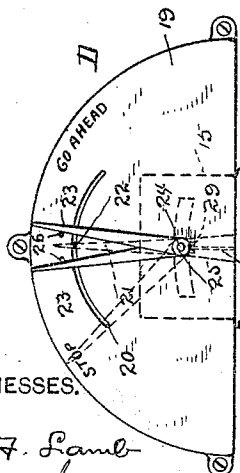


E. M. QUITTMAYER.
ELECTRIC TRAIN SIGNAL.
APPLICATION FILED DEC. 23, 1903.

NO MODEL.

Fig. 1.



WITNESSES.

H. A. Lamb
S. W. Whitton.

Fig. 3.

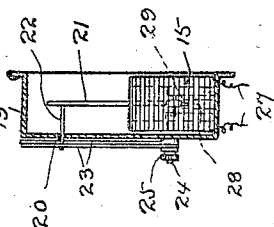
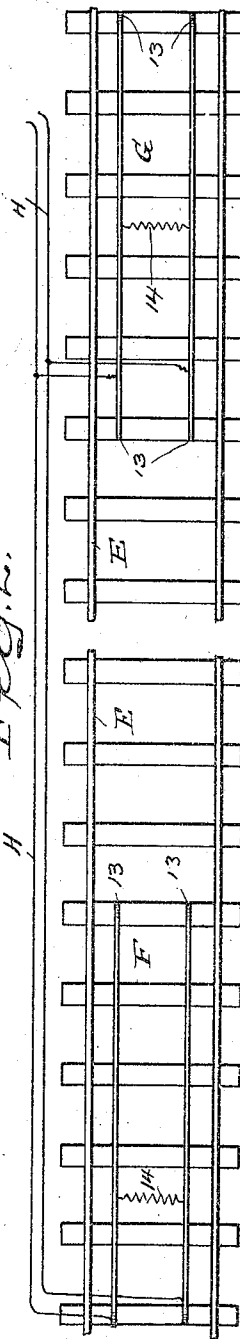


Fig. 4.



Fig. 2.



INVENTOR.

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Att'y.

UNITED STATES PATENT OFFICE.

ERNEST M. QUITMEYER, OF BRIDGEPORT, CONNECTICUT.

ELECTRIC TRAIN-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 773,263, dated October 25, 1904.

Application filed December 23, 1903. Serial No. 186,310. (No model.)

To all whom it may concern:

Be it known that I, ERNEST M. QUITMEYER, a citizen of the United States, residing at Bridgeport, county of Fairfield, State of Connecticut, have invented a new and useful Electric Train-Signal, of which the following is a specification.

My invention has for its object to produce railway signal mechanism which shall be simple in construction, inexpensive to install, thoroughly reliable in use, and not likely to get out of repair, which will do away with the objectionable features of the various semaphore systems now in use—for example, the uncertainty in operation during storms, the difficulty of seeing the signals in foggy weather or in a bright light when running at high speed, the necessity of employing engineers free from color-blindness and men of great strength in the towers to operate the signals—will enable the signals for a number of blocks to be operated from a single tower, thus greatly reducing the cost of operation, will give to the engineer a positive signal within the cab of his locomotive, will show to the operator in the tower just what signal is set in the cab, will keep the signal operator informed if the system is in working order, will inform the signal operator whether or not a train stops when signaled to do so and if it passes out of the block, and in which the signals will remain as set until manually reversed.

With these and other objects in view the invention consists in certain constructions and in certain parts, improvements, and combinations, which will be hereinafter described and then specifically pointed out in the claims hereunto appended.

In the accompanying drawings, forming a part of this specification, Figure 1 is a diagrammatic view illustrating the operation of the system and showing both the tower-indicator and the cab-indicator; Fig. 2, a plan view of a section of railway-track and showing both the warning-signal rails and the final-signal rails; Fig. 3, a vertical section of one of the indicators, showing the coil and pointers in elevation; and Fig. 4 is a plan view of the coil and the magnet detached.

