

(No Model.)

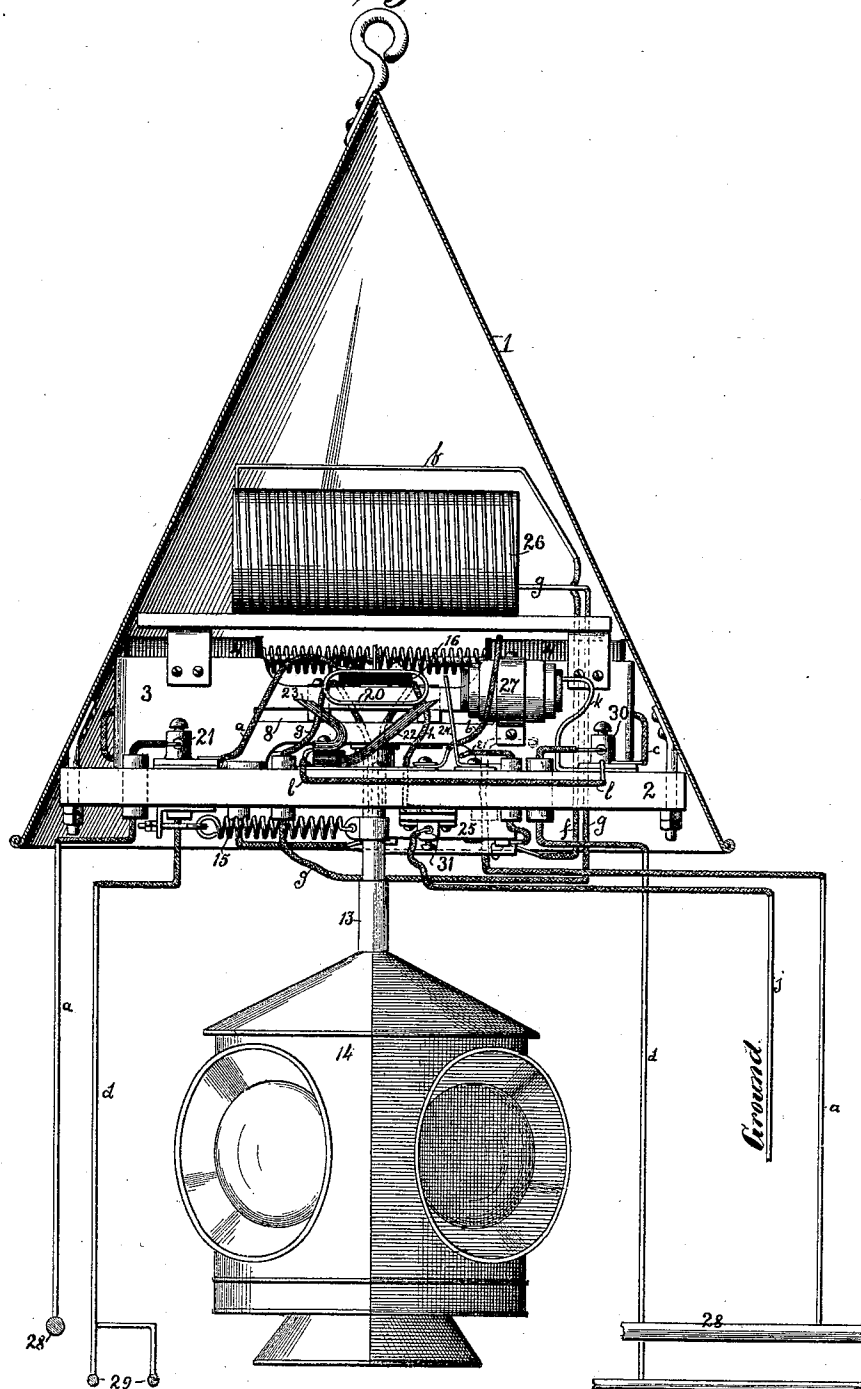
4 Sheets—Sheet 1.

J. R. FARMER.
AUTOMATIC ELECTRIC SIGNAL LAMP.

No. 521,435.

