(No Model.) 3 Sheets—Sheet 1.

G. OTTE.

INDICATOR FOR RAILROAD SWITCHES.

No. 311,846. Patented Feb. 3, 1885.

Fig. 1

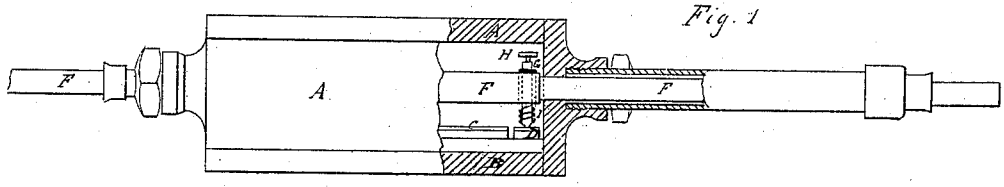


Fig. 2

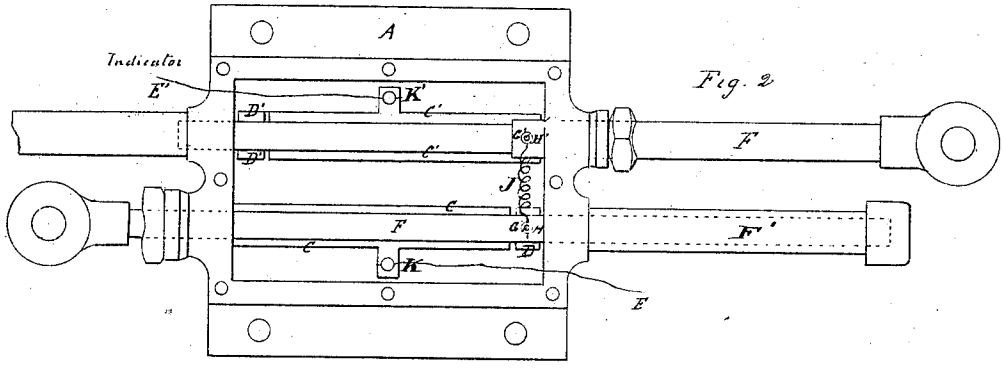


Fig. 4

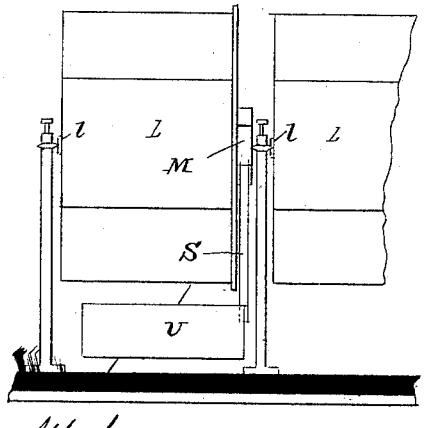
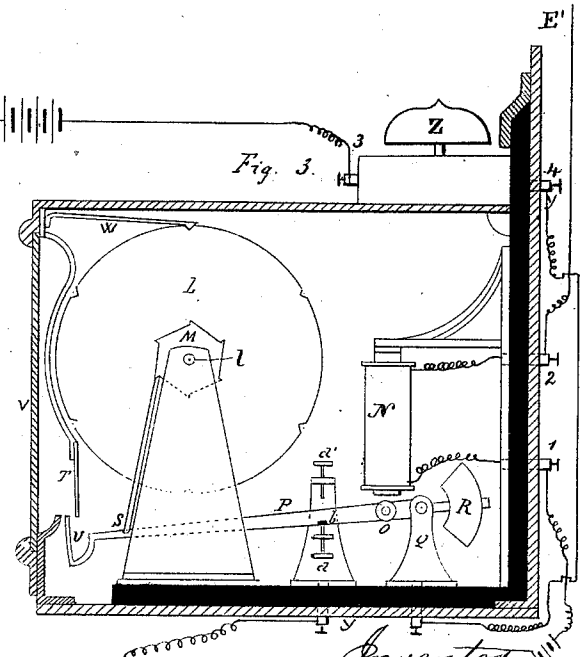


Fig. 3.



Attest.

C. M. Hopkins.

Wm. F. Fayers.

Inventor.

