(No Model.) 3 Sheets—Sheet 1.

H. A. PARRISH.

ELECTRICAL APPARATUS FOR CONTROLLING SIGNAL OR OTHER CIRCUITS.

No. 509,244. Patented Nov. 21, 1893.

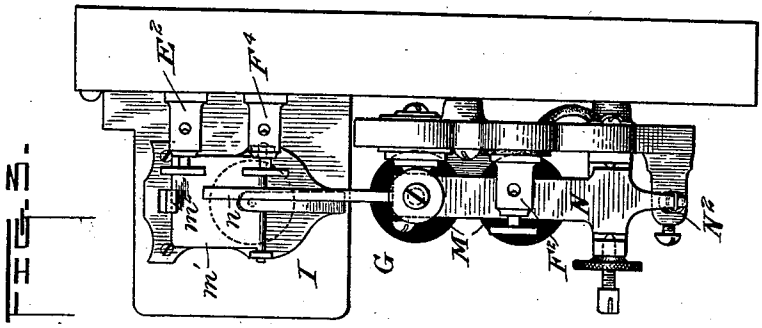

FIG. 3.

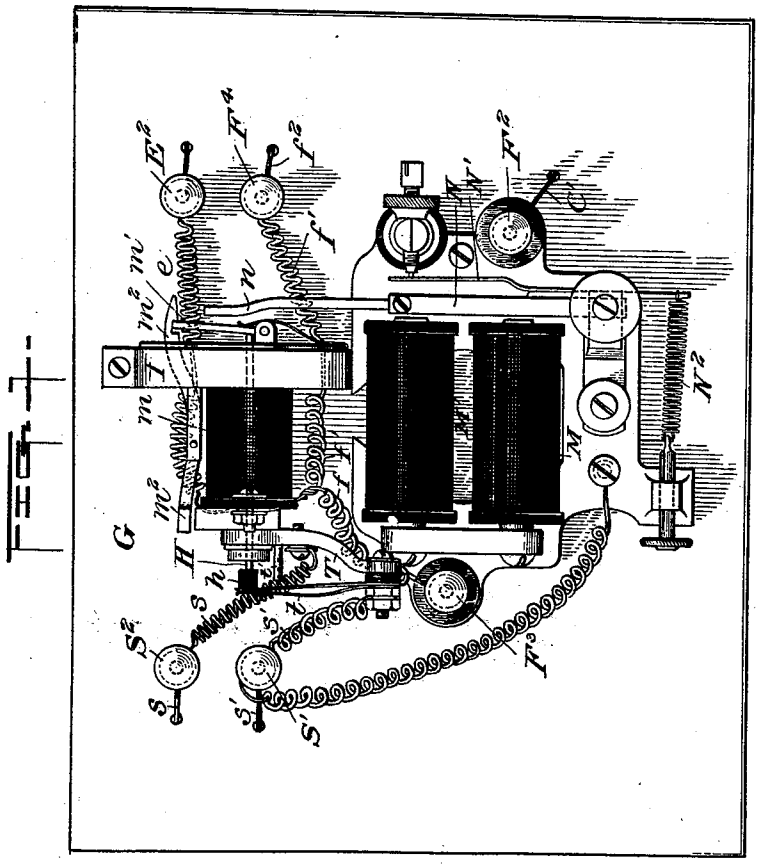

FIG. 1.

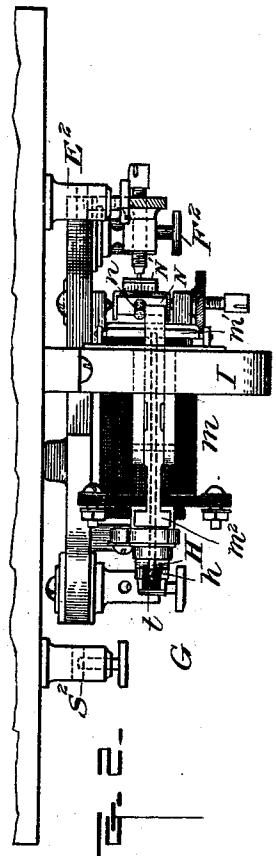

FIG. 2.

