No. 648,252. Patented Apr. 24, 1900.

M. GARL.

ELECTRIC SIGNALING SYSTEM FOR RAILWAYS.

(Application filed Nov. 28, 1899.)

(No Model.) 2 Sheets—Sheet 1.

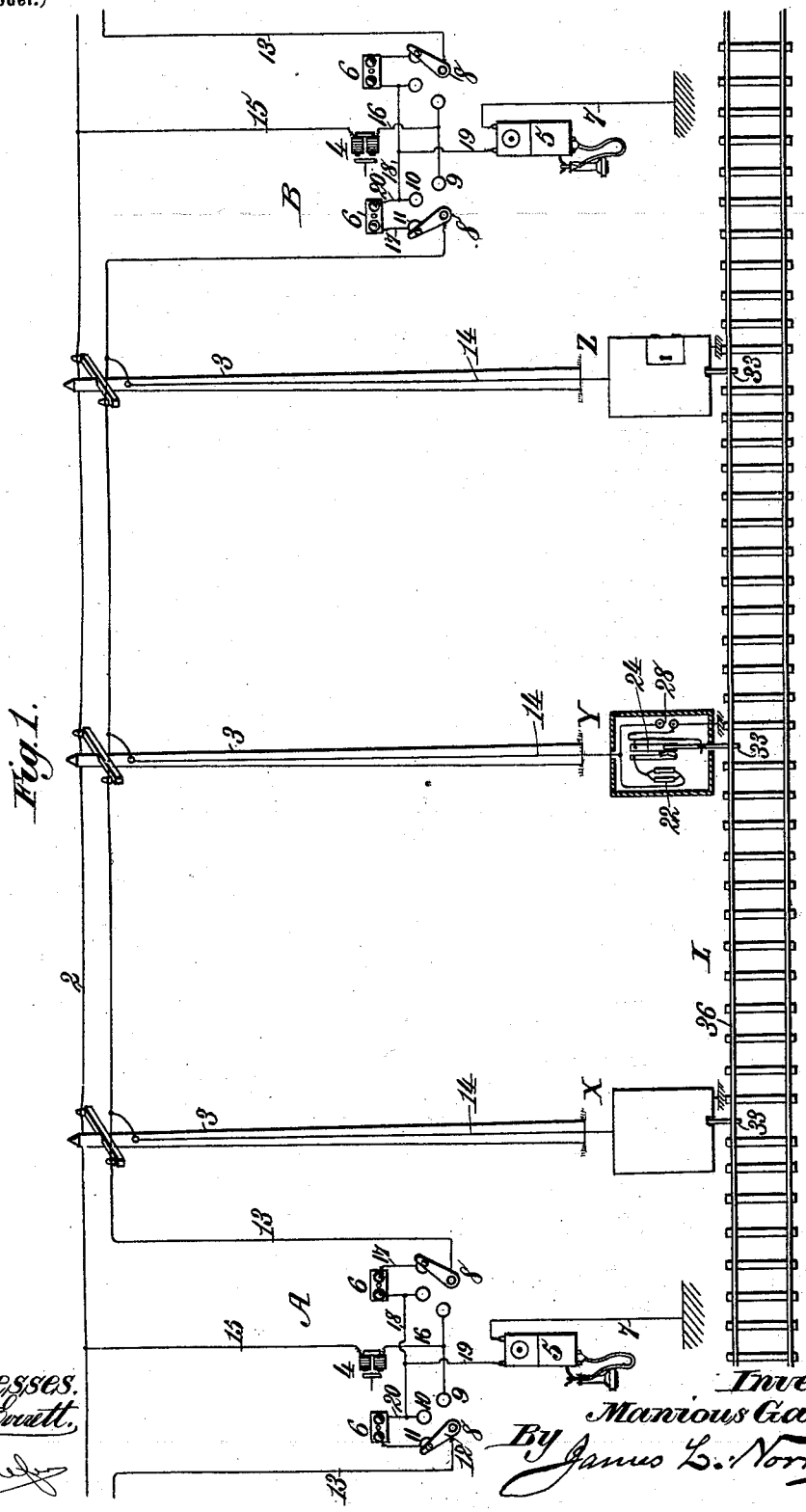

Fig. 1.

