

(No Model.)

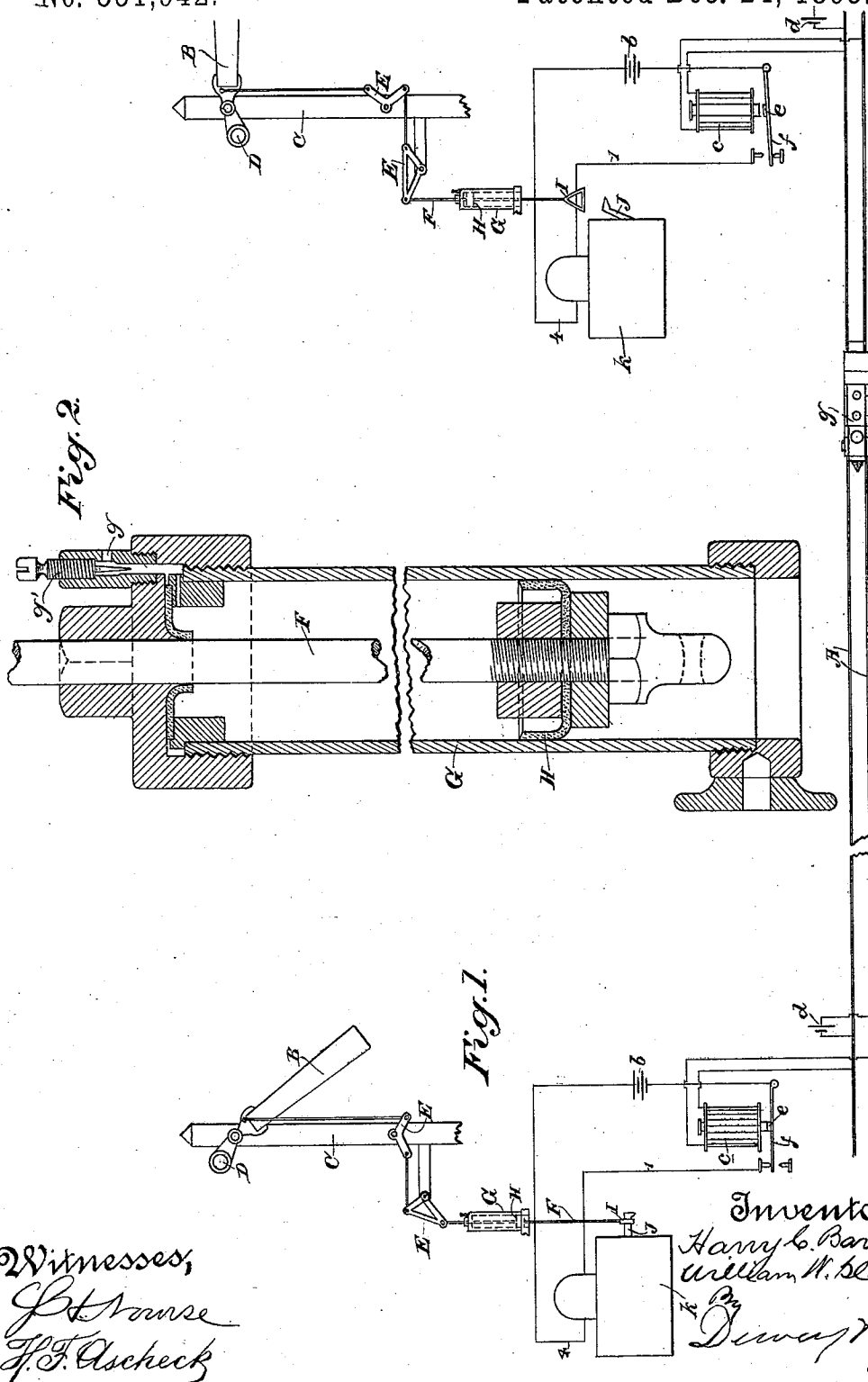
2 Sheets—Sheet 1.

H. C. BARNES & W. W. SLATER.

ELECTRIC LATCH APPARATUS FOR SEMI-AUTOMATIC OPERATION OF
RAILROAD SIGNALS.

No. 551,942.

Patented Dec. 24, 1895.



Witnesses,
J. H. Hourse
J. F. Aschbeck

Inventors,
Harry C. Barnes
William W. Slater
By
Dwight H. O.
att'y

(No Model.)