Patented June 12, 1894.

Fig. I.



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(No Model.)

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Fig. II.

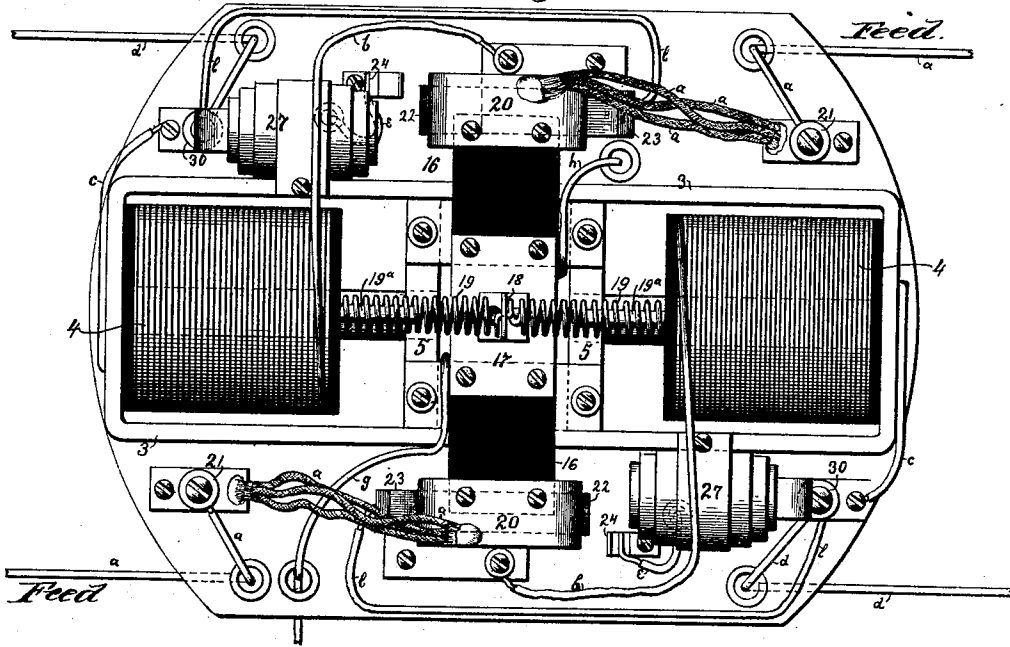
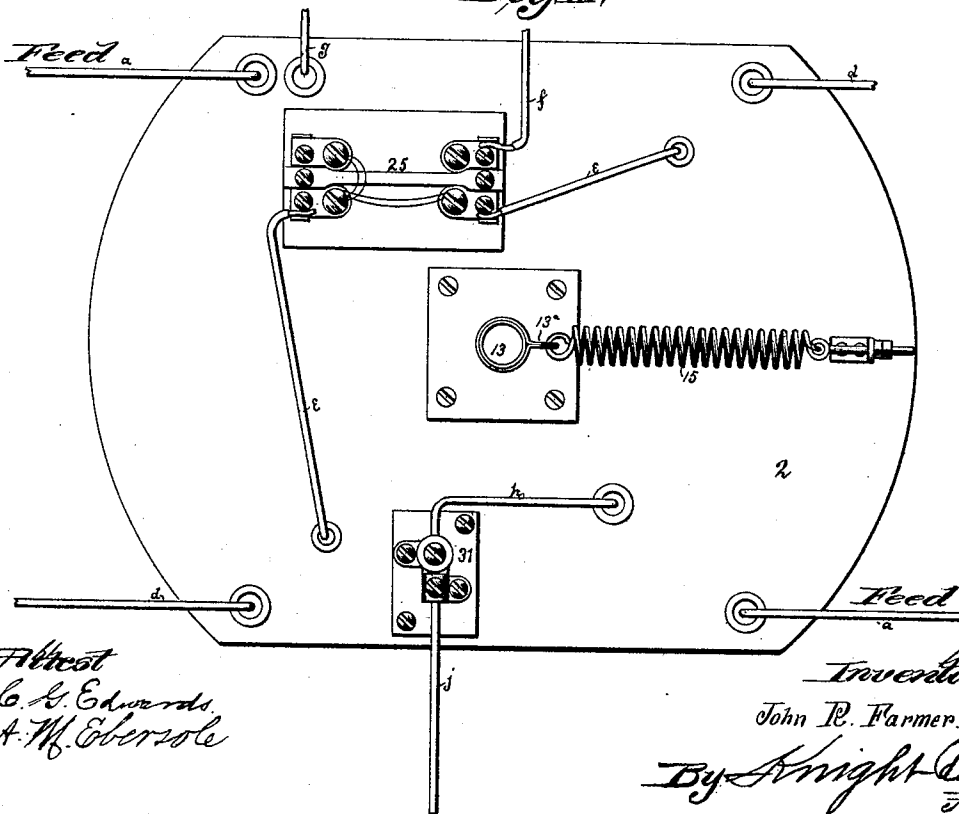