Witnesses.
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[illegible]

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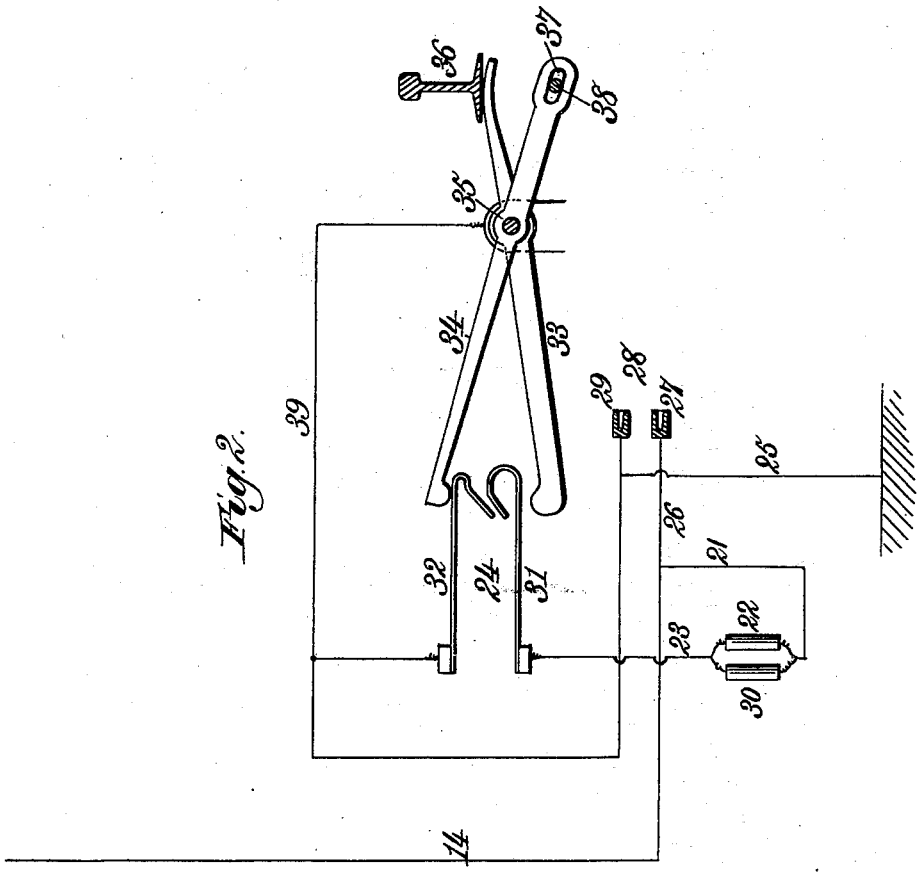
Fig. 2.



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UNITED STATES PATENT OFFICE.

MANIOUS GARL, OF AKRON, OHIO.

ELECTRIC SIGNALING SYSTEM FOR RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 648,252, dated April 24, 1900.

Application filed November 28, 1899. Serial No. 738,582. (No model.)

To all whom it may concern:

Be it known that I, MANIOUS GARL, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented new and useful Improvements in Electric Signaling Systems for Railways, of which the following is a specification.

My invention relates to systems of electric signaling for railways.

As is well known, most railways at the present time are operated upon what is known as the "block system," according to which the road is divided up into sections or blocks with a signaling-station at the end of each block, the purpose being to allow but a certain number of trains in a block at one time. If by any chance more than the prescribed number of trains are allowed in a block there is no means by which communication may be had with these trains in order to avoid an accident, which is almost certain to ensue.

My invention is designed for the purpose of providing means whereby trains may be signaled at points intermediate the stations at the ends of the blocks and means whereby communication may be had between the trainmen and the operators at the signaling-stations.

In carrying out my invention I provide each block-station with a telephone, a relay, and a magneto or extension call-bell and extend a circuit between each two stations. I also provide intermediate stations containing signaling devices and telephone-jacks connected in multiple with the circuit between the block-stations, switches at the block-stations for closing the circuit to said intermediate stations, and switch mechanism actuated by a passing train for completing the circuit through the signaling devices at said intermediate stations.

The details of the invention will hereinafter appear, and the novel features thereof will be specifically defined in the claims.

In the drawings forming a part of this specification, Figure 1 is a diagrammatic view illustrative of my invention, and Fig. 2 is a detail view of the trip mechanism which is actuated by the train and the circuit connections therewith.

Like reference letters and numerals indicate like parts in the different views.