Gilbert Otte

By Knight Bros. Attys

(No Model.) 3 Sheets—Sheet 2.

G. OTTE.

INDICATOR FOR RAILROAD SWITCHES.

No. 311,846. Patented Feb. 3, 1885.

Fig. 5

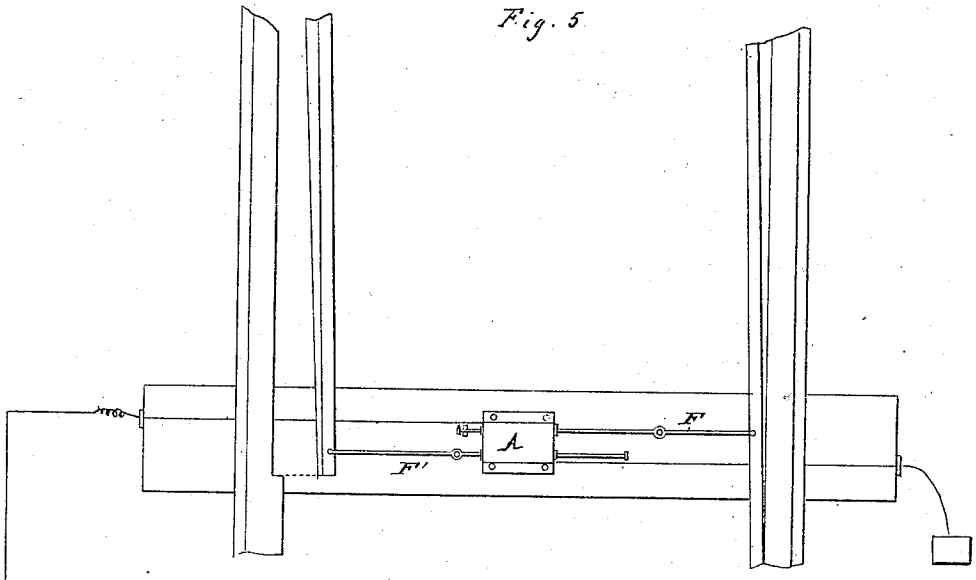
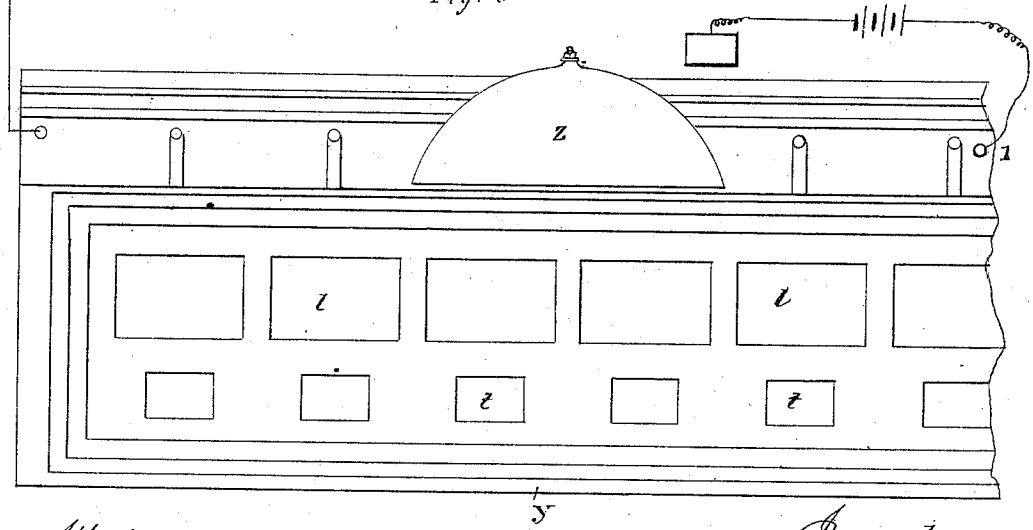


Fig. 6



Attest.

D. M. Hopkins

Jno. F. Jayes.

Inventor.

Gilbert Otte.

By Knight Bros.

attys

(No Model.) 3 Sheets—Sheet 3.

G. OTTE.

INDICATOR FOR RAILROAD SWITCHES.

No. 311,846. Patented Feb. 3, 1885.

