(No Model.) 2 Sheets—Sheet 1.

J. A. CARLTON & H. L. JOHNSTON.

AUTOMATIC ELECTRIC BLOCK SYSTEM.

No. 449,731. Patented Apr. 7, 1891.

Fig. 1.

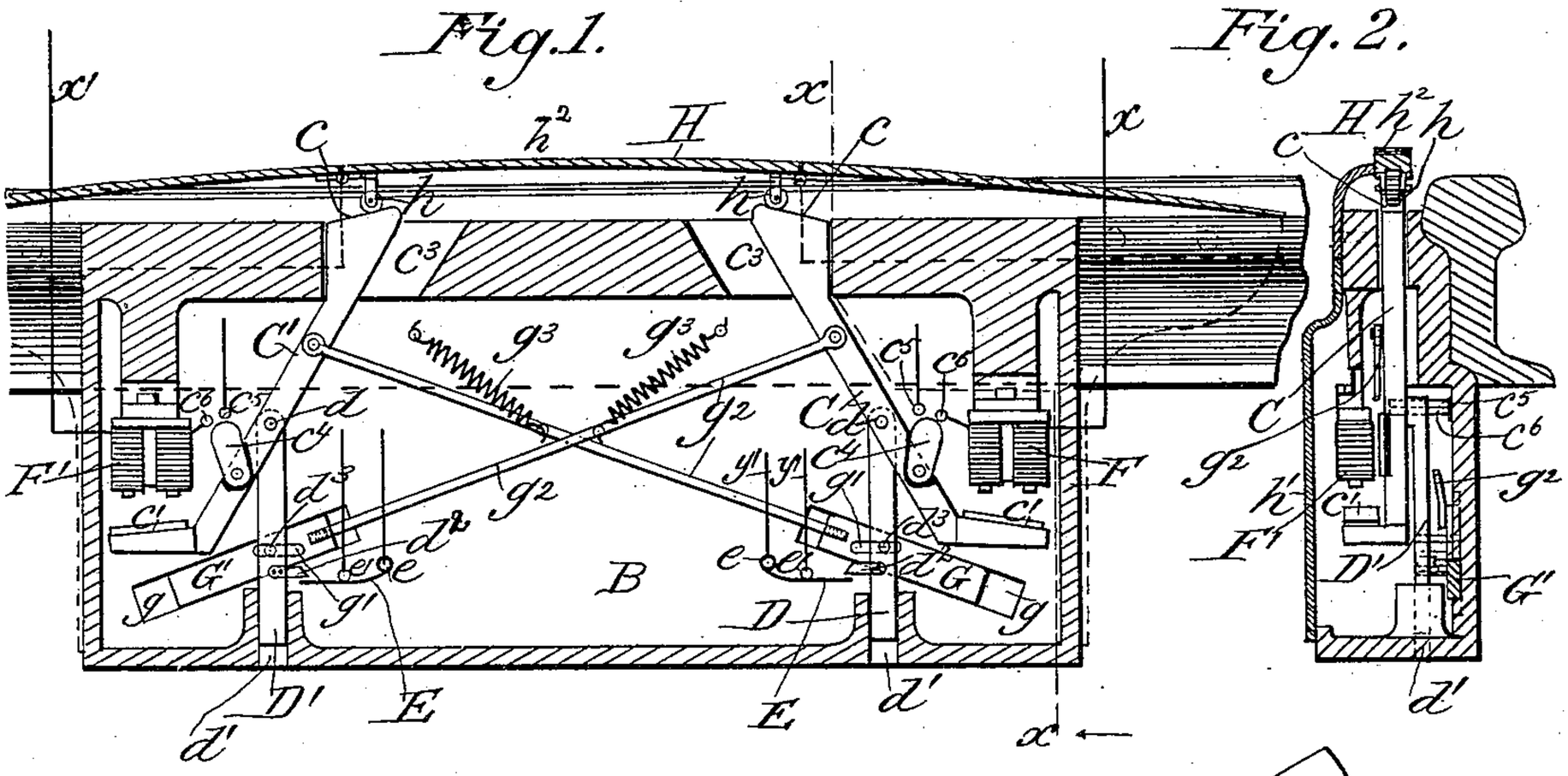
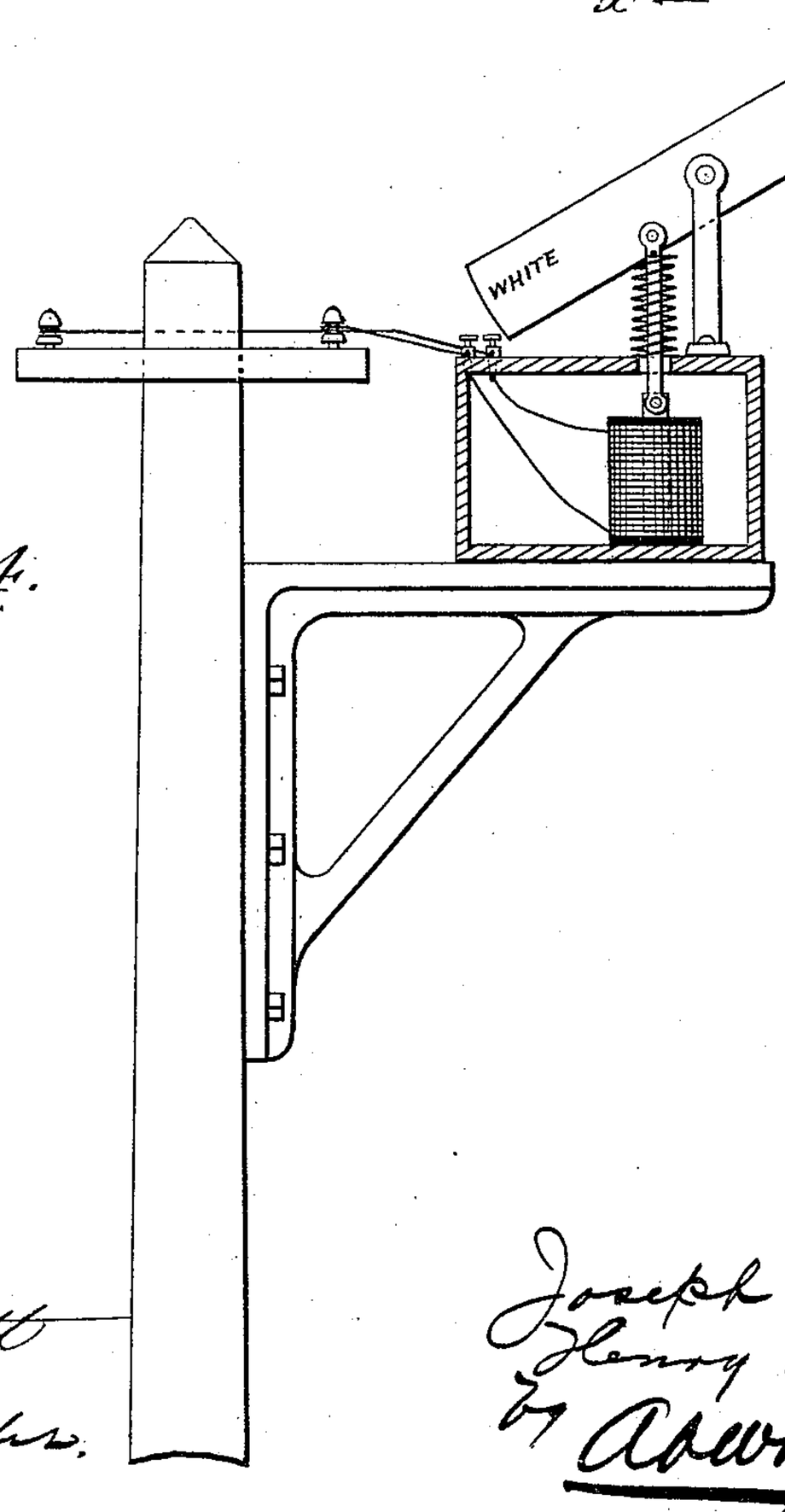


Fig. 2.

