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A. L. RUTHVEN.

RAILWAY SIGNAL SYSTEM.

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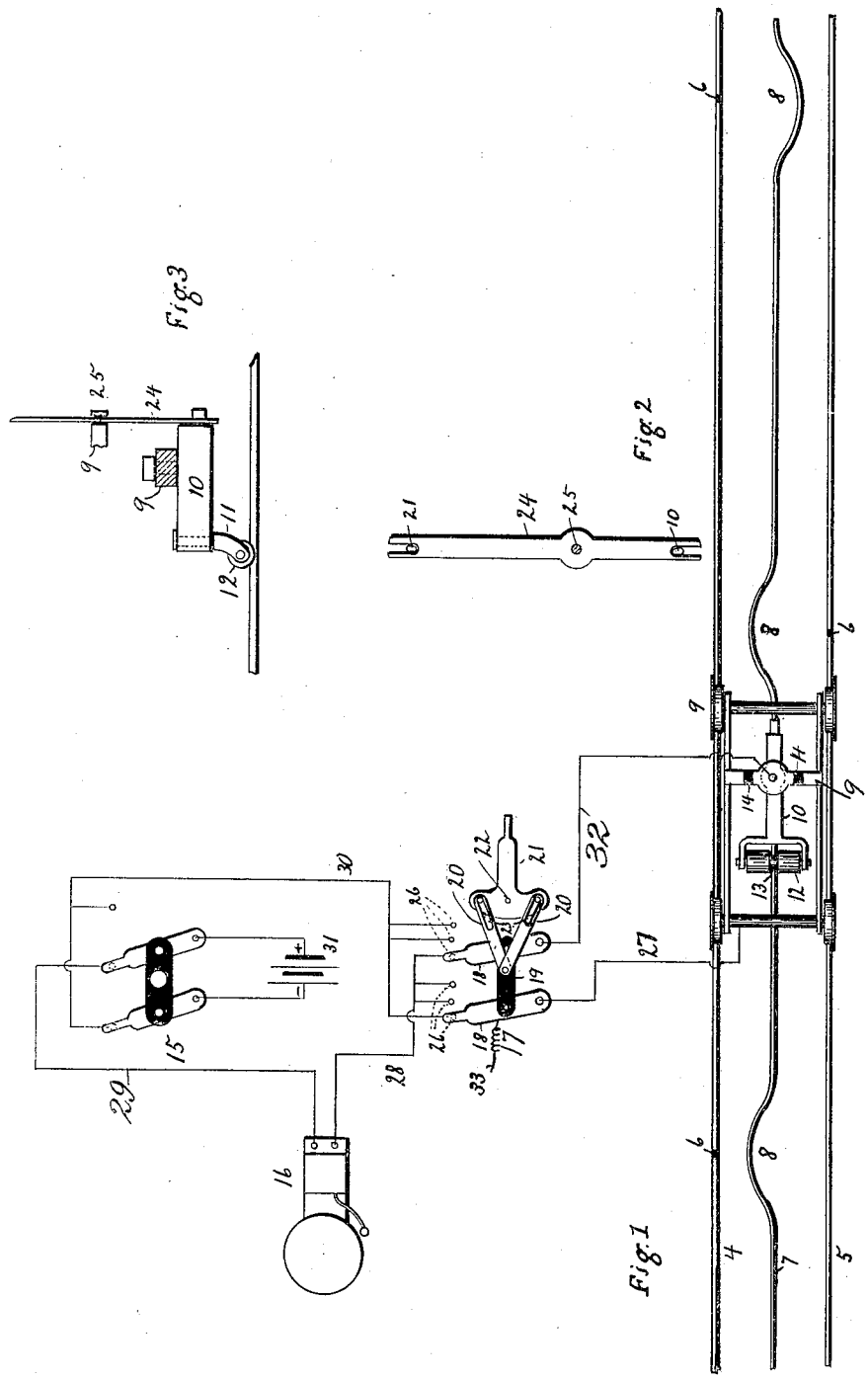

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RAILWAY SIGNAL SYSTEM.

No. 843,703. Specification of Letters Patent. Patented Feb. 12, 1907.

Application filed April 20, 1906. Serial No. 312,919.

To all whom it may concern:

Be it known that I, ALFRED L. RUTHVEN, a citizen of the United States, residing at Topeka, in the county of Shawnee and State of Kansas, have invented new and useful Improvements in Railway Signal Systems, of which the following is a specification.