In the drawings I have illustrated two block-stations A and B and three intermediate signaling-stations X, Y, and Z in the block between the stations A and B. Along the line of the road-bed 1 is a telegraph-wire 2, having live current thereon at all times and supported upon the poles 3 3. In both stations A and B are relays 4, telephones 5, and magneto or extension call-bells 6, all being of the usual form and construction. One side of the telephone 5, however, is grounded through wire 7. I also employ in each of said stations a switch 8, comprising contact-points 9, 10, 11, and a switch-arm 12. Connecting the stations A and B and attached to the switch-arm 12 is a circuit-wire 13, from which lead to the intermediate stations X, Y, and Z the wires 14 14. Leading from the wire 2 to the relay 4 in each station is a wire 15, and leading from said relay to the contact 9 of the switch 8 is a wire 16. Each of the extension-bells 6 is connected through a wire 17 with the contact-point 11 of the switch 8 and through the wires 18 and 19 with the telephone 5. Contact-point 10 is connected through the wire 20 with the wire 18.

It will be understood that in each of the stations A and B duplicate switches 8 and magneto or extension bells 6 are employed, one set connected with the adjacent station in one direction and the other set connected with the adjacent station in the opposite direction.

In each of the intermediate stations X, Y, and Z the wires 14 are divided, the branch 21 thereof leading to the signaling device 22, and thence to ground through wire 23, switch 24, and wire 25, and the other branch 26 thereof connected with one of the contacts 27 of the jack 28, the other contact 29 of said jack being grounded through the wire 25. The specific form of signaling device 22 employed by me consists of a plurality of dynamite cartridges 30, which are exploded by the heat generated by the passage of the current therethrough. The switch 24 is normally open and consists of two spring-contacts 31 and 32, having their free ends inclined, as shown, so that when they are brought together they will produce a rubbing contact. These arms are adapted to be actuated for the purpose of closing the ground-circuit

through the signaling device 22 by means of a trip consisting of a pair of levers 33 34, fulcrumed at 35 to a stationary point. The free end of the lever 34 lies in contact with the spring 32, and the free end of the lever 33 normally lies at the point below the spring 31. The opposite end of the lever 33 lies directly beneath the rail 36 and is adapted to be depressed by the passage of the train over said rail. When this action takes place, the free end of the lever 33 is lifted, forcing the spring 31 up into contact with the spring 32 and closing the ground-circuit through the wire 25. The rear end of the lever 34 is provided with an elongated slot 37, through which passes a pin 38, this construction providing for a small degree of longitudinal movement of the lever 34, but preventing the upward or downward movement thereof. The forward arm of the lever 33 is longer and heavier than the arm which is engaged by the rail 36, and consequently when the train passes from the rail 36 the arm 33 will return by gravity to its normal position out of contact with the spring 31. In order to insure the closing of the ground-circuit through the signaling device 22 in case the springs 31 and 32 fail to act, the current may pass through the spring 31 to the arm 33, and thence through the wire 39 to the ground-wire 25.

From the foregoing description it will be observed that the circuit from the supply-wire through the signaling device 22 is broken at two points, one at the block-station and the other at the intermediate station. This being the case, the passage of a train along the track 1 will normally produce no action on the part of the signaling mechanism. If, however, two trains should by accident or otherwise get into the same block or if for any reason it was desired to signal and stop a train, all that would be necessary to do would be to move the switch-arm 12 onto the contact-point 9. The circuit to the signaling devices would then be closed at the block-station, but would still be open at the intermediate stations. When the train to be stopped reaches any one of the intermediate stations X, Y, or Z, it being understood that these are arranged in multiple, the circuit through the signaling device 22 would be closed in the manner described through the switch 24 over the following path: wires 2 and 15, relay 4, wire 16, switch-contact 9, switch-lever 12, wires 13, 14, and 21, signaling device 22, wire 23, springs 31 and 32, and wire 25 to ground, it being understood, of course, that one brush of the generator which supplies current to the wire 2 is also grounded. When the circuit is thus closed, the signaling device 22 will be actuated and a loud report given, which will indicate to the trainmen that the train is to stop. After the operator at the block-station has set the switch-arm 12 on the switch-contact 9 he waits until the train being signaled has reached one of the intermediate stations X, Y, or Z, when after the signaling device has been actuated the circuit is broken, and an indication of the same will be made by a click of the relay 4. When the operator hears this click, therefore, he knows the signaling device has operated, and he moves the switch-arm 12 to the contact-point 10, thereby cutting out the relay 4 and the wire 2 and throwing into circuit his telephone 5. The conductor or other trainman then plugs in the portable telephone carried by him onto the jack 28, and conversation may be had between the operator in the block-station and the trainman. The cause of the trouble may be communicated to the train, and any orders that may be desired can be transmitted. When the train receives orders to proceed, a proper attendant thereon recharges the signaling mechanism at the intermediate station by inserting dynamite cartridges 30 to take the places of those which have been exploded. The operator at the block-station then returns the switch-arm 12 to its normal position on the contact-point 11, and the magneto or extension bell 6 is then in position to be operated either from another block-station or from one of the intermediate stations. A train-attendant may thus call up the operator at one of the block-stations from an intermediate point even though he be not signaled to stop.