Fig. III.



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Fig. VIII.

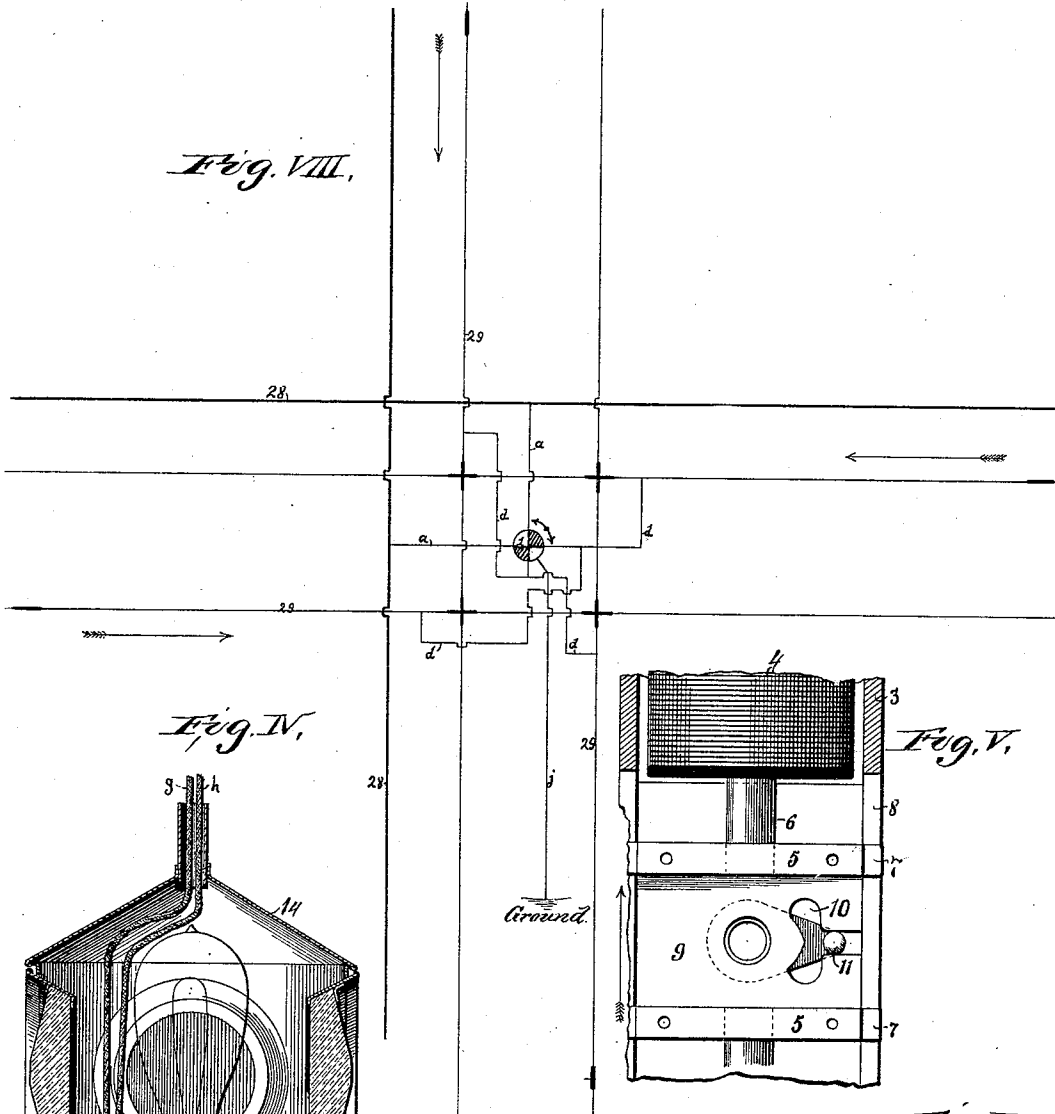


Fig. IV.

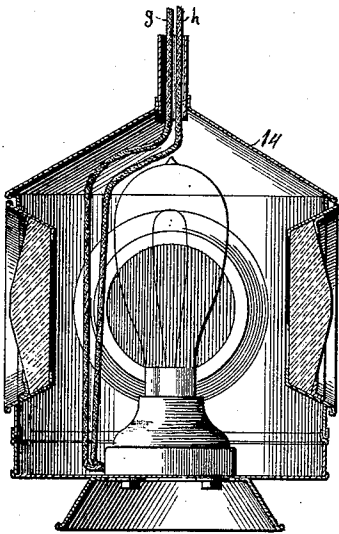


Fig. V.