Fig. 7.

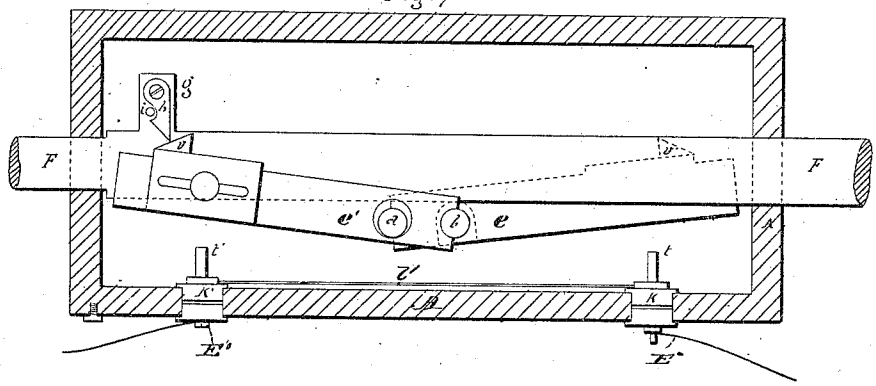


Fig. 8.

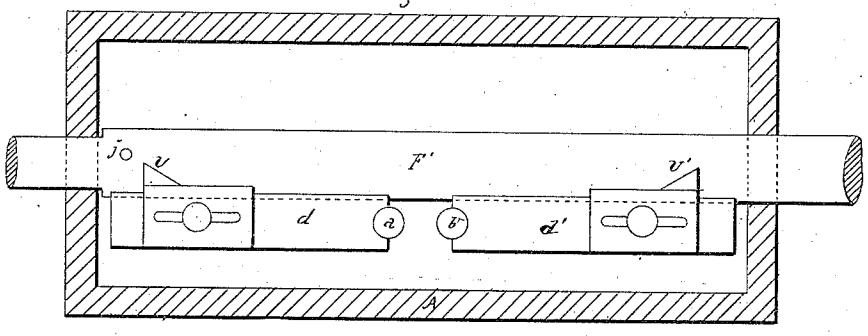
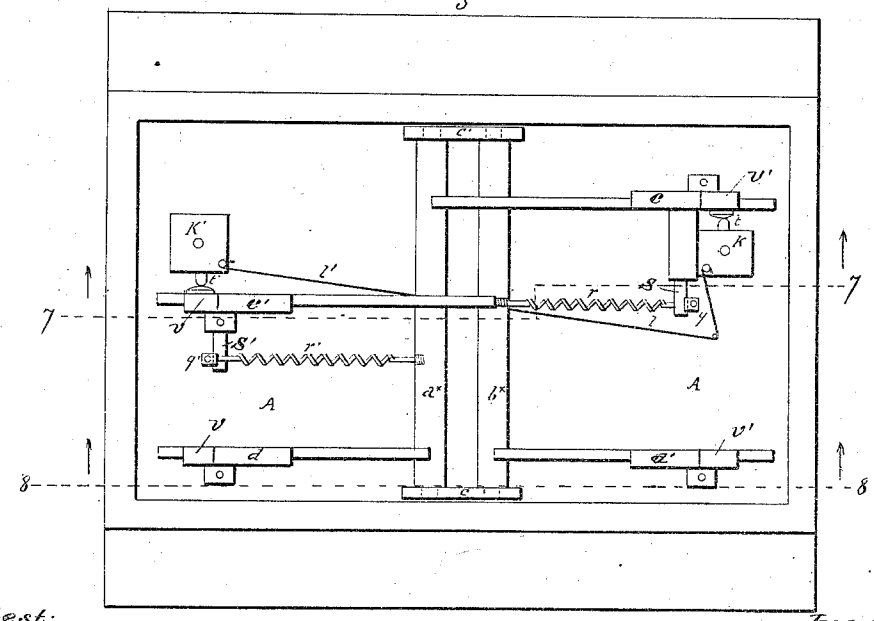


Fig. 9.



Attest:
Wm. J. Canney
Wm. F. Fayers.

Inventor
Gilbert Otte,
By Knight Bros
his Attorneys.

UNITED STATES PATENT OFFICE.

GILBERT OTTE, OF APELDOORN, HOLLAND.