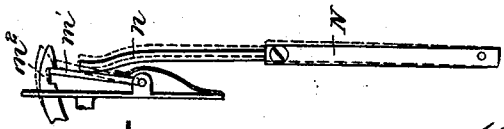

FIG. 4.

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(No Model.) 3 Sheets—Sheet 2.

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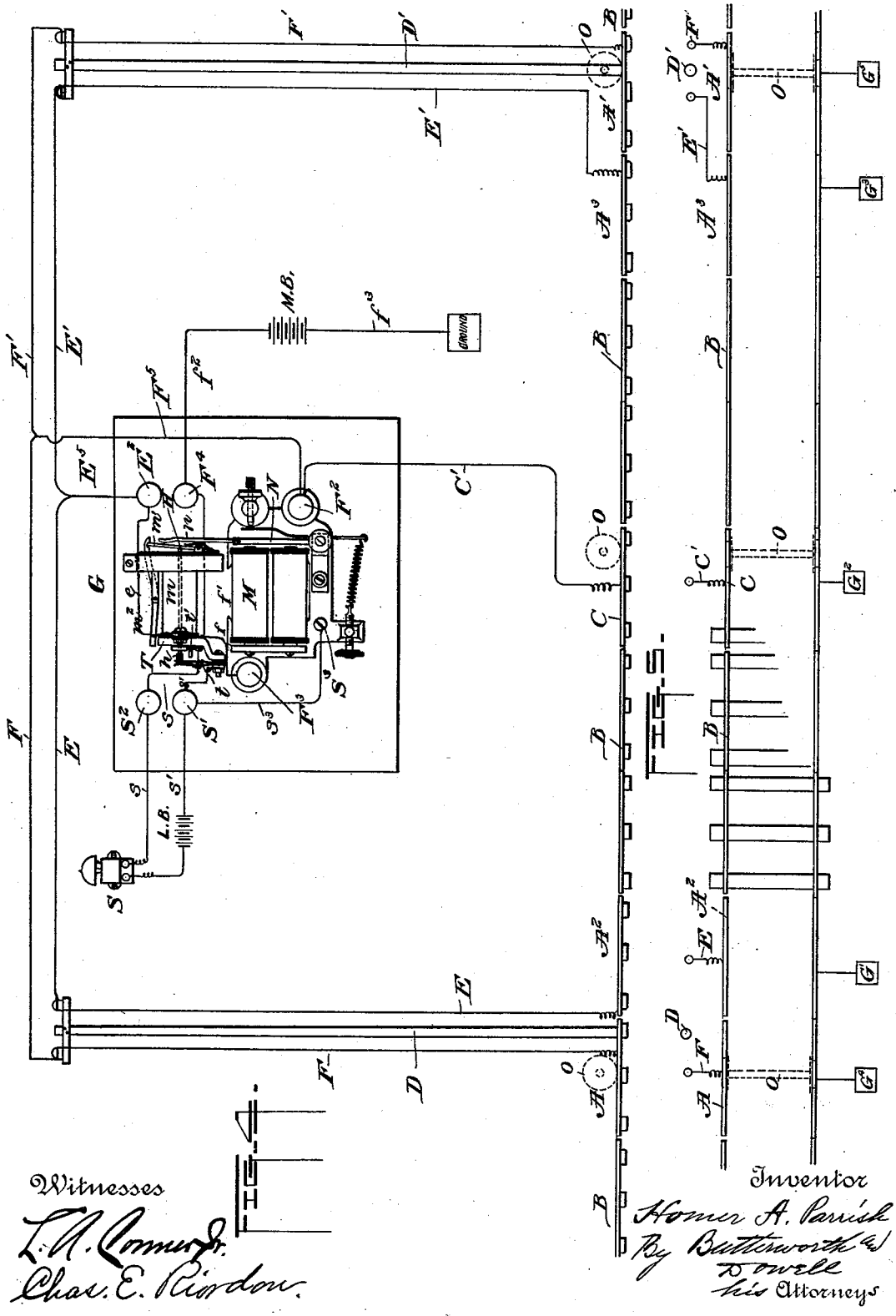

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(No Model.) 3 Sheets—Sheet 3.