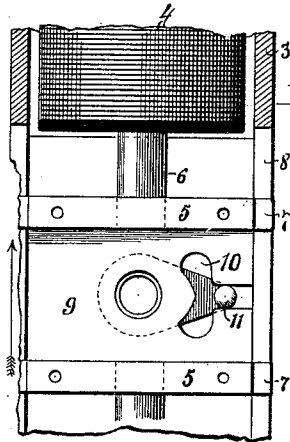


Fig. VI.

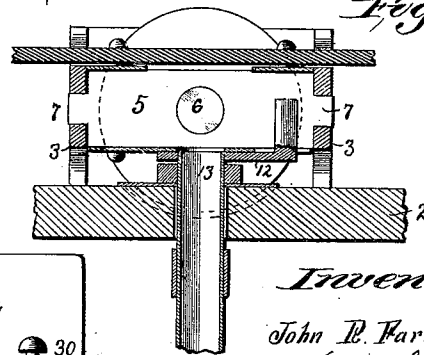
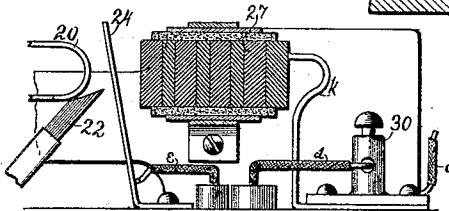


Fig. VII.



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Fig. IX.