A denotes an electric generator; B, a switch;

C, the tower-indicator; D, the cab-indicator; E, a railway; F and G, pairs of signal-rails, one of said pairs of rails being the warning-signal rails, the other pair being the final-signal rails; H, an electric circuit extending from the generator through the switch, the tower-indicator, and through both sets of signal-rails, and J denotes a locomotive-cab.

The construction of the switch is wholly immaterial so far as the principle of the invention is concerned, the sole requirement being a switch adapted to close the circuit in such a manner as to cause the current to pass in either direction, as may be required by the tower operator. The two pairs of signal-rails may be placed at any required distance apart and at any distance from the signal-tower. They should, of course, be placed far enough apart to permit a train to be brought to a standstill between the warning-signal rails and the final-signal rails, as will be more fully explained.

As the cabs of locomotives specifically form no portion of the invention, I have merely indicated the position of a locomotive-cab when receiving a signal through circuit H by a line, as at J. Upon the cab are cylinders 10, carrying spring-actuated plungers 11, provided at their lower ends with rollers 12, adapted to engage the signal-rails, the ends of said signal-rails being beveled, as at 13, so as to permit the rollers to ride up on the signal-rails and to pass off from them without shock or blow. The cylinders are connected with the cab-indicator as by means of wires 27. The springs in the cylinders insure contact of the rollers with the signal-rails. When a signal is given to the cab, these plungers connect the cab-indicator with circuit H, as will presently be more fully explained. Between the signal-rails of each pair I place a high-resistance connection 14, the purpose of which will presently be fully explained.

The two indicators, which I have denoted, respectively, as the "tower-indicator" and the "cab-indicator," are identical in structure. The essential elements in each indicator are a coil 15 and a magnet 16, pivoted at its mid-length within the coils, so as to swing freely.

The coils of the two indicators are wound in the same direction, so that in use the two magnets will act in unison, as will be more fully explained. The manner in which the magnet is suspended is of no consequence so far as the principle of the invention is concerned. I have shown the magnet as provided with a shaft 17, which is mounted to oscillate in bearings 18 within the coil. As the special details of construction of the indicators are not of the essence of the invention, I have merely illustrated the indicators in a general way.

19 denotes a case which may be of any ordinary or preferred construction and is shown as provided in its face with an arc-shaped slot 20. Any suitable indications may be placed upon the face of the indicators—as, for example, the words “Stop” on one side and “Go ahead” on the other.

21 denotes a pointer, which is connected to the magnet and extends outward therefrom radially to the shaft.

22 denotes a projection, as a pin, which extends from pointer 21 and passes through the slot in the front of the case. The magnet is so balanced that the pointer will normally remain in an upright position. If preferred, a light spring may be employed to keep the pointer steady. In the drawings I have shown for this purpose a flat spring, as at 28, the lower end of which is fixed and the free end of which lies between two pins 29, extending downward from the magnet.

23 denotes auxiliary pointers mounted to turn on a hub 24, which is in alinement with the shaft of the magnet. Friction-washers and a set-nut are provided on the hub and are indicated by 25 in the drawings, the action of which is to permit the auxiliary pointers to be moved freely when slight power is applied, as by means of projection 22 on pointer 21, but which will remain in any position in which they may be placed, either by the movement of said pointer or by hand. Stop-pins 26 are provided on the face of the indicator which prevent the auxiliary pointers from being moved to a vertical position, thereby rendering any interference of these pointers with each other or with the free operation of pointer 21 impossible.

The operation is as follows: The current may be sent in either direction through the circuit and reversed at will by means of the switch. When the circuit is closed, a relatively weak current will pass through the high-resistance connections at the signal-rails and through the tower-indicator. As soon as a cab passes upon the warning-signal rails—suppose, for convenience, signal-rails F—the cab-indicator will be connected, through wires 27, the cylinders, plungers, rollers, and signal-rails, with circuit H. As the resistance through the cab will be much less than through high-resistance connections 14, most of the

