(No Model.) 3 Sheets—Sheet 1.

D. O. BECKWITH.

AUTOMATIC SIGNAL LAMP FOR ELECTRIC RAILWAYS.

No. 566,283. Patented Aug. 18, 1896.

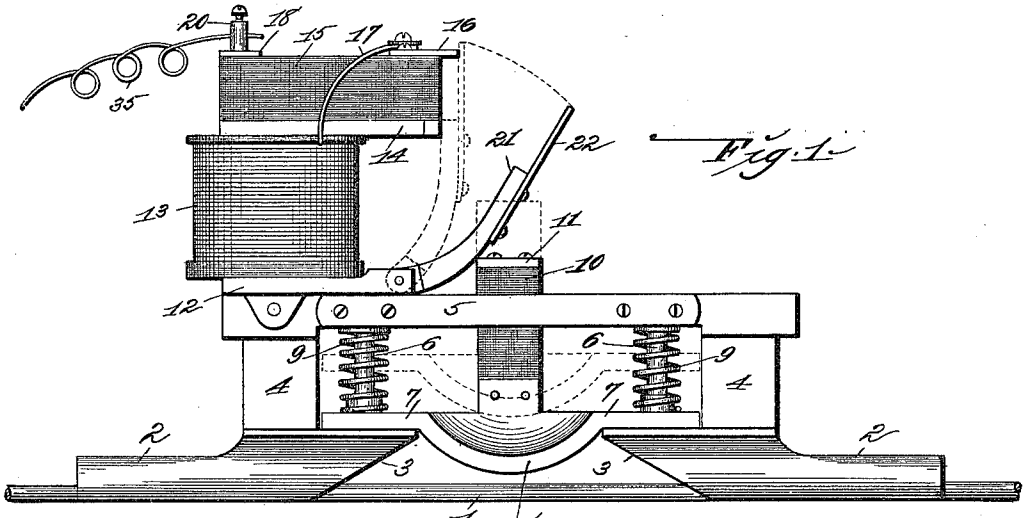


Fig. 1.

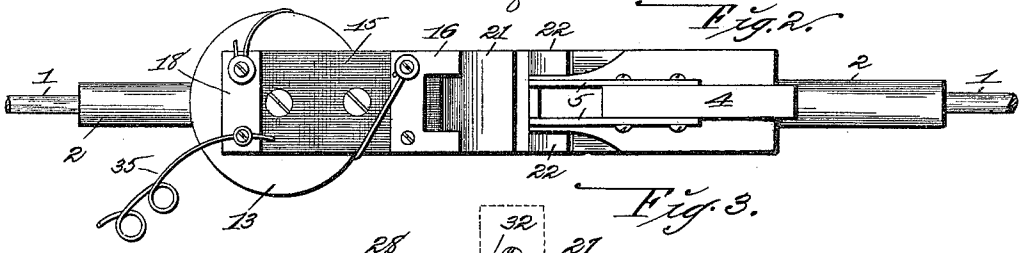


Fig. 2.

Fig. 3.

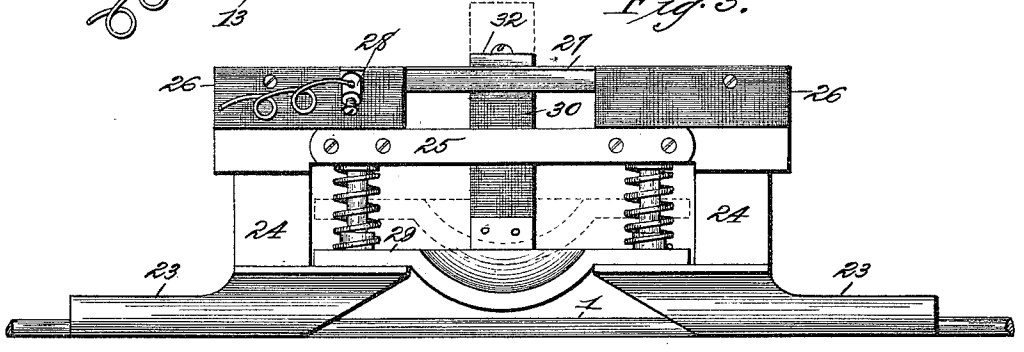
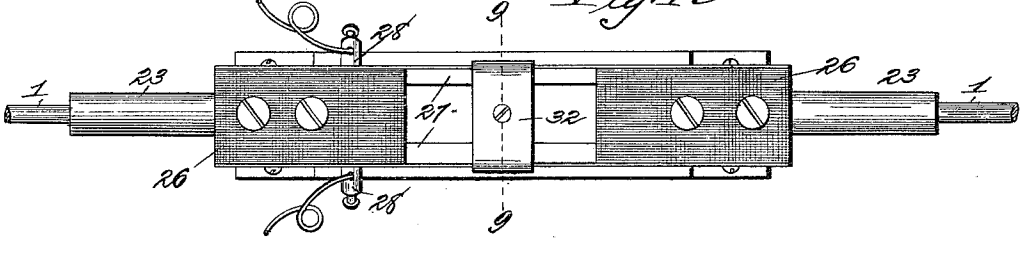


