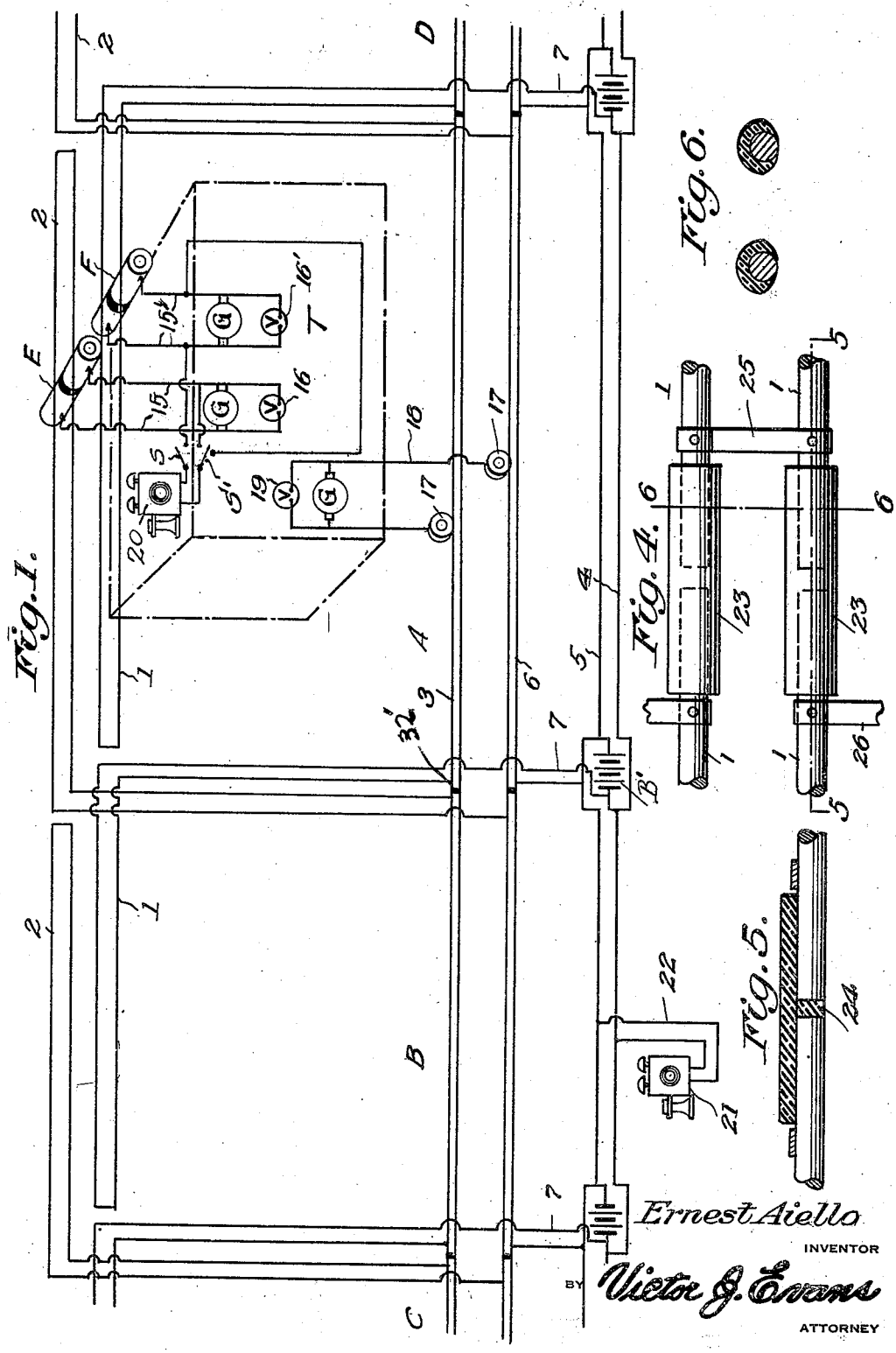
Feb. 23, 1932. E. AIELLO 1,846,983

RAILWAY TELEPHONE AND SIGNAL SYSTEM

Filed Sept. 27, 1929 4 Sheets-Sheet 1



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RAILWAY TELEPHONE AND SIGNAL SYSTEM

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Fig. 3.

