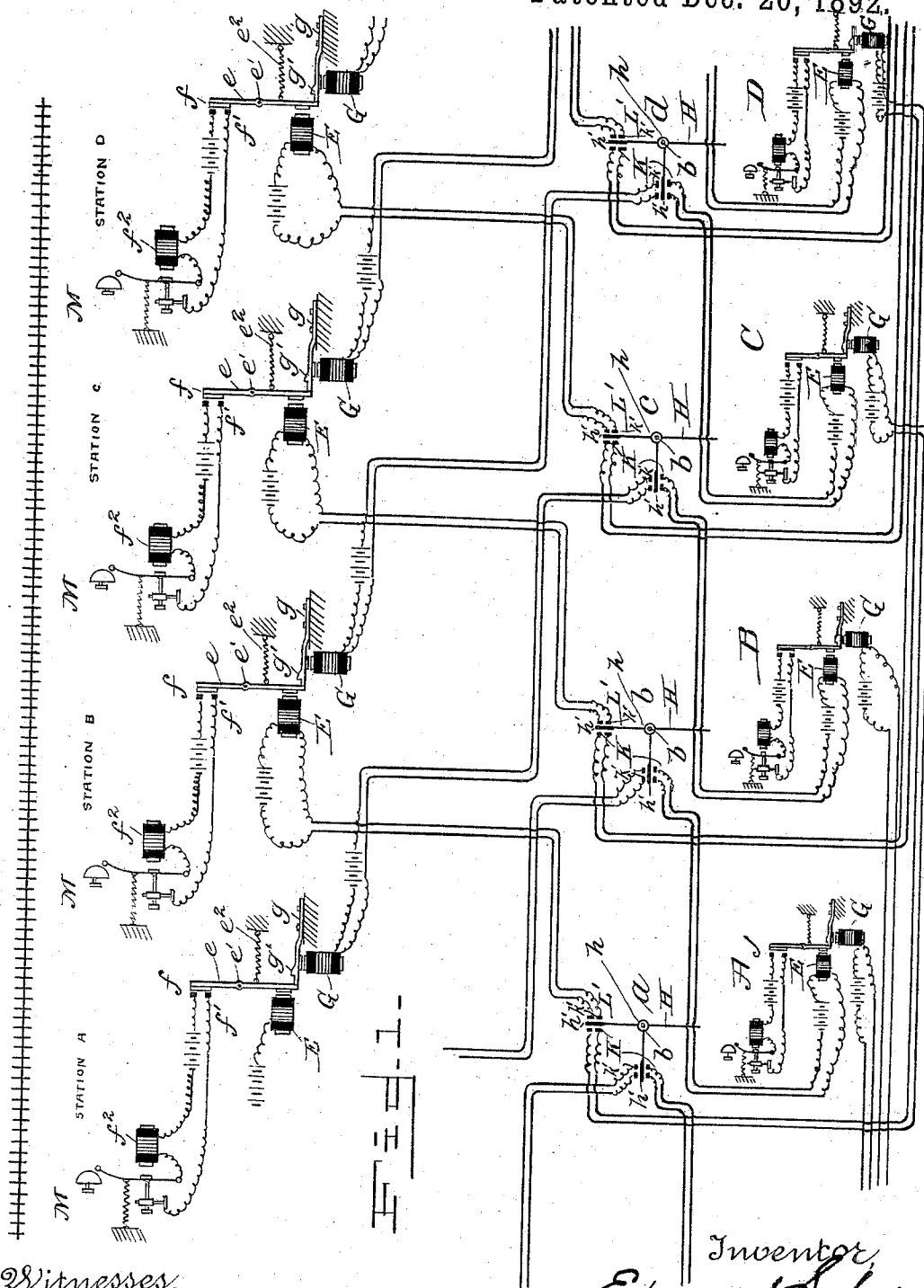


E. SCHAEFER.
RAILWAY SIGNAL.

No. 488,225.