Fig. 4.



Witnesses:
M. P. Smith.
John L. Tunnicon.

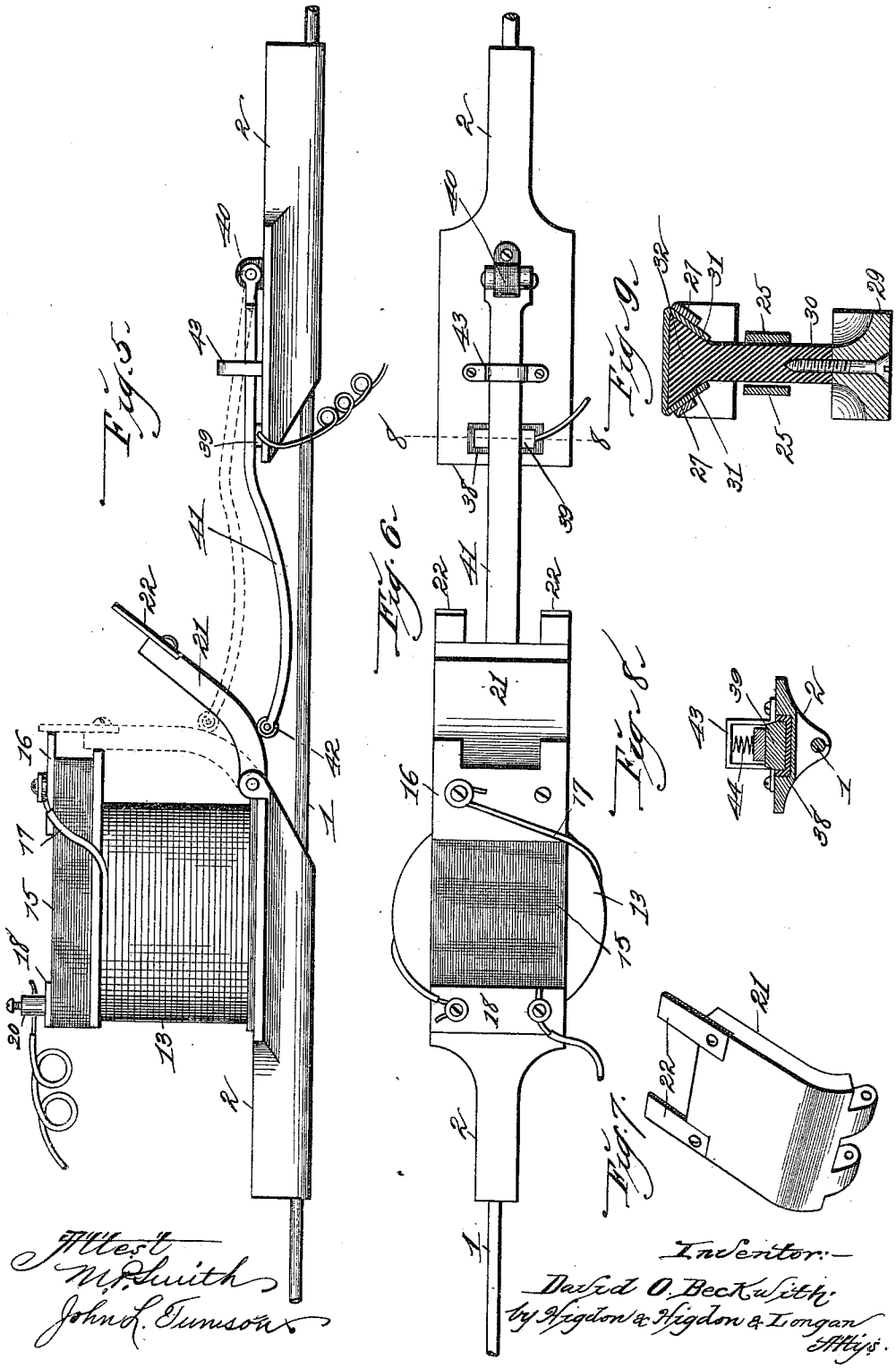
Inventor:
David O. Beckwith
by Wigdon & Wigdon & Tongan
Attys.