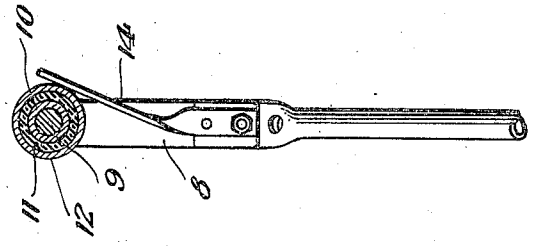
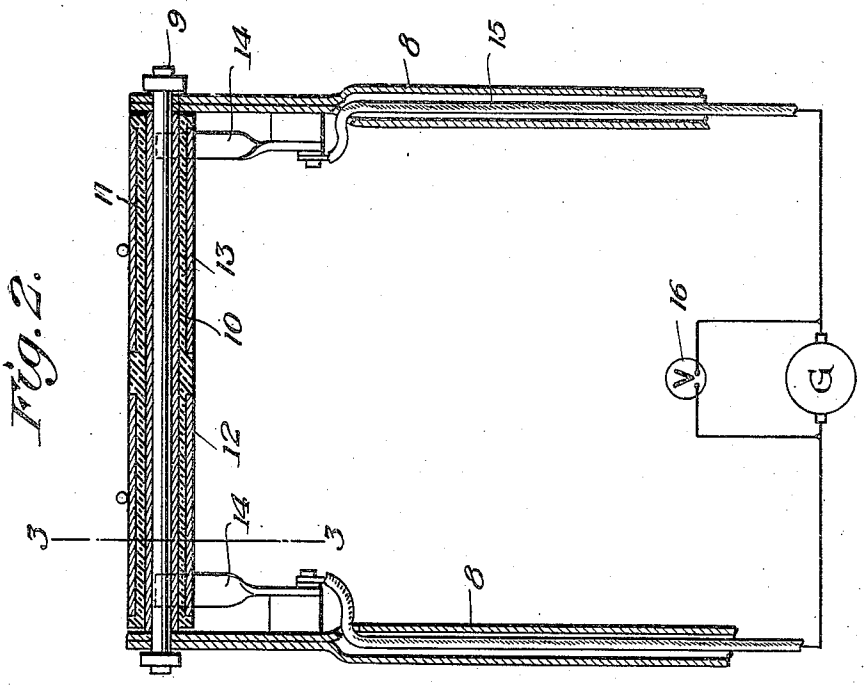


Fig. 2.



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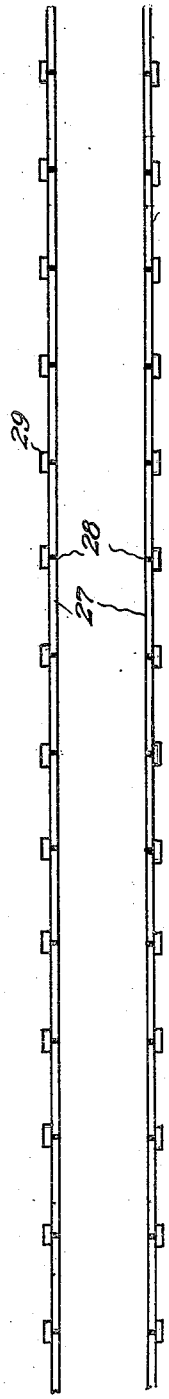


Fig. 10.