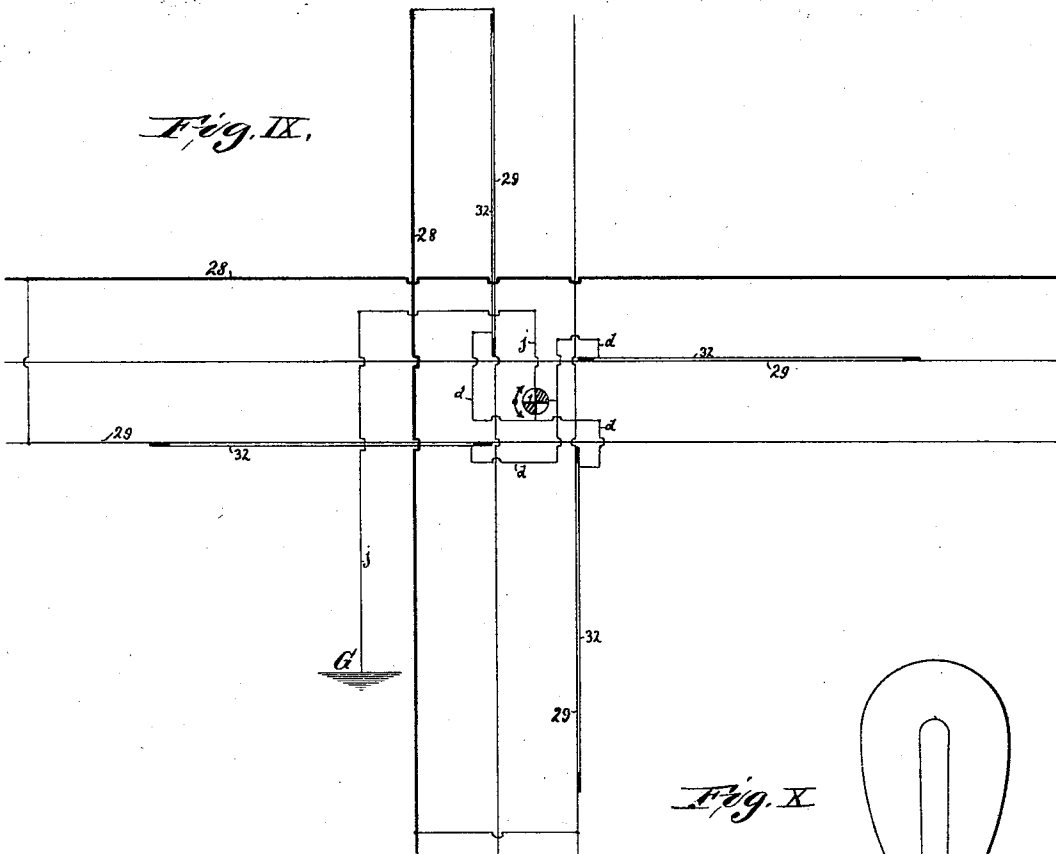
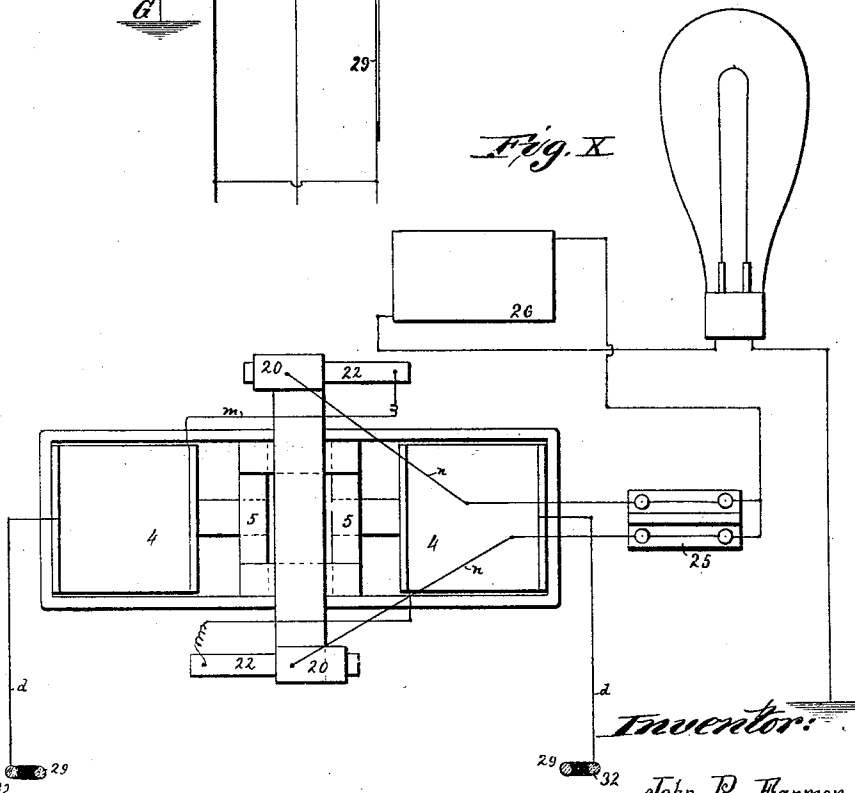


Fig. X



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UNITED STATES PATENT OFFICE.

JOHN R. FARMER, OF ST. LOUIS, MISSOURI, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF TWO-THIRDS TO O. M. SCHMIDT AND W. B. GRABLE, OF SAME PLACE.