(No Model.) 3 Sheets—Sheet 2.

D. O. BECKWITH.

AUTOMATIC SIGNAL LAMP FOR ELECTRIC RAILWAYS.

No. 566,283. Patented Aug. 18, 1896.



Witnesses:
W. P. Smith
John L. Tumson

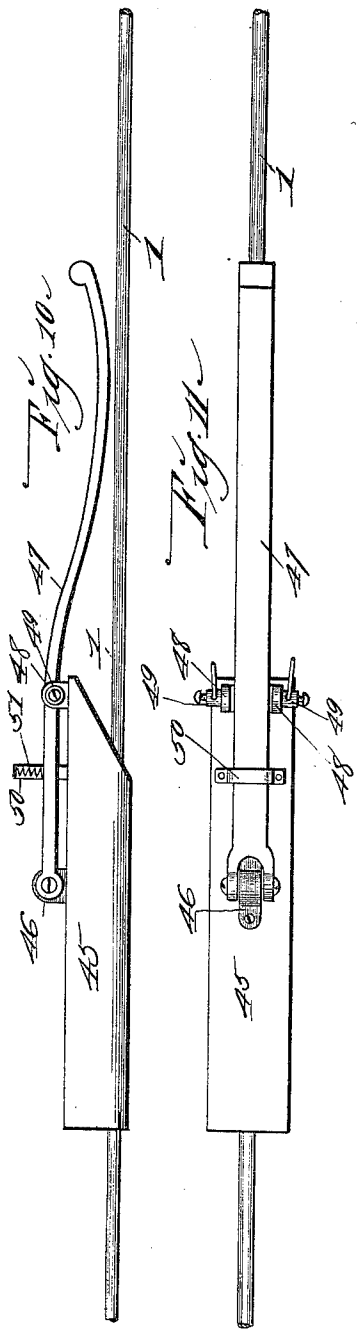
Inventor:
David O. Beckwith
by Wigdon & Wigdon & Longan
Attys.

