(No Model.)

O. GASSETT & I. FISHER.

Circuit Controlling Apparatus for Railway Switch Signal.

No. 232,344. Patented Sept. 21, 1880.

Fig: 1.

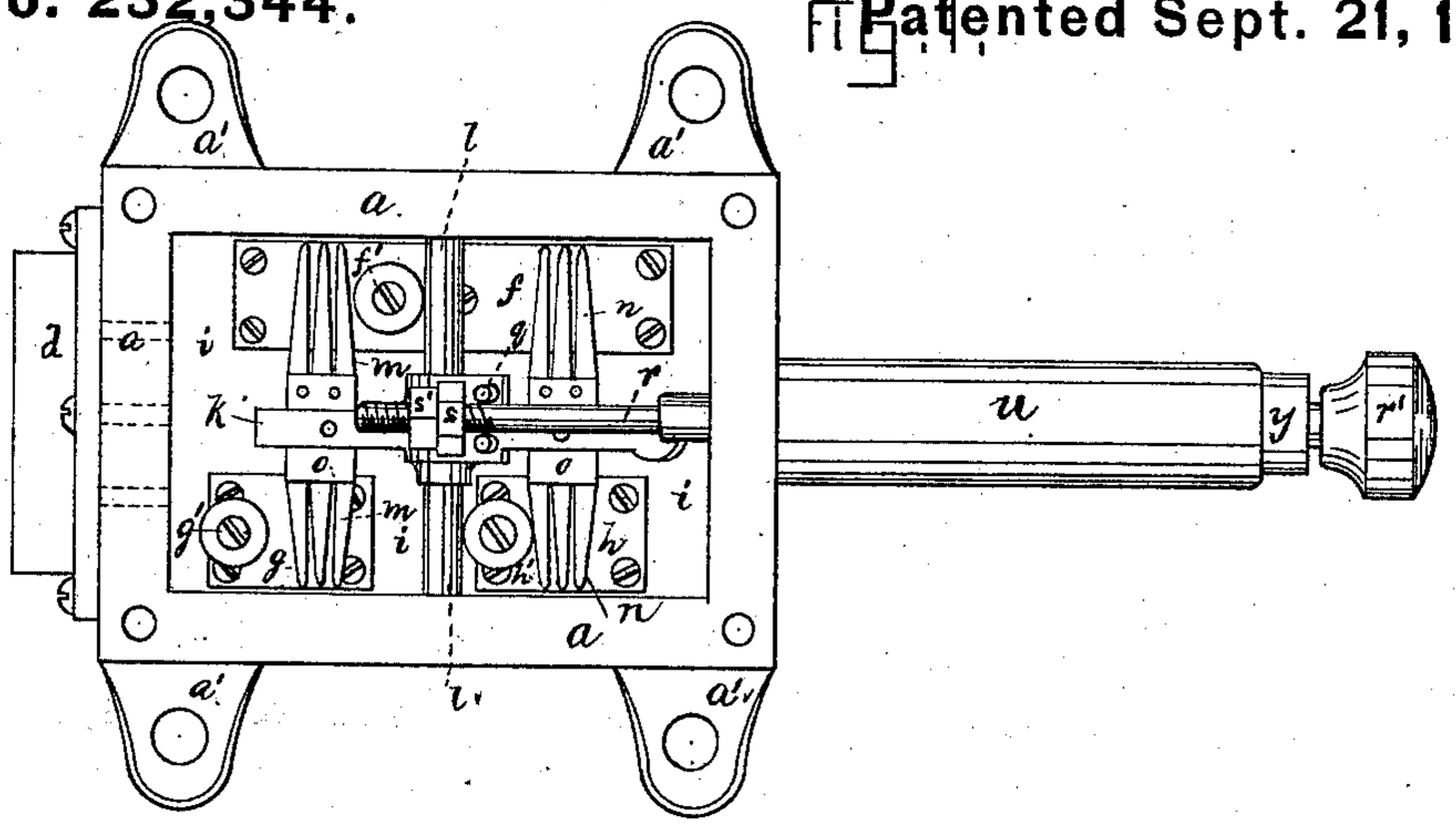


Fig: 2.