AUTOMATIC ELECTRIC SIGNAL-LAMP.

SPECIFICATION forming part of Letters Patent No. 521,435, dated June 12, 1894.

Application filed April 9, 1894. Serial No. 506,797. (No model.)

To all whom it may concern:

Be it known that I, JOHN R. FARMER, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Automatic Electric Signal-Lamps, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This invention has for its object to provide an electric right-of-way signal at the junction of electric railways.

This invention consists essentially in a hood, which is to be suspended over the trolleys where two or more trolley lines cross each other, and it is so arranged that suspended from the hood there is an ordinary signal lantern having four lights, the alternate ones being white and red as is usual in junction lamps. The normal position of this lamp is as shown in Figure I, where neither the red light which is indicated in the drawings by a shaded portion, nor the white light faces the direction of either of the crossing lines.

The operation of the signal consists in turning the lamp one-eighth of a revolution in either direction, according to the direction of the approaching car. This is accomplished by an electric connection which is formed by the trolley of the electric car, which closes the circuit through the magnet in the hood and turns the lamp one-eighth of a revolution turning the white light in a direction parallel to the movement of the car, and the red light facing the direction of the cross lines.

Fig. I is a vertical section through the hood showing the turning mechanism for the lamp, and showing the lantern in elevation. Fig. II is a top view of turning mechanism with the resistance coil removed. Fig. III is a bottom view of Fig. II. Fig. IV is a vertical section through the lantern. Fig. V is a top view of the turning gear. Fig. VI is a vertical, cross section of the turning gear. Fig. VII is a vertical section of the shunt circuit connection. Fig. VIII is a diagram of the trolley connection. Fig. IX is a diagram of the modification of the trolley connection, and Fig. X is a plan of the mechanism adapted to be used in the modification shown in Fig. IX.

Referring to the drawings, 1 represents the hood of conical form suspended from a hook at its apex. This hood contains the turning mechanism for the lamp which mechanism is supported by a platform 2.

3 is a rectangular frame supported on the platform 2 in either end of which is secured an electro magnet 4. The lantern which is suspended under the hood being capable of being turned in either direction according to the way in which the car approaches the junction, the turning mechanism consists of two parts exactly alike, one part operating to turn the lantern one-eighth of a revolution in one direction, the other turning the lantern one-eighth of a revolution in the other direction.

In the description of the turning mechanism but one side will be described, the other side being in all respects like it.

Placed in front of each of the electro magnets 4 is an armature 5 of the same width as the space between the sides of the rectangular frame 3. These armatures are secured to cores 6 of the electro magnets and are capable of being drawn down close to the field of the magnet. Each armature is provided with small lugs 7 on each side, which extend through slots 8 in the sides of the rectangular frame 3. These slots are horizontal and serve as guides to the movement of the armatures. The two armatures are secured to a metal plate 9 on their lower sides. This plate 9 has an irregular slot or opening 10 in it, through which a crank pin 11 extends. The crank pin 11 is secured to a crank 12 which turns a hollow shaft 13 from which the signal lantern 14 depends. The irregular shape of the slot 10 as shown in Fig. V is designed so that when a current is passed through one of the electro magnets 4 and the armature is drawn down close to the field of this magnet there will be a little lost motion at this point. This is to provide for any unusual strength of current which would have a tendency to draw the armature 5 in contact with the face of the magnet, so that if it should happen the lost motion would provide for movement of the plate 9 without turning the lantern 14. To the hollow shaft 13 there is secured a small lug 13^a which is connected to a coil spring 15.