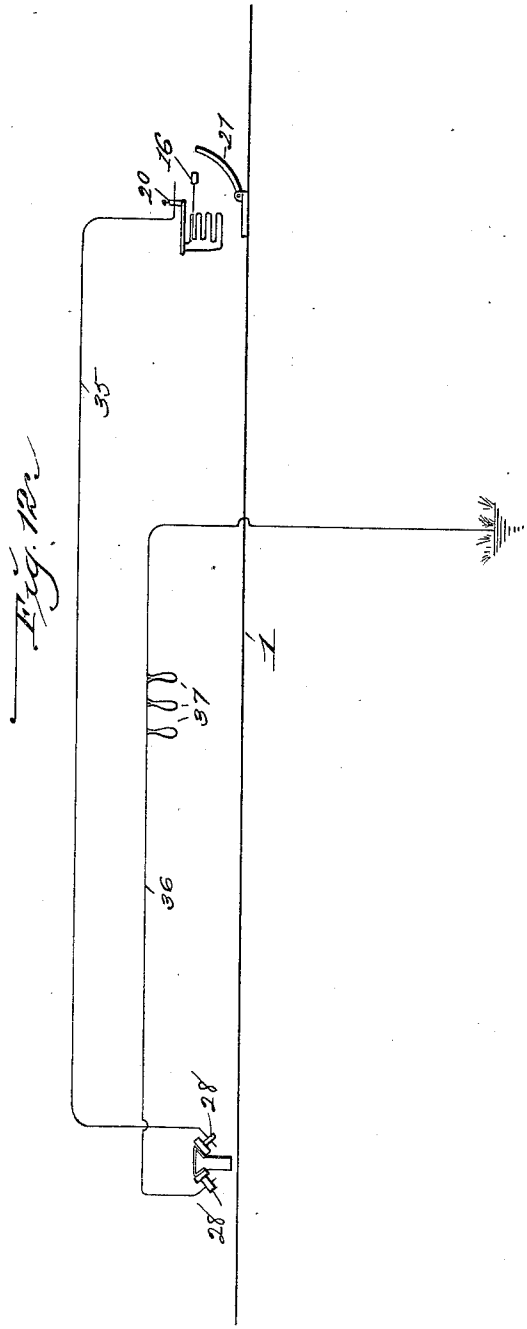
(No Model.) 3 Sheets—Sheet 3.

D. O. BECKWITH.

AUTOMATIC SIGNAL LAMP FOR ELECTRIC RAILWAYS.

No. 566,283. Patented Aug. 18, 1896.





Attest
M. P. Smith
John L. Tunison

Inventor
David O. Beckwith.
by Wigdon & Wigdon & Longan.
Attys.

UNITED STATES PATENT OFFICE.

DAVID O. BECKWITH, OF ST. LOUIS, MISSOURI, ASSIGNOR TO GEORGE HAKE, OF SAME PLACE.

AUTOMATIC SIGNAL-LAMP FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 566,283, dated August 18, 1896.

Application filed April 29, 1895. Serial No. 547,486. (No model.)

To all whom it may concern:

Be it known that I, DAVID O. BECKWITH, of the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Automatic Signal-Lamps for Electric Railways, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to an improved automatic signal-lamp for electric railways; and it consists in the novel construction, combination, and arrangement of parts hereinafter described and claimed.

In the drawings, Figure 1 is a side elevation of a contact-connecting device of which I make use in carrying out my invention. Fig. 2 is a top plan view of the same device. Fig. 3 is a side elevation of the contact-disconnector. Fig. 4 is a top plan view of the same. Fig. 5 is a side elevation of a modified form of contact-connecting device. Fig. 6 is a top plan view thereof. Fig. 7 is a view in perspective of a hinged contact-plate of which I make use in carrying out my invention. Fig. 8 is a cross-sectional view taken approximately on the indicated line 8 8 of Fig. 6. Fig. 9 is a cross-sectional view taken approximately on the indicated line 9 9 of Fig. 4. Fig. 10 is a side elevation of a modified form of the contact-disconnector. Fig. 11 is a top plan view thereof. Fig. 12 is a diagram showing the application of the completed device to a trolley-wire.

Referring by numerals to the accompanying drawings, 1 indicates the trolley-wire, to which is clamped at some distance from the point where it is desired to locate the signal-lamp a pair of metallic blocks 2, the same having inclined inner ends 3. Formed integral with these blocks or clamps 2 and extending upwardly therefrom are blocks 4, the same being connected by longitudinally-extending parallel straps or bars 5.

Vertically arranged between the protruding inner ends of the clamps or blocks 2 and the blocks 4 are guide-rods 6. Horizontally arranged between the blocks 4 and arranged for vertical movement is a plate 7, the center 8 of which is curved downwardly and nearly touches the trolley-wire 1 between the clamps 2. The guide-rods 6, previously mentioned, pass through the opposite ends of this plate 7, and expansive coil-springs 9 are located upon these guide-rods 6 and interposed between the inner ends of the clamps 2 and protruding upper ends of the blocks 4.

Fixed to the longitudinal center of the plate 7 and extending upwardly therefrom between the parallel bars 5 is a block 10, of any suitable insulating material. Rigidly fixed upon the upper end of this block 10 is a wear-plate 11.