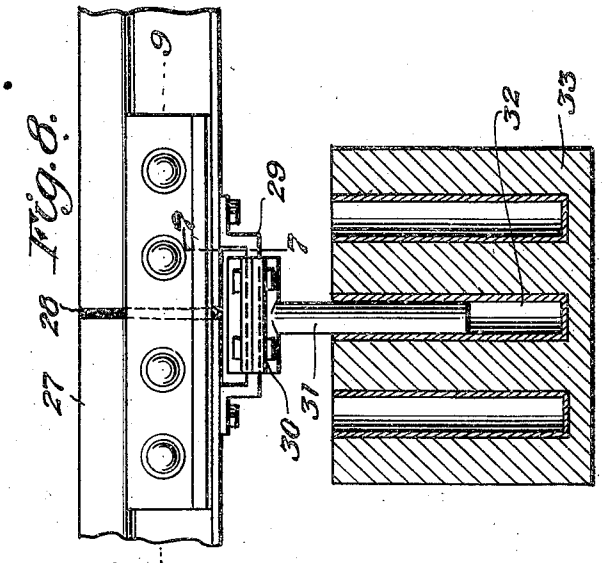


Fig. 8.



Fig. 7.

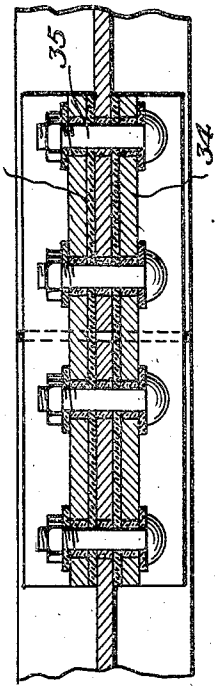


Fig. 9.

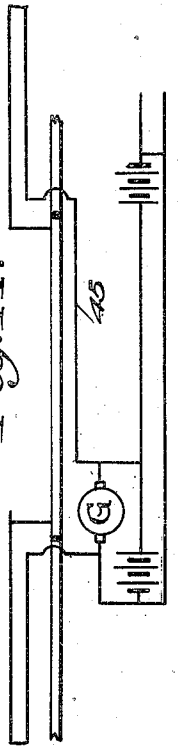


Fig. 14.

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RAILWAY TELEPHONE AND SIGNAL SYSTEM

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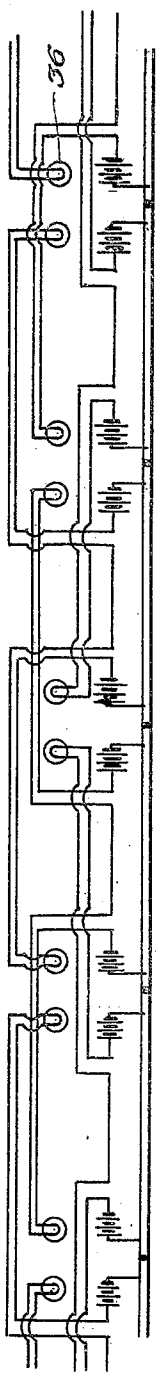


Fig. 12.

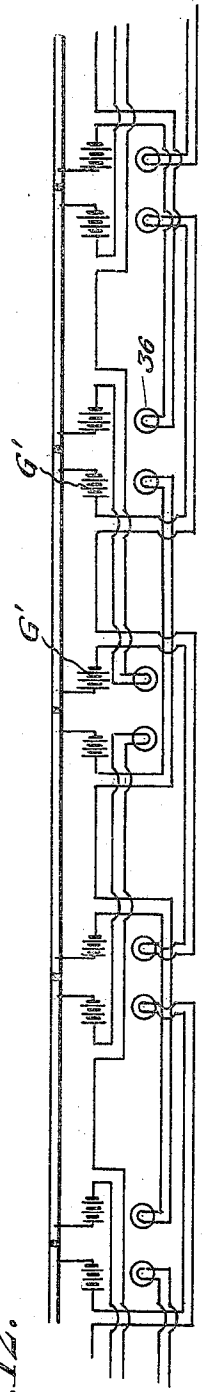


Fig. 11.

