

No. 847,105.

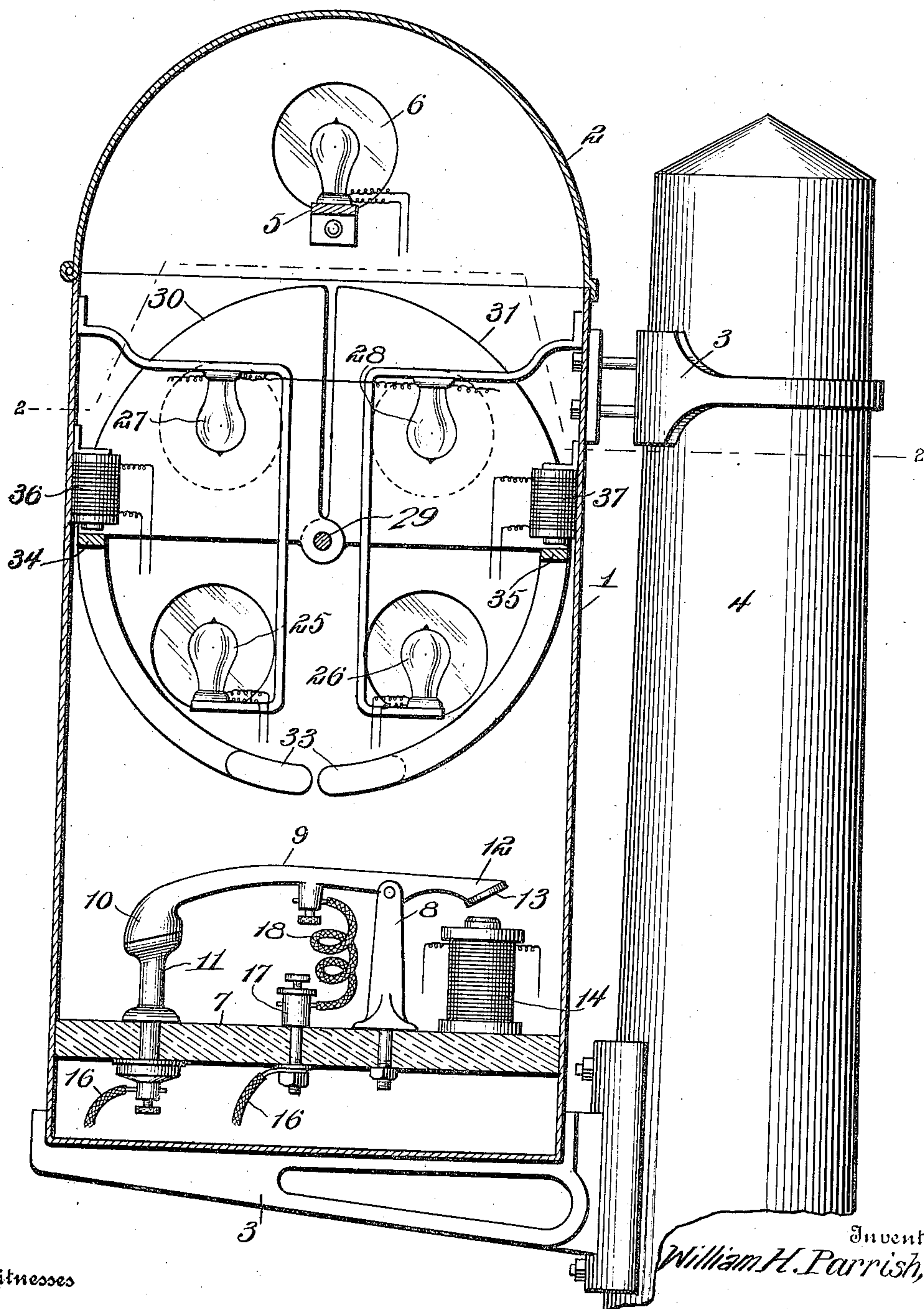
PATENTED MAR. 12, 1907.