Patented Dec. 20, 1892.



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(No Model.)

E. SCHAEFER.
RAILWAY SIGNAL.

2 Sheets—Sheet 2.

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Fig. 2.

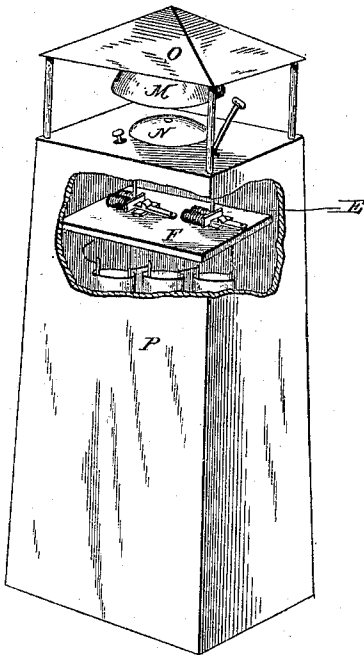


Fig. 3.

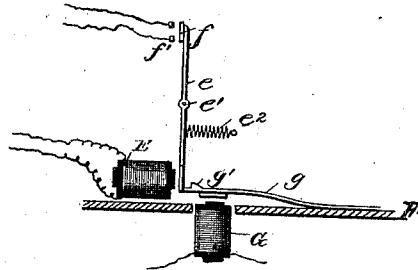


Fig. 4.

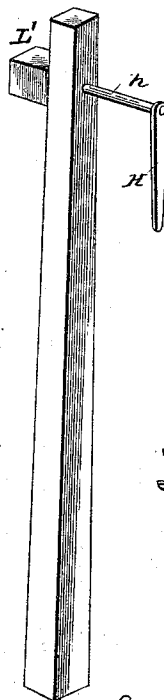


Fig. 5.

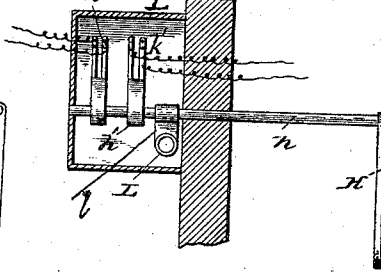


Fig. 6.

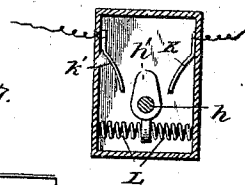


Fig. 7.

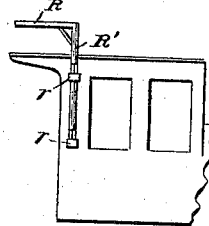
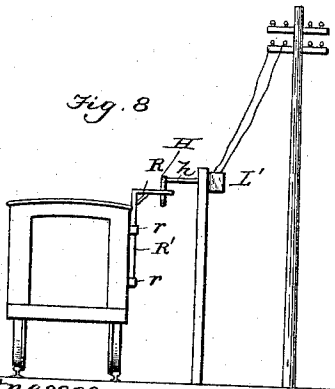


Fig. 8.



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UNITED STATES PATENT OFFICE.

EDMUND SCHAEFER, OF LYNCHBURG, VIRGINIA.

RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 488,225, dated December 20, 1892.

Application filed August 26, 1891. Serial No. 403,806. (No model.)

To all whom it may concern:

Be it known that I, EDMUND SCHAEFER, a citizen of the United States, residing at Lynchburg, in the county of Campbell and State of Virginia, have invented certain new and useful Improvements in Railway-Signals; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The object of the present invention is to provide a system of railway signals to be operated by passing trains, either visible or audible or both as may be preferred, and which will give notice when a train enters a block or section controlled by the signal, the signal sounding or remaining set so long as the train remains on that block or section, and said signal stations are also to be placed at country road or railroad crossings to give warning of approaching trains. Notice is also given by the system of the direction of the moving train, all of which is hereinafter described and fully set forth in the claims.

Figure 1 is a drawing showing several sections along the line of the road. Fig. 2 shows one of the signal towers or posts. Fig. 3 illustrates the device for setting or cutting out a signal. Figs. 4 to 8 are details illustrating a switch for use on signal posts and train arm for operating same.

This system of signals is designed to be operated in conjunction with the Owen system of signaling, described in Patent No. 441,773, of December 2, 1890, whereby a train passing a station automatically sends a telegraphic signal to the train dispatcher's office indicating the number of the station, and the present invention, though not necessarily connected with the system of railway signals, described in said patent, is designed to supplement the same and provide a system of audible signals which will be heard by the engineers of other trains at night as well as day time unless a visible signal is preferred for this purpose. On many roads having light traffic the system of audible signals is all that is required, but on lines having heavy traffic

both audible and visible signals, or the latter alone may be used.

In Fig. 1, four stations are shown, A, B, C, and D, the stations being any desired distance apart, as for example, half a mile. Adjacent to the track in the vicinity of each station there is a post, *a*, *b*, *c*, and *d*, respectively, carrying a contact or switch device to be operated by a passing train, by means of which the signals are controlled. These posts may carry a pair of contact plates forming the terminals of an electric circuit, as employed in the Owen system of signaling, and a copper roller, rod or brush carried by a train striking the contact plates in passing closes the signal circuit; or a pendent arm to be struck by a passing train, as hereinafter described, may be used or any similar device for closing the circuit. Each signal post is the end of a circuit that leads forward to a signal station one mile or other determined distance ahead to set a signal, and also of another circuit that leads back to a signal station one-half mile or other determined distance behind to stop an audible signal or change a visible signal to its original position, and preferably the system is arranged so that a signal is set one mile in advance of the train and it continues to sound or remains set until the train has passed half a mile beyond that station. Each signal station is provided with two bells or gongs M and N, of entirely different pitch, or tone, or audible signals of different character, one, for example, being of a deep tone, and the other of a high pitch; one being controlled by trains moving in one direction, either north or east, and the other by trains moving in the other direction south or west, so that the direction in which the train is moving will be known from the audible signal. Where visible signals are employed the horizontal position will show that there is a train on the section while the arm pointing downward will show the section to be free. The visible signal is not shown in the present case as its use will be readily understood by those familiar with this art and the circuits which are herein described as controlling and operating the ringing of a gong, or sounding of other audible signal, may also be employed to set and cut out a visible signal or to con-

trol both an audible and a visible signal. For directly actuating the signal or hammer of a gong, I may employ the ordinary electric bell-ringing contrivance as disclosed more fully in Fig. 1, wherein is an open circuit whose electro-magnet f^2 is connected to one of the circuit wires having the terminals f' , hereinafter more fully described, and wherein the spring retracted hammer carries the armature of said magnet and is itself, connected to the other of said wires. Such however in itself constitutes no part of the present invention. It is only aimed to show how the contacts at the posts control the signal stations ahead and behind.

The gongs, M. and N. are supported on a small elevated platform under a roof, O, and the lower part of the supporting structure, P, is inclosed, and forms a box, containing the batteries for operating the several circuits and mechanism for operating the gongs or setting the visible signal. Within the box P, and near the top thereof is a shelf F (Fig. 3) that supports the mechanism for electrically starting and stopping the signals; e is a lever pivoted at e' and carrying the armature of the magnet E at its lower end and a contact plate f at its upper end; e^2 is a light spring to retract the armature end of the arm; g is a flat spring carrying the armature of the electro-magnet G and fastened at its rear end to the shelf F. In its normal position the forward end of the flat spring g comes behind the lower end of the lever e ; a short distance back from the end of the spring plate g there is a shoulder or stop g' on its upper side; f' are the terminals of the circuit which rings one of the gongs either M or N, or controls a visible signal, a duplication of the device being provided for controlling the other gong.

The electro-magnet E is in circuit with a signal post for stopping the audible signal and the electric magnet G is in circuit with a post for starting it. For example, the magnet E of the gong M, of station B is in circuit with post a and the magnet G with post d ; while the magnet E of the gong M of station C will be in circuit with the post b , and the magnet G of the gong M will be in circuit with the post of the next station north of d . When the magnet G is energized by the closing of its circuit by a passing train, the spring plate g is drawn down releasing the arm e , and the spring e^2 retracting the lower end of the arm throws the contact plate f against the terminals f' , and closes the circuit of the gong, and the gong continues to ring until the circuit is broken by an impulse coming over the circuit of the magnet E. The stop g' limits the rearward movement of the arm e . When the circuit of the magnet E is closed the arm e is drawn forward breaking the circuit of the gong at f' , and thereby cutting out the signal, at the same time, the spring plate g locks the arm e and holds it locked until the magnet G is again energized.

Referring now to the switch device illus-

trated by Figs. 4, 5 and 6, H is a pendent arm carried on the shaft h , which shaft has two small insulated cams h' that engage with the terminal plates K, of electro-magnets that close the signal circuit, of which these plates are the terminals, when the arm H is swung out of a vertical position. The locomotive or passing train is provided with a projecting rod R that will strike the pendent arm H in passing, throwing it to one side and thus momentarily cause the cams h' to engage with the terminal plates K, closing their respective circuits. One of these circuits leads forward to the signal one mile ahead that is to be set and the other circuit leads back a half mile behind to the signal that is to be cut out. As a further improvement a second group of terminal plates k' , arranged on the opposite side of the cams h' are employed, so that when the arm H is struck by a train passing in one direction, as for example, going east, the arm will be first swung to the east and the circuit will be established through the contact plates K by the cam h' ; while when the arm is struck by a train going west it will be first swung to the west and the circuit will be established through the contact plates k' by the cams h' . To prevent the arm H from swinging back after it has been struck and swung in one direction by a passing train and thereby close the circuit of the other group of contact plates, springs L are provided, which will stop the swinging of the arm and bring it to rest at once. These springs are connected to a pendant l , sleeved fixedly to the shaft h , and to the sides of a closure or housing L' , secured to a post, respectively.

The train arm R for operating the switch is preferably attached to the cab of the locomotive as shown in Figs. 7 and 8, and is carried by the vertical standard R' . This standard is supported in square sockets r affixed to the side of the cab, the standard R' at its bottom and also where it passes through the upper socket, being made square so that it will be held fast in its support, but by lifting it a short distance and then turning it the cross arm R can be swung back parallel with the track where it will not strike the pendent arms H. This is done when an engine is switching or backing or for other reasons it is not desired to operate the signals.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a system of electric railway signals a pendent arm H hung adjacent to the track where it can be struck by a projecting arm on a passing train, said arm hanging from a shaft h carrying an insulated cam h' in combination with two pairs of spring terminal plates of two electric circuits, the plates being located on opposite sides of the cam h' , together with a spring L for stopping the swinging of the arm, whereby the swinging of the arm by a train passing in one direction will close one of the circuits, and the swinging of the arm by a

train passing in an opposite direction will close the other circuit.

2. In a system of electric railway signals a pendent arm H hung adjacent to the track where it can be struck by a projecting arm on a passing train, said arm hanging from a shaft *h* in combination with a pair of insulated cams *h'* and two sets of circuit terminal plates arranged on opposite sides of the cams *h'*, together with springs L for checking the movement of the arm, whereby the swinging of the arm H by a train passing in one direction will

close the circuits of one set of signals, and the swinging of the arm in an opposite direction by a train passing in that direction will close the circuits of the other signals, as and for the purpose set forth. 15

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

EDMUND SCHAEFER.

Witnesses:

JNO. STEWART WALKER,
S. H. FRANKLIN.