Fig. 4.



Attest
F. H. Schott
C. Burroughs.

Inventors.
Joseph A. Carlton
Henry L. Johnston
by Adwood Son Attys

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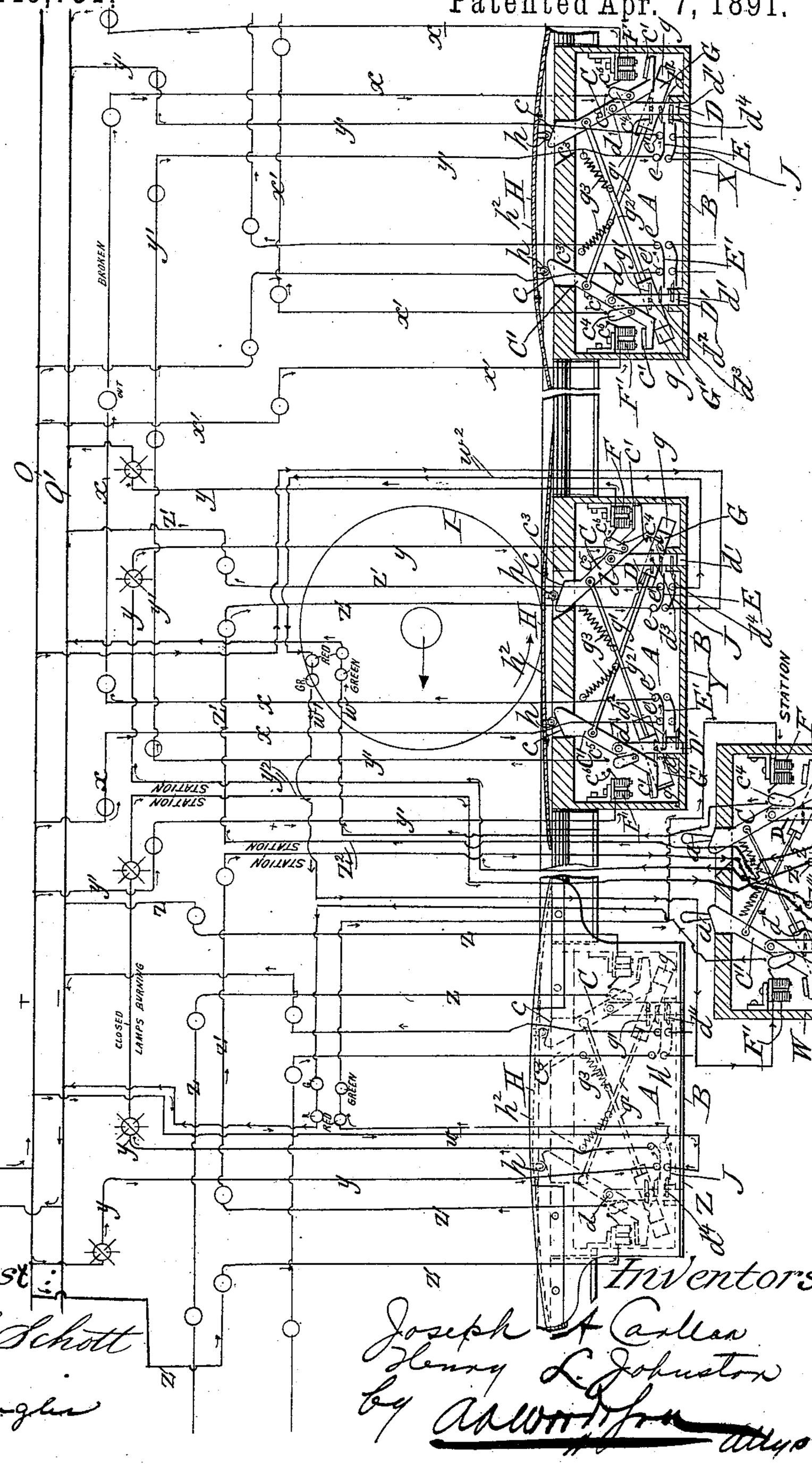

Fig. 3.

