(No Model.) 2 Sheets—Sheet 1.

W. D. SHELDON.

TRAIN SIGNAL FOR RAILROADS.

No. 441,030. Patented Nov. 18, 1890.

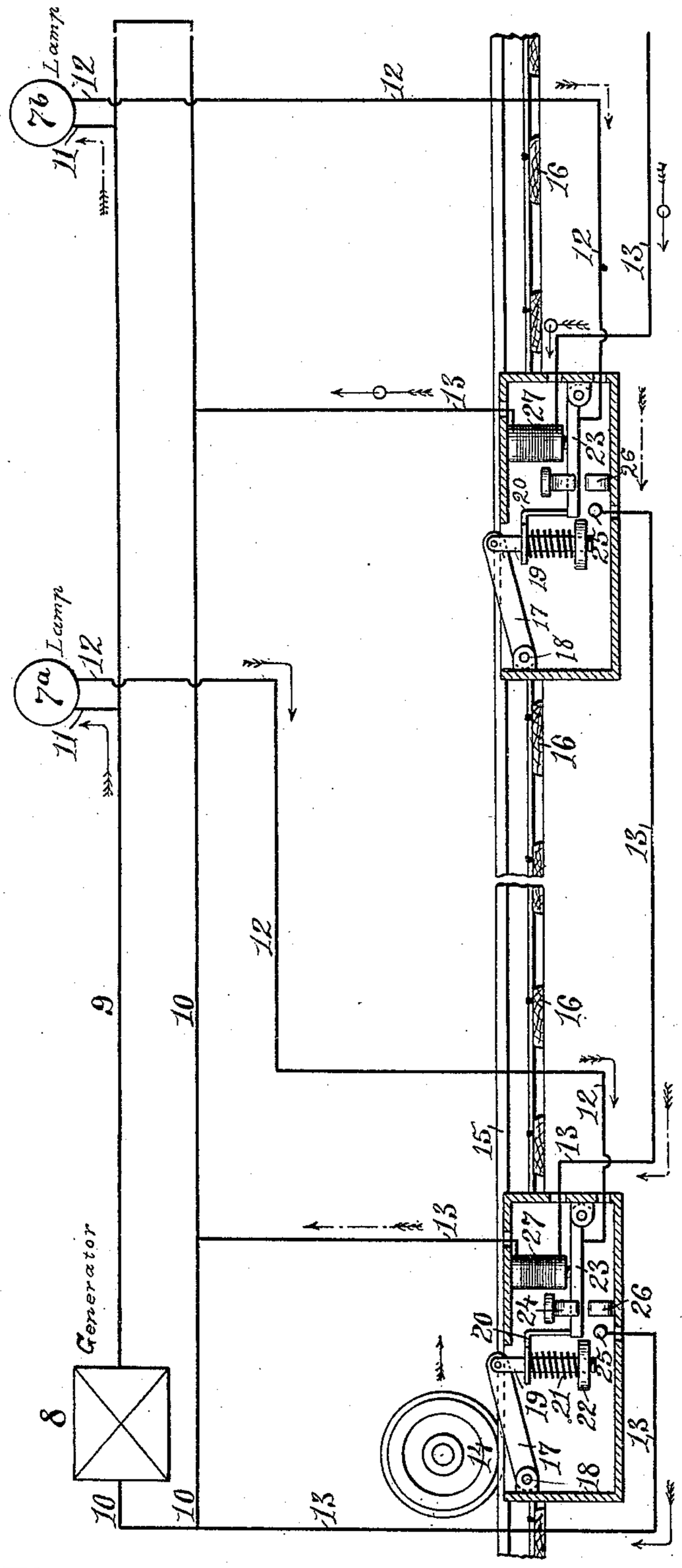


Fig. 1.

WITNESSES:

J. L. Seymour

W. F. Bligh

INVENTOR:

William D. Sheldon

by Joseph A. Miller & Co.

Attys

(No Model.) 2 Sheets—Sheet 2.

W. D. SHELDON.

TRAIN SIGNAL FOR RAILROADS.

No. 441,030. Patented Nov. 18, 1890.

Fig. 2.

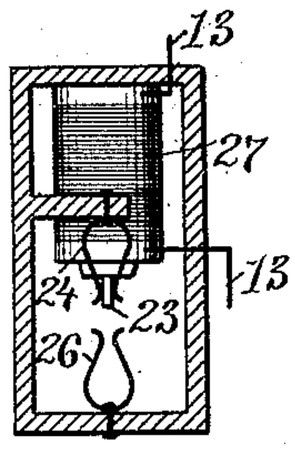


Fig. 3.