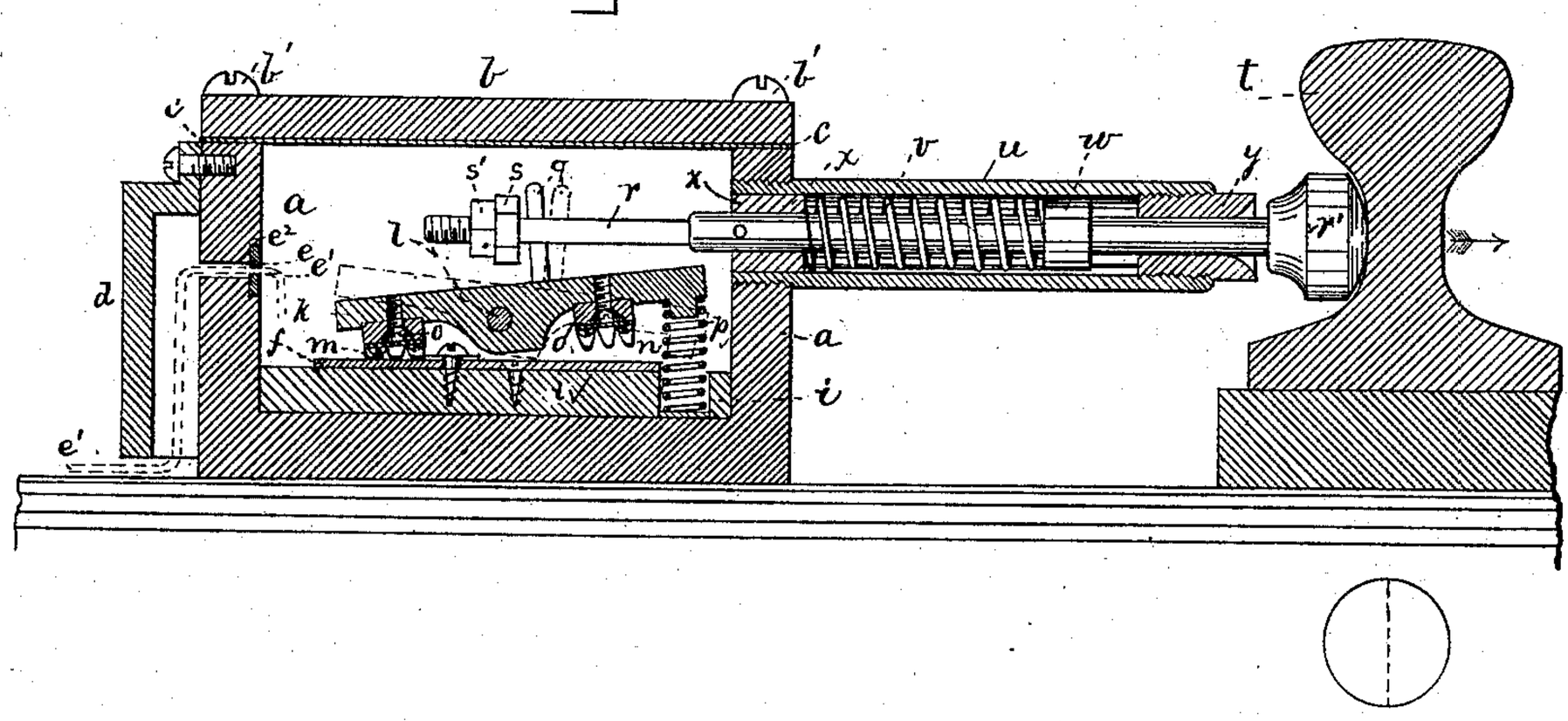


Fig: 3.