When the lantern is turned in either direction the lug 13^a expands the spring 15. As soon as the current is disconnected from the magnets 4, the spring 15 contracts and turns the lantern into its normal position as shown in Fig. I. Secured to the top of the armatures are insulating bars 16 which extend out over the top of the rectangular frame 3. These bars are connected together by a metal plate 17 which supports an upright flange 18 about its center. Against this flange coil springs 19 extend from either of the electro magnets 4 and are held in place by rods 19^a secured to the insulation of the field of the magnets. These springs 19 exert an equal pressure from both sides and tend to keep the armatures mid-way between the two magnets. At the outer end of the bars 16 there is a contact ring 20 which is in permanent electric connection with a binding post 21 on the platform 2. 22 is a spring brush which is normally in contact with the ring 20 and 23 is a brush insulated from the brush 22, the use of which will be explained farther on. 24 is a brush through which connection is made to the lamp. This connection leads through a fuse box 25 also through a resistance coil 26 before reaching the incandescent lamp in the lantern.

27 is a shunt circuit connection which leads to the trolley. This shunt circuit connection consists of a series of disks of carbon which are surrounded and contained within an asbestos collar. The contact ring 20 communicates with one end of the shunt carbon, and the other end is connected by a wire directly to the trolley. The use of this shunt circuit will be explained in turn.

The feed wires 28 of the electric road are represented in the diagrams VIII and IX by heavy lines, and the trolley wires 29 are represented by lighter lines in the same diagrams. Referring to the diagram VIII there are four trolley wires shown crossing each other at right angles two in each direction. The direction in which the car is supposed to travel when in communication with a given trolley is indicated by the arrows parallel to the lines. Each trolley is insulated at a distance from the junction in the direction from which the car approaches. The part of the trolley between this insulating point, which is indicated in diagram VIII by a short heavy line, and the junction of the wires is entirely disconnected from the feed lines 28, except through the lamp.

The operation of the signal lamp consists essentially in having the current pass from the feed line through a wire *a*, to the lamp through mechanism which turns the lamp one-eighth of a revolution, lights the incandescent globe within the suspended lamp 14, passes out through the mechanism into the insulated part of the trolley wire, through the motor of the car and to the ground thus completing the circuit, the current being drawn into the mechanism within the hood so that

part of it contains the incandescent lamp and the balance operates the motor of the car. The current enters the lamp by a leading in wire *a*, which passes through the platform 2 and terminates in a binding post 21. This post 21 is permanently connected by the wires *a*, to the contact ring 20. The contact ring 20 being normally in contact with the brush 22, the current passes down brush 22 up through the wire *b*, into the electro magnets, out from the coil 4 by the wire *c*, to the binding post 30, by the wire *d*, to the trolley wire 29. This part of the current passes through the motor of the car and to the ground. The current passing through the electro magnets 4 draws armatures 5 toward the field of this magnet: the contact ring 20 is then brought into communication with the brush 24, which is connected by wire *e*, to the fuse box 25, through this fuse box by wire *f*, up to the resistance coil 26, said resistance coil being supported by a platform on the rectangular frame 3: from the resistance coil 26 a small wire *g*, leads down through the hollow shaft 13 to an incandescent globe within the body of the lantern 14, out from the lantern 14 through a wire *h*, which passes also through the hollow shaft 13 to a binding post 31. From this binding post a wire *j*, leads to the ground, in this way forming a communication between contact ring 20 and the ground through the incandescent globe placed within the lantern 14. The fuse box 25 and resistance coil 26 are of such proportion and capacity as to preserve and regulate the amount of current necessary for the incandescent globe.

The electro magnets 4 are wound and proportioned for the usual strength of current used on the line. This current will ordinarily attract one of the armatures 5 within a short distance of the field of the electro magnets, compressing the springs 19 by so doing. There is still left, however, a short distance which the spring may be still further compressed. When an unusual strength of current passes through electro magnets 4, the armatures 5 are drawn close down to the field and brings ring 20 into contact with the face of the carbon shunt circuit connection 27. This permits an easement of the electro magnets 4 by providing a short circuit through the carbon disks in the shunt circuit connection 27 and prevents the burning out of the electro magnets 4.

When two cars approach the junction at nearly the same time the first one reaching the insulated portion of the trolley will turn the lamp so that the red light will face the other car. This other car can come upon the insulated portion of its trolley wire and will receive a current direct from its feed line. The current coming in to the lamp by wire *a*, leading from that up to the ring 20 (on the other side from the ring making contact with the lamp brush 24), the ring 20 will be in contact with the brush 23, so that the second car will receive its current through this brush

23: from this brush through the wire 1, to the binding post 30 and from there to the trolley, the current in this case passing in uninterrupted connections from the feed wire directly to the insulated trolley and has no effect in moving the mechanism within the hood 1.