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UNITED STATES PATENT OFFICE.

JOSEPH A. CARLTON AND HENRY L. JOHNSTON, OF ATLANTA, GEORGIA.

AUTOMATIC ELECTRIC BLOCK SYSTEM.

SPECIFICATION forming part of Letters Patent No. 449,731, dated April 7, 1891.

Application filed December 3, 1890. Serial No. 373,508. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH A. CARLTON and HENRY L. JOHNSTON, of Atlanta, in the county of Fulton, State of Georgia, have invented certain new and useful Improvements in Automatic Electric Block Systems; and we 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to a system of indicating by the automatic making and breaking of electrical-lighting circuits the presence of a train of cars in a block division of a railway, or the exit of said train therefrom, and the resultant clearance of the block, which produces an automatic electrical block system for railways, the elements of all of which will hereinafter be clearly defined and their conjunctive operation fully specified as in actual operation, the elements of novelty being fully set up in the claims forming part hereof.

In the accompanying drawings, Figure 1 is a longitudinal vertical section of the instrument in which is made and broken by the pressure of a wheel the electrical circuits necessary to the operation of the system. Fig. 2 is a transverse vertical section on the line x x, Fig. 1, further showing the elements therein shown. Fig. 3 is a view illustrating diagrammatically the several instruments necessary to the complete operation of two blocks, the preferable form of wiring suitable to the transmission of the currents required, and also suitable wiring and apparatus for one station intermediately situated. Fig. 4 is a side elevation of the day-signal or semaphore stand.

In the figures like reference-marks indicate corresponding parts in all the views.

A is the instrument, which is best shown in Figs. 1 and 2 in detail, and its construction is as follows: The frame B is of metal preferably of a form to carry the attached parts, and is secured to the rail in any desired manner. The elements in opposite ends of the frame B are duplicated in reversed positions, but will be lettered differently by the use of superior numbers added to the proper letters for sake of distinction and clearness in the description of the wiring and operation of the device, and the instruments are successively lettered X, Y, and Z. The lever C, having the incline c and the armature c', is pivotally attached by the pin d to the plunger D, which has vertical play within the recess d', and is guided and held in a perpendicular position by the sides thereof. Said lever C projects upwardly through slot c^3 in the top of the frame B. The lever C carries a brush C^4, which is adapted to slide over and make contact between the points c^5 and c^6, which are suitably set in and insulated from the frame B and are connected in circuit, as hereinafter described; also set in and insulated from the frame B is the pin e and contact-point e', which are electrically connected normally by a spring-brush E, which is secured to the pin e and presses against the terminal e'. On the descent of the plunger D the lip d^2 thereon engages with the spring E and breaks the contact, and on a further depression of the said plunger the engagement will obviously be broken and the said spring allowed to return to its normal position, the object of which will be obvious upon a further description. The electro-magnet F is connected in circuit, and when the lever C is moved so that the brush c^4 will make a connection between the points c^5 and c^6 the said magnet will be energized, and the armature c' will be attracted and held thereby, thus sustaining the contact between the points c^5 and c^6 and the brush c^4.

Sliding in a recess g in the frame B is a plate G, which has a slot g' therein at an angle to its line of motion in said recess, and the plunger D has a pin d^3 engaging with said slot g'. The plate G is connected with the lever C′ by a rod g^2, and its motion from a normal position is resisted by a spring g^3, which indirectly acts upon the lever C′. It is evident that any motion of the lever C on its pivotal point will cause, through the rod g^2, a downward movement of the plunger.