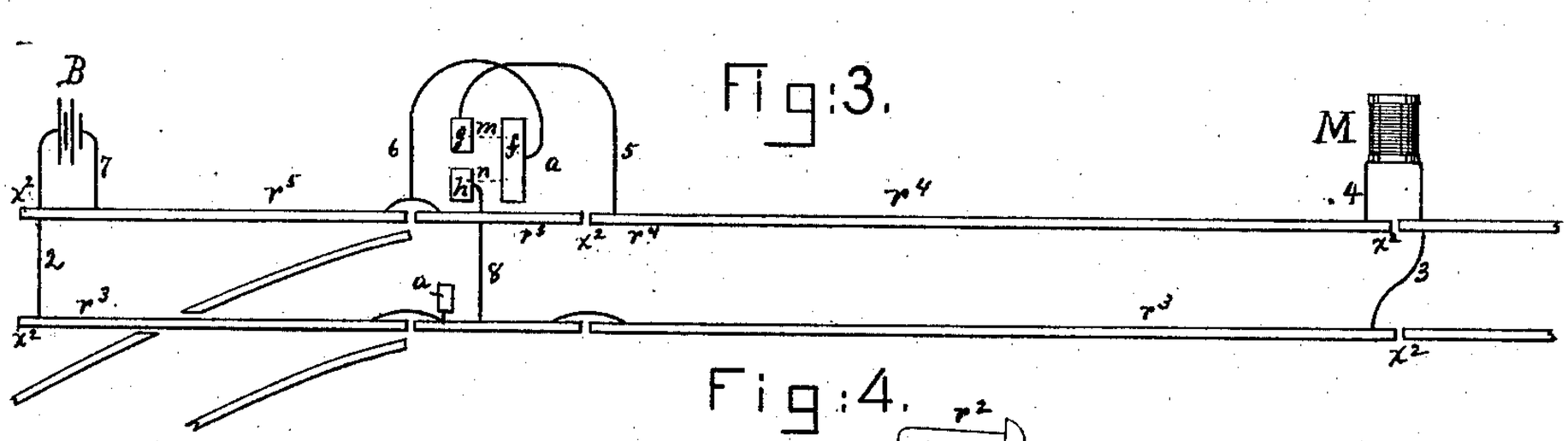
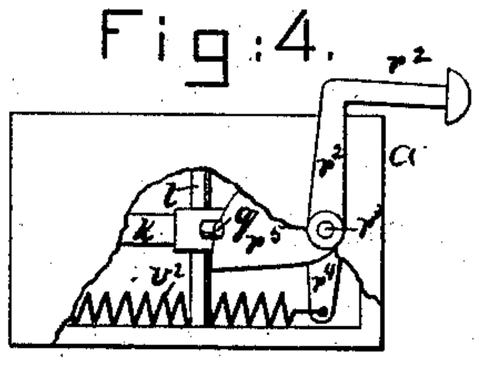


Fig: 4.



Witnesses.
Jos. P. Livermore
L. F. Connor.

Inventor.
Oscar Gassett and
Israel Fisher by
Crosby & Gregory
Attys.

UNITED STATES PATENT OFFICE.

OSCAR GASSETT AND ISRAEL FISHER, OF BOSTON, MASSACHUSETTS, ASSIGNORS TO THE UNION ELECTRIC SIGNAL COMPANY.

CIRCUIT-CONTROLLING APPARATUS FOR RAILWAY-SWITCH SIGNALS.

SPECIFICATION forming part of Letters Patent No. 232,344, dated September 21, 1880.

Application filed March 8, 1880. (No model.)

To all whom it may concern:

Be it known that we, OSCAR GASSETT and ISRAEL FISHER, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Circuit-Controlling Apparatus for Railway-Switch Signals, of which the following description, in connection with the accompanying drawings, is a specification.

Our invention relates to a circuit-controlling apparatus for operating electric switch-signals for railways; and it consists partly in using a strong and tight inclosing case or box, in which the circuit-changing device is placed and kept protected from the effects of the weather and tampering of unauthorized persons, the said box being adapted to be secured to one of the usual sleepers on which the movable switch-rails slide.

The invention also consists in the employment, with insulated metal plates and movable contact-fingers to electrically connect the said plates, of a shifting device (shown as a rod provided with a head to rest against one of the movable switch-rails) and a strong spring to press the said rod toward the said rail, the said spring being compressed while the switch-rails are in line with the main track, and the rod then held back in its normal position out of engagement with, and thus preventing the jarring of passing trains from affecting the circuit-changing device; but when the switch-rail is moved the said spring, in expanding, causes the rod to follow the rail a short distance, and in such movement to operate the circuit-changing device to set the signal.

The arm is held in its normal position with one set of contact-fingers connecting their corresponding plates by a light spring, which is overcome by the stronger spring acting on the rod or shifting device before mentioned while the switch-rails are moved from the main line, during which time the other set of contact-fingers are held in position to connect their corresponding plates.

As herein shown, the first-mentioned set of spring-fingers close the circuit through the signal electro-magnet, which then holds the signal in the position indicating safety, while the second set of spring-fingers close a shunt when the switch-rails are moved from the main line, the said shunt short-circuiting and demagnetizing the signal electro-magnet to set the signal to danger.

The apparatus of the present invention will be described as used in connection with a block-signal operated by a constant electric current in a closed circuit consisting, mainly, of the rails of the track; but it is obvious that it may be used with any signal in use which is operated by opening or closing a circuit, or both, as all these operations are performed.