Rigidly fixed to the top of one of the blocks 4 is a metallic plate 12, and located upon and insulated from said plate 12 is a single coil-magnet 13. Located upon and insulated from this magnet 13 is a plate 14, and located upon said plate 14 is a block 15, of suitable insulating material. Fixed upon the forward end of this block of insulating material 15 is a plate 16, of copper or analogous material and to which one end 17 of the magnet-coil leads and connects.

Located upon the rear end of the insulating-block 15 is a plate 18, of copper or analogous material, to which the remaining end 19 of the magnet-coil leads and connects. A binding-post 20 is fixed to this plate 18. Hinged or pivoted to the forward end of the plate 12 is a hinged contact-plate 21, that is provided on its end with a bifurcated plate 22, of copper or analogous material. This contact-plate 21 is so pivoted or hinged as that it will always rest directly upon the upper edge of the wear-plate 11 when out of engagement. When said contact-plate is thrown into engagement, its upper end will contact with the forward end of the metallic plate 14 and the upper ends of the copper plate 22 will contact with the outer end of the copper plate 16.

Referring now to Figs. 3 and 4, the construction of the contact-disconnecting device will be described. A pair of clamps 23, in every way similar to the clamps 2 and provided with the upwardly-extending blocks 24, that are connected by parallel strips or bars 25, are located or fixed on the trolley-wire a suitable distance beyond where the signal-lamp is located. Located upon the upper ends of the blocks 24 are blocks 26, of insu-

lating material, and extending from one of said blocks to the other and located in the upper outer corners of said blocks are parallel metallic bars or strips 27. Binding-posts 28 are fixed to these strips 27 and protrude from the side faces of one of the blocks 26. Arranged for vertical movement between the protruding inner ends of the clamps 23 and blocks 24 is a plate 29, in every way similar to the plate 7 previously described. Fixed to and extending upwardly from the center of this plate 29 is a block 30, of insulating material, the upper end of which is constructed with inclined sides 31, and these inclined sides 31 and the entire head of the block 30 is covered by a metallic plate 32. Coil-springs 33 are located upon guide-pins 34, that extend between the protruding inner ends of the blocks 23 and 24 and tend to hold the plate 29 against the upper sides of the clamp 23 and to hold the metallic plate 32 against the parallel bars or strips 27.

35 indicates a suitable conductor that leads from the binding-post 20 along the trolley-wire 1 to one of the binding-posts 28.

A suitable conductor 36 leads from the opposite binding-post 28 to one or a series of ordinary electric lamps, such as 37, and from thence to the ground.

In the modified form of the contact-connecting device the magnet-coil 13 is located directly upon and insulated from one of the clamps 2, and the contact-plate 21 is pivoted or hinged directly to the end of said clamp 2. Located in the top face of the opposite clamp 2 is a rectangular block of insulating material 38, and located in said rectangular block of insulating material is a metallic wear-plate 39.

Located in the top face of the clamp 2 is a block 40, of insulating material, the same extending upwardly a slight distance from said clamp 2 in order to form a bearing. Pivoted to this bearing or block 40 is an arm 41, that extends to a point immediately in front of the clamp 2, upon which the magnet-coil is located. The free end of this arm 41 is provided with an antifriction-roller 42.

A loop or yoke 43 is fixed to the upper face of the clamp 2, to which the arm is pivoted, and extends over and around said arm and restricts the upward movement of the same. An expansive coil-spring 44 is interposed between this loop and the top side of the arm 41, the tendency of which is to hold the arm 41 at its lowermost position.

When the parts are properly positioned, the contact-plate 21 rests against the antifriction-roller 42 on the end of the arm 41. Connections are made to the magnet-coil in the same manner as previously described.