INDICATOR FOR RAILROAD-SWITCHES.

SPECIFICATION forming part of Letters Patent No. 311,846, dated February 3, 1885.

Application filed August 28, 1882. (No model.) Patented in Belgium July 19, 1882, No. 58,612; in France August 2, 1882, No. 150,436; in England August 2, 1882, No. 3,667, and in Italy December 14, 1882, No. 14,747.

To all whom it may concern:

Be it known that I, GILBERT OTTE, a subject of the King of Holland, residing at Apeldoorn, Holland, have invented certain new and useful Improvements in Switch-Indicators, of which the following is a specification.

The object of my apparatus is to furnish a means of controlling the position of a railway-switch in such manner that it may at all times be known what position it occupies—*i. e.*, whether or not the switch is forced over into contact with the stationary rail, so as to insure its position in a position to enable the safe passage of a train. To this end I employ a contact-box placed directly upon the track between the rails of each switch, and electrically connect such box, in the manner hereinafter described, both with a central or special signal-station and with one or more indicators (preferably of the improved form hereinafter described) placed along the track at various points for the warning of train-men.

My apparatus has the great advantage of being adaptable to all known systems of switching, and of indicating by itself the exact position of the switches, and consequently of serving to control the action of the switchman.

In the annexed drawings, Figure 1 represents the contact-box partly in elevation and partly in vertical section. Fig. 2 represents this box in plan with its cover removed. Fig. 3 is a sectional elevation of the indicator-box and its contained mechanism, showing also the complete alarm-circuit and a portion of the indicator-circuit. Fig. 4 is a view of a portion of the indicator. Figs. 5 and 6 are conjointly a diagrammatic view of the entire indicating-circuit, Fig. 5 being a plan of a switch to which the contact-box is applied, and Fig. 6 is a front elevation of the indicator. Fig. 7 is a vertical section on the line 7 7, Fig. 9, of a modified and improved form of my contact-box. Fig. 8 is a similar section of the same on the line 8 8, Fig. 9. Fig. 9 is a plan of the same with its cover and the operating-rods removed to show more fully the mechanism beneath the same.

A is a contact-box, of brass or other suitable material, placed transversely or laterally upon the road between the ends of the switch. This box is furnished with a wooden bottom, B, for insulation from the ground.

C C′ are metallic plates fixed to the bottom and separated from the rest of the box.

D D′ are parts of the plates completely isolated or insulated from the parts C C′.

E′ is a wire conductor in communication with the contact-box, the indicator, and the batteries.

E is a wire conductor in communication with the earth.

F F′ are movable rods of iron, the extremities of which are secured to the switches. These rods are pierced vertically, and in the orifices thus formed are placed contact-buttons H H′, of brass, separated from the rods by means of little insulating-cylinders G G′. These contact-buttons carry spiral springs I, which insure the contact between the buttons and the plates C C′ D D′.

J is a wire conductor insulated from the rods F and putting in communication the contact-buttons H and H′.

K K′ are the points of contact between the plates C C′ and the wire conductors E E′.

In the indicator, L is a cylinder, of brass, divided into a number of pairs of sections, (six in the drawings,) these sections being alternately painted in different colors. M is a ratchet-wheel, having as many teeth as there are sections in the cylinder L. This wheel is of brass, and is insulated from the rest of the apparatus. It has direct control of the cylinder L, being fixed to the same shaft, *z*. N is an electro-magnet. O is an armature of soft iron fixed to the lever P, which pivots on the support Q and carries a counterpoise, R. At the extremity opposite to the counterpoise the lever P carries a rod, S, which engages with the teeth of the ratchet-wheel M. T is a fixed index-plate painted white. U is a movable index-plate painted red. It is fixed to the lever P. V is a glass forming one of the sides of the indicator-box, through which can be seen the cylinder L and the index-plate which may for the time be exposed. W is a spring-pawl serving to retain the cylinder L in the position that it occupies on being shifted by the lever P. X is an insulating material. *y* is the indicator-box. *a a′* are

screws serving to regulate the movement of the lever P, the screw *a'* also forming a part of the indicator-circuit, as presently to be explained. *b* is a piece of insulating material fixed on the lever P at its point of contact with set-screw *a*.

