H. W. SOUDER.

RAILWAY CROSSING SIGNAL.

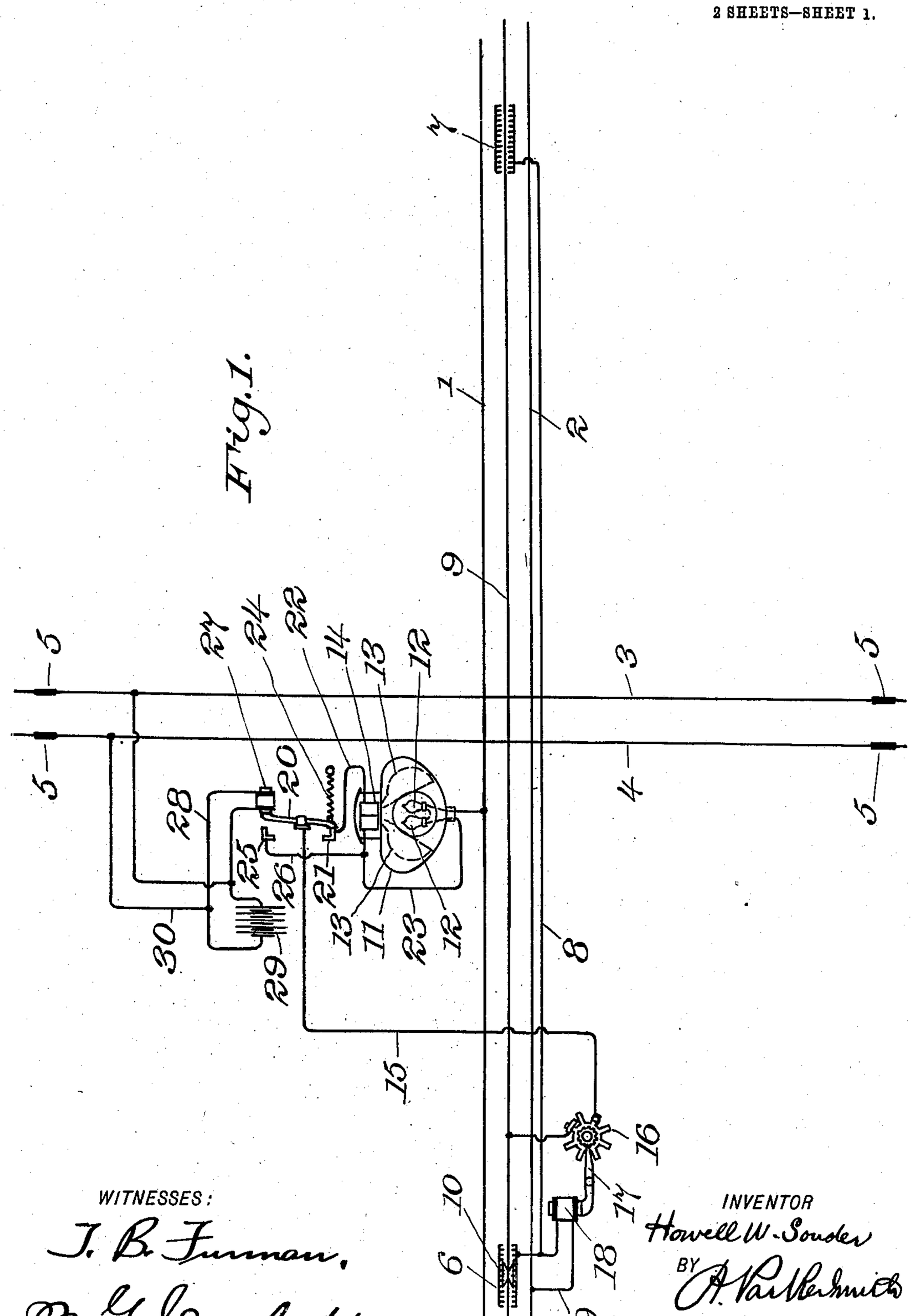
APPLICATION FILED MAY 20, 1907.

911,623.

Patented Feb. 9, 1909.

2 SHEETS—SHEET 1.

Fig. 1.