H. A. PARRISH.

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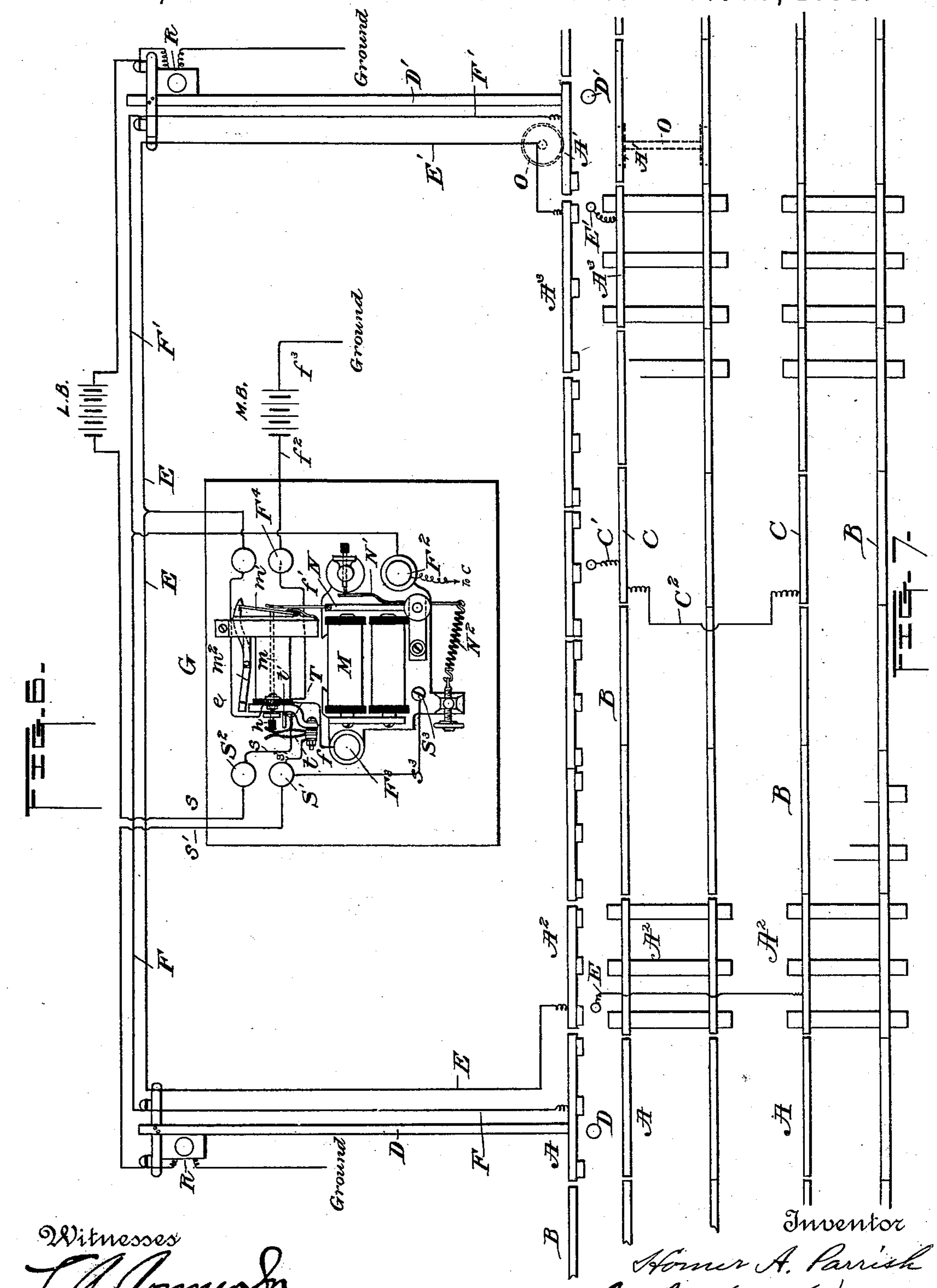

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UNITED STATES PATENT OFFICE.