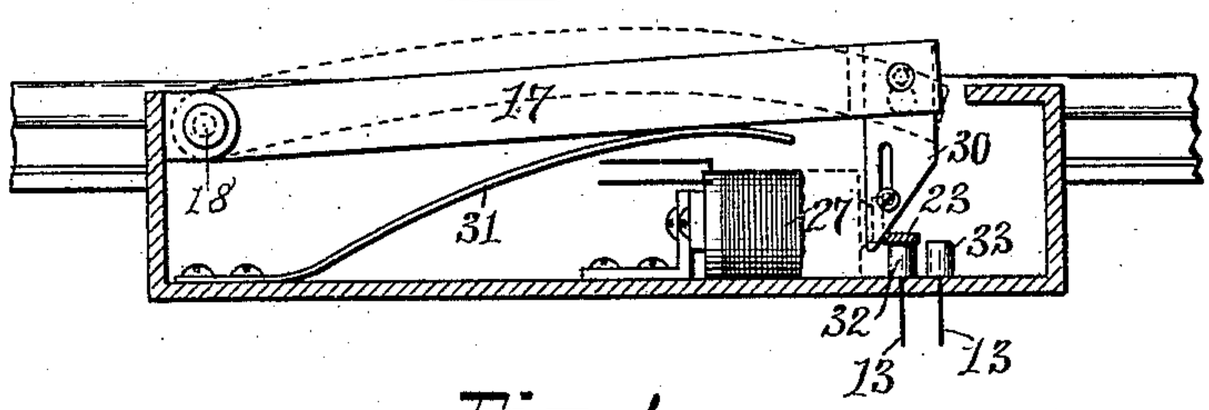
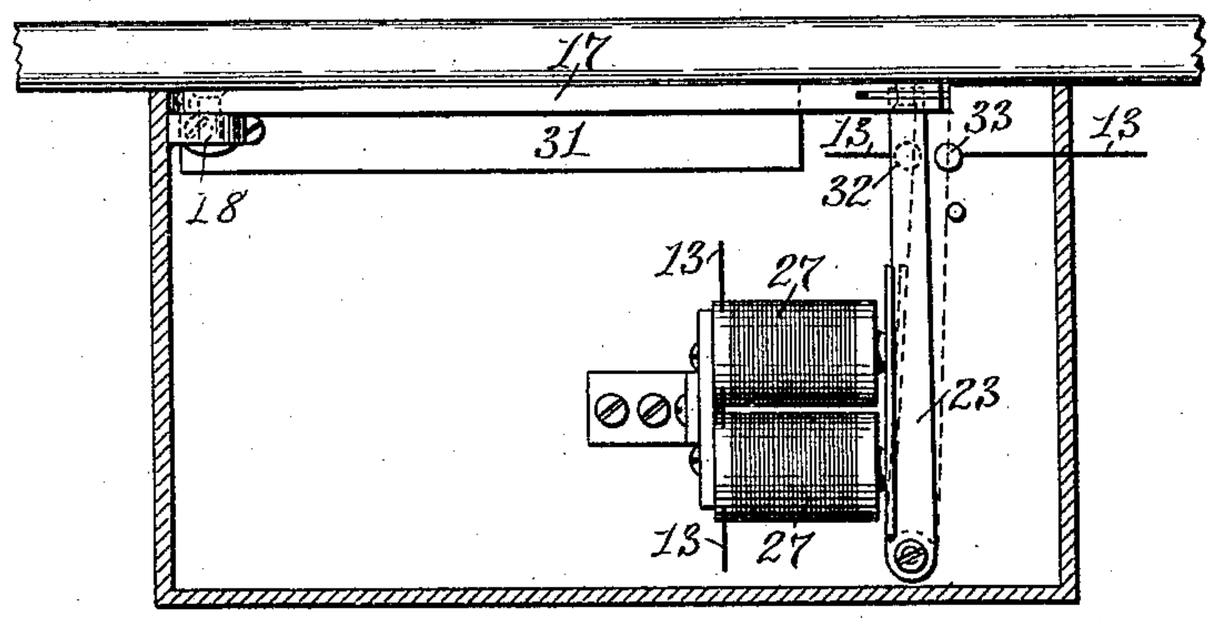


Fig. 4.



WITNESSES:

J. L. Seymour

W. F. Bligh.

INVENTOR:

William D. Sheldon

by Joseph A. Miller & Co.

Attys

UNITED STATES PATENT OFFICE.

WILLIAM D. SHELDON, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO NICHOLAS SHELDON, OF SAME PLACE.

TRAIN-SIGNAL FOR RAILROADS.

SPECIFICATION forming part of Letters Patent No. 441,030, dated November 18, 1890.

Application filed June 15, 1889. Serial No. 314,486. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM D. SHELDON, of the city and county of Providence, and State of Rhode Island, have invented a new and useful Improvement in Train-Signals for Railroads; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

The object of this invention is to signal the approach of a railroad-train in advance, to signal in advance and in the rear of a train the position of the train, so that other trains following or moving in the opposite direction will know the position of the train about to be approached by them, and thus produce an automatic reliable signal by which with ordinary care collisions will be avoided.