current will take the path through the cab and will operate the cab-indicator, as I will now explain. All the operator is required to do to signal a train is by means of the switch to send the current in the proper direction through circuit H, the signal-rails, tower-indicator, &c. When the current passes through the coil of the tower-indicator, lines of force are set up at right angles to the direction of the wire. Other lines of force proceed from the magnet. The lines of force from the magnet may be described as longitudinal and the lines of force from the coil as vertical. The tendency of these lines of force is to become parallel. As the coil is fixed and the magnet movable, the latter will be tilted on its bearings when a current passes through the coil. When the current passes in one direction, the north pole of the magnet will move upward and the south pole downward, and when the current is reversed the movement of the magnet will be reversed—that is, the south pole will move upward and the north pole downward. The tilting movement of the magnet will of course impart similar movement to the magnet-pointer carrying pin 22, and the latter will engage one of the auxiliary pointers, imparting a similar movement thereto. In each signal-tower there is placed an indicator, with a circuit H corresponding to each block that is to be controlled from that tower. By placing high-resistance connections between the signal-rails the operator is informed the instant he closes the switch if the circuit is in working order. If the circuit is all right, sufficient current will pass through the high-resistance connections and through the coil of the tower-indicator to move the magnet and magnet-pointer slightly in either direction, preferably far enough to pick up the corresponding auxiliary pointer and move it slightly, as indicated by dotted lines at the right in Fig. 1, thus proving that the system is in order and showing unmistakably just how the signal is set. Suppose that it is desired to stop a train upon its entrance into a block or at any special pair of signal-rails. The operator, by means of the switch corresponding to that block or set of signal-rails, closes the circuit, sending the current in the required direction. The instant the circuit passes through the coil of the tower-indicator the lines of force above referred to will issue from the coil and will cause the magnet-pointer to swing toward the left and to pick up the left auxiliary pointer and move that also toward the left, where it will remain, owing to the friction-washers, until it is returned to its normal position by the operator. The instant the cab of the locomotive passes over the signal-rails corresponding to the switch that is closed, whether at the beginning of a block or elsewhere, the greater portion of the current, following the path of least resistance, will pass from said pair of signal-rails,

which I term the "warning-signal" rails, through the rollers, plungers, cylinders 10, wires 27, and the coil of the cab-indicator, whereupon lines of force corresponding to those in the tower-indicator will issue from the coil in the cab-indicator and will tilt the magnet correspondingly, swinging the magnet-pointer toward the left, the magnet-pointer carrying with it the left auxiliary pointer. In the present instance the left auxiliary pointer will be carried over to the word "Stop" and remain there, the magnet-pointer returning, of course, to its normal position the instant rollers 12 pass off from the signal-rails. The signal to stop, however, will be a positive one, and, as already stated, the auxiliary pointer will remain at the word "Stop" and will convey to the engineer the positive and unmistakable order to stop the train. It will then be the duty of the engineer to stop the train over the final-signal rails. This will again cause the magnet-pointers in both the tower-indicator and the cab-indicator to again move over to the left and will indicate positively and unmistakably to the operator in the tower that the train has stopped as ordered and is in position on the final-signal rails. When it is desired to have the train go ahead again, the tower operator so manipulates the switch as to throw the current in the opposite direction. This causes the magnets in both indicators to tilt in the opposite direction and swings the magnet-pointers, carrying with them the right auxiliary pointers, toward the right and over to the words "Go ahead" on the indicators. The instant the cab passes from the final-signal rails the circuit through the cab-indicator is again opened, and the magnet-pointer in the cab will return to its normal position. The magnet-pointer in the tower-indicator, however, will return to the intermediate dotted position, (indicated at the right,) where it will remain, owing to the fact that a portion of the current will pass through the high-resistance connection until the circuit H is opened by throwing off the switch. The tower operator and the engineer will return the auxiliary pointers of the respective indicators to their normal position as soon as an order has been executed, and both of them may, if required, record the time at which an order was given and received.

