

(No Model.)

2 Sheets—Sheet 1.

J. LA BURT. ELECTRIC BLOCK SIGNAL SYSTEM.

No. 461,760.

Patented Oct. 20, 1891.

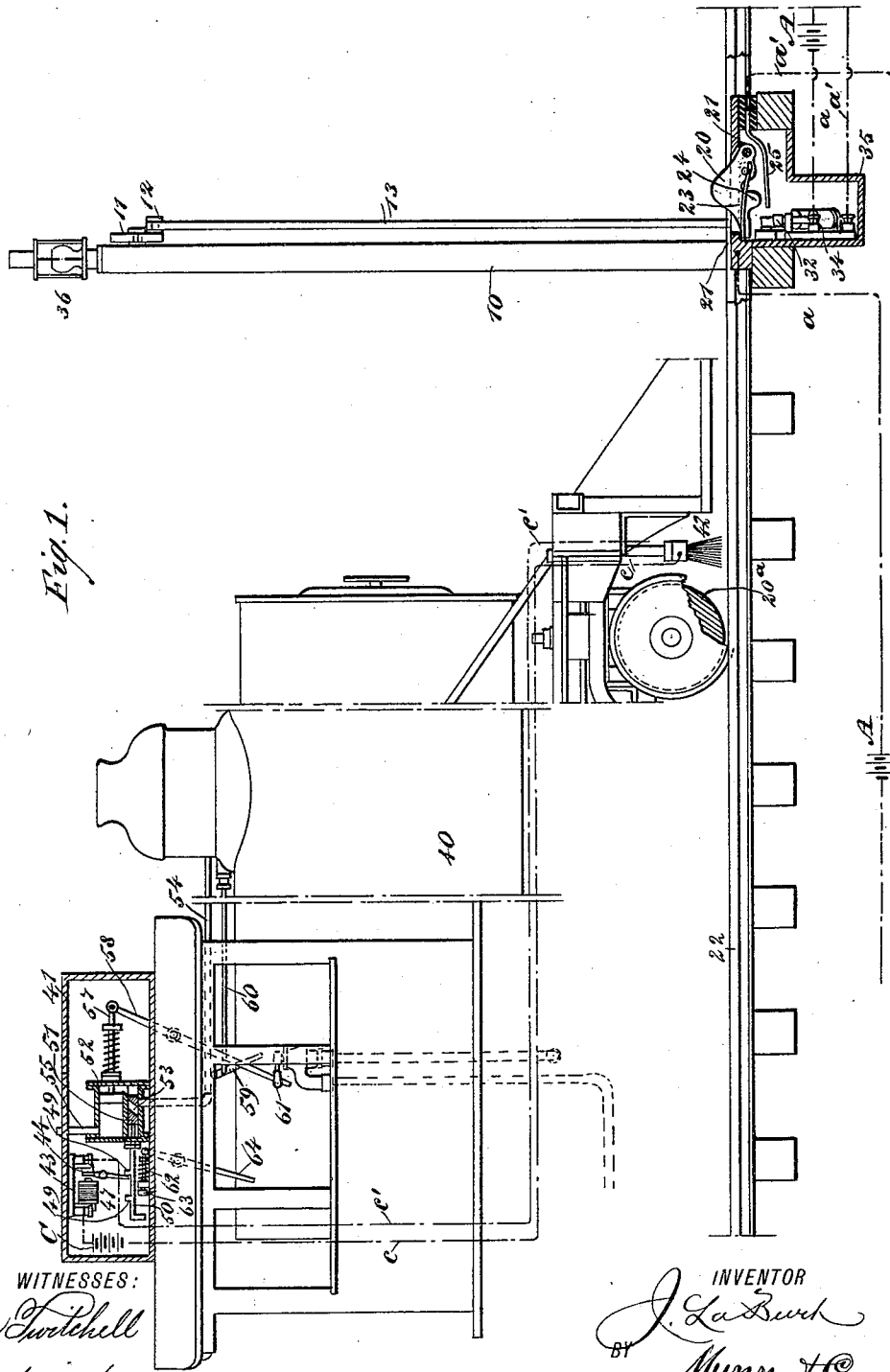


Fig. 1.

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 ATTORNEYS.