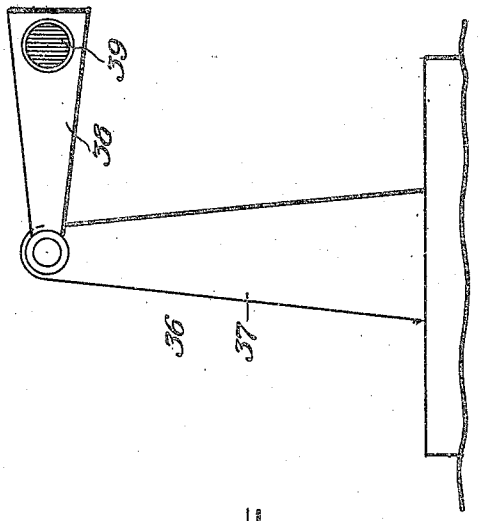
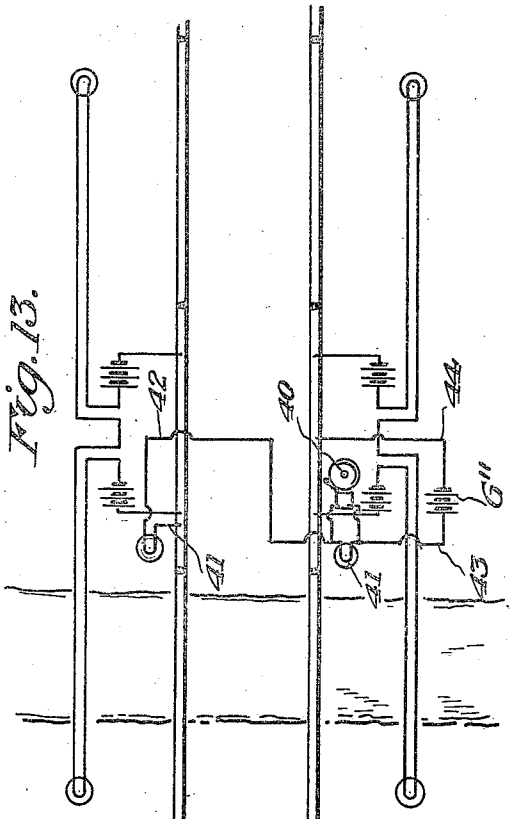


Fig. 13.



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Patented Feb. 23, 1932 1,846,983

UNITED STATES PATENT OFFICE

ERNEST AIELLO, OF WALLA WALLA, WASHINGTON, ASSIGNOR OF ONE-HALF TO JOHN SOUDAS, OF WALLA WALLA, WASHINGTON, AND ONE-HALF TO JEAN SPEROS SOUTHAS, OF CRISTOBAL, CANAL ZONE

RAILWAY TELEPHONE AND SIGNAL SYSTEM

Application filed September 27, 1929. Serial No. 395,666.

This invention relates to a railroad telephone and signal system, the general object of the invention being to provide means whereby an engineer on one train can have telephonic communication with engineers of other trains and with train dispatchers or other persons along the track, and with means whereby an engineer can tell whether or not the track is occupied by another train a number of sections ahead of him or a number of sections in back of him.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts, to be hereinafter fully described, illustrated in the accompanying drawings and specifically pointed out in the appended claims.

In describing the invention in detail, reference will be had to the accompanying drawings wherein like characters denote like or corresponding parts throughout the several views, and in which:—

Figure 1 is a diagrammatic view showing one manner of carrying out the invention.

Figure 2 is a sectional view of one of the trolley devices.

Figure 3 is a section on line 3—3 of Figure 2.

Figure 4 is a plan view showing means for connecting two of the aerial members together and to insulate one member from the other.

Figure 5 is a section on line 5—5 of Figure 4.

Figure 6 is a section on line 6—6 of Figure 4.

Figure 7 is a section on line 7—7 of Figure 8.

Figure 8 is an elevation, partly in section, showing the means for electrically connecting together the rails of a track section, with means for breaking the connection if the rails should spread.

Figure 9 is a sectional view showing the means for insulating a rail of one track section from a rail of another track section.

Figure 10 is a view showing a track arrangement.

Figure 11 is a view of a semaphore which may be used with the invention.

Figure 12 is a diagrammatic view showing a modification.

Figure 13 is a diagrammatic view showing the invention used with a crossing signal.

Figure 14 is a diagrammatic view showing another modification.