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ELECTRICAL APPARATUS FOR CONTROLLING SIGNAL OR OTHER CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 509,244, dated November 21, 1893.

Application filed January 28, 1893. Serial No. 460,061. (No model.)

To all whom it may concern:

Be it known that I, HOMER A. PARRISH, a citizen of the United States, residing at Jackson, in the county of Jackson and State of Michigan, have invented certain new and useful Improvements in Electrical Apparatus for Controlling Signal or other Circuits; 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.

This invention relates to electrical apparatus for actuating electrical devices such as electric bells or visual signals, and though designed for general application, it is especially adapted to actuate electric signaling apparatus such as are ordinarily employed in railway service; hence I have illustrated in the accompanying drawings the application of the invention to an electrical signaling apparatus for use upon railways, in which the moving train is adapted to automatically close the electric circuit or circuits through the axle and wheels thereof for the purpose of actuating the electric bell or signal.

The primary object of the invention is to provide two independent but co-acting electric circuits including an electric bell or other electrical device to be actuated thereby, and a circuit controller common to both circuits, whereby the working of the electric bell or other electrical device is assured at each closing of the circuit through one or the other circuit in case either fails to act.

Another object is to provide means for automatically putting up the drop of an annunciator in order to open the circuit to an electric bell or other electrical device.

A further object is to provide means for automatically and electrically putting up the drop of an annunciator so as to close the bell or signal circuit in an electrical signaling apparatus for railways, and to hold said circuit closed until the last "blocked" rail in the section of the track where the signal is located is passed by the moving train.

Other objects are to provide two independent electric bell or signal circuits controlled by a main or track circuit and a circuit-closer therefor, operating in conjunction with a circuit controller common to both of the first named circuits, and adapted to automatically close and lock the bell circuits for the desired period of time and also open and lock said circuits at the expiration of such period; and further to provide an electrical signaling apparatus which shall be simple in construction and efficient and reliable in use, and which after each operation shall be restored to normal position and caused to work with certainty at the proper time.

Referring to the drawings by letters of reference, Figure 1 represents a side elevation of an electrical circuit-controller constructed in accordance with my invention. Fig. 2 is a plan of the same. Fig. 3 is an end view. Fig. 4 is a side elevation illustrating the application of the improvements to an electrical signaling apparatus for railways; a section of the railroad track and circuit connections being shown diagrammatically. Fig. 5 is a diagrammatical plan of a section of the track. Fig. 6 is a side elevation similar to that illustrated in Fig. 4, illustrating the application of the invention to a double track. Fig. 7 is a diagrammatical plan of the double track, and Fig. 8 is a detail.

The letters A, A′, A^2, A^3 and C, in the drawings, denote electrically-insulated rails of a railway track which are included in or form parts of the electric circuits.

B, B, denote other rails of the track which may be insulated from the rails A, A′, A^2, A^3 and C, by slightly separating the adjacent ends of the rails and, if desired, interposing between such ends blocks of wood, vulcanite, or other suitable insulating material.

D, D′, denote uprights or posts which are located in proximity to the track and support the circuit wires E, E′, and F, F′, which may be strung on said posts in any proper manner. The rails A and A′ are connected by the circuit wires F and F′, through the electric circuit-controller G, while the rails A^2 and A^3 are connected through the same apparatus by the circuit wires E and E′; the points of attachment of the rails being at either side of a station, which, for the purpose of the present illustration, may be supposed to be located centrally between the posts D and D′, where the signaling devices are also located. The rails of the track at the side thereof op-

posite the rails A, A′, A², A³ and C, are grounded so as to complete the electric circuits through the axle and wheels of a passing train; the ground connections being shown at G′, G², G³, G⁴, G⁵. The wires F and F′ lead from the rails A and A′, respectively, by wire F⁵, to a binding post F², through a magnet M, to binding post F³, thence by wires *f*, and *f′*, to binding post F⁴, and thence by wire *f*², through battery M. B. and wire *f*³, to ground. A wire C′ also leads from binding post F² to the track rail or conductor section C. The wires E and E′ lead from the rails A² and A³, respectively, by wire E⁵, to binding post E², and from thence by wire *e*, to the wiring of the magnet *m*, of the annunciator, thence by wire *f′*, to binding post F⁴ and from thence through battery M. B. to ground.