Figure 1 is a plan view of a circuit-controlling apparatus embodying our invention, the top of the case being removed; Fig. 2, a longitudinal section thereof; Fig. 3, a diagram, showing the apparatus connected in circuit; and Fig. 4 a modification to be referred to.

The inclosing-case is shown as a strong box, *a*, which may be of cast-iron of convenient size, and provided with suitable lugs *a'*, to enable it to be securely fastened to the sleeper, as by screws or bolts. The cover *b* is attached by screws *b'*, and a layer, *c*, of india-rubber or other suitable material, is placed between the cover and box, to form a perfectly-tight joint, so that no moisture can enter.

At a convenient place (shown as the side of the box away from the rail) is placed a strong hood, *d*, beneath which the wires are led, as shown by the dotted line *e'*, to suitable holes *e*, through which the said wires are introduced to the case, where they are connected by suitable binding-screws *f' g' h'* to the metal contact-plates *f g h*, screwed upon a bed, *i*, of insulating material, tightly fitted in the bottom of the case *a*. The holes *e* are counterbored, as shown at e^2, to receive any suitable packing material to make a tight joint.

An arm, *k*, free to oscillate on an axle, *l*, supported in the sides of the case *a*, carries upon each end an electrical connector, (shown as a set of metallic spring-fingers *m* and *n*,) to connect the metallic plates at the opposite sides of the box, the said spring-fingers being insulated from the arm *k* by blocks *o*, of hard rubber or other suitable material.

The arm *k* is normally held, as shown in full lines, Fig. 2, with the spring-fingers *m* forming connection between the plates *f* and *g* by a spring, *p*.

Two strong pins, *q*, connected with the arm *k*, extend upward on opposite sides of the shift-

ing device, (shown as a rod, *r*,) in proper position to be engaged by a projection on the end of said rod, (herein shown as a nut, *s*,) the position of which may be readily adjusted, the said nut being retained in desired position by a check-nut, *s'*.

The rod *r*, provided at its outer end with a suitable head, *r'*, to rest against one of the movable switch-rails *t*, passes out through a tube, *u*, inserted in the side of the case *a*, and is pressed toward the rail by a strong spring, *v*, which acts against a collar, *w*, on the rod *r*, the other end of the spring resting against a shoulder, *x*, which also serves as a guide for the rod *r*. A sleeve, *y*, in the outer end of the tube *u*, serves as a guide for the rod *r*, and also forms a stop for the collar *w* to limit the outward movement of the rod *r*.

The sleeve *y* and shoulder *x*, besides forming a guide for the rod *r*, also fits *w* closely as to make practically an air-tight passage for the said rod.

Instead of the rod *r* the shifting device for the circuit-changing arm *k* might, as shown in Fig. 4, consist of an arm or bent lever, r^2, attached to and adapted to rotate a shaft, r^3, extended into the case *a*, through an air-tight bearing in the said case, where it is provided with an arm, r^4, and spring v^2, to actuate it when the rail is moved.

Any suitable connection may be used to transmit the movement to the circuit-changing arm *k*, the essential feature of this part of the invention being that the movement is transmitted from the rail to the circuit-changer by a shifting device, which enters the case through a tight guide or bearing.

As shown, a cam, r^5, may be used to engage one of the pins *q* to shift the circuit-changer; but it is obvious that a suitable cam might be used to engage the end of the arm *k* to rock the said arm.

As shown in Fig. 4, the spring *p* should be at the opposite end of the arm *k* to the one shown in the other figures, and the plates *f h* would normally be connected by the spring-fingers *n*, the circuit-connection being made to correspond.

The operation is as follows: The case *a* is secured to a sleeper, near the movable end of either one of the switch-rails, as shown at *a*, Fig. 3, on the side from which the rail moves, in such proximity to the said rail that when it is in normal position in line with the main track the rod *r* is pressed into the case *a*, as shown in Figs. 1 and 2, the spring *v* then yielding. When in this position the nut *s* is removed a considerable distance from the pins *q*, so that the jarring of the shifting-rod *r* from passing trains does not affect the lever *k* of the circuit-changing device, as in the usual circuit-changers controlled by the switch-rail. When the switch is shifted the spring *v* causes the rod *r* to follow the rail *w* in its movement in the direction of the arrow, Fig. 2, and the nut *s* strikes the pins *q* and tilts the arm *k*, as shown in dotted lines, Fig. 2, the spring *p* then yielding, and the spring-fingers *m* are raised and those marked *n* depressed, thus breaking the electric connection between the plates *f g* and establishing it between the plates *f h*.