Another object of the invention is to light the road-bed in advance of a moving train.

To these ends the invention consists in a series of electric lamps connected by wires forming the two arms of an electric circuit and means for automatically closing the circuit to light the lamp or lamps and automatically breaking or opening the circuit to extinguish the light or lights by the moving of the train, as will be more fully set forth hereinafter.

To enable others skilled in the art to clearly understand my invention, I will describe the operation of my invention as applied to a double-track railroad.

On each side of the road, at such distances apart as experience and the situation of the road may require, electric lamps are placed. These are connected with one of the wires forming an electric circuit, which circuit is connected with a generator. Thus along a railroad the ends of the wires of the circuit may be connected with dynamos of the electric-lighting plants of the towns or stations on or near the road. All the lamps on each circuit are connected with the positive conductor-wire, while the negative conductor-wire is at each lamp connected with a switch normally open, and from the switch a wire extends to the lamp, so that by closing the switch the circuit for one lamp will be closed and the lamp lighted. An electric lamp is thus automatically lighted at any desired point in front of the train by the passing train. A conductor-wire operatively connects two of the switches above referred to through an electro magnet, so that by the closing of one switch a circuit is closed in advance of the switch to light the lamp in advance of the train, and a circuit is broken by energizing the magnet of the other switch, and thus a light is extinguished in the rear of the passing train. A train may thus signal its approach at night and light up the road-bed in advance continuously at a cost equal to the cost of one lamp burning during the passage of the train. A train from Philadelphia to New York will automatically light each successive lamp to signal its approach and light the road-bed, the combined time of the burning of all the lamps being equal to the burning of one lamp two hours, this being the usual time occupied by a fast train between Philadelphia and Jersey City, as every lamp may be extinguished automatically by the passing train. As there are towns along the railroad at short intervals in which electric-lighting stations are established, the required electric energy for this system of signaling can be readily obtained without carrying the electric current over objectionable distances.

Figure 1 is a view, partly in section, showing the connection of the system of wires with the lamps and with the switches in connection with a railroad-track for the system in which a circuit of wires is connected with a fixed source of electric energy. Fig. 2 is a view in cross-section of the switch for automatically lighting and extinguishing the lamps shown in Fig. 1. Fig. 3 is a vertical view, partly in section, of a modified form of the make and break switch shown in Fig. 1; and Fig. 4 is a horizontal view of the same.

Similar numbers of reference indicate corresponding parts in all the figures of the drawings.

In the drawings, the number 7^a indicates one electric lamp, and 7^b the next lamp on the line. Any form of lamp may be used. 8 is the source of electric energy—such as the electric-lighting stations—located near the railroad or a special dynamo-plant located at any desired point along the railroad.

9 indicates the positive electrode or circuit-wire, and 10 the negative electrode of the circuit. The electrodes 9 and 10 form the circuit, commencing at the source of electric energy 8 and ending at the same. The lamps 7 are connected by means of the conductors 11 with the positive electrode 9, and by means of the wire 12 the lamps are connected through a suitable circuit-closing device and the wire 13 with the negative electrode 10, so that when the circuit is closed the lamp 7 will be in the circuit and lighted.

14 indicates a wheel of a railroad-train. In practice it would usually be one of the pilot-wheels of the forward truck of the locomotive.

15 indicates the rail, and 16 the ties. The lever 17 (shown as hinged at 18) is connected pivotally with the push-pin 19. The arm 20 is secured to the push-pin 19. The coiled spring 21, bearing on the plate 22, through which the lower end of the push-pin passes, and the arm 20 hold the lever 17 in the raised position shown in the drawings. The arm 20 bears on the hinged contact-arm 23, to which the wire 12 is connected. The hinged contact-arm 23 is held in the raised position by the spring-clamp 24. When a wheel passes over the lever 17, the push-pin 19 is depressed and the arm 20 pushes the contact-arm 23 from the spring-clamp and brings the same in contact with the contact-point 25, in which position it is held by the spring-clamp 26. In this position the contact-arm 23 forms a bridge and connects the wire 12 with the wire 13, closing the negative arm of the circuit.

It is obvious that various modifications may be made in this switch device without materially changing the operation of the same. Thus the push-pin may act directly on the contact-arm. The wire 12 may be connected with the spring-clamp 26, or any other switching device operated in any suitable manner by the passing train to close the circuit may be used.

The closing of the circuit, as above described, lights the first lamp 7^a at any desired distance in front of the moving train, which, as is indicated by the arrow extending from the wheel 14, is moving from the left to the right of Fig. 1.