S, denotes an electro-magnetic bell or visual signal, which is connected in circuit with a local battery L. B. by wires *s* and *s′*. The wire *s* leads from one pole of the battery L. B. through the electric bell or signal S, to binding post S², and thence to a bracket T, of conducting material secured to or depending from the annunciator device. The wire *s′*, leads from the opposite pole of the battery to binding post S′, and thence to a spring-contact *t*, which is secured to but insulated from the bracket T. The bracket T is provided with a contact point *t′*, which is adapted to make contact with the spring *t*, and close the circuit through the bell when said spring is released, as will be hereinafter described. This circuit is held normally open or broken by a sliding rod H which extends through the annunciator magnet *m*, in position to be struck by the drop *m′*, of the annunciator and forced against the free end of the spring *t*, so as to hold the latter out of contact with the contact point *t′*. The rod H may be insulated from the spring *t*, by an insulating piece or head *h* thereon. It will thus be seen that so long as the drop *m′*, is up, the described bell circuit will remain open, but when the drop falls the spring *t*, will push the rod H toward the drop and close the circuit by contact with the point *t′*. The drop *m′*, may be pivoted to a bracket I, and its free upper end is adapted to engage the notched or hooked end of the armature *m*² of the annunciator magnet *m*, so as to be locked thereby, as indicated in Figs. 1, 4 and 6.

The electro-magnet or relay M, is arranged in proximity to the annunciator and provided with an armature lever N, having an extension or rod *n*, on the free end thereof adapted to impinge against the drop *m′*, for the double purpose of establishing a second circuit through the bell or signal S, and local battery L. B., and also restoring the drop to proper position to be locked by the armature of the annunciator magnet when the circuit through the latter is broken. This second circuit, (which, for clearness may be termed the secondary bell circuit, while the first mentioned circuit may be termed the primary bell circuit) may be completed through the drop, *m′*, the core of magnet *m*, bracket T, wire *s*, binding post S², bell S, battery L. B., wire *s′*, binding post S′, wire *s*³, binding post S³, and through the base plate of the magnet M, to the armature N, and through the extension *u* thereof to the drop *m′*, when the latter is in contact with said extension. The armature N is provided with a stop spring N′, and a retracting spring N², combined with adjusting screws as shown for the purpose of regulating the tension of the springs. When the magnet *m* is energized the drop *m′*, will be released from the locking armature *m*² and by falling upon the rod or extension *n*, of the armature N, will close the aforesaid secondary circuit around the relay magnet and at the same time permit the spring *t* to push the rod H backward and make contact with the contact point *t′*, so as to close the aforesaid primary bell circuit. When both magnets are inactive and the drop *m* is up and locked by the armature *m*² both signal circuits will be open or broken, but when the magnet M is energized so as to attract its armature and throw the extension *n* thereof into contact with the drop *m′*, the primary signal circuit will be open while the secondary circuit is closed. It will thus be seen that two independent but co-acting electric circuits are simultaneously established through the electric bell or signal by a circuit-closer and an intermediate circuit controlling device common to both circuits. In this particular instance the circuit closer consists simply of the axle and wheels of the train. The closing of either of said circuits will operate the signal or effect the ringing of the bell, but they are also adapted to work in harmony as well as independently of each other, so that if for any cause one circuit should fail to operate the other will act and thereby insure the operation of the bell or signal.