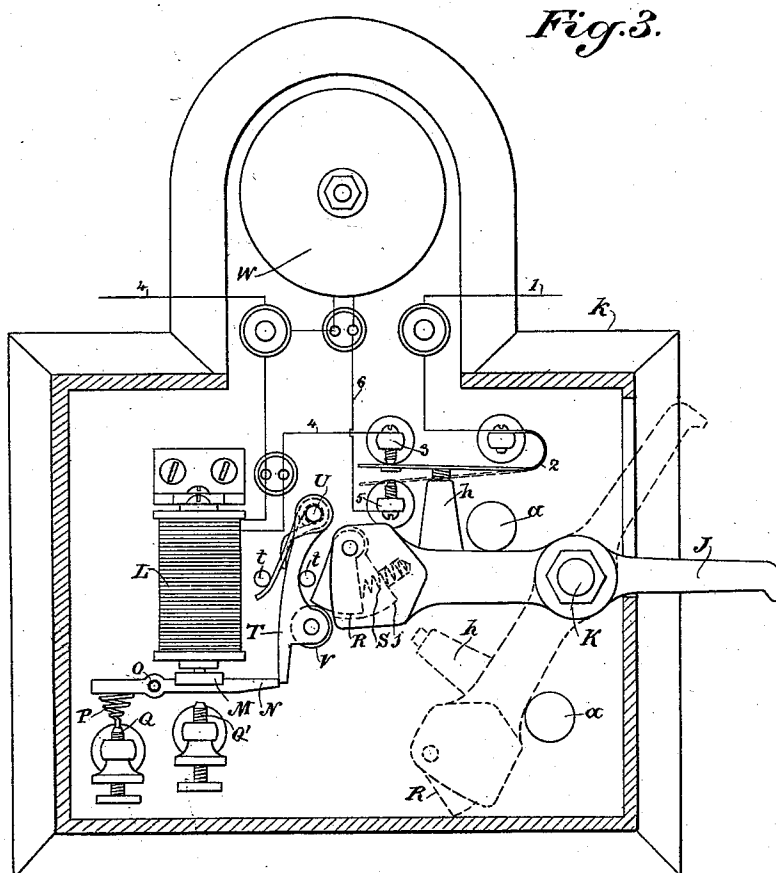
2 Sheets—Sheet 2.

H. C. BARNES & W. W. SLATER.

ELECTRIC LATCH APPARATUS FOR SEMI-AUTOMATIC OPERATION OF
RAILROAD SIGNALS.

No. 551,942.

Patented Dec. 24, 1895.



Witnesses,
J. F. Aschbeck

Inventors,
Harry C. Barnes
William W. Slater
By Dewey & Co. attys

UNITED STATES PATENT OFFICE.

HARRY C. BARNES AND WILLIAM W. SLATER, OF OAKLAND, CALIFORNIA.

ELECTRIC LATCH APPARATUS FOR SEMI-AUTOMATIC OPERATION OF RAILROAD-SIGNALS.

SPECIFICATION forming part of Letters Patent No. 551,942, dated December 24, 1895.

Application filed March 21, 1895. Serial No. 542,710. (No model.)

To all whom it may concern:

Be it known that we, HARRY C. BARNES and WILLIAM W. SLATER, citizens of the United States, residing in Oakland, county of Alameda, State of California, have invented an Improvement in Electric Latch Apparatus for Semi-Automatic Operation of Railroad-Signals; and we hereby declare the following to be a full, clear, and exact description of the same.

Our invention relates to a latch apparatus for the semi-automatic operation of railroad-signals.

It consists in certain details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a diagrammatic view illustrating two stations upon the line of railroad and their connections. Fig. 2 is an enlarged view of air-cushion. Fig. 3 is a view of our operating device.

A are the rails of a line of railroad.

B B are two semaphores or signal-blades pivoted upon posts C, with counterweights D, by which they will be held in a horizontal or "danger" position when released, and bell-crank levers E E, with connecting cords or wires, by which they are drawn down to a vertical position, showing that the line is clear.

The connecting rod or wire F passes through a cylinder G, having a piston H movable therein, and packed in such a manner that the outside air will pass readily into the cylinder when the piston is pulled downward and is confined on the upward movement. This forms an air-cushion in the upper part of the cylinder, so that when the connecting rod or wire is released and the semaphore rises by reason of the counterweight it will not move with such sudden velocity as to create damage by reason of the sudden stoppage when it reaches its position. The air will, however, escape rapidly enough through an adjustable exhaust to allow it to rise gradually to its place.