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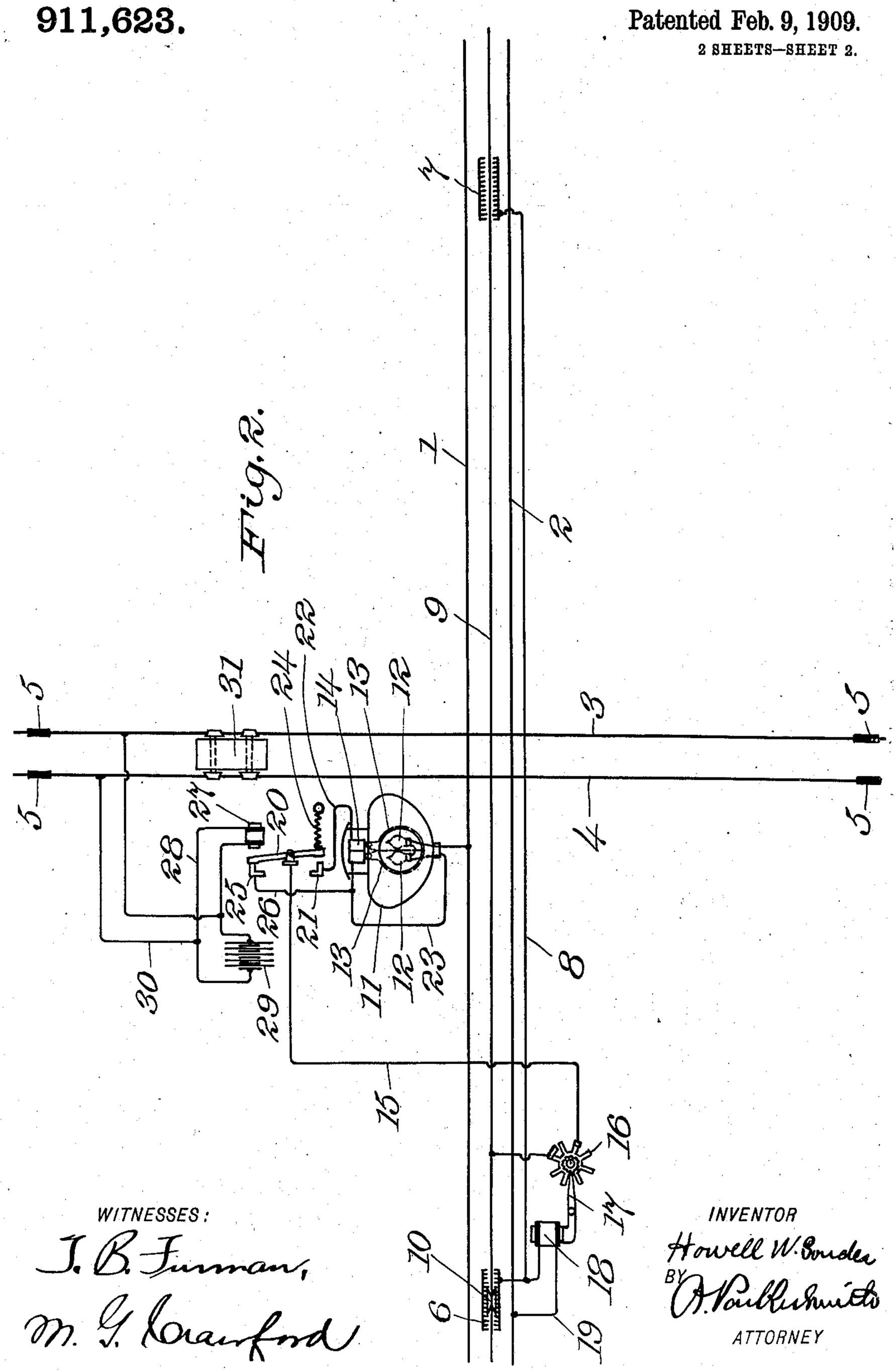
2 SHEETS—SHEET 2.

Fig. 2.



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RAILWAY-CROSSING SIGNAL.

No. 911,623. Specification of Letters Patent. Patented Feb. 9, 1909.

Application filed May 20, 1907. Serial No. 374,539.

To all whom it may concern:

Be it known that I, HOWELL W. SOUDER, a citizen of the United States of America, and a resident of Tamaqua, county of Schuylkill, State of Pennsylvania, have invented certain new and useful Improvements in Railway-Crossing Signals, of which the following is a specification.

My invention relates to railway signals and has for its object the production of a signal controlling the crossing of a steam railroad or other form of heavy traffic road by a trolley road. In such situation it is difficult to devise a simple form of signal which may be operated by the trolley car automatically to show whether or not a train is approaching upon the main line of road and have said signal also controlled by the train upon the main line of road whether or not it is under the control of the trolley apparatus. I have invented a simple form of apparatus which overcomes all these difficulties and the best form of it at present known to me is illustrated in the accompanying two sheets of drawings, in which:

Figure 1 is a diagram of the railroad crossing and electrical connections therefor the parts being in the position assumed when there is no train within the danger zone on the main line and a trolley car has just entered the signal zone on the trolley road. Fig. 2 is a similar diagram showing the position of the parts when a train is within the danger zone on the main line.

Throughout the drawings like reference figures indicate like parts.

1 and 2 represent the rails of the trolley track, and 3 and 4 the rails of the main road which crosses the trolley track. As shown these rails on the main or steam road are separated at the limits of the danger zone from the remaining portions of the track by blocks of insulation 5, 5.

6 and 7 are contact makers located near the trolley wire 9 at the limits of the signal zone.

10 represents a trolley wheel in operative contact with the contact maker 6.

11 is a variable signal located at or near the crossing of the tracks and comprising one or more incandescent electric lamps 12, 12, the movable shutters 13, 13, adapted to drop in front of said lamps and the electromagnet 14 arranged when energized to lift or swing the shutters away from the front of the lamps. This signal lantern is preferably of the form shown in detail and fully described in my pending application Serial No. 378,048 filed June 10, 1907, though it may be of other construction.

