

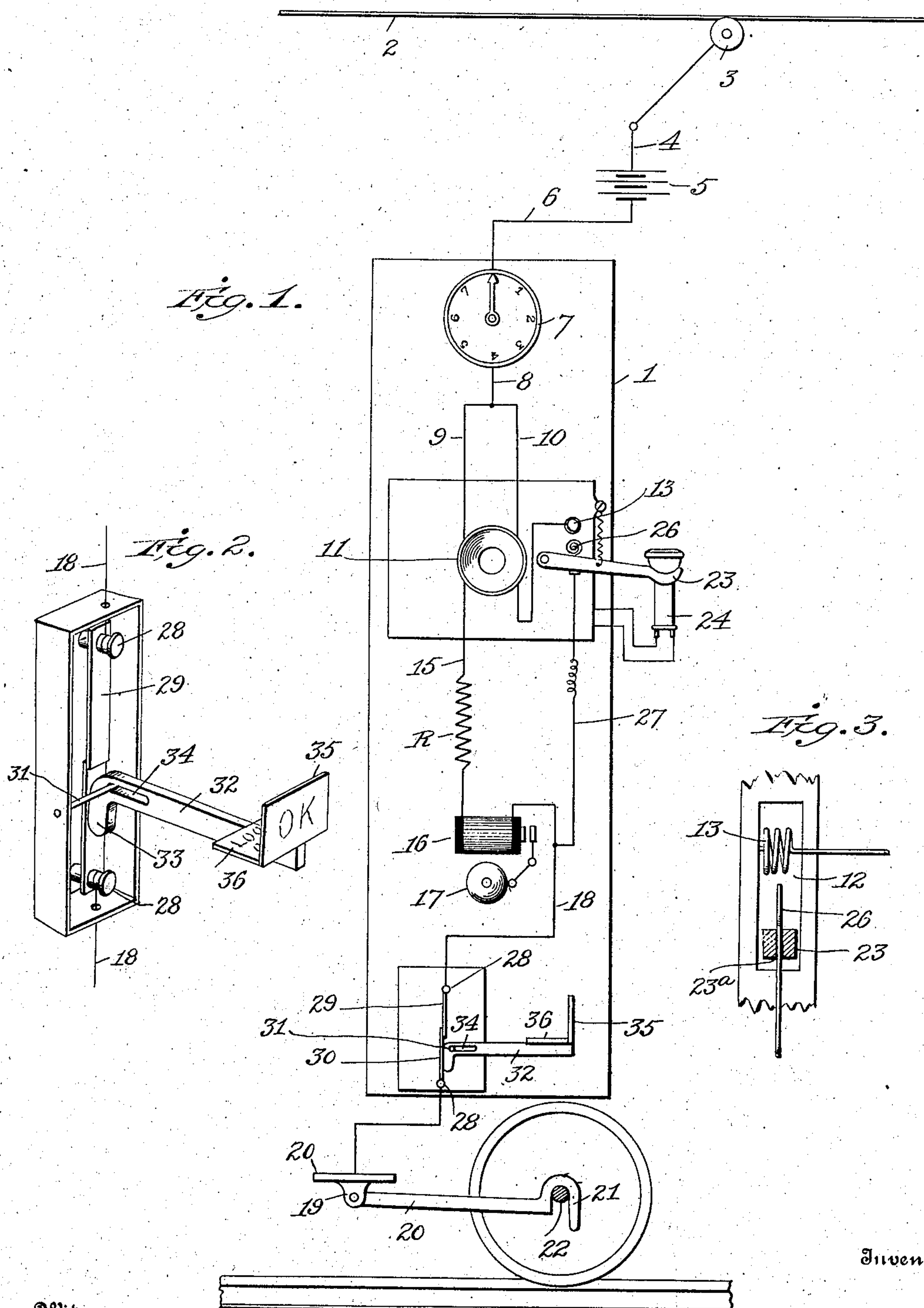
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J. W. TATUM

ELECTRIC RAILWAY SIGNALING APPARATUS.

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ELECTRIC RAILWAY SIGNALING APPARATUS.

No. 815,131.

Specification of Letters Patent.

Patented March 13, 1906.

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To all whom it may concern:

Be it known that I, JAMES WILLIAM TATUM, a citizen of the United States, residing at Durham, in the county of Durham and State of North Carolina, have invented new and useful Improvements in Electric Railway Signaling Apparatus, of which the following is a specification.

My invention has relation to new and useful improvements in electric signaling apparatus employed in connection with railway-trains, and more especially to apparatus of the general type including instruments located and operating in the cabs of the locomotives and which serve to indicate the distance between approaching trains, to sound an alarm when the trains approach each other within certain limits, and which provide for communication between trains.