W. H. PARRISH, JR.
SIGNAL.

APPLICATION FILED NOV. 3, 1906.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

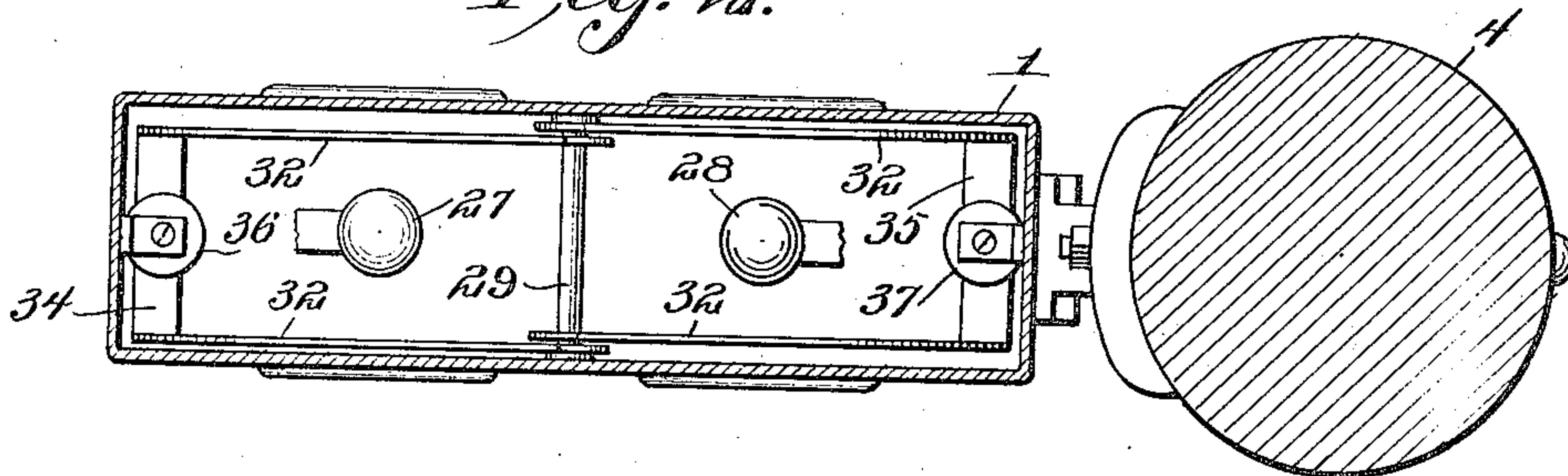
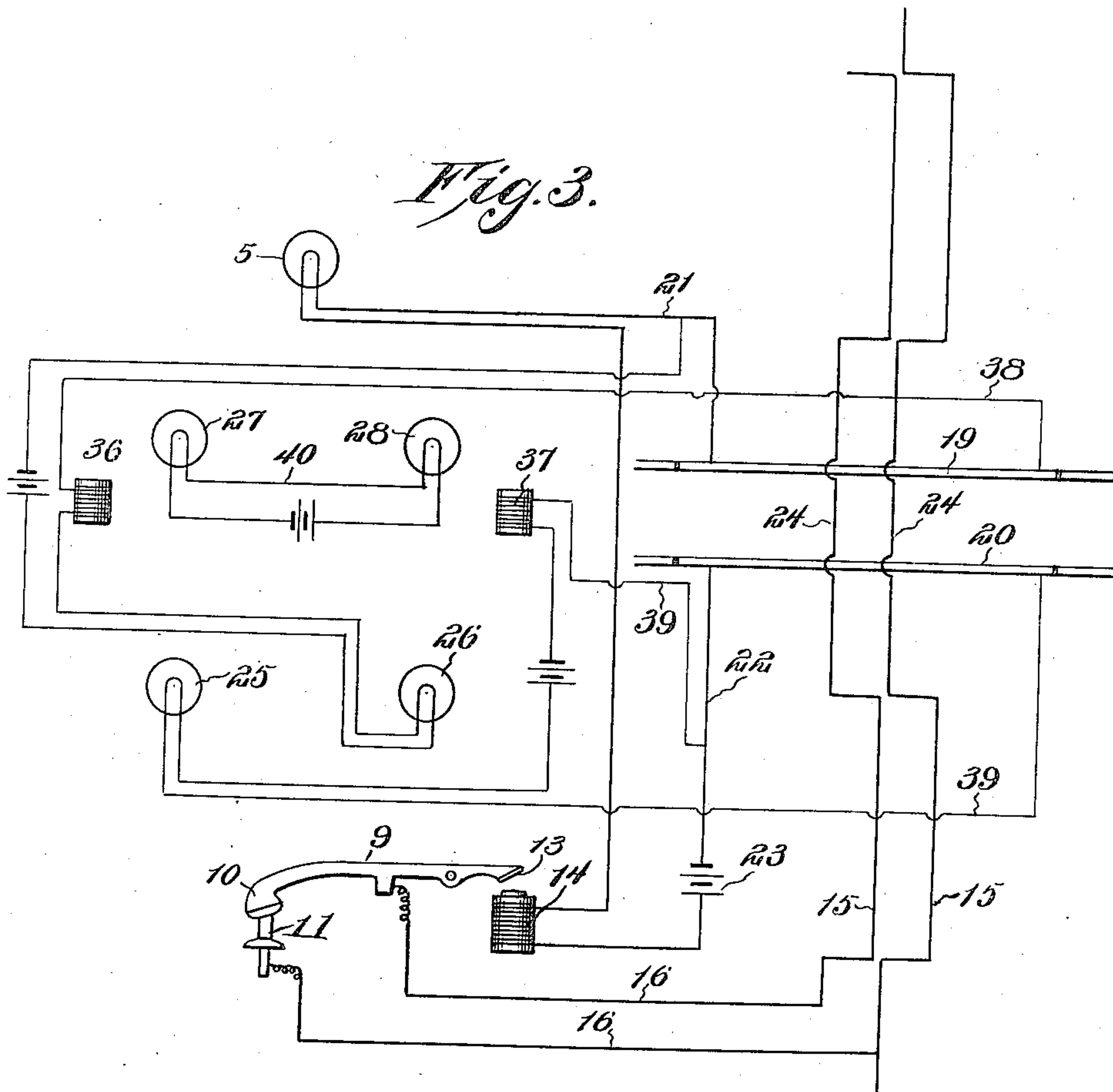