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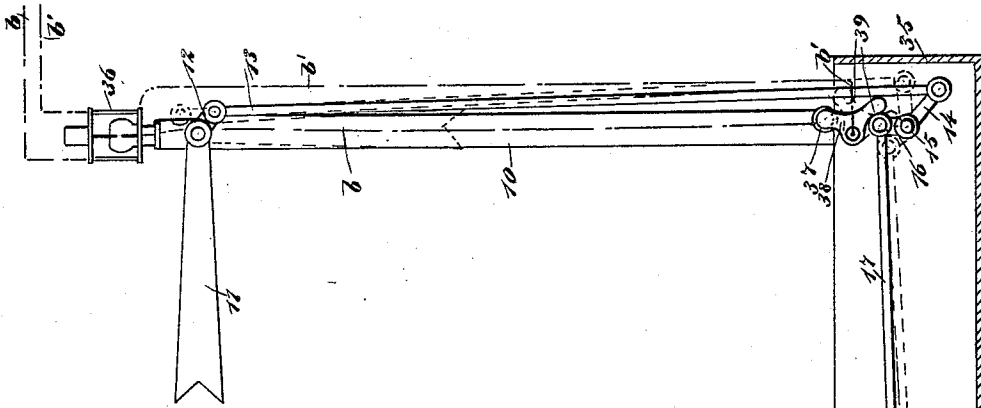


Fig. 3.

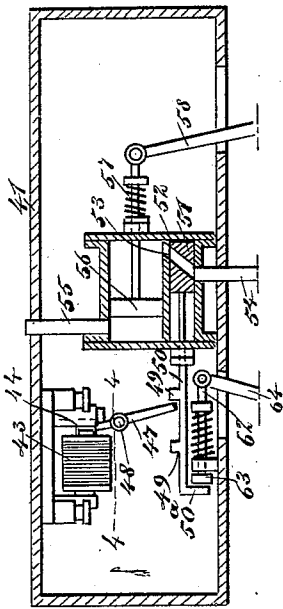


Fig. 2.

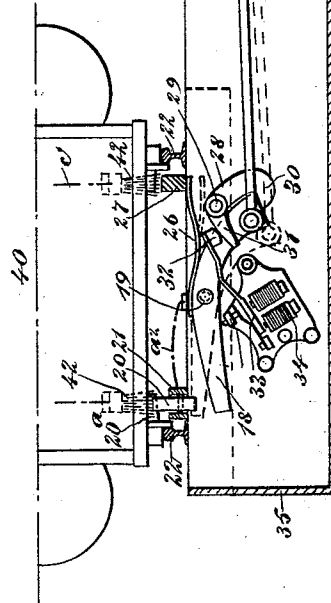
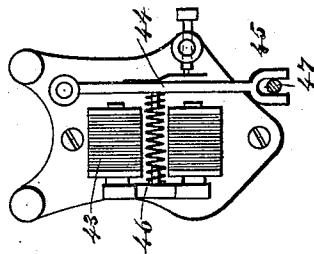


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN LA BURT, OF NEW YORK, ASSIGNOR OF ONE-HALF TO WILLIAM H. AGRICOLA, OF BROOKLYN, NEW YORK.

ELECTRIC BLOCK SIGNAL SYSTEM.

SPECIFICATION forming part of Letters Patent No. 461,760, dated October 20, 1891.

Application filed July 14, 1891. Serial No. 399,505. (No model.)

To all whom it may concern:

Be it known that I, JOHN LA BURT, of New York city, in the county and State of New York, have invented a new and Improved Electric Block Signal System, of which the following is a full, clear, and exact description.

My invention relates to improvements in an electric block signal system for railways; and the object of my invention is to produce a simple system which will enable a moving locomotive or car to automatically operate the signals, so as to set them in a position to indicate "danger" and afterward automatically change them to indicate "safety," and also to produce an apparatus which, in case the engineer does not see the danger-signal and runs over the signal, will automatically shut off the steam so as to stop the train and render an accident impossible.

To this end my invention consists in a system and apparatus, which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures and letters of reference indicate corresponding parts in all the views.

Figure 1 is a broken side elevation, partly in section, showing the general arrangement of the entire apparatus, and showing, also, the electric connections. Fig. 2 is a broken cross-section showing the signal-operating apparatus, and showing the locomotive in a position to close the circuit and shut off the steam. Fig. 3 is an enlarged detail sectional view of the apparatus for controlling the steam of the locomotive; and Fig. 4 is an inverted detail view of the magnet which operates the steam-valve on the line 4 4 in Fig. 3.