Referring now to Figs. 10 and 11, the construction of the contact-disconnector will be discribed. A clamp 45, in every way similar to the clamps previously described, is located upon the trolley-wire 1 a suitable distance from the signal-lamps, and extending upwardly from the center of the top face of this clamp 45 is a block 46, of insulating material. Pivoted to this block of insulating material 46 and extending past the forward end of the clamp 45 is an arm 47, the same being bent downwardly and almost to the trolley-wire 1. Formed integral with the front end of the clamp 45 are contact-blocks 48, between which the arm 47 normally rests. Fixed to said contact-blocks 48 are binding-posts 49. Suitably located upon the top face of the clamp 45, between the contact-blocks 48 and the block 46, of insulating material, is a loop 50, that restricts the upward movement of the arm 47, and a coil-spring 51 is interposed between said loop and the top surface of the arm 47. The tendency of this spring 51 is to keep the arm 47 at its lowermost limit of movement and in contact with the blocks 48. A suitable conducting-wire extends from the binding-post on the magnet-coil of the modified form of my device to one of these binding-posts 49, and a suitable conductor extends from the opposite binding-post 49 to the signal lamp or lamps, and from thence to the ground.

The operation is as follows: The contact connecting or closing portion of the device is of course located upon the trolley-wire a suitable distance from the point where the signal-lamps are suspended and the contact-disconnecting device is located upon the trolley-wire a suitable distance beyond the point where the lamps are suspended. When the proper connections have been made between the contact connector or closer, the contact-disconnector, the lamps, and the ground and the trolley-wheel passes beneath the contact connector or closer, the following operation takes place: As said trolley-wheel passes off from the first clamp 2 it necessarily strikes against the downwardly-pending portion 8 of the plate 7, and said plate 7 and integral or fixed parts are moved upwardly to the position as shown by dotted lines in Fig. 1. In so doing the resistance offered by the coil-springs 9 is overcome and the wear-plate 11 will engage against the curved contact-plate 21 and move the same upwardly to the position as shown by dotted lines in Fig. 1. When said contact-plate moves upwardly, the bifurcated copper plate 22 will contact with the plate 16, and thus an electrical current will pass from the trolley-wire 1 through the clamp 2, block 4, formed integral therewith, plate 12, located upon the blocks 4, from thence through the contact-plate 21, copper plate 22, copper plate 16, through the magnet-coil 13, from thence through the plate 18, and into the conductor 35, that leads to the contact-disconnector. The coil 13, performing the function of a magnet, will hold the contact-plate 21 and copper plate 22 in engagement with the plate 14 and copper plate 16. The current through the conductor 35 passes from one of the binding-posts to one of the metallic strips or bars 27, and from said bar 27 to the opposite bar 27, through the metallic plate 32

on the head of the block 30. From this opposite bar or strip 27 the current will pass through the binding-post 28, attached thereto, to the conductor 36, from thence through the signal-lamps 37, and to the ground. Thus the circuit is completed and the lamps are lighted until the trolley-wheel reaches and passes beneath the contact-disconnector. As soon as the trolley-wheel leaves the plate 7 the coil-springs 9 return said plate to its lower and normal position. In passing beneath said contact-disconnector the following operation takes place: When said trolley-wheel passes away from the first one of the clamps 23, it will strike and engage against the downwardly-pending portion of the plate 29, and said plate, with the integral and fixed parts, will be moved upwardly by said trolley-wheel. In so doing the resistance offered by the coil-springs 33 will be overcome and the plate and integral parts will be moved to the position as shown by dotted lines in Fig. 3. The metallic plate 32, carried by the head of the insulating-block 30, moving away from the parallel strips or bars 27, will break the connection from one bar to another, and consequently the circuit that was closed or made in the manner described will be broken. When said circuit is broken, the contact-plate 21 and copper plate 22, attached thereto, will, by reason of their own weight, fall away from the plate 14 and copper plate 16 and rest in their normal positions against the wear-plate 11 on the top end of the block 10, of insulating material, or as clearly shown by solid lines in Fig. 1. As the trolley-wheel leaves the plate 29 said plate will be carried to its normal position by the action of the coil-springs 33 and the various parts will be in a position to be operated upon by the succeeding trolley-wheel that passes along the trolley-wire.

The operation of the modified form of my device is similar to the operation just described. The trolley-wheel in passing along the trolley-wire will strike the arm 41 of the contact-connector, and said arm 41 will be moved upwardly to the position shown by dotted lines in Fig. 5. In so moving upwardly the curved contact-plate and copper plate carried thereby will be moved upwardly to be held by the magnetic influence of the current that is passing through said contact-plate and copper plate and the plate on the magnet. The current will pass through the various parts in the manner as previously described and the circuit completed and the lamps lighted. When the trolley-wheel reaches the contact-disconnector, said wheel will raise the arm 47 away from the contact-blocks 48 and the circuit will be broken.