Fig. 3.



Witnesses

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SIGNAL.

No. 847,105.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM H. PARRISH, Jr., a citizen of the United States, residing at Nashville, in the county of Davidson and State of Tennessee, have invented new and useful Improvements in Signals, of which the following is a specification.

The invention relates to an improvement in signaling apparatus designed primarily for service at a grade-crossing of electric and steam railroads, the apparatus in use being adapted to automatically control the travel of the electrically-operated train.

The main object of the present invention is the production of a signaling apparatus for indicating to the motorman of an approaching electric train the presence of a train upon the steam-railroad within a specified distance of the crossing, the construction of the apparatus providing for the automatic cutting out of the power to the electric train in the normal operation of the device.

A further object of the invention resides in the combination, with the signaling and controlling apparatus referred to, of an automatic testing apparatus constructed and arranged to automatically advise the motorman of the approaching electric train of any defect in the main signaling and controlling apparatus, whereby failure of the main signaling and controlling apparatus is automatically guarded against.

The invention will be described in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical sectional view, partly in elevation, illustrating the signal-box in use with my signaling apparatus. Fig. 2 is a transverse section of the same on line 2 2 of Fig. 1. Fig. 3 is a diagrammatic view of the wiring for the signaling apparatus.

Referring particularly to the drawings, wherein similar reference-numerals indicate like parts throughout the several views, my improved signaling and controlling apparatus comprises in its essential details a signal box or casing 1, preferably of rectangular shape in cross-section and constructed of sheet metal or the like, so as to be wholly inclosed, a hinged cover, as 2, being provided to afford access to the interior of the casing. The signal-box is supported through the medium of suitable brackets 3 on a post or standard 4, the latter being arranged at one side of the track-rails immediately adjacent the grade-crossing. The signal-box is so ar-

anged relative to the respective tracks that the signals operative within the box are visible only to the motorman of the electrically-controlled train and invisible to the engineer of the steam-operated trains.

The signaling and controlling apparatus includes a visual signal, as an incandescent lamp 5, arranged within the signal-box, preferably in the upper portion thereof, and visible through bull's-eyes 6, secured in the sides of the box and colored green to indicate the usual caution-signal.

Supported upon a base 7, arranged within the lower part of the signal-box, is an automatic circuit-breaker, including a standard 8, on which is pivotally supported a contact-lever 9, one terminal of the lever, as 10, being arranged in the normal position of the lever to engage a contact-post 11, secured in the base 7, the opposite end of the lever, as 12, carrying a contact-plate 13, disposed within the influence of an electromagnet 14, also supported on the base 7. The contact-lever 9 and contact-post 11 form a part of the feed-circuit for the trolley wires or conductors 15 of the electrically-operated railroad. The feed-wires 16 are directly connected to the contact-post 11 and the lever 9, as shown in Fig. 1, the connection to the lever being preferably through the medium of a binding-post 17 and a coiled strip of conductor, as 18, to permit the necessary movement of the lever without destroying the contact.

The track-rails 19 and 20 of the steam-railroad are for a specified length on each side of the electric road-crossing to be so arranged as to provide uninterrupted metallic conductors—such, for instance, as bonding the meeting ends of the rails of each track. Each of these independent track-rails constitute one terminal of the normally open circuit of the main signaling and controlling system, which circuit includes conductors 21 and 22, terminally connected to the respective track-rails, as shown, and including in series in the circuit the signal 5, the electromagnet 14, and a suitable source of energy, as a battery 23.

As above constructed and arranged it will be apparent that the normally open circuit referred to will become a closed circuit by the presence of a steam-operated train upon the particular section of track adjacent the grade-crossing, the wheels and axles of the car of the train serving to electrically connect the normally spaced terminals. Upon the closing of the main circuit the green sig-

nal is flashed, and the energizing of the electromagnet 14 serves to rock the lever upon its pivotal support and break contact with the trolley-feed-post terminal 11, thereby breaking the feed to the trolley-wires and depriving the approaching electrically-operated train of power.

As is well understood in the art, the feed-wires for an electrically-operated circuit are arranged to feed and control only a certain block or length of the trolley-conductors. In the present instance the feed-wires controlled by the signaling apparatus described are to be arranged to feed and control a certain length or block on each side of the grade-crossing, while that portion of the trolley-conductors directly overlying the crossing, as at 24, is to be so arranged in the trolley-feeding system as to be at all times energized or "live" conductors. This particular arrangement will prevent the use of the signaling apparatus from depriving the electric train of power in the event the steam-operated train enters the prescribed section of track while the electrically-operated train is on or immediately adjacent the crossing. In this event, notwithstanding the complete operation of the device, the electrically-operated train will be given power to cross the track and avoid being stopped immediately upon the steam-tracks. The use of the above-described signaling and controlling apparatus thereby insures that the presence of a steam-operated train within the prescribed section of track adjacent the grade-crossing will be immediately signaled to the motorman of the advancing electrically-operated train and the latter train automatically deprived of power to advance, thereby compelling the stopping of the electrically-operated train until after the passage of the steam-operated train, as such electrically-operated train can receive no motive power until the main circuit is broken by the steam-operated train traveling beyond the prescribed track-section and the return of the contact-lever 9 to normal position by gravity.