It is obvious that instead of using three plates, *f g h*, it might, in some cases, be desirable to divide the plate *f*, thus making four plates; or, if needed, any desired number of connections from side to side of the case *a* might be made and broken by the movement of the arm *k;* also, that the length of movement of the rod *r* might be increased or the case placed nearer the pivotal end of the switch-rails, so that a circuit between *f* and *h* would be established only when the rails were in line with the side or branch track, the said circuit controlling a signal to indicate such condition; also, that the rod *r*, spring *v*, and nut *s*, or equivalent, might be used with a sliding circuit-changing device instead of the pivoted one, the essential feature of this part of our invention being that the rod *r* is the only mechanism needed to transmit a movement from the rail to the circuit-closer, thus enabling the instrument to be made very compact, so that it may be placed on the sleeper, if necessary, between the rails, and that the head *s* is out of engagement with the said device when the rails are in line with the main track, so that the jarring of passing trains does not affect the contact-points of the circuit-closer.

In Fig. 3 one arrangement of the circuit of a block-section is shown; but we do not claim this arrangement, as it will form the subject of another application.

The rails of the track have metallic continuity, except at certain points to be specified, and the opposite rails are insulated from one another. One pole of the battery B is connected, by a wire, 2, with the rail r^3, which affords a continuous circuit between the insulating-points x^2, the siding being insulated at the proper points. At the other end of the section the rail r^3 is connected by the wire 3 with one end of the coil of the signal electro-magnet M, the other end of which is connected by wire 4 to rail r^4, continuous to an insulating-point, x^2, near the switch, where it is connected by wire 5 with the plate *g*. The plate *f* is connected by a wire, 6, with the rail r^5, extending from the rail r^4 to the end of the section, and the rail r^5 is connected by wire 7 with the other pole of the battery B.

When the plates *f g* are connected by the spring-fingers *m*, the circuit just described is completely closed and the electro-magnet M magnetized. A wire, 8, connects the plate *h* with the rail r^3, and when the fingers *n* connect the plates *f h* the circuit is through wire 2, rail r^3, wire 8, metal pieces *h n f*, wire 6, rail r^5, and wire 7, and the electro-magnet M is demagnetized.

The signal may be of any usual construction, and its controlling electro magnet or magnets connected in any desired way with the metal plates of the switch-circuit-controlling apparatus herein described.

We are aware that a circuit-closer operated by a railway-switch in a cast-iron inclosing-post is not new, and also that a circuit-closer has been inclosed in a tight case similar to that herein shown, but not adapted to be fastened to the sleeper beside the rail, the said circuit-closer being operated by shifting mechanism entirely different from that herein shown; but we are not aware of any in which the parts are so arranged that they may be inclosed in substantially air and water tight case of suitable size and shape to be attached to one of the usual sleepers without any extension thereof, and to be placed within the rails if desired or demanded by the peculiar construction of the switch.

The case *a*, constructed as herein described, may be immersed in water without any moisture entering.

We claim—

1. In a circuit-controlling apparatus for railway-switch signals, a circuit-changing device and a tight, strong, inclosing-case therefor, suitably shaped and provided with means to enable it to be readily attached to the usual sleeper beside or between the switch-rails, combined with a spring-actuated shifting device to operate the circuit-changing device extended out from the said case through a tight guide or bearing and adapted to be engaged and moved by the switch-rail, substantially as described.

2. In a circuit-controlling apparatus for railway-switch signals operated by a closed circuit, a circuit-changing device held in normal position by a spring to close the main circuit, combined with a spring-actuated shifting device to operate the said circuit-changer adapted to be positively held out of engagement with the circuit-changing device by the switch-rails when in line with the main track, and actuated by the said spring to engage and shift the circuit-changing device when the switch-rails are moved from the main-line rails, substantially as and for the purpose set forth.

3. In a circuit-controlling apparatus for railway-switches, insulated contact-plates, contact-fingers to connect them, and a pivoted arm to carry the said fingers provided with pins to move the said arm, combined with a rod controlled by the movable rail having a head adjustable longitudinally thereon to engage the said pins and tilt the said arm, substantially as described.

4. The combination, with a rod moved positively in one direction by a movable rail and in the other direction by a spring, of the pivoted circuit-changer adapted to be engaged and tilted by the said rod to remove contact-fingers on one side of its axis from, and those on the other side into, connection with corresponding insulated plates, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

OSCAR GASSETT.
ISRAEL FISHER.

Witnesses:
JOS. P. LIVERMORE,
N. E. C. WHITNEY.