H is a spring which rests beside the rail of the track and has on its lower side the rollers H, which contact with the levers C and C′, respectively, upon the passage forward and back of the wheel I of a car or locomotive,

and by following down the incline partially rotates the lever C or C′, as the case may be, due to the direction of the approach of said wheel. The spring H is jointed in two or more places either by means of pivoting the points or holding the sections together, so that they slide upon each other. The small rollers or lugs *h* will preferably be carried upon the central section h^2 of said spring. The section h^2 of the spring H carries a shield-plate *h*′, which forms a flange, preventing the changing of the curvature of the said spring and acting as a shield-cover for the instrument and a guide for the spring in its motion.

The circuits closed by the operation of the instruments X, Y, and Z by the successive passage of wheel I over them in the direction of the arrow on said wheel will be lettered successively *x*, *y*, and *z*, while the circuits closed by its passage on the opposite direction are lettered successively *z*′, *y*′, and *x*′. All these circuits are alike in construction, with the exception of cut-ins at stations intermediately situated, and hence the tracing of one of them will suffice for a description of all, the station-instrument and cut-in being afterward specified.

The wire *y* connects with the line-wire O a short distance within the block, of which only a portion is shown in the drawings at the left of the instrument Z, in order to burn one light in such a position as to be visible to the engineer in time for the train to be stopped before entering the block Y Z, from which point of connection said wire *y* runs on poles parallel to the line of railway until the instrument Z is reached, being then carried to said instrument and connected with the terminal contact *e*′, which is electrically connected normally with the pin *e* by means of the spring E. From the spring said wire *y* extends to the poles along the railway, having lights of suitable intensity and color (red usually) cut in suitably therein, until it reaches the instrument Y, when it is connected with the terminal contact c^5, electrically connected at times, as fully specified hereinafter, by means of the brush c^4, with the contact-point c^6, from which a wire extends to the coils of the electro-magnet, whence it passes to the poles along the railway and extends a sufficient distance into the block, of which only a portion is shown in the drawings at the right of the instrument X, to burn a light therein in such a position as to warn an engineer approaching the instrument of the occupancy of the block Y Z and prevent his operating the instrument Y by passing over it, from which point the wire *y* passes to the negative line-wire O′. The wire *z*′, through which the electrical circuit is completed by the passage over the lever C′ of the block-instrument Z, is run the same as the wire *y*; but the circuit is completed at the opposite end of the block Y Z—that is to say, the end of said block opposite the end at which the said circuit *y* is normally broken.

As shown, there is a station situated intermediately in the block Y Z, and an instrument W, the same in construction as the instrument A, but smaller and more delicate, and with handles *a* for manual operation attached to each of the levers C and C′. Two extra station-circuits *w* and *w*′, carrying red and green signals, run from about one-half mile each side of the station-instrument W, being so constructed as to be closed by the revolution on its pivotal point on the plungers D or D′ of one of the levers C or C′, one lever C lighting the red and green lights on circuit *w* and the lever C′ lighting those on the circuit *w*′. In order that the passage of the train from the block may break the red and green lighting-circuits, a loop w^2 is run from the wires *w* and *w*′ to each of the block-instruments Y and Z, and is connected to terminals consisting of two points d^4 and d^5, which are connected normally by the spring J, which is operated by the engagement therewith of the lip d^4 on the corresponding plunger.

After a train has entered a block and lighted the signals and has stopped at the station and side-tracked and lighted the red and green precautionary signals, it is necessary to reopen the block to allow the meeting train to enter by cutting out the red lights in the block. For this purpose a loop y^2 is cut into the circuit *y*, which said loop extends to the station, the points z^3 and z^4 and the spring-brush z^5 being operated upon to make and break the circuit by the lip d^2 on the plunger D being connected in circuit therewith. A loop z^2, corresponding in function with the wire y^2, is cut into the wire *z*′ and terminals y^3 and y^4, which are electrically connected normally by a spring-brush y^5, operated by the lip d^2 on the plunger D′.