As the signaling and controlling apparatus is entirely automatic in its operation, it is possible that such apparatus may fail of actuation notwithstanding the presence of a steam-operated train upon the prescribed section of track. As such failure would be mainly liable through a defect in the main circuit, I have arranged for combination with said circuit an auxiliary or test circuit, in the use of which the motorman of the advancing electrically-operated train is at once notified of any defect in the main circuit. To this end I secure within the signal-box two visual signals 25 26, preferably incandescent lights and showing through white bull's-eyes fixed in openings in the opposite side walls of the box, these signals being hereinafter termed

"clear-signals." Above the lamps 25 and 26 I arrange two additional visual signals 27 28, also preferably incandescent lamps, arranged to show through red bull's-eyes fixed in the side walls of the casing, these signals being hereinafter termed "danger-signals." The respective clear and danger signals are arranged in alinement, so that one clear-signal is directly beneath a danger-signal, as shown in Fig. 1. A pivot-rod 29 is mounted in the side walls of the casing, centrally between and equally spaced from the four signals just referred to.

Independent shutters 30 and 31 are pivotally mounted upon the rod 29, each of the shutters comprising quadrant-shaped plates 32, maintained in spaced relation, so as to lie adjacent the respective side walls of the signal-box and beyond the plane of the respective signals. The plates 32 are of such size as to close the openings in the side walls of the box through which the signals are visible, the respective signal showing openings of the clear and danger signals being so spaced relative to each other that when the shutters are in the upper or normal position, as shown in Fig. 1, the danger-signals are concealed and the clear-signals exposed, while in the lower or operative position of the shutters the clear-signals are concealed and the danger-signals exposed. Each shutter is preferably provided with a counterweight 33, connected to the shutter through the medium of an arm 34, the respective arms being of course connected to opposing plates of the respective shutters to avoid interference in operation. The plates of each of the respective shutters are connected by a transversely-disposed bar 34 35, and electromagnets 36 37 are secured to the interior of the box in such position that when the respective shutters are in normal position and concealing the danger-signals the bars 34 and 35 form armatures for the respective electromagnets 36 and 37.

Each track-rail 19 and 20, as well as that portion of the conductors of the main circuit system beyond the signal-box, are in circuit with one of the electromagnets and one of the clear-signals, as shown in Fig. 3. For instance, the track-rail 19 is in circuit with a conductor 38, including in series the electromagnet 36 and the clear-signal 26, located remote from said magnet, the terminal of the conductor 38 being in electrical engagement with the conductor 21 of the main circuit immediately beyond the signal-box. The track-rail and main conductor 22 is similarly in circuit with a conductor 39, electromagnet 37, and clear-signal 25. The respective test-circuits thus include one of the prescribed sections of rail and all that portion of the conductor of the main circuit connected with that rail-section.

As the test-signals noted are primarily de-

signed to provide a means for automatically indicating any defect in the main circuits of the system, the entire length of such circuit beyond the signal-box is included in the particular test-circuit, the ends of the conductors 38 and 39 being connected to the respective track-rails and to the main circuit-conductors. As thus connected each of the test signal-circuits is a normally closed circuit, including the entire length of the main circuit beyond the signal-box, and in the event the electrical continuity of such circuit is broken for any reason whatever the particular test-circuit immediately becomes an open or broken circuit.

As the test-circuits are normally closed circuits, the electromagnet and clear-signals included in such circuits are normally energized. With the test-signals energized the respective shutters will be maintained in normal position through the holding power of the respective electromagnets, and the clear-signals will be visible through the sides of the box. The motorman of the approaching electrically-operated train will thus be advised that the prescribed track-section of the steam-operated train is in proper circuit, and if he does not receive the main signal and cut-out he knows that there is no steam-operated train approaching the crossing and within the prescribed section. If, however, either of the prescribed track-rails or the main conductors connected thereto should for any reason be disturbed, so as to prevent completion of the main circuit or the bonding between the rail ends become broken—as, for instance, the track-section 19—the particular test-circuit will be broken, with the effect to deenergize the electromagnet 36 and the clear-signal 26. The deenergization of the electromagnet 36 releases the shutter 30, enabling the latter to gravitate to the lower or operative position, in which position it will shut out the clear-signal 25 and expose the danger-signal 27. As the opening of the test-circuit referred to extinguishes the clear-signal 26 and by the operation of the shutter 30 shuts off the clear-signal 25, the effect of the opening of either test-signal will eliminate both clear-signals and expose one or the other of the danger-signals.