The operation of the apparatus as thus far described is as follows:—Supposing the parts to be in the relative positions indicated in Fig. 4, and the dotted lines O to indicate the axle and wheels of the moving train passing over the track from right to left;—when the wheels contact with the conducting section A′, the circuit will be closed through wire F′, binding post F², thence through magnet M, post F³, wires *f* and *f′*, post F⁴, wire *f*², battery M. B. and wire *f*³ to ground. Armature N being thus attracted its extension *n*, will touch drop *m′*, which is already locked by armature *m*², and thus close the secondary bell circuit through said armature N, the base plate of magnet M, binding post S³, wire *s*³, binding post S′, wire *s′*, to battery L. B., thence through bell S by wire *s*, to binding post S², thence to bracket T, and through the core of the annunciator magnet *m*, to drop *m′*, and rod *n*, impinging thereon. The armature N, thus electrically locked will so remain until the last wheels of the train have left said rail A′; the rail being made longer than the distance between the trucks for this purpose.

It will be immaterial whether one car or many be upon the track, some of the wheels will be on the rail until the last wheel leaves it, whereupon the armature N will be released and said circuit broken. Continuing the movement of the train in the same direction, when the last wheels have left the rails A′, armature N being released will permit drop m', to fall as indicated by the dotted lines in Fig. 8, and still hold the bell or signal circuit around the magnet M closed, and also close the circuit through bracket T, contact point t', wire s, binding post S^2, bell S, battery L. B., wire s', binding post S′, and spring t, thus completing two distinct circuits to the bell or signal. The wheels in contact with the rails A^3 will have previously closed the circuit through the wire E′, post E^2, and wire e, to magnet m, and thence by wire f', and post F^4 through battery M. B., to ground, locking the armature m^2, and releasing the drop m', so as to permit the latter to fall as soon as the circuit is broken through the magnet M.

The circuit thus closed by means of the axle and wheels connecting the conducting section A^3 to the opposite ground section will remain closed until the last wheels leave the second rail section A^3, both bell circuits being also closed so that if from any cause one circuit should fail it may not affect the other. When the wheels reach the rail C, the magnet M, is again energized, attracting the armature N, and putting up the drop m', thereby opening the primary bell or signal circuit. When the wheels reach the rail A^2, the magnet m will be energized through the wires E, e, f', f^2, and battery M. B., to ground, thus attracting the armature m^2, and releasing the drop m', and also closing the primary bell circuit. When the wheels reach the rail A, the armature N will be again raised, forcing up the drop m', and holding it in position to be locked by the armature m^2 as soon as the latter is released. The armature N will hold up the drop until all wheels have left the last rail A, whereupon said armature will be released and all the circuits will be opened. This operation holds good in the movement of the train in either direction. Thus it will be seen that while the bell is constantly sounded during the passage of the train over the blocked or electrically-insulated section of the track the signaling devices are automatically rendered inoperative as soon as the train passes the blocked section.

One great advantage of this feature of the invention resides in the fact that in signaling apparatus as heretofore constructed employing lock signals, the train in passing in many instances leaves the signal circuit closed, while with my device the opening of the circuit on the passage of the train is assured and a continuous ringing action is effected while the train is passing.

In Fig. 6 the wires s and s', of the bell or signal circuit extend to relay signals R, supported on uprights or posts D and D′, and from said signals the wires are grounded. The results attained are the same as described with relation to Fig. 4, except that the signals are operated at a distance from the station in both directions in Fig. 6, while in Fig. 4, the bell or signal is located at a station or crossing. Supposing the train to be passing from right to left over the track as illustrated in Fig. 6, the car wheels on the right hand rail A′, will close the circuit through the magnet M, thus causing its armature to make contact with the drop m', and close the circuit to the relays of the signals. When the train has passed said rail A′, the armature N is released and the annunciator armature m^2 is attracted and the drop m' falls, keeping said signal circuit closed until the last wheels of the train have left the last left hand rail A, during which action the latch-end of the annunciator armature m^2 is raised (by the contact of the wheels with the first left hand blocked rail A^3, to which the wire E′ is attached) ready to receive the drop m'. Continuing the movement of the train, when the wheels come in contact with the last left hand rail A, to which the wire F is attached, the armature N closes, pushing up the drop and holding it until the last wheels of the train have passed the left hand blocked rail A^2, to which the wire E is attached, at which time the latch-end of the annunciator armature m^2 falls, holding the drop locked by said latch, as described in the operation of Fig. 4. When the last wheels of the train have passed the blocked rails A, at the left, all circuits are open and the signals are turned to safety.