The following is the method of operation of the above-described form of my invention.

The drawings represent the apparatus in a normal position, one switch-rail lying against the main rail. Under these conditions the electric current coming from the batteries and passing through the indicator, entering the box A by means of the wire E', is interrupted by the space between C and D. Consequently, the electro-magnet and all the apparatus are not subjected to any electrical action.

In the indicator the armature is not attracted, and the lever P rests upon the insulated piece *b*. If the switches be shifted at the moment when the contact-button H gets beyond the insulated part D of the plate and comes in contact with the conducting part C thereof, the current coming by E' is no longer interrupted, and it follows the circuit E' K' C' H' J H C K E to earth. The indicator-box *y* is placed in the circuit intermediate of battery and contact-box, the helix of the electro-magnet N being a part of said circuit. When, therefore, the circuit is completed in the manner above described by the shifting of the switch-lever, the magnet N is excited and attracts the armature O. This draws with it the lever P and the rod S. The cylinder L makes a sixth part of a revolution, indicating a change in the position of the switch. The red index-plate U is lifted and takes position before the white index-plate T. At the same time an electrical circuit is completed by elevating the lever P into contact with the screw *a'*, whereby an alarm is sounded by a bell, Z.

While the shifting of the switch continues and the pins H' H are in contact with plates C' C a continual alarm will be sounded. The break between plates C' and D' is so arranged, however, that when the switch has attained a proper position the contact-pin H', passing the gap between the plates and resting upon the insulated plate D', will completely break connection between E' and E and the circuit will be interrupted until the switch be again shifted. The breaking of the circuit releases the armature of magnet N, dropping the signal-lever P, which in its descent cuts off the alarm-circuit in a manner presently to be explained. The consequence of this is that if for any reason whatever the switch-rail is arrested in its movement and does not come in contact with the opposed rail the current, not being intercepted, continues to pass, and the armature of the lever P remaining fixed against the electro-magnet, the bell continues to sound, and the red signal remains fixed in front of the white signal-plate.

Fig. 6 of the drawings shows a front view of the indicator-box. This box is furnished with large and small openings, each corresponding in number to the switches whose several positions should be indicated. Through the large openings *l* can be seen the different sections of the cylinders L, which are painted alternately red and white and indicate the position of the switch. For example, the white may signify that the switch is closed and main way open, while the red may signify exactly the reverse. The small openings *t* expose to view the white plates, or, if the switches are not in order, the red ones. The result is that when the alarm continues to sound—that is to say, when one of a number of switches does not occupy the required position, the small opening corresponding to this switch will expose to view the red plate in front of the white plate, and thus it can be ascertained with certainty which switch is in fault. Each time that the switches change their positions the cylinder L revolves one section and presents a different color. The signals are sounded by different batteries.

I have described the most simple manner of arranging the contact-box by reference to Figs. 1 and 2, but have shown in Figs. 7, 8, and 9 another form thereof. In this form the box A is entirely of metal. It has toward the middle of its length two transverse shafts, $a^{\times}$ and $b^{\times}$, pivoted in the supports *c c'*. The shaft $a^{\times}$ has two levers, *d e*, and the shaft $b^{\times}$ bears two other levers, *d' e'*. These four levers have each a small projection, *v v'*, by which they are put in motion. Rods F F', attached to the switch-rails, traverse the box A in manner similar to those before described in relation to Figs. 1, 2, and 5. The rod F has a little plate, *g*, depending from each side of which is a small gravity or spring bolt, *h*, which a pin, *i*, prevents from turning in one direction. These two bolts *h h* work in opposite directions. The rod F' carries a stationary pin or stud, *j*.

K K' are the contact-pieces for the wires E E', (similar to the device already described,) which are connected by a wire, *l'*. The wire E establishes the connection with the earth and the wire E' with the batteries. At the bottom of the box are placed two uprights, *q q'*, each bearing two stops, in which are lodged the bolts S S', fixed to the levers *e* and *e'*, designed to hold the latter in two determined positions. The springs *r* and *r'* serve to bring back the uprights *q q'* into their normal position every time they are displaced by the passage of the bolts S S'. The pieces K K' are insulated from the box and bear the contact-points *t t'*, which are insulated when the levers *e* and *e'* are lifted, but which establish the contact with these latter when they are lowered.