A device constructed in accordance with the foregoing description is simple, inexpensive, easily located upon a trolley-wire, and is positive in action.

The trolley-wire does not have to be cut or spliced in locating my improved device thereon and extra poles and sustaining or suspending wires are unnecessary in fitting up or locating one of my improved signals.

At the intersection of two lines of railways the apparatus may be duplicated upon the intersecting or crossing line, and in such cases it is preferable that the signal-lamps of the crossing or intersecting line be of a different color from those on the main line; but it will be seen how, by a slight deviation from the construction shown and described, that one set of lamps may be used for both lines.

The lamps of a signal constructed in accordance with my invention remain lighted from the time the trolley-wheel passes beneath the contact-connecting device until said trolley-wheel passes beneath the contact-disconnecting device.

What I claim is—

1. In combination with a trolley-wire, a contact-connector, a magnet-coil located upon said contact-connector, a contact-plate hinged to said contact-connector, a vertically-moving plate for operating the contact-plate, a contact-disconnector located upon the trolley-wire, a vertically-moving plate and block operating within said contact-disconnector, a series of lamps located between the contact-connector and contact-disconnector, and suitable wire-conductors leading from the contact-connector to the contact-disconnector, lamps and ground.

2. In a device of the class described, the combination with the trolley-wire of a pair of clamps located upon said trolley-wire, a magnet-coil located upon one of said clamps, a block of insulating material located upon said magnet-coil, suitable plates located upon said block of insulating material, connections from the magnet-coil to the plates, a contact-plate hinged to one of the clamps, the upper end of which engages against one of the copper plates on the block of insulating material, and a spring-actuated plate operating between the two clamps, the upper end of which bears and engages against the hinged contact-plate.

3. In a device of the class described, a contact-connector comprising a pair of clamps located upon the trolley-wire, a magnet-coil located upon one of said clamps, a block of insulating material located upon said coil, metallic plates located upon said block of insulating material to which the terminals of the coils are fixed, a contact-plate hinged to one of the clamps and adapted to engage against one of the plates on the block of insulating material, a vertically-moving spring-actuated plate operating between the two clamps and constructed with a downwardly-pending portion that passes between said clamps, a block of insulating material located upon said plate, and a wear-plate located upon the block of insulating material and engaging against the under side of the hinged contact-plate.

4. In a device of the class described, a contact-disconnector comprising a pair of clamps located upon the trolley-wire, blocks of insu-

lating material located upon said clamps, suitable metallic connections between said blocks of insulating material to which the terminals of the conductor-wires are fixed, a vertically-moving spring-actuated plate operating between the two clamps, a block of insulating material located upon said vertically-moving plate, and a metallic plate located upon the head of this block of insulating material for forming a connection between the two metallic plates.

5. In a device of the class described, the combination of a suitable contact-connector and a contact-disconnector, comprising a pair of clamps located upon a trolley-wire, blocks of insulating material located upon said clamps, a pair of metallic plates fixed to said blocks of insulating material and extending parallel to each other, binding-posts fixed to each of said metallic plates for engaging the terminals of the conducting-wires, a spring-actuated plate moving vertically between the clamps, a block of insulating material extending upwardly from the center of said plate, and a metallic plate located upon the head of this block of insulating material for forming an electrical connection between the metallic plates.

6. In a device of the class described, a contact-connector, comprising a pair of clamps located upon the trolley-wire, a magnet-coil located upon one of said clamps, suitable plates to which the terminals of the magnet-coil are connected, a contact-plate hinged to one of said clamps, the end of which engages with one of the plates on the magnet-coil, and a spring-actuated arm hinged to and insulated from the other one of said clamps and adapted to engage and throw the hinged contact-plate into contact with one of the plates.

In testimony whereof I affix my signature in presence of two witnesses.

DAVID O. BECKWITH.

Witnesses:
M. G. IRVIN,
JOHN C. HIGDON.