The invention relates to that class of railway signal systems in which the signal is carried on the train, as in the cab of the locomotive, so that the signal is given either direct to the engineer or so that the train may be stopped automatically, it being understood that the mechanism herein claimed may be used for either or both purposes. In the class to which this invention specially relates the signal mechanism is designed to be operative when two engines or trains are approaching each other within a short distance, so that both may be stopped, and thus prevent collision, and it is also adapted to operate whenever two trains are within a given distance of each other upon the same track, whether they be traveling in the same or in opposite directions, and, further, to indicate by the signal upon each train in which direction the other train is going.

Objects of the present invention are, to improve generally upon such signal systems and upon the several parts thereof; to so arrange the apparatus that as few conductors may be used as possible; to reduce the number of circuits, so that only one conductor, in addition to the two insulated rails, is necessary; to improve upon the mechanism adapted to indicate in which direction the other train is going; to simplify and render practicable the means for operating at intervals the automatic pole-changer; and the invention consists of the parts, improvements herein set forth and claimed.

In the drawings accompanying and forming part of this specification I have shown the invention in its preferred form and have shown the best mode of applying the principles thereof; but it is to be understood that I do not intend to limit myself to the exact details of construction shown therein, as obvious changes—such as changes in form, proportions, materials, the transposition of parts, and the substitution of equivalent members—will suggest themselves to persons skilled in the art and without departing from the spirit of the invention.

Figure 1 is a diagram of a track divided into blocks with an engine or car upon the track equipped with my improved apparatus. Fig. 2 is a detached view of the connecting-lever between the trolley-lever and the pole-changer lever, and Fig. 3 is a side view of the trolley and connecting-lever.

Like reference-numerals indicate like or corresponding parts throughout the several views.

Each of the two rails 4 and 5 is divided into blocks, as by the insulated points 6 6 6, at suitable distances apart, as a mile or two, depending upon the nature of the track and also of the traffic to be controlled, and the points of insulation are arranged alternately in the one rail or the other, so as to make about equally-distant overlapping blocks. A third rail or any other suitable conductor 7 is also laid or hung along the track, preferably along the middle thereof between the two rails, as indicated in the drawings. At each point of insulation the third rail or conductor has an offset or outturned portion 8, the purpose of which will be hereinafter explained.

9 may represent any car or locomotive upon the track, and to this is secured, as to the under side thereof when the third rail, as illustrated in the drawings, is used, a trolley-rod 10, which carries in a pivoted bracket 11 a trolley or roller 12, which has a groove or sheave 13 to engage the third rail. I prefer to use the roller, as indicated in the drawings, and to have it wide enough so that if it should be thrown off the rail as to the groove it will still bear against the rail with the higher surface of the roller, even in passing over one of the outturned places or offsets 8 and without losing contact or electrical connection with the third rail, and the groove will also readily find the rail again. The forward end of the pivoted trolley-rod 10 engages with a connecting-lever 24, pivoted to the frame at 25, the upper end of which engages with the arm 21 of the operating-lever of the automatic pole-changer 17, which is located in any suitable place on the locomotive, tender, or car. Also located in convenient places upon the locomotive, car, or tender are a manually-operable pole-changer 15, a signal device, as a bell 16, and a battery 31. Each of the arms 18 18 of the automatic pole-changer engages with a series of contacts, as three in number for each arm 26 26 26, so arranged that normally (in the positions shown in the drawings) the arms engage oppositely-connected

contacts, and so that the other contacts are oppositely connected in reverse order, as shown by tracing the connections with the wires 28 and 30, respectively. Pivoted to the connecting-rod 19 are the links 20 20, pivoted by slots 23 23 to the oppositely-extended arms of the operating-lever 21, which is pivoted at 22, so that when said operating-lever is moved in either direction by the connecting-lever 24 the arms 18 18 will be drawn over said contacts. The arms are held against the normal contacts by a spring 33 and are or may be returned thereto by said spring; but as the curve 8 is rather gradual the passage of these arms over the contacts may be accordingly slow, and it is apparent that the movement full way in either direction of the operating-lever and return will make three contacts with the reversed connection of the poles.

One arm of the automatic pole-changer is connected by wire 27 to the running-gear of the car or locomotive 9, and thereby with the rails. The other arm is connected by wire 32 with the trolley-rod and trolley, and thereby with the third rail or conductor 7. One side of the pole-changer 15 is connected to the bell 16, by wire 29, while the other pole of said manually-operable pole-changer is connected by wire 30 with one set of contacts of the automatic pole-changer 17, the other set of contacts thereof being connected by wire 28 with the bell or signaling device 16.