A day-signal consisting, preferably, of a semaphore, operated by a solenoid, is connected in circuit with the lights.

The operation of the device is as follows: The wheel I, running in the direction of the arrow thereon, has depressed the spring H in passing from the block X Y to the block Y Z, and so caused the lever C to partially revolve on its pivotal point and by closing the circuit between the terminal contacts c^5 and c^6, which completes the circuit through the wire *y*, and hence energizes the electro-magnet which holds the lever C stationary until the circuit is broken again. The movement on its pivotal point of the lever C has, by reason of the connecting elements, broken the circuit *x*, as will be described, in connection with the circuit now lighted. As soon as the train reaches the station, running under the protection of these lights, it is side-tracked, and by a partial revolution of the lever C′ of the instrument W by the application of manual force to the handle *a* thereon red and green light circuit *w*′ is completed and the red-light circuit *y* cut out, the lever being held in such position by the magnet F in cir-

cuit until the meeting train has passed and run into the block X Y over the instrument Y, and by causing the partial revolution of the lever C′ of said instrument lighting the circuit y', and by the operation of the plate G, through the rod g^2, depressing the plunger D of said instrument, causing the engagement of the lips d^2 and d^4 with the springs E and J, respectively, disrupting the contact between the said springs and their contacting terminal points, which breaks the circuit z', previously lighted by the passage into the block Y Z over the instrument Z of the meeting train, which, as before stated, entered said block over said instrument, and also breaks the circuit w', which was lighted by hand as soon as the side-track train running in the direction of the arrow on the wheel I was safely side-tracked. The breaking of these two circuits z' and w' demagnetizes the electro-magnet sustaining the levers C of the instruments Z and W, respectively. Upon the further passage downwardly of said plunger the springs E and J are released and fly back to their normal position, leaving the two circuits broken only as to the terminals in the instruments W and Z, and hence ready to be completed by the electrical connection of said terminals. After the side-tracked train has left the siding the lever C of the instrument W is turned by hand, which completes the circuit through the red and green lighting circuit w, and the said side-tracked train passes under the protection of the red and green lights, running in the direction of the arrow on the wheel I, until the instrument Z is reached, where it will by the depression of the lever C of said instrument light the red-light circuit z and, through the rod g^2, the plate g', and lip d^4 of said instrument, break the circuit through the wires w. In case the train which is to be side-tracked enters the block Y Z over the instrument Z, and the meeting train runs in the direction of the arrow on the wheel I, the operations will be the reverse of those just specified.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a device of the class specified, the frame B, secured to the track, and the lever C, pivoted thereto, carrying a spring-brush c^4, adapted to contact with the circuit-terminals c^5 and c^6, set in said frame, said lever having an inclined top end for contact with a wheel of railway rolling-stock, substantially as described.

2. In a device of the class specified, the frame B, set in or secured to the track, and the lever C, pivoted thereto and extending above the top thereof, carrying means for closing the circuit between two points, and the spring H, adapted to press upon the said projecting end of said lever and partially revolve the same upon the application of a pressure greater than the resistance of the spring, all combined, arranged, and operating substantially as and for the purpose specified.

3. In a device of the class specified, the frame B and the levers C and C′, pivoted to the plungers D and D′, said plungers having vertical play in said frame and the plates G and G′ sliding in recesses in said frame and connected each to one of the levers C C′, and springs adapted to return the elements to their normal positions after action, substantially as shown and described, and for the purpose specified.

In testimony whereof we have hereunto set our hands this 25th day of November, A. D. 1890.

JOSEPH A. CARLTON.
HENRY L. JOHNSTON.

Witnesses as to said Carlton:
A. A. WOOD,
A. P. WOOD.

Witnesses as to said Johnston:
A. P. WOOD,
G. BURROUGHS.