The primary object of the invention is to provide an improved apparatus of the character mentioned embodying means for automatically indicating the distance between approaching trains, to permit telephonic communication between said trains, to sound an alarm when approaching within certain limits, and also to permit transmission of messages by a key instrument in the event of unsatisfactory operation of the telephone apparatus.

A further object is to provide means controlled by the telephone apparatus to cut out the alarm while said apparatus is in use without disturbing or affecting the distance-indicating mechanism, so that said alarm will not interfere with the sending of messages and at the same time the indicator will remain in operation to indicate to the trainman using the telephone the distance between the trains.

I have fully and clearly illustrated my invention in the accompanying drawings, to be taken as a part of this specification, and wherein—

Figure 1 is a diagrammatic view of the apparatus and its circuits. Fig. 2 is a detail perspective view of the combined cut-out and key signaling device forming a part of the invention, and Fig. 3 is a detail view of the switch operated by the movement of the telephone-receiver hook.

1 designates a supporting or instrument board adapted to be supported in a vertical plane upon a railway-locomotive and upon which are mounted the various instruments employed in connection with my invention, it being understood that each train of a system is equipped with such a set of instruments carried by the locomotive or other vehicle in the train.

2 designates an overhead wire running parallel to the track along which the trains travel, said wire forming, together with the track-rails and the circuits carried by the trains, the circuit for transmitting intelligences between the trains.

Carried by the car upon which the apparatus is located is a trolley or collector 3, arranged to engage the overhead wire at all times when the train is standing upon the track or when traveling thereon, and from this collector extends a conductor 4, connected at one end to one of the poles of a battery 5, which supplies the current for the signaling system. The other pole of the battery is electrically connected, by means of a conductor 6, with a distance-indicating instrument 7, which consists of an ohmmeter of any well-known construction, the dial of which for the purpose of the use to which said instrument is employed being graduated in a scale of miles. From the indicating instrument the circuit is continued by a wire 8 for a distance, when said circuit is divided into two separate lines 9 10, each of which is so connected to a telephone-transmitter, as shown at 11, that the current necessary for the operation of the latter in order to transmit messages may be supplied over either of said wires.

From the transmitter the conductor 10 is led to a point within the upper portion of a slot 12 in the telephone-casing, in which slot the receiver-hook moves, the end of said conductor being provided with a contact member of any suitable design constituting one member of a switch or cut-out and which in the present instance is shown as consisting of a coil-spring 13, disposed with its longitudinal axis extending horizontally in the slot 12. The transmitter-circuit, including the wire 9, is continued by a wire 15, the end of the latter

opposite to that connected to the transmitter being connected to the magnet 16 of an alarm-bell 17, the circuit being continued from said magnet by means of a wire 18 to a depending post 19, secured to the bottom of the car by means of a plate 20, suitably insulated from the car-body. Pivoted to the lower end of said post 19 is a swinging metallic arm 20, the free end of which is formed with a hook 21 to catch over and rest upon the axle 22 of the car and complete the circuit through said axle and car-wheel to the track-rail. It will be seen that when it is not desired to employ the apparatus the circuit may be broken by swinging said arm 20 upward on its pivot to throw the hooked end out of contact with the axle. It will thus be seen that when two vehicles equipped as above described are upon a single track the circuit is completed through the wire 2, the track-rails, and the circuits including the apparatus mounted on the vehicles.

The operation of the system as far as described, it will be apparent, is such that the indicator will indicate the distance in miles or parts of miles between trains according to the resistance of the circuit, which of course depends on the distance between the trains. It will also be apparent that the telephone-transmitter and the alarm-bell are always in circuit, the whole apparatus operating whenever the trains are within such a distance of each other that the resistance of the circuits is overcome, at which time the bell will ring to give warning that the trains have approached each other within danger limits. The apparatus may be so regulated that any number of miles may be set as the danger limit—say one to three miles. If desired, a resistance element R of any desired form may be inserted in the wire 15, said resistance serving a purpose to be presently set forth.

Pivotally mounted at one end upon the supporting-board is an arm 23 for the telephone-receiver 24, said arm carrying a contact member to cooperate with that above described. This second contact member consists of a spiral 26, mounted upon the upper side of the telephone-hook, the arrangement being such that when the receiver 19 is moved from the hook of the arm 23 and said arm moves upward in the usual manner said spiral contact 26 will be carried upward with the arm and pressed into the space between the convolutes of the coiled contact 13 and into contact with the coils of the latter for a purpose to presently appear.