The next switch or circuit-closing device is shown farther to the right of the drawings. It is in all respects like the first. The lamp 7^b is connected with the switch-circuit-closing device by means of the wire 12, exactly like the lamp 7^a. The only difference between the first circuit-closing device and all the subsequent switches or circuit-closing devices consists in placing into the line of the wire 13 the electro-magnet 27, the wire on the spool of which is connected with the wire 13, so that on the closing of the circuit at all stations beyond the first the electric current will pass through the electro-magnet 27, vitalizing the core and attracting the armature secured to the contact-arm 23, and thus by drawing the contact-arm from the contact-point 25 break the circuit of the first lamp 7^a, thus extinguishing the first lamp at the same instant when the second lamp is lighted. This automatic lighting of one lamp and extinguishing the lamp in the rear of the passing train continues through the whole length of the road when the electric conductors 9 and 10 extend the whole length, or the arrangement of the switches, as shown in Fig. 1, may be repeated as the train reaches a new electric circuit connected with a local source of high-tension electric energy.

The invention is applicable only to circuits conveying electric energy of sufficient tension to be useful for electric lighting. It is evident that the arrangement of the wires may be reversed, so that the conductor 10 will receive the positive and the conductor 9 the negative energy. The directions of the currents are indicated in connection with the lamp 7^a by solid arrows, in connection with the lamp 7^b by arrows, the shafts of which are formed of broken lines, and the current connecting with the lamp in advance of lamp 7^b (not shown in the drawings) is indicated by the arrows, the shafts of which are surrounded with a circular disk.

In the modification of the switch or circuit-closer shown in Figs. 3 and 4 the hinged actuating-lever 17 is shown provided with the slotted cam 30, into the slot of which a stop is placed to limit the motion of the same. The beveled surface of the cam bears against the contact-arm 23, and on descending against the yielding resistance of the spring 31 moves the arm so as to connect the two contact-points 32 and 33, to which the ends of wire 13 are connected so as to form a bridge. The contact-arm 23 bears on the contact-points 32 and 33, so as to hold the same in the position connecting the same until the frictional resistance is overcome by the electro magnet or magnets 27.

In practice the actuating-lever 17 is curved, as is shown in broken lines, so that the train may pass in opposite directions over the same. The actuating-lever may be so placed that the tread of the wheels or the flange will pass over the same; or it may be placed so as to move horizontally, so that the side of the wheel will operate the same. The weight of the passing train may be utilized to operate the switch or circuit-closer in any of the well-known manners by which circuits are now closed or opened.

It is evident that lamps to light the tracks may be placed between the two end lamps of the section or block, so that two or more lamps may be burning on a section or block as long as a train is on the block. The conductors 9, 10, 12, and 13 may be suspended from poles in the same manner as electric-light wires are now suspended, or the wires may be placed under ground.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with the track of a railroad and the two conductor-wires of an electric circuit connected with a dynamo, of a series of electric lamps, one pole of each of which is connected with one of the conductor-wires, the other pole of each lamp being connected by a wire with a circuit-closing device, a conductor-wire connecting the circuit-closing device with the other conductor-wire of the circuit, and operative connections between two circuit-closers, whereby when one circuit-closer is automatically actuated by the passage of a train its lamp is lighted and the other circuit is opened and its lamp extinguished.

2. The combination, with the track of a railroad and the two conductor-wires of an electric circuit connected with a dynamo, of a series of electric lamps, one pole of each of which is connected with one of the conductor-wires, the other pole of each lamp being connected by a wire with a circuit-closing device, a conductor-wire connecting the circuit-closing device with the other conductor-wire of the circuit, and a wire operatively connecting two of the circuit-closing devices, all being arranged so as to light a lamp in advance of a train and extinguish a lamp in the rear of the train automatically, as described.

3. The combination, with a device for closing an electric circuit, a railroad-track, and an electric circuit connected with a dynamo, of a series of electric lamps connected with one arm of the circuit, conductor-wires connecting each lamp with a circuit-closing device, and an electro-magnet in each circuit-closing device connected by a conductor-wire with the other arm of the main circuit and by a wire with another circuit-closing device, all being arranged so as to light a lamp in advance of the train and extinguish a lamp in the rear of the train automatically by the passing train, as described.

4. The combination, with the dynamo 8, the circuit-wires 9 and 10, and the railroad-track, of the arm 17, the contact-arm 23 and intermediate connections, the electro-magnet 27, the contact-point 25 and connecting-wires 13, the lamps 7^a and 7^b, and conductor-wires 11 and 12, all being arranged so as to close the circuit with a lamp in advance of the passing train and open the circuit in the rear of the train, as described.

WILLIAM D. SHELDON.

Witnesses:
JOSEPH A. MILLER,
JOSEPH A. MILLER, Jr.