The exhaust takes place through a small opening *g* in the upper part of the cylinder, and the rate is regulated by a screw *g'* or other equivalent device. Below this cylinder is formed a loop or yoke I, and this is engaged

by a latch-lever J, fulcrumed at K within the case, which, for convenience, is employed to contain and protect the mechanism. The end of the lever projects out through a slot in the side sufficiently to allow the loop or yoke to be hooked upon it, and when in this position the semaphore will be held down in an inclined or "safety" position, indicating that the line is clear.

L is an electromagnet fixed within the case, and M is an armature fixed upon a lever N, which is fulcrumed, as shown at O, so that one end will be drawn up by the action of the electromagnet, and when the magnet is de-energized the opposite end will be pressed upward by means of a spring P, the tension of which is adjusted by means of a screw Q, with which it is connected, as shown.

Q' is an adjustable screw or stop which limits the downward movement of the armature and the lever N.

Upon the inner end of the lever J is pivoted or fulcrumed a latch R which is normally held pressed outward around its pivot by a spring S in a chamber in the end of the lever, this latch operating similar to the latch of car-doors.

T T is a lever fulcrumed, as shown at U, and extending downwardly from its fulcrum-pin so as to pass the latch R, as shown plainly in the drawings, Fig. 3. The lower end of this lever stands at such a point that when the magnet L is energized and the armature M and lever N drawn up the end of the lever N will be in such position as to act as a stop to prevent the movement of the lever T in the direction toward the lever N.

The lever T is curved on the side adjacent to the latch R, so that when the lever J is in an essentially horizontal position the latch R, forced outward by its spring S, projects into the curvature of this lever, and is practically locked therein, so that the lever J cannot be tilted about its fulcrum-point as long as the lever T remains in its position.

Whenever the lever T is released from the holding-lever N by the de-energizing of the magnet L, the pull upon the outer end of the lever J will cause the latch R to press the lever T away from the latch until the latch can pass the projecting portion of the lever T, and this allows the lever J to tilt upwardly and take

the position shown in dotted lines, when the yoke or loop I will be released and the signal allowed to move. The movement of the lever T is limited by suitable stops.

5 *a* are stops which limit the movement of the lever J in each direction.

V is a roller journaled in the lever-arm T at the point where it acts as a lock for the latch R, and this roller serves to relieve the friction with the latch R, and allow the latter to easily pass the roller when the lever T is released.

The lever T is normally pressed toward the end of the lever J and latch R by a spring coiled upon its fulcrum-pin and acting against it, as shown, or in any other suitable manner.

b represents the battery connected with this apparatus and the magnet L.

c is a relay, of which there is one at each station of the signal apparatus, and *d* is a battery forming a circuit through the line of the rails A and the relay C, so that when the latter is energized it acts upon the armature *e*, drawing up the lever-arm *f*, and thus closing the circuit from the battery *b* through the electromagnet L.

The arrangement of the line of track, the relays and semaphores at the different stations being well known and in common use we have not gone into any detail of their description beyond what is sufficient to illustrate the operation of our particular mechanism.

When the locomotive or train enters upon the section between the stations, as shown at *g*, a short circuit takes place from the battery *d* through the wheels and axles of the locomotive and the rails A, and the current is cut off from the relay *c*, thus allowing the armature *e* and lever-arm *f* to drop. This cuts off the current from the battery *b*, which previous to this has passed through the electromagnet L and has held up the armature M and the locking-lever N. As soon as this occurs the armature M and locking-lever N, dropping, release the lever T, and the action of the weighted semaphore, through its bell-crank levers and connections and the link I upon the lever-arm J, will act to pull the latter up, the lever T yielding to allow the latch R to pass from its locked position, and the lever J, taking the position shown in dotted lines, will, as before described, allow the weighted semaphore to swing into the position showing "danger" or that the track is occupied.

The passage of the current is from the line or relay through wire 1, thence to the spring 2, which is held in contact with the point 3 by an arm *h* projecting up from the lever J, which presses against the spring 2 as long as the lever J is held in its horizontal position. The current passes from this point through the wire 4, thence to the electromagnet, and thence to the battery. As soon as the lever J drops after being released the spring 2 is also allowed to drop and then forms contact with the point 5, and thence by wire 6 to the

bell or annunciator circuit, which shows when the track is again clear. When the outside circuit from battery *d* is again closed by reason of the train leaving the track and passing out of that section or by the removal of the "danger signal," the relay *c* will again act, drawing the armature *e* upward and making contact between the lever-arm *f* and the point through which the circuit of the battery *b* is again closed. A current will then pass through the wire 1, spring 2, and point 5 and wire 6 to the bell, annunciator, or other signal, thence to the battery and return-wire, and this causes an audible or visual signal to indicate that the instrument is in readiness to be manually put in a normal condition to hold the semaphore-blade to the "safety" position. This is done by simply swinging the lever J about its fulcrum-point until it stands in the horizontal position, when the latch R will pass the antifriction-roller V of the lever T, and the arm *h*, pressing against the elastic blade 2, will force it up into contact with the point 3, thus making the circuit through wire 4 and electromagnet L, when the latter will again attract its armature M, and the lever N will be raised so as to act as a stop for the lever T, and will thus again hold the lever J in its horizontal position, after which the loop I may be pulled down and hooked upon the point of the lever J, and this will act to draw the semaphore-blade B down into its "safety" position.