The railway is provided with the usual signal-posts 10, which are arranged at one side of the track in the usual manner, and on these are the usual swinging semaphores 11, having crank-arms 12, which connect by means of vertical rods 13, extending parallel with the posts, with cranks 14, located at the bottom of the posts and in a suitable casing, as described below, and each crank 14 forms one arm of a double crank 15, the opposite

arm 16 of which connects by a horizontal rod 17, which is arranged transversely to the railroad-track with the lower end of a bent lever 18, which lever is pivoted beneath the track at a point near its center, as shown at 19, and has its free end arranged beneath the rounded contact-block 20, which is pivoted at one end in a slotted plate 21, adjacent to one of the track-rails 22, and which projects above the bed of the track so as to contact with an inwardly-projecting portion 20^a of one of the locomotive-wheels. The contact-block 20 is normally held upward by a spring 23, and has on its under side a depending portion 24, which is adapted to contact with a spring 25, which spring is insulated from the plate 21, and connects by a wire *a'* with a battery A, the said battery also connecting by a wire *a* with the plate 21, as best shown in Fig. 1, and consequently when the contact-block is depressed so as to strike the spring 23 the battery-circuit will be closed. On the upper side of the curved lever 18 and near the center thereof is a spring 26, which, when the free end of the lever is depressed, strikes against a contact-plate 27, which is arranged on the track-bed near one of the rails 22 and opposite the contact-block 20, and the spring 26 connects by a wire *a*² with the plate 21, the wire serving to close the circuit through the electric apparatus in the locomotive, as hereinafter described. Near the lower end of the curved lever 18 is a latch 28, which is pivoted near its upper end, as shown at 29, and the lower end 30 of which is formed into a hook, which is adapted to engage the lower end of the lever 18, as in Fig. 2, and the upper end 31 of the latch extends inward above the hook portion 30 and into the path of a hammer 32, which is secured to a vibrating armature 33, arranged opposite an electro-magnet 34. This magnet is included in the battery-circuit, and the circuit through the magnet is closed by the passing of a train at the signal beyond that at which the magnet is located.

The apparatus for operating the semaphore is contained, chiefly, in a suitable casing 35, which is sunk beneath the track. Each signal-post carries an ordinary electric light which is arranged to operate at night instead of the semaphore, and which is connected by

wires *b* and *b'* with a suitable source of electricity in the ordinary way. One of the wires *b'* is provided with a switch 38, which is adapted to contact with a button 37, arranged in the circuit, and which has a depending arm 39, which extends into the path of the upper arm 16 on the double crank 15, and the weight of this arm 39 will normally hold the switch so as to break the circuit, and the light will not shine; but when the contact-block 20 is depressed the lever 18 will operate the rod 17 and crank-arm 16, so as to push on the switch-arm 39 and close the circuit through the lamp, and after a train has passed to a safe distance the circuit will be again broken, as hereinafter described.

The locomotive 40 is provided with a casing 41, which is preferably located on the engine-cab, but which may be carried at any convenient point, and in this casing is a battery C, which connects by wires *c* and *c'* with brushes 42, which are carried beneath the locomotive and near the front end thereof, the said brushes being adapted to make a co-instantaneous contact with the block 20 and plate 27, thus closing the circuit, when the current will pass from the plate to the block through the spring 26 and wire *a*², as shown in Fig. 2. Included in the battery-circuit of the locomotive is an electro-magnet 43 having a suitable armature 44, the free end 45 of which is forked, as shown in Fig. 4, and the armature, when the magnet is energized, moves against a spring 46, as best shown in Fig. 4. The forked end of the armature embraces one end of a lever 47, which is centrally pivoted, as shown at 48 in Fig. 3, and the free end of the lever projects between two abutments 49 on the piston-rod 50, which rod projects into a small steam-chest on the lower portion of a steam-cylinder 52 and connects with a slide-valve 51 in said steam-chest, which slide-valve is provided with a diagonal port 53, adapted to connect with a steam-pipe 54 opening from the boiler and with a port in the cylinder 52.

The cylinder is provided with an exhaust 55, located at one end, and with a reciprocating piston 56 having a spring-pressed piston-rod 57, which projects outward through the end of the cylinder 52 and is pivoted to the tilting lever 58, which lever is centrally pivoted on a suitable support and is adapted to contact with the cut-off lever 59, so that when moved it will operate the lever and shut off the steam by means of the connecting-rod 60, which operates the ordinary shut-off valve. The lever 58 is also arranged to engage the lever 61, by means of which the air-brakes are operated, and it will thus be seen that when the lever 58 is moved it will shut off the steam from the locomotive and will also apply the brakes. I have not shown this mechanism in detail, but simply enough to show its operation, for this lever connection may be made in a great many ways. The piston-rod 50 is bent downward at its free end 50^a so as to extend into the path of a button

63 on the end of a spring-pressed sliding rod 62, which rod is connected with a lever 64, by means of which the engineer may push back the piston 50 and close the entrance to the cylinder 52.