In the operation of either test-circuit as described the motorman of the approaching electrically-operated train will by the elimination of the clear-signals and the showing of the danger-signal be at once advised of the defect in the main signal system. Hence said motorman will exercise every possible caution in approaching and before crossing the steam-railroad. The test-circuits therefore serve as an automatic check on the main signal system, providing a means whereby a defect in the main system is at once signaled to the motorman of approaching trains.

The danger-signals 27 28 are independent

of any of the signal-circuits, being, in the event such danger-signals are incandescent lamps, connected in an independent lamp-circuit 40, as shown in Fig. 3. It is to be understood, of course, that as the danger-signals are wholly independent of any of the signal-circuits the lights of said signals may be incandescent lamps, oil-lamps, or any preferred means of transmitting light.

The above description and drawing describes the invention as particularly designed for use with a railroad-crossing with the respective tracks used for a steam-operated railroad and an electrically-operated railroad. In the invention the steam-operated railroad is given the right of way and the signals always set against the electric railway. It is to be understood that the invention is equally applicable to railroad-crossings wherein the crossing roads are both electric, as an urban and interurban road, and that either may be given the right of way in accordance with the arrangement of the signals.

The invention is equally applicable without material variation to railroad-bridges, including electrically-operated draws. In such use of the invention the prescribed length of protected track will extend from the draw in both directions and the circuit-breaker or current-controller will be included in the draw-operating power-circuit. In this application of the invention the described main and test circuits are to be used, so that the operator of the draw will be notified as to the condition of the circuits exactly as is the operator of the controlled train. The presence of a train within the prescribed limits of the draw will, in the event the main signal is fully operative, automatically cut off power from the draw-motors and prevent movement of the draw, the signal-lights being so placed as to be seen both by the engineer of the steam-train and the operator of the draw-bridge.

While preferring the specific details of construction and arrangement of parts described in the above specification and illustrated in the drawings, it is to be understood that I do not limit myself thereto, considering as within the spirit of the present invention all such changes of structure and variations or modifications of parts as may legally fall within the scope of the appended claims.

Having thus described the invention, what is claimed as new is—

1. A crossing signaling system, including a means operated by one train for signaling the crossing train, and means for operating an independent signal in the event of defect of the first-mentioned means.

2. A crossing signaling system, including a means operated by one train for signaling and controlling a crossing train, and test means for signaling to the crossing train the condition of the first-mentioned means.