It will be manifest that the operation of the electromagnet might be reversed without altering the results—that is, the energizing of the magnet could release the signal and the de-energizing of the magnet act to lock it; but we have adopted the present device because it is in accord with the usual practice in this class of apparatus, in which an open circuit indicates "danger."

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

1. In a railway signal system having a movable signal or semaphore and a connection therefrom, a means independent of the signal for controlling the same, comprising a containing case, a pivotally mounted latch lever within the same having one end projecting therefrom to detachably receive the connection from the signal, a pivotally secured stop within the case for engaging and supporting opposite ends of the lever, and holding the lever in "safety" position, an armature and a lever carrying the same and engaging the stop to hold it in contact with the latch lever, and an electro-magnet for actuating the armature and releasing the stop whereby the latch lever is released and the position of the signal changed to "danger" position.

2. In a railway signal system, and in combination with a movable signal or semaphore and a connection therefrom, a means independent of the signal for controlling the same comprising a containing case, a latch lever

pivottally mounted within the same, having one end projecting therefrom to detachably receive the connection from the signal, said latch lever having a spring-actuated latch mounted in its inner end, a stop within said case pivoted at one end and adapted to engage the latch to hold the latch lever and signal in "safety" position, and an electro-magnet and intermediate devices for controlling the stop whereby when the magnet is energized the stop is released and the signal changed to "danger" position.

3. In a railway signal system, and in combination with a movable signal or semaphore, and a connection therefrom, a means independent of the signal devices for controlling the latter, comprising a containing case, a latch lever centrally pivoted within the case, having one end projecting therefrom to detachably receive the connection from the signal, an electro-magnet within the case, a swinging stop engaging the inner end of the lever and intermediate mechanism whereby when the magnet is energized the stop is released and the signal moved from "safety" to "danger" position.

4. In a signal system, and in combination with a signal or semaphore, a mechanism independent of the signal devices for controlling the same, comprising a centrally pivoted latch lever to the outer end of which a connection from the signal is detachably connected whereby the signal is normally held in "safety" position and allowed to move to "danger" position when the connection with the lever is broken, a depending stop pivottally held at its opposite end and adapted to engage and hold the inner end of the latch lever, an electro-magnet and intermediate mechanism controlling the free end of the stop, and an air cushion mechanism whereby the movement of the signal, when released, is regulated.

5. In a signal system, a movable signal or semaphore, a mechanism by which the signal is normally retained in a "safety" position,

consisting of a latch lever to which the signal connections are attached, a stop by which the latch lever is retained in position, and an electro magnet with battery and circuit by which the electro magnet is energized, or de-energized, and the stop is retained in position to prevent the movement of the intermediate mechanism and the signal in combination with the relays and energizing batteries at the stations, and movable arms through which the circuit is completed when the relay is energized, and is broken when the relay is subjected to the opposite condition by a train entering upon the section controlled thereby.

6. In a signal system, a movable signal or semaphore, a latch lever, stop, and intermediate mechanism, an electro magnet by which the signal controlling mechanism is actuated, a battery and wires connecting it with the electro magnet and binding posts, with a resilient connecting arm through which the binding posts are connected when the lever and latch mechanisms are engaged, and disconnected when they are released.

7. In a signal system, a movable signal or semaphore, a latch lever, stop, and intermediate mechanism, with a controlling electro magnet and battery, a bell or annunciator whereby a "clear line" is indicated, binding posts with which wires from the battery are connected, a relay connected with a main line battery, an arm actuated by the armature of the relay to connect or cut off the current from the signal battery and magnet, an elastic arm which connects the binding posts through the electro magnet when the latch mechanism is engaged, and which shunts the current through the annunciator mechanism, when the latch is disengaged.

In witness whereof we have hereunto set our hands.

HARRY C. BARNES.
WILLIAM W. SLATER.

Witnesses:

HARRY J. LASK,
JOHN BRUCKMAN.