The apparatus for shutting off the steam is intended to operate only in cases when the engineer through negligence or incapacity has run over the signal, and in this case the circuit will be closed through the magnet 43 by means of the contact made with the block 20 and the plate 27, and when this is done the armature 44 is moved so as to tilt the lever 47, and this moves the piston-rod 50 and the slide-valve 51 so as to admit steam to the cylinder 52, and the steam will push back the piston 56 and operate the lever 58 so as to shut off the steam and apply the brakes in the manner described.

The operation of the semaphore-working mechanism is as follows: When a wheel of the locomotive strikes the contact-block 20 it depresses the block, which, operating on the free end of the lever 18, depresses the free end of the lever and raises the opposite end, and the latch 28 will drop by gravity, so as to hold the lever in this position. The spring 26 on the lever will also be brought into contact with the plate 27. When the lever is tilted, as described, it pushes horizontally on the rod 17, thus tilting the double crank 15, and the movement of the crank pulls downward on the rod 13, which, operating on the semaphore crank-arm 12, lifts the semaphore 11 into a horizontal position, as shown in Fig. 2. It will be seen that the latch 28 serves to hold the semaphore in this position. The semaphore will thus warn an engineer in the rear that there is a train in advance of him, and when the forward train passes onto another block the advance contact-block 20 is operated in the manner described, thus setting the signal with which it is mechanically connected and closing the circuit through the magnet 34 in the rear of it by bringing the depending portion 24 into contact with the spring 25, and the magnet 34, being energized, causes the armature 33 to vibrate and deliver rapid blows of the hammer 31 on the latch 28, thus lifting the hook 30 of the latch from the lever 18, and the semaphore 11 will then drop by gravity. If it is dark, so that the semaphore cannot be seen, the movement of the rod 17 will serve to operate the switch 38, so as to close the circuit through the electric light, and when the light is seen it will indicate "danger," and when it is not seen the engineer in the rear will know that everything is all right.

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

1. In an electric block system, the combination, with a signal-post and swinging semaphore thereon, of a vertically-movable contact-block arranged adjacent to the rails of a track, a swinging lever arranged in the path

of the contact-block, connections between the swinging lever and the semaphore, whereby the latter will be operated by the swinging lever, a bent latch adapted to engage the swinging lever and hold it in locked position, said latch having a bent arm, as shown, a magnet having a vibrating armature carrying a hammer to strike the latch-arm, and means for closing an electric circuit through the magnet by the depression of a contact-block in advance of it, substantially as described.

2. In an electric block signal system, the combination, with the signal-post and swinging semaphore thereon, of a movable contact-block arranged adjacent to a track rail, a swinging lever hung in the path of the contact-block, a rod-and-crank connection between the swinging lever and the semaphore-arm, a gravity locking-latch to engage the lever and hold it in depressed position, an electric magnet to release the latch, and means for closing the circuit through the magnet by the depression of a contact-block in advance of it, substantially as described.

3. In an electric block signal system, the combination, with a swinging lever adapted to be operated by a passing train, and the rods and cranks connecting the lever with the semaphore-arm, of an electric light mounted on the signal-post, and a switch arranged in the light circuit, said switch having a weighted arm extending into the path of one of the cranks and adapted to normally hold the switch open, substantially as described.

4. An electric block signal system comprising intermittently-connected contacts arranged upon a track, a steam-cylinder and piston carried by the locomotive and adapted

to operate the shut-off and brake-levers, electrically-operated mechanism for controlling the cylinder-valve, contact-brushes carried by the locomotive to strike the track-contacts, electrically-operated means for breaking the connection between the track-contacts from a train in advance of them, and electrical connections between the contact-brushes and the valve-controlling mechanism, substantially as described.

5. In an electric block signal system, the combination, with the locomotive, of contact-brushes suspended thereon and forming the terminals of an electric circuit, intermittently-connected contacts arranged upon the track in the path of the brushes, means for breaking the connection between the track-contacts by the movements of a train in advance of them, and a lever mechanism controlling the locomotive steam-supply, and set by a magnet included in the contact-brush circuit, substantially as described.

6. The combination, with the shut-off and brake levers of the locomotive, of a steam-cylinder and piston connected therewith, a valve controlling the cylinder-ports, a sliding piston-rod for operating the valve, a tilting lever to move the piston-rod, a magnet and armature to operate the tilting lever, an electric battery connected with the magnet and with terminals carried by the locomotive near the track, and intermittently-connected contacts on the track to contact with the terminals on the locomotive and close the circuit, substantially as described.

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