, to strap 17; and thence, by wire 30, to other pole of battery T.

The several wires are conducted into the apparatus and confined by a tube U with
110 which the bed-plate A is provided.

Having thus described my invention, what I claim is—

1. In an electrical railway signal, the combination of a longitudinally-movable sleeve,
115 an arm pivotally connected therewith, means for drawing said sleeve and arm rearward when a train enters the block, two contact plates, one of which is secured to said movable sleeve, a locking means for said sleeve,
120 an electro-magnet, designed to be located in the circuit with the next succeeding instrument and to be energized when said contact plates thereof are in engagement with each other, and when so energized to unlock said
125 sleeve, and means for forcing said sleeve and arm to their original position when said sleeve is released, substantially as described.

2. In an electrical railway-signal, the combination of a movable sleeve, an arm pivotally connected therewith, an outwardly-facing
130 electro-magnet, a pivoted transverse locking-bar, having a trigger mounted on its outer end, said trigger engaging the sleeve, and said

locking-bar extending between the helices of the magnet and terminating beyond the outer end thereof, a hook on the outer end of said locking-bar, and a spring-pressed hook carrying the armature of the magnet and adapted to engage said hook of the locking-bar, substantially as described and for the purposes specified.

3. In an electrical railway-signal, the combination with a movable sleeve, an arm pivotally connected therewith, an outwardly-facing electro-magnet, a pivoted transverse locking-bar, having a trigger mounted on its inner end, said trigger engaging the sleeve, and said locking-bar extending between the helices of said magnet and terminating beyond the outer end thereof, a hook on the outer end of said locking-bar, a hook, L, adapted to engage said hook of the locking-bar, a threaded rod, engaging said hook L at one end, a coiled spring, encircling said rod and pressing against said hook L, a nut on said rod, for adjusting the tension of said spring, and the armature of the magnet, secured directly to said hook L, substantially as shown and described.

4. In an electrical railway signal, the combination of a movable sleeve, an arm pivotally connected therewith, a pivoted transverse locking-bar, and a trigger, mounted on the inner end of said locking bar and designed to engage said sleeve, of a hook, L, designed to engage the outer end of said locking-bar when the sleeve is locked, an electro-magnet, for forcing said hook L out of engagement with said locking-bar, a threaded rod, engaging said hook L at one end, a coiled spring, encircling said rod and pressing against said hook, and a nut on the threaded portion of said rod for adjusting the tension of said spring.

5. In an electrical railway signal, the combination with a longitudinally-movable arm, having a lug formed with an inclined surface and a horizontal surface contiguous thereto, of a stand having an inclined surface and a horizontal portion at the base of said inclined surface, substantially as described, whereby the forward end of the arm will be raised simultaneously with the rearward movement thereof and the arm, when raised, will withstand any downward pressure to which it is subjected.

6. In an electrical railway signal, the combination with a longitudinally-movable arm, a means for locking the same in its rearward position, and contacts, brought into engage-

ment with each other by the rearward movement of said arm, of a relay, and an electro-magnet, said magnet serving to release the locking mechanism for the arm.

7. In an electrical railway signal, the combination with a longitudinally-movable arm, a means for locking the same in its rearward position, and contacts, brought into engagement with each other by the rearward movement of said arm, of a relay, in the circuit with the contacts of the next succeeding instrument, and an electro-magnet in the circuit controlled by the relay, said magnet serving when energized to release the locking mechanism from the arm, substantially as specified.

8. In an electrical railway signal, the combination with a longitudinally-movable sleeve, an arm pivotally connected thereto, contacts, brought into engagement with each other by the rearward movement of said sleeve and arm, a pivoted transverse locking bar, a trigger mounted on the inner end of said locking-bar and serving to lock the sleeve in its rearward position, and a spring-pressed hook designed to engage the outer end of said locking-bar when the sleeve is locked, of a relay, in the circuit with the contacts of the next succeeding instrument, and an electro-magnet, in the circuit controlled by said relay, said magnet when energized drawing said hook out of engagement with said locking-bar, as described.

9. In an electrical railway signal, the combination with a longitudinally-movable sleeve, an arm pivotally connected thereto, and contacts, brought into engagement with each other by the rearward movement of said sleeve, of a relay, in the circuit with the contacts of the next succeeding instrument, an outwardly-facing electro-magnet, in the circuit controlled by said relay, a pivoted transverse locking-bar, a trigger mounted on the inner end of said locking bar and engaging said sleeve, said locking-bar extending between the helices of said magnet and terminating beyond the outer end thereof, a hook on the outer end of said locking bar, and a hook L engaging said hook of the locking bar when the sleeve is locked, said hook L having the armature of the magnet secured directly to it.

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

IRA LLOYD GREEN.

Witnesses:

THOS. MCMASTER,
JAMES S. MATEER.