3. A crossing signaling system, including a normally open circuit adapted to be closed by the travel of the train, said circuit including a signal and controlling means for the crossing train, and a test-circuit to indicate to the operator of the crossing train the condition of the first-mentioned circuit.
4. A crossing signaling system, including a main circuit having a signal and controlling means for the crossing train, said main circuit being normally open and arranged to be closed to operate the signal and controlling means by the passage of a train, and a test-circuit including a part of the main circuit.
5. A crossing signaling system, including a main circuit having a signal and controlling means for the crossing train, said main circuit being normally open and arranged to be closed to operate the signal and controlling means by the passage of a train, and a test-circuit including a part of the main circuit, said test-circuit being normally closed and including a "clear" signal.
6. A crossing signaling system, including a main circuit having a signal and controlling means for the crossing train, said main circuit being normally open and arranged to be closed to operate the signal and controlling means by the passage of a train, a test-circuit including a part of the main circuit, said test-circuit including a "clear" signal, and a danger-signal controlled by the test-circuit.
7. The combination with a steam-railroad and electric-railroad crossing, of a signaling system comprising a main circuit including a prescribed length of the steam-railroad tracks, a signal arranged in said circuit, a power-circuit for the electric railroad, and means included in the main signal-circuit for breaking the power-circuit upon the closing of the main circuit.
8. The combination with a railroad-crossing of a steam and electric road, of a main signal-circuit including a signal for the motorman of the electric road, said circuit being normally open and including a prescribed length of the steam-railroad tracks, and a test-circuit normally closed and including the prescribed length of the steam-railroad track.
9. The combination with a railroad-crossing of a steam and electric road, of a main signal-circuit including a signal for the motorman of the electric road, said circuit being normally open and including a prescribed length of the steam-railroad tracks, and a test-circuit normally closed and including the prescribed length of the steam-railroad track, said test-circuit including a "clear" signal.
10. The combination with a railroad-crossing of a steam and electric road, of a main signal-circuit including a signal for the motorman of the electric road, said circuit being normally open and including a prescribed length of the steam-railroad tracks, a test-circuit normally closed and including the prescribed length of the steam-railroad track, said test-circuit including a "clear" signal, and a danger-signal controlled by the test-circuit.
11. The combination with a railroad-crossing of a steam and electric road, of a main signal-circuit including a signal for the motorman of the electric road, said circuit being normally open and including a prescribed length of the steam-railroad tracks, a test-circuit normally closed and including the prescribed length of the steam-railroad track, said test-circuit including a "clear" signal, a danger-signal normally concealed while the test-circuit is closed, and means operative upon the breaking of the test-circuit to expose the danger-signal.
12. The combination with a railroad-crossing, of a signal-box arranged adjacent the crossing, a main signal-circuit including a prescribed length of one of the crossing tracks, a signal and power controlling means for the train of the other crossing track located within the signal-box, said signal and power controlling means being influenced by the main circuit, duplicate test-circuits each including the prescribed length of one of the respective tracks and normally closed, clear-signals and danger-signals carried by the signal-box, and means for controlling the signals in accordance with the condition of the test-circuits.
13. The combination with a railroad-crossing, of a signal-box arranged adjacent thereto, a main circuit including a prescribed length of track-rails of one of the tracks, a signal and power controlling means arranged within the box and adapted to be influenced by the presence of a train upon the prescribed length of track, test-circuits, each including one of the prescribed lengths of track and being normally closed, a "clear" signal included in each test-circuit and arranged within the box, a danger-signal arranged within the box, and a shutter controlled by the test-circuit to conceal the danger-signal while the test-circuit is closed and to expose said signal upon the opening of the test-circuit.
14. The combination with a railroad crossing, of a signal-box arranged adjacent thereto, a main circuit including a prescribed length of track-rails of one of the tracks, a signal and power controlling means arranged within the box and adapted to be influenced by the presence of a train upon the prescribed length of track, test-circuits, each including one of the prescribed lengths of track and being normally closed, a "clear" signal for each test-circuit, said "clear" signal being arranged within the box, a plurality of danger-signals arranged within the box, and means whereby the opening of a test-circuit extinguishes the "clear" signal in said circuit, exposes one of the danger-signals, and

conceals the "clear" signal of the other test-circuit.

15. The combination with a railroad-crossing, of a signal-box arranged adjacent thereto, a main circuit including a prescribed length of track-rails of one of the tracks, a signal and power controlling means arranged within the box and adapted to be influenced by the presence of a train upon the prescribed length of track, test-circuits, each including one of the prescribed lengths of track and being normally closed, a "clear" signal for each test-circuit, said "clear" signal being arranged within the box, a plurality of danger-

signals arranged within the box, shutters 15 pivotally supported within the box, electromagnets included in each test-circuit and operating when energized to maintain the shutters in position to conceal the danger-signals, said shutters upon the deenergization of the 20 magnets gravitating to conceal the clear-signals.

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

WILLIAM H. PARRISH, JR.

Witnesses:

G. S. MOORE,
JNO. T. BANKS.