The normal circuit may be traced, commencing with the rail 4, through running-gear of car or locomotive, through wire 27 and one arm of automatic pole-changer, wire 30, pole-changer 15, and battery 31, wire 29, signaling device 16, wire 28, other arm of automatic pole-changer, wire 32, trolley-rod 10, trolley 12, to the third rail, and this circuit is normally open by reason of there being normally no electrical connection between the ordinary rails 4 and 5 and the third rail or conductor 7. Should such a connection occur, the signal will be actuated, either the ringing of a bell, the lighting of a light, or the operation of automatic devices for stopping the train or doing other work, the particular work to be done being immaterial so far as the present invention is concerned. By overlapping the circuits there is no place in the track where the signal will not be given by a proper electrical connection between the opposite rails within a predetermined distance of the train. This electrical connection of the rails may be made by numerous devices, such as by the throwing of switches, the going out of a bridge, or by the presence of another train on the track within the prescribed distance, by any suitable means.

In actual practice I contemplate the equipment of each train with an apparatus similar to the one shown in the drawings and that the same pole of the battery on each train moving in the same direction shall be connected to the third rail, and this connection may be controlled by the manually-operable pole-changer 15. Thus we may assume that whenever a train moves east (to the right on the drawings) the positive side of the batteries on all trains shall be connected to the third rail, and when moving west the negative side shall be so connected. Thus when the engine changes its direction of travel the engineer may simply shift the pole-changer to adjust his apparatus properly. If now two trains approaching each other come upon the same block, their respective batteries will be oppositely connected, so that the current will flow through the circuit through both trains, and thus actuate the signal or other devices in both trains, upon which the trains may be stopped or such other precautions taken as may be necessary. If, however, two trains be upon the same block and be moving in the same direction, no signal will be given, for the reason that the batteries have the same poles connected with the third rail, and thus neutralize each other, and it is to overcome this difficulty that the automatic pole-changer is designed. Upon passing over the offset 8 the automatic pole-changer is operated so as to intermittently make connection through the apparatus and the battery with the poles reversed, and if there is another train upon the same block moving in the same direction there is obviously an intermittent signal given on each of these trains by which each engineer will know that both trains are moving in the same direction and can govern himself accordingly.

What I claim is—

1. In a railway danger-signal system, a series of overlapping sectional conductors arranged along the track, suitable connecting means with the train, and a signaling device, a manually-operable pole-changer, a battery, and an automatically-operable pole-changer on each train, together with means arranged at intervals along the track for automatically shifting the automatic pole-changer.

2. In a railway signal system, a series of conductors, one of the conductors having offsets at intervals along the line, means for connecting with the conductors, signaling devices, batteries, manually-operable pole-changers, and automatically-operable pole-changers.

3. In a railway signal system, a series of conductors, one of the conductors having offsets, suitable signaling apparatus on the trains including an automatic pole-changer operable by said offsets.

4. In a railway signal system, a series of conductors, one of the conductors of said circuits having offsets at intervals along the line, a trolley and trolley-rod for connecting

said conductor with the train, and suitable signaling devices on the trains including an automatic pole-changer operable by the engagement of said trolley and trolley-rod with said offsets.

5. In a railway signal system, a track whose rails are insulated and divided alternately into blocks as set forth, a third rail between said two rails, said third rail being electrically continuous and having offsets arranged at intervals therealong; a trolley on the train for engaging said third rail and operable by said offsets; and a battery, a signaling device, and an automatic pole-changer operable by said offsets, on the train.

6. In a railway signal system, a track whose rails are insulated and divided alternately into blocks as set forth, a third rail between said two rails, said third rail being electrically continuous and having outturned portions at the points of insulation of the other rails; a pivoted trolley on the train for engaging with said third rail and operable by said offsets; and a battery, a signaling device, and an automatic pole-changer operable by said trolley and offsets, on each train.

7. In a railway signal system, a track whose rails are insulated and divided alternately into blocks as set forth, a third rail which is electrically continuous and has offsets at intervals along the line, a trolley on the train movable laterally by said offsets and continuously engaging said third rail; and a battery, a signaling device, a manually-operable pole-changer, and an automatically-operable pole-changer controlled by said trolley, on the train.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ALFRED L. RUTHVEN.

Witnesses:
JOHN A. HULIT,
Z. T. FISHER.