In these drawings, the letters A, B, C and D indicate the insulated track sections of a railroad track over which trains pass from right to left in Figure 1. The numeral 1 indicates a forwardly extending aerial connected with one end of each section and the numeral 2 indicates a rearwardly extending aerial connected with the other end of each track section. Each aerial 1 consists of a pair of conductors connected together at their upper ends, with one conductor connected to a rail 3 and the other conductor connected to a line wire 4, the other line wire 5 being connected to the other rail 6 of the section, as shown at 7.

Each aerial 2 also consists of a pair of conductors connected together at their upper ends, with the lower end of one conductor connected with the rail 3 and the lower end of the other conductor connected with the rail 6, so that current will flow from the line wire 4 over the forwardly extending aerial 1, back to the rail 3, through said rail and through the rearwardly extending aerial 2 back to the rail 6 and through said rail 6 and the conductor 7 to the line wire 5.

The horizontal part of the aerial 1 of one track section parallels the aerial 2 of the second track section in front of the section in question. For instance, the aerial 1 of track section A parallels the aerial 2 of the track section C, with the two parallel parts of the aerials 1 and 2 arranged over the section B. Each train, one of which is shown diagrammatically at T, carries a pair of trolley arrangements E and F, each arrangement consisting of the pair of uprights 8 connected together at their upper ends by a shaft 9 on which is rotatably mounted a sleeve 10 covered with non-conducting material 11 and a pair of metal sleeves 12 and 13 on the non-conducting material, with their inner ends spaced apart and with their outer ends spaced from the uprights, so that these sleeves 12 and

13 are insulated from the uprights and from each other. A brush 14 is carried by each post and engages the sleeve 12 or 13 adjacent the post, and the brushes of trolley E are connected by the conductors 15 with a meter 16 or other indicating device on the train and the brushes of trolley F are connected by wires 15′ to meter 16′. The trolley E is so positioned that its sleeves 12 and 13 will engage the two conductors of the rearwardly extending aerials and the trolley F will have its sleeves 12 and 13 engage the two conductors of the forwardly extending aerials.

A pair of shoes 17 is so carried by a part of the train that they will engage the rails of the track and conductors 18 pass from these shoes into a part of the train and are connected with a meter 19 or other indicating device. A telephone 20 is arranged in the cab or other part of the train and can be connected with the wires of either the trolley E or the trolley F, and a telephone 21 is connected by the conductors 22 with the line wires 4 and 5. The connections for telephone 21 may be permanent, but in order to make either connection for phone 20, which may be desired, switch S of Figure 1 cooperates with contacts included in the respective circuits 15, 15′,—whereas switch S′ places phone 20 in communication with the other side of the circuit which is to be used. This in turn depends upon whether communication is to be established through trolley E or trolley F. From the foregoing it will be seen that when a train is in block A, for instance, its trolley E will engage the rearwardly extending aerial 2 of block section B, while the trolley F will engage the forwardly extending aerial 1 of block section D, with the shoes 17 of the train engaging the track rails of the section A on which the train is located. Thus the meter 16 of trolley E will indicate whether or not the circuit of the rails of block section B and its aerials 1 and 2 are in proper order, and the meter 16′ of trolley F will indicate whether or not the circuit of the rails of block section D and its aerials are in proper order. The meter 19 of the shoe arrangement will indicate whether or not the circuit of the rails of section A and its aerials are in proper order, for if any of the circuits should be broken, the meter would register zero and thus the engineer would know that something is out of order. Due to the fact that the rear ends of the aerials 2 and the forward ends of the aerials 1 are farthest from the source of supply, a train moving from right to left over each track section will have its meter 16 show gradually increasing readings as the trolley E moves over the aerial 2 and its meter 16′ will show gradually decreasing readings as the trolley F moves over the aerial 1. The meters are, of course, suitably calibrated so that the engineer can, by glancing at the readings, ascertain his position in the block.

If there is a train in section B, there would be no current in aerial 2 over section A as the circuit would be short-circuited by the train in section B. Thus the meter 16 of the train in section A would register zero so that the engineer of the train in section A would know that there is a train in the section ahead of him.