Having thus described my invention, I claim—

1. A railway-train signal comprising an electric generator, a reversing-switch, warning and final signal rails, a tower-indicator, an electric circuit through said parts and a cab-indicator having connections adapted to engage the signal-rails whereby the circuit may be completed through said cab-indicator, substantially as described, for the purpose specified.
2. A railway-train signal comprising an

electric generator, a reversing-switch, a pair of warning-signal rails, a pair of final-signal rails, high-resistance connections between said pairs of signal-rails, a tower-indicator, an electric circuit through said parts and a cab-indicator having connections adapted to engage the signal-rails whereby when the circuit is closed a portion of the current will pass through the high-resistance connections and will cause an actuation of the tower-indicator, and when the cab passes upon the warning-signal rails the current, following the path of least resistance, will complete the circuit through the cab-indicator and will cause an additional actuation of the tower-indicator.

3. The combination with an electric generator, a reversing-switch, warning and final signal rails and an electric circuit, of a tower-indicator and a cab-indicator, said indicators having pointers adapted to be moved in either direction simultaneously depending upon the direction of the current and said cab-indicator having connections adapted to engage the signal-rails.

4. The combination with an electric generator, a reversing-switch, warning and final signal rails and an electric circuit, of a tower-indicator and a cab-indicator, the latter having connections adapted to engage the signal-rails, said indicators each comprising a coil, a pivoted magnet mounted to swing freely within the coil and a pointer extending from the magnet.

5. The combination with an electric generator, a reversing-switch, warning and final signal rails and an electric circuit, of a tower-indicator and a cab-indicator the latter having connections adapted to engage the signal-rails, said indicators each comprising a coil, a pivoted magnet mounted to swing freely within the coil, a pointer extending from the magnet and having a projection and auxiliary pointers pivoted in alinement with the magnet-pointer and adapted to be engaged by said magnet-pointer.

6. The combination with an electric generator, a reversing-switch, warning and final signal rails and an electric circuit, of a tower-indicator and a cab-indicator the latter having connections adapted to engage the signal-rails, said indicators each comprising a coil, a pivoted magnet mounted to swing freely within the coil, a pointer extending therefrom and provided with a projection, and frictionally-held auxiliary pointers pivoted in alinement with the magnet-pointer and adapted to be engaged by the projection.

7. The combination with an electric generator, a reversing-switch, warning and final signal rails and an electric circuit, of a tower-indicator and a cab-indicator the latter having connections adapted to engage the signal-rails, said indicators each comprising a coil, a pivoted magnet mounted to swing freely within the coil, a pointer extending therefrom and

provided with a projection, a spring for normally holding the magnet and pointer steady, and frictionally-held auxiliary pointers pivoted in alinement with the magnet-pointer and adapted to be engaged by the projection.

8. The combination with an electric generator, a reversing-switch, warning and final signal rails and an electric circuit, of a tower-indicator and a cab-indicator the latter having connections adapted to engage the signal-rails, said indicators each comprising a case having an arc-shaped slot, a coil within the case, a pivoted magnet mounted to swing freely within a coil, a pointer extending therefrom and provided with a projection passing through the slot, and frictionally-held auxiliary pointers pivoted in alinement with the magnet-pointer and adapted to be engaged by the projection.

9. The combination with an electric generator, a reversing-switch, warning and final signal rails and an electric circuit, of a tower-indicator and a cab-indicator the latter having connections adapted to engage the signal-rails, said indicators each comprising a case having an arc-shaped slot and stop-pins, a coil within the case, a pivoted magnet mounted to swing freely within the coil, a pointer extend-

ing therefrom and provided with a projection passing through the slot, and frictionally-held auxiliary pointers pivoted in alinement with the magnet-pointer and adapted to be engaged by the projection, the normal position of said auxiliary pointers being determined by engagement with the stop-pins.

10. The combination with an electric generator, a reversing-switch, warning and final signal rails and an electric circuit, of a tower-indicator and a cab-indicator the latter having connections adapted to engage the signal-rails, said indicators each comprising a case having an arc-shaped slot, a coil within the case, a pivoted magnet mounted to swing freely within the coil, a pointer extending therefrom and provided with a projection passing through the slot, a spring for holding the magnet and pointer steady, and frictionally-held auxiliary pointers pivoted in alinement with the magnet-pointer and adapted to be engaged by the projection.

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

ERNEST M. QUITTMEYER.

Witnesses:

JERE. LIEBERMANN,
WILLIAM EBERLING, Jr.