15 is a circuit extending from the trolley wire or other feed wire through the controller 16 which is adapted to alternately make and break the circuit. This controller is preferably of the form illustrated and described in my Patent No. 789,240, dated May 9, 1905, but may be of any other suitable construction. As shown, the controller is provided with a ratchet wheel with which the pawl 17 coöperates to produce a step by step rotation, the ratchet wheel having twice as many teeth as the circuit controller has arms. This pawl is controlled by the magnet 18 in the circuit 19, which extends from the contact maker 6 to ground, or to one side of the rails, as 2. 8 is a branch connection from one wire of the circuit 19 to the contact maker 7.

20 is a pivoted switch, one end of which cooperates with the contact 21 which is connected to the circuit 22, which includes the lantern magnet 14. This circuit 22 connects with the circuit 23 which extends through the lamps to the ground or to one of the rails, as 1.

24 is any convenient form of spring which tends to swing the switch lever 20 in the position shown in Fig. 2 so that the other end of said switch lever bears upon the contact 25, which is connected to the circuit 26, which extends to circuit 23, cutting out the magnet 14.

27 is a switch operating magnet located so that when energized it will swing the switch lever 20 in a direction opposite to that in which the spring 24 tends to swing it. This switch magnet 27 is in a local circuit 28 to which current is supplied by battery 29, or other source of current. This circuit 28 has a shunt circuit 30 connected to the two insulated rails 3 and 4 of the main railroad. This circuit when closed, as by a car 31, cuts out the magnet 27 and deënergizes the same.

The operation of my invention is as follows: Normally, the shutters 13 are down in the position shown in Fig. 2, there being no current through the lantern magnets 14 and the lamps are dead, there being no current supplied to them, the circuit 15 being broken at the controller 16. The switch magnet 27

being energized, however, by current in local circuit 28, the switch lever 20 is in the position shown in Fig. 1. When a car enters either end of the signal zone on the trolley track, its trolley wheel 10 makes connection with one of the contact makers, as 6, energizes the magnet 18, turns the circuit controller 16 one tooth, thereby establishing connection of the circuit 15 with the trolley wire 9 or other feed wire. This sends a current through the switch 20, contact 21, circuit 22, lantern magnet 14, circuit 23, lamps 12, 12, to the rail 1. This current causes the lamps to glow and lifts the shutters 13 so that the signal goes to "safety". The shutters 13 are usually made of some translucent material red in color so that the lamps will show through them at night as long as said shutters are in their lower position. Consequently the signal shows red in daylight when the shutters are down and red at night when the shutters are down and the lamps are lighted. If a car is on the insulated section of rails of the main road either when the trolley wheel makes contact with the contact maker 6 or 7, or after said contact has been made, as indicated in Fig. 2, said car will connect the two insulated rails 3 and 4 and establish the low resistance shunt circuit 30 around the magnet 27. This will rob the magnet 27 of practically all its current and deënergize it sufficiently so that the spring 24 will pull the switch 20 into the position shown in Fig. 2. This breaks the contact at 21 and establishes it at 25. Accordingly the current for the trolley wire through circuit 15 will go to contact 25, through circuit 26 and 23 and the lamps to the ground instead of through the magnet 14. As a result, shutters 13, 13, will drop and show red either in the day or at night, indicating to the trolley motorman that a train or car has entered the danger zone on the main road, and that he must wait until the same has passed before attempting the crossing. When this train or car upon the main road leaves the danger zone the shunt circuit around the magnet 27 will be destroyed, this magnet will again become operative, the parts will resume the position shown in Fig. 1, current will be again directed through the magnet 14, and the variable signal thrown to "safety" by the lifting of the shutters 13, 13. The trolley car can then make the crossing and on going out of the signal zone will make contact with the other contact maker, as 7, advancing the circuit controller 16 another tooth, breaking the circuit 15, extinguishing the lamps 12, 12, and setting the signal back at "danger". Trolley cars traveling in the opposite direction will produce the same results through the contact maker 7 and branch wire 18. A second trolley car approaching the signal zone while one car is in the same will see the signal in abnormal condition, the lamps glowing and the shutters lifted, and will note that a car ahead of it is in the signal zone. Such second car will wait until the first car has passed out of the signal zone at the other end. It may, however, enter the signal zone before the first car passes out, thereby breaking the circuit 15 and returning the signal to "danger", and retaining it there, while the first car is in the block. The second car should not attempt the crossing until the signal goes to "safety", which will be accomplished on the passing out of the first car from the signal zone, if no train or car is within the danger zone on the main line. If a train is within the danger zone the signal cannot go to safety under any circumstances till the danger zone is cleared.

The advantages of my invention comprise its dual control by cars on the two lines of road with the predominating influence of the car on the main line of the road, whereby the signal is brought to or retained at "danger" whenever a car is within the danger zone on said main road, whether or not a car is within