If there is a train in section C, the passage of current through the trolley F thereof would affect the meter 16 of a train in section A so that the engineer of the train in section A could tell that there was a train in block C or the second block in front of it. A train in section or block D would also affect the meter 16′ of a train in block A so that the engineer of the train in block A would know that there was a train following him.

By connecting the telephone 20 with the wires of trolley E, the engineer of a train on section A can get in communication with the engineers of trains on track section B, and by connecting the telephone with the trolley F, the engineer of the train on section A can get in communication with the engineers of trains on section D. The engineers can also get in communication with a train despatcher or other person through the telephone 21, so that such person can get in communication with the engineers of moving trains. Thus the engineers of moving trains can get in touch with stations along the track and with each other, at least to the extent specified.

An engineer occupying track section A and employing telephone 20, makes connection by switches S S′ with the circuit 15, trolley E, and aerial wire or trolley wire 2, extending to the respective rails of track section B. A train assumed to be in this section B will carry telephone equipment, suitably energized, adapted to receive communications through track or aerial equipment similar to that illustrated at the right in Figure 1.

Communication between trains on track section B and track section A (in the direction B to A) is by similar apparatus, but trolley F then cooperates with aerial wire 1 of section B which is shown to be in communication with the track rails of section A through battery B′.

An engineer occupying section B may also communicate with a train in section D through his aerial wires 1 (section B), rail 3 (section A), the lower horizontal wire of circuit 2 section D,—thence through the trolley and phone assume to be on the train at D, the upper horizontal wire of circuit 2, section D; track rail 6, section A, track battery B′ and the right vertical wire of circuit 1, section B.

The line wires 4 and 5 are, of course, connected with a suitable source of supply and

in order to boost the current, batteries B are connected with the line wires 4 and 5, as shown in Figure 1, and these batteries are preferably placed adjacent the points where the line wires are connected with the aerials and track sections.

The aerials may be supported in any desired manner and I prefer to connect the adjacent ends of the aerials together, as shown in Figures 4, 5 and 6, which show a sleeve 23 for connecting a conductor of one aerial with a conductor of another aerial, the sleeve being formed of insulating material, with its bottom open and with a partition 24 at its center for separating the two conductors, as clearly shown in Figures 4 and 5. The sleeve is so formed as to grip the conductors, as shown in Figure 6. Each pair of conductors of each aerial is electrically connected together by the cross piece 25 and the vertical portions of the aerials are connected with the horizontal portions, as shown at 26 in Figure 4.

Figure 10 shows at 27 the rails on each side of an insulated track section, the rails having their ends insulated from each other, as shown at 28, with the ends of the rails electrically connected together by the yoke members 29. Each of these members 29 passes through a two-part casing 30 carried by an upright 31 which is supported for vertical movement in a socket 32 formed in a block 33 supported in the track bed. These parts are shown in detail in Figures 7 and 8. This arrangement will permit the rails to have limited vertical movement, but if the rails should spread, the lateral movement of the member 29 in the member 30 would break said member 29, so that the circuit between the two rails would be broken and thus an engineer approaching the spread rails would know from his meter that the circuit has been broken.

The sections are, of course, insulated from each other, as shown at 32′, and Figure 9 shows the specific construction of the means for connecting together the rails of two sections, with rails insulated. As shown in this figure, insulating material 33′ is placed between the ends of the rails and the fish plates 34 and around the bolts 35 which connect the fish plates with the rails.

A semaphore arrangement may be placed at the end of each aerial, as shown at 36 in Figure 12. Figure 11 shows one of these semaphores as comprising an upright 37 and an arm 38 which is preferably formed with a lamp 39. This semaphore is preferably so constructed that the arm will remain in raised position as long as the current is passing through the device, but as soon as the circuit is broken, the arm will drop. This semaphore will indicate to a track walker whether or not the circuit is in proper order and it will also indicate to an engineer approaching the semaphore whether or not the circuit is in proper order.