Fig. 7 represents the stem F and the contact-levers for making circuit; and Fig. 8 repsents the stem F' and the levers which serve to break the circuit.

The apparatus works as follows: When the switches occupy their normal position, the levers *e* and *e'*, Fig. 7, are lifted. The current coming from E' is interrupted at the insulated

piece K′. If, then, the switches are moved, the bolt *h* engages upon the stop *v* and lowers the lever *e′*. The connection with K′ is established immediately, and the current no longer being intercepted the alarm is heard; but the lever *e* in being lowered has raised the lever *d′*, and the switches continuing to advance, the bolt *j* of the stem F′, Fig. 8, meets the projecting part *v* of the lever *d′*, and in advancing farther it lowers this latter, raises the lever *e′*, and breaks the electrical communication. The alarm then ceases to be heard. When the switch reaches the extremity of its permitted movement, the circuit thus established will be broken, whereupon the red signal-plate U will disappear and the alarm cease. If the position of the switches is again changed, the bolt *h* of the stem F engages upon the projection *v′* of the lever *e* and depresses it, thus raising the lever *d*, the connection is again established and maintained until the bolt *j* engages upon the projection *v* of the lever *d*, and lowering the latter again breaks the connection, whereupon the bell ceases to sound. With this form of contact-box I employ an indicator similar to that already described.

The following is the course of the main circuit: A wire coming from the batteries and fixed to the button 1 on the indicator-box *y* establishes connection with a wire which is wound around the electro-magnet N. It is brought back then against the side of the box *y*, comes out at the button 2, and passes to the contact-box, where it follows the course shown in the specification. The alarm-current coming from the batteries passes by a wire fixed to a button, 3, into a core or bobbin placed in the alarm-box; thence to button 4; thence to button 5; thence to support Q; thence to lever P, and thence, (when the lever P is elevated by the electro-magnet N,) to the ground, through the contact-screw *a′*, its support, and the button 6.

I claim—

1. The combination, with an indicator circuit having an electro-magnet and a contact-box within which the said circuit is completed and broken by the shifting of the switch-rails, substantially as described, of an alarm-circuit having an armature carried by a pivoted arm which forms a part of the said alarm-circuit, said armature being attracted by the electro-magnet of the indicator-circuit when said magnet is excited, whereby the pivoted arm is vibrated and the alarm-circuit completed, substantially in the manner set forth.

2. In a railway-signal, substantially as herein described, the combination, with the switch-rails, of the connecting-rods F F′, carrying contact-buttons H H′, insulated therefrom and electrically connected to each other, the conductors C C′, located within the circuit, over which the buttons H H′ pass during the shifting of the rails, and the insulated blocks D D′, upon one of which one of said buttons rests while the rods F F′ are at either extremity of their permitted movement, substantially as described.

3. The combination, with an electrical circuit and a contact-box within which said circuit is completed and broken by the shifting of the switch-rails, of an electro-magnet located within said circuit, an armature mounted on a pivoted lever and attracted by said magnet when excited, a cylinder having alternately similar signals for indicating the position of the switch, as described, and connections between said pivoted lever and cylinder, whereby the latter has a partial revolution imparted to it at each oscillation of the former, as and for the purpose set forth.

4. The combination, with the indicator-circuit completed and broken by the movement of the switch-rails, and having the electro-magnet N and the alarm-circuit, substantially as described, of the pivoted lever P, having armature O and insulator *b*, the indicator-cylinder L, and the danger-signal T U, actuated by the vibration of said lever, as explained.

5. In combination with the indicator-circuit and a contact-box within which it is completed and broken by the shifting of the switch-rails, an electro-magnet, N, located in said circuit, a pivoted lever, P, carrying armature O, attracted by said magnet when excited, the stationary signal T, the danger-signal U, carried by the lever P and adapted to cover the signal T when the switch is displaced, the cylinder L, bearing alternate similar signals, the ratchet-wheel M, carried by the cylinder L, and the pawl S, carried by the lever P, whereby said cylinder is rotated, as and for the purpose set forth.

GILBERT OTTE.

Witnesses:
ADOLPH STEIN,
EMILE PICARD.