Referring now to Fig. 7, in which a double track is shown, the same results are attained as with a single track as shown in Fig. 4. In this arrangement a connection is made from the blocked rail C of one track to the blocked rail C of the other track, by a wire C^2, and the wire E′, at the right is attached to the blocked rail A^3 of one track, and the wire E at the left is attached to the blocked rail A^2 of the other track, wires F, F′, being omitted. In a double track with a central blocked rail C, it is only necessary to have one line of wire elevated on poles. Consequently the wires F and F′, and blocked rails A and A′, may be left out. In case the signal bell is used, the annunciator is placed at a point opposite the rail C and the wire C′ may be connected to post F^2. When a train is passing from right to left the operation will be the same as in a single track in connection with wires F, F′, the magnet M being energized by the closing of the circuit through blocked rail C, post F^2, wires f, and f', post F^4, and battery M. B. to ground, putting up said drop and opening all circuits. This holds good in trains running in either direction. As stated, the results are the same with double or multiple tracks, but the trains run only in one direction on each individual track of the double track, while on a single

track the trains of course run in both directions; hence with a single track the construction at each side of the station is alike.

Instead of using the rails as parts of the electric circuits the signaling devices may be operated by any suitable track instrument adapted for making and breaking the circuits.

I do not desire to be limited in the application of my invention to electrical signaling apparatus, as it is obvious that my improved circuit controlling device may be applied to a variety of uses, for instance, in connection with various telephone systems and other electrical apparatus for operating visual signals, electric alarms, &c.

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

1. In an electrical signaling apparatus, the combination with a signal, of two independent electric circuits including the signal, a main or track circuit and circuit closer, and an intermediate circuit controlling device common to both signal circuits, substantially as described.

2. The combination with a signal, of two independent electric circuits, a circuit controller common to both circuits, track rails electrically connected with the signaling devices through said circuit controller, and means for closing the circuit through the rails, substantially as described.

3. The combination with a magnet and a locking armature, of a signal, a signal circuit, and a pivoted drop; a second magnet arranged in proximity to said drop, an armature controlled by said latter magnet and adapted to contact with said drop and thereby close said signal circuit, and electrical connections for operating said signal by a moving train substantially as described.

4. The combination with the signal, the two independent circuits including said signal, the magnet, the pivoted drop and the locking armature, of a second magnet arranged adjacent to the magnet having the locking armature and provided with an armature adapted to raise and sustain said drop in a position for engagement by said locking armature, substantially as described.

5. The combination with a signal, of two independent electric circuits in which said signal is included, one of said circuits being adapted to be opened when the other is closed, a circuit controller common to both signal circuits, and track connections for controlling said circuits, whereby the signal may be actuated by the conjoint or separate action of the circuits, substantially as described.

6. The combination with the signal, a circuit controlling magnet therefor and local circuit, of an armature for raising a pivoted drop, a magnet for controlling said armature, and track connections for opening and closing a circuit through said magnet, substantially as described.

7. The combination with the annunciator magnet, of the drop, the signal bell placed in a circuit including said drop, a second bell circuit including a spring contact, an insulated sliding rod interposed between said spring and drop, a magnet and armature for raising said drop against the pressure of said spring on said rod and thereby breaking said second circuit, circuit connections between said magnets and the railway track, and track connections for controlling said magnet circuits, substantially as described.

8. The combination with the signal bell, its local circuit and a magnet and pivoted drop, of a second magnet and armature for raising the drop and opening the signal circuit, and means for locking said drop when the signal circuit is broken, substantially as described.

9. The combination with two independent separately and conjointly acting circuits, of a signal included in said circuits so as to operate when either or both are closed, electrical means common to both circuits for automatically closing and locking the same from a railway track, and mechanism for opening and locking the circuits after the passage of a train, substantially as described.

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

HOMER A. PARRISH.

Witnesses:
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B. F. BURGESS.