Connected with the contact 26 is one end of a lead 27, which passes up through an opening 23^a in the arm 23, and the other end of which is connected to the conductor 18, so that a second continuous circuit is completed by way of the wire 2, collector 3, wires 4 and 6 through the indicator, wires 8 and 10, the

transmitter, contacts 13 and 26, wires 27 to the track-rails through the arm 20 and the vehicle-axle.

It will be seen that the resistance in the circuit including the wires 6, 8, 9, 15, and 18 will be greater than that including the wires 6, 8, 10, and 27, for the reason that the first-named circuit includes a greater number of instruments embodying elements of high resistance than the latter circuit, the latter circuit not including the bell-magnets and the resistance R, the result being that when the gap between the wires 10 and 27 is closed and two completed independent circuits formed the natural tendency of the current will be to seek the path of least resistance, which will be by way of the wires 10 and 27, so that the alarm-bell will be cut out of the circuit or insufficient current will flow through its magnet-coils to actuate its armature.

It will be seen that when the receiver 24 is removed from the hook to permit use of the telephone in transmitting messages between trains that the upward movement of the arm closes the circuit at the contacts 13 and 26, so that the bell is cut out and prevented from interfering with the sending of telephone-messages by reason of its noise; but at the same time the operation of the indicator and the transmitter will not be discontinued, as both of said instruments are still included in a circuit including the wires 2, 4, 6, 8, 10, and 27 and the track-rail, the indicator therefore continuously indicating the relative position of the trains at all times. When the receiver is replaced upon the hook, the flow through the line of least resistance is broken and the current follows the line 6, 8, 9, 15, and 18, which is its normal condition during movement of the trains or when the latter are standing still.

Means is provided for breaking the circuit between the apparatus and the track-rails, so that the use of the apparatus may be discontinued when desired, said means embodying a structure which will permit it to be used as a signal-transmitting instrument under circumstances when it is impossible or undesirable to use the telephone. This means consists of a switch or cut-out inserted in the circuit in the wire 18 beyond the point at which the wire 27 joins the latter, said switch comprising a casing secured to the board 1, in which casing are arranged oppositely-disposed binding-posts 28, to which the circuit-wire 18 is connected, and bridging the space between these posts are overlapping spring-contacts 29 30, connected, respectively, to said posts and so arranged as to normally engage each other at their meeting or overlapping ends. Pivotally mounted in the casing upon a pin 31 is a key-lever 32, which is normally arranged to rest horizontally and is formed at its end within the casing with a

foot or cam 33, extending downwardly at right angles to the said lever substantially parallel to the overlapping contacts, the pivot of the lever being so located that when the outer end of the latter is depressed into a vertical position the foot or cam will engage the spring-contact 30 to move it out of engagement with the contact 29, so that the circuit is broken and the operation of the instrument discontinued.

Formed in the lever 32 is a longitudinally-extending slot 34, which receives the pivot-pin 31, heretofore mentioned, and which, it will be seen, provides for a back-and-forth movement of said lever on said pin, the arrangement being such that when the circuits are closed at the overlapping contacts and the lever is in horizontal position said lever may be reciprocated horizontally or oscillated vertically to force the contact 30 out of engagement with the contact 29 to make and break the circuit and enable the operator to utilize any desired system of signaling, the import of which will be indicated on an approaching train by the intermittent ringing of the bell 17 thereon corresponding to the making and breaking of the circuit by the operator of said lever.

Carried by the free end of the key-lever and arranged in a plane at right angles thereto is a plate 35, said plate standing vertically when the lever is in its normal or horizontal position and bearing any suitable inscription, such as "O. K.," to indicate to the operator that the circuit is closed to insure operation of the instruments therein. Also attached to said lever and lying flat thereon and in the same or a parallel horizontal plane is a second plate 36, which when the lever is in a horizontal plane is hidden by the plate 35; but when said lever is moved downwardly into a vertical position to open the contacts 29 and 30 said plate 36 will be disposed in a vertical plane to display the face which is uppermost when in horizontal position and which bears a warning, such as "Look out," to warn the attendant that the circuits are broken and the train is no longer protected by the signaling system. It will be evident from reference to the drawings that the face of the plate 35 bearing the sign "O. K." will be turned downward when the lever is swung down into vertical position, so that the inscription on only one of the plates will be displayed at one time.

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

1. In an electric railway signaling system, the combination with suitable circuits, of a signaling apparatus carried by a vehicle and consisting of a line including a distance-indicating instrument, a telephone and an alarm, and a second line including all of said instruments with the exception of the alarm, and

means rendered effective by the operation of the telephone to cause the current to flow through said second line whereby all of the instruments are operative but the alarm.