In the foregoing description I have referred to the wire 2 as being an ordinary telegraph-wire. Such a wire will of course be found very convenient to use; but I may substitute therefor any other wire carrying a live current, which may have either a grounded or metallic return. I may also, if desired, locate in each of the block-stations batteries for supplying current to the wires 13 14, &c., in lieu of the wire 2. If a metallic return for the circuit is used, the wires 7 and 25 instead of being connected to ground will be connected to the metallic return.

Having now described my invention, what I claim is—

1. In a system of electric signaling for railways, block-stations, a main circuit connecting the same, a signaling device along the line of the track, a normally-open branch from said main circuit leading to said signaling device, means in said block-stations for connecting said main circuit with a source of electric energy and means actuated by a passing train for closing said branch circuit.

2. In a system of electric signaling for railways, block-stations, a talking-circuit having telephones therein connecting said stations, a signaling device along the line of the track, a normally-open branch circuit leading from said talking-circuit to said signaling device, a switch in each of said block-stations for cutting out said telephones and connecting said talking-circuit with a source of electrical energy, and means actuated by a passing train for closing said branch circuits.

3. In a system of electric signaling for railways, block-stations, a talking-circuit having

telephones therein connecting the same, one or more signaling devices arranged along the track and connected in multiple on said circuit, means at said stations for connecting said circuit with a source of electrical energy and simultaneously cutting out said telephones, and means actuated by a train, for closing the circuit through and thereby actuating said signaling devices.

4. In a system of electric signaling for railways, block-stations, a talking-circuit having telephones therein connecting the same, one or more signaling devices arranged along the track and connected in multiple on said circuit, a switch in each of said stations for connecing said circuit with a source of electrical energy and simultaneously cutting out said telephones, and electric switches lying adjacent to the track and adapted to be actuated by a moving train for closing the circuit through and thereby actuating said signaling devices.

5. In a system of electric signaling for railways, block-stations, a normally-open circuit connecting the same, a switch in each of said stations comprising a plurality of contacts and a movable member adapted to engage said contacts, the movable member in each station constituting one terminal of said circuit, a telephone in each of said stations connected with one of said contacts, a source of electrical energy connected with another of said contacts, one or more signaling devices arranged along the track between said stations and connected in multiple on said circuit, a switch for each of said signaling devices adapted to be actuated by a passing train for closing the circuit through said signaling devices, and telephone connections arranged in multiple on the circuits to said signaling devices, as and for the purpose set forth.

6. In a system of electric signaling for railways, block-stations, a normally-open circuit connecting the same, a switch in each of said stations, comprising a plurality of contacts and a movable member adapted to engage said contacts, the movable member in each station constituting one terminal of said circuit, a telephone and a call-bell in each of said stations connected respectively with two of said contacts, a relay in each of said stations, a source of electrical energy connected through said relay with another of said contacts, one or more signaling devices arranged along the track between said stations and connected in multiple on said circuit, a switch for each of said signaling devices adapted to be actuated by a passing train for closing the circuit through said signaling devices, and telephone connections arranged in multiple on the circuits to said signaling devices, as and for the purpose set forth.

7. In a system of electric signaling for railways, a signaling device adjacent to the track, a normally-open circuit therethrough, and a switch for closing said circuit, comprising a pair of normally-separated contact-springs, and a pair of crossed levers whose free ends embrace and are adapted to engage said springs, the opposite end of one of said levers being located beneath one of the rails and adapted to be depressed thereby.

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

MANIOUS GARL.

Witnesses:
J. V. WELSH,
H. A. SULLIVAN.