The system of connection shown in the diagram IX is one in which the operation of the signal lamp is regulated by a supplementary connection in the trolley wire instead of being connected in series through the trolley wire and car motor. In this case there is a supplementary wire carried along and supported from the trolley wire approaching the junction a reasonable distance, as in the other case where the trolley wire was insulated. This supplementary wire is suspended from the trolley wire within a distance of about one inch by insulating supports. Each of these insulated supplementary wires is connected to the mechanism within the lamp, the wires of the parallel tracks being connected together before entering the lamp, each pair of tracks having connection with the electro magnets at one end of the rectangular frame 3. The lamp has its own ground wire *j*, the same as in the other instance. When a car approaches the junction the trolley wheel of the car brings the insulated supplementary wire in electric connection with the trolley wire. This supplementary wire is connected by the leading-in wire *d*, to one of the electro magnets 4, out from the electro magnets 4 by wire *m*, to the brush 22, from the brush 22 through the contact ring 20, and from the contact ring 20 by wire *n*, which has a permanent connection in this case to the contact ring 20, to the fuse box 25, through the fuse box to the resistance coil 26, from the resistance coil through the incandescent lamp and from the incandescent lamp by the wire *j*, to the ground thus completing the circuit, drawing the armatures 5 toward the magnet which has been placed within the circuit, turning the lantern in the proper direction and making a circuit through the incandescent globe thereby illuminating the lamp.

By either system of connecting the trolley wires to the lamp, the lantern is only illuminated after it has been turned to face in one direction or the other.

I claim as my invention—

1. In an automatic electric signal lamp, a hood or case containing mechanism for turning a suspended lantern, a lantern suspended from said hood or case having different colored lights on adjacent sides with insulated trolley wires leading to the junction and connected to the feed line through the lamp so that when the trolley reaches the insulated trolley wire it completes a circuit through the

lamp, turns the lantern and illuminates the same: substantially as described.

2. The combination in an automatic electric signal lamp of the electro magnets 4, sliding armatures 5, the turning lantern 14 suspended from the hood or casing 1, the trolley leading to the junction, insulated and connected to the feed line through the electro magnets 4, so arranged that the trolley on reaching the insulated trolley wire completes the circuit through the lamp, turns the red light to the cross track and illuminates the lantern: substantially as described.

3. The combination in an automatic electric signal lamp, of hood or casing 1 containing the electro magnets 4, the armatures 5 connected by the plate 9, the crank 12 connected to the hollow shaft 13 and operated by the plate 9, the lantern suspended on the hollow shaft 13 and arranged to turn with it, and an electrical connection made by the trolley of the car by which the current will pass through one of the electro magnets 4, turn the lantern 14 and illuminate the same: substantially as described.

4. The combination in an automatic electric signal lamp of the hood or casing 1 containing the rectangular frame 3, the electro magnets 4, and sliding armatures 5 connected together by the plate 9 which operates the crank 12 for turning the lantern 14 the lantern 14 suspended under the hood or casing 1, and an electrical connection made by the trolley of the car by which the current will pass through one electro magnet 4, through the car motor and to the ground, turning and illuminating the lantern 14: substantially as described.

5. The combination in an automatic electric signal lamp, of the hood or casing 1 containing the electro magnets 4 placed within the rectangular frame 3 the sliding armatures 5 connected by the plate 9 to the crank 12, the suspended lantern 14, and the shunt circuit connection 27, all arranged substantially as described.

6. In an automatic electric signal lamp, a hood or case containing the mechanism for turning a suspended lantern, a lantern having different lights on adjacent sides, and supplementary wires 32 suspended and insulated from the trolleys leading to the junction, so that when the trolley reaches the supplementary wire 32, it will be brought in contact with the trolley, the supplementary wire being connected through the mechanism for turning and illuminating the lantern to the ground: substantially as described.

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