Figure 12 also shows an arrangement somewhat similar to that shown in Figure 1, but with the circuits connected with each rail of the track, so that an engineer can tell which rail and the circuits thereof are out of order. This figure also shows a pair of batteries G′ connected with each side of each track section, with these batteries connected with the aerials and with the rails. In other respects, this figure shows the same arrangement as shown in Figure 1.

Figure 13 shows a crossing signal associated with the parts shown in Figure 12, this signal comprising an alarm 40 on one side of the track adjacent the crossing and a lamp 41 on each side of the track. The lamp on one side of the track is connected with one of the rails, as shown at 41, and a conductor 42 connects the lamp with the alarm and lamp on the opposite side of the track, and a conductor 43 connects the alarm and lamp with a battery G″ which is connected by a conductor 44 with the rail adjacent the alarm. Thus when a train enters the track section adjacent the crossing, the circuit of the alarm and lamps will be completed through the parts of the train so that the lamps will be lighted and the alarm sounded to indicate to persons about to cross the crossing that a train is approaching.

Figure 14 shows an arrangement in which the aerials are connected to one side of each track section and with a conductor 45 connecting the conductor of the rearwardly extending aerial with a line wire, so that the second rail is not used as a conductor.

It is thought from the foregoing description that the advantages and novel features of the invention will be readily apparent.

It is to be understood that changes may be made in the construction and in the combination and arrangement of the several parts, provided that such changes fall within the scope of the appended claims.

What I claim is:—

1. A signal system for railways comprising a track divided into a plurality of sections insulated from each other, a forwardly extending aerial connected with one end of each section and extending over the section in front thereof, a rearwardly extending aerial connected with the other end of each section and extending over the next section behind the section in question, each aerial consisting of a pair of conductors having their upper ends connected together, with one conductor of each pair of aerials connected with one of the rails of the section, means for connecting the other conductor of the aerials with a source of supply, whereby the current will flow through both aerials and a rail of the section, a pair of trolley members on each train, each member consisting of a pair of

aerial engaging members insulated from each other, with one member engaging one conductor of an aerial and the other the other conductor, one trolley engaging the forwardly extending aerials and the other trolley the rearwardly extending aerials, indicating means on the train connected with the members of each trolley, rail engaging members on each train and indicating means electrically connected therewith.

2. A telephone and signal system for railways comprising a track composed of a plurality of sections insulated from each other, a forwardly extending aerial connected with one end of each track section, a rearwardly extending aerial connected with the other end of each track section, each aerial consisting of a pair of conductors having their upper ends connected together and one conductor connected with a rail of the section, with the other conductor of the rearwardly extending aerial connected with the second rail, line wires, one of which is connected with said second rail and the other with the second conductor of the forwardly extending aerial, a pair of trolley members on a train, each member consisting of two insulated parts, one engaging one conductor of an aerial and the other the other conductor thereof, with one trolley engaging the rearwardly extending aerials and the other trolley the forwardly extending aerials, indicating means electrically connected with the members of each trolley, shoes engaging the rails of the track sections, indicating means electrically connected with said shoes, a telephone on each train, means for connecting the same with either one of the trolleys and a telephone connected with the line wires.

3. A signal system for railways comprising a track composed of a plurality of sections insulated from each other, a forwardly extending aerial connected with one end of each track section, a rearwardly extending aerial connected with the other end of each track section, each aerial consisting of a pair of conductors having their upper ends connected together and one conductor connected with a rail of the section, with the other conductor of the rearwardly extending aerial connected with the second rail, line wires, one of which is connected with said second rail and the other with the second conductor of the forwardly extending aerial, a pair of trolley members on a train, each member consisting of two insulated parts, one engaging one conductor of an aerial and the other the other conductor thereof, with one trolley engaging the rearwardly extending aerials and the other trolley the forwardly extending aerials, indicating means electrically connected with the members of each trolley, shoes engaging the rails of the track sections, indicating means electrically connected with said shoes, and a signal device connected with each aerial for indicating whether the circuit of each track section and its aerials are in proper order.

In testimony whereof I affix my signature.

ERNEST AIELLO.