2. In an electric railway signaling system, the combination with suitable circuits, of signaling apparatus carried by a vehicle and consisting of a line of high resistance including a plurality of instruments, one of which is an audible alarm, and a line of low resistance including all of the instruments with the exception of said alarm, and means rendered effective by the operation of one or more of said instruments for closing the line of low resistance whereby the current will be caused to flow thereby and be diverted from the line of high resistance.

3. In an electric railway signaling system, the combination with suitable circuits, of signaling apparatus carried by a vehicle, and consisting of a line of high resistance, including a distance-indicating instrument, a telephone and an alarm, and a line of low resistance including all of said instruments with the exception of the alarm, and means for opening and closing said line of low resistance.

4. In an electric railway signaling system, the combination with suitable circuits, of a line of high resistance, including a distance-indicating instrument, a telephone and an alarm arranged in series, and a shunt-line of low resistance connected at one end to said first-named line at a point between the indicating instrument and the telephone, and at the other end at a point beyond said alarm, said shunt-line including the telephone, and means for opening and closing the shunt-line.

5. In an electric railway signaling system, the combination with suitable circuits, of a line of high resistance, including a distance-indicating instrument, a telephone and an alarm arranged in series, and a shunt-line of low resistance connected at one end to said first-named line at a point between the indicating instrument and the telephone, and at the other end at a point beyond said alarm, said shunt-line including the telephone, means for opening and closing the shunt-line, and a key instrument located in the line of higher resistance at a point beyond the shunt.

6. In an electric railway signaling system, the combination with suitable circuits, of signaling apparatus carried by the vehicle and consisting of a line of high resistance, including a distance-indicating instrument, a telephone and an alarm arranged in series, a line of lower resistance including all of said instruments with the exception of the alarm, a switch located in said line of lower resistance, a pivoted hook for the telephone-receiver, and means whereby the removal of the receiver from the hook permits the operation of the hook to close said switch.

7. In an electric railway signaling system,

the combination with suitable circuits, of signaling apparatus carried by a vehicle and consisting of a line of high resistance, including a distance-indicating instrument, a telephone and an alarm arranged in series, a line of lower resistance including the indicating instrument, and the telephone, and constituting a shunt to the line of high resistance, a movable hook for the telephone-receiver, a contact member associated therewith, a second contact member in said low-resistance line circuit, and means whereby the removal of the receiver from the hook causes the engagement of said contacts to close the line of low resistance.

8. In an electric railway signaling system, the combination with suitable circuits, of signaling apparatus carried by the vehicle, and consisting of a line of high resistance including a plurality of instruments, one of which is an audible alarm, a line of lower resistance including all of the instruments with the exception of said alarm and constituting a shunt to the first-named line, and a combined switch and key signaling instrument located in the line of higher resistance beyond the shunt, and comprising normally closed contacts, and a lever arranged adjacent said contacts and constructed to swing on its fulcrum to separate the contacts, and also having a reciprocating movement, whereby the contacts may be intermittently separated.

9. In an electric railway signaling system, the combination with suitable circuits, of signaling apparatus carried by the vehicle and consisting of a line of high resistance, including a plurality of instruments, one of which is an audible alarm, a line of lower resistance including all of the instruments with the exception of said alarm and constituting a shunt to the first-named line, a combined switch and key signaling instrument located in the line of higher resistance beyond the shunt, and comprising normally engaged contacts, and a vertically-swinging lever fulcrumed adjacent said contacts and provided with a cam which operates to separate said

contacts by the swinging movement of the lever.

10. In an electric railway signaling system, the combination with suitable circuits, of signaling apparatus carried by the vehicle and consisting of a line of high resistance, including a plurality of instruments, one of which is an audible alarm, a line of lower resistance including all of the instruments with the exception of said alarm and constituting a shunt to the first-named line, a combined switch and key signaling instrument located in the line of higher resistance beyond the shunt and comprising normally engaged contacts, a vertically-swinging lever fulcrumed adjacent said contacts and provided with a cam which operates to separate said contacts by the swinging movement of the lever, and indicating devices carried by said lever to indicate the position of the contacts.

11. In an electric signaling apparatus, the combination with suitable circuits including the track-rails, of signaling apparatus carried by a vehicle, and means for placing said apparatus in circuit with the rails consisting of an arm pivoted to the vehicle-body, and having said apparatus in circuit therewith, the free end of the arm being adapted to engage the axle of the vehicle.

12. In an electric signaling apparatus, the combination with suitable circuits including the track-rails, of signaling apparatus carried by a vehicle, and means for placing said apparatus in circuit with the rails consisting of an arm pivoted to the bottom of the vehicle-body to swing in a vertical plane, and having said apparatus in circuit therewith, the free end of the arm being provided with a hook adapted to engage over the axle of the vehicle.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JAMES WILLIAM TATUM.

Witnesses:

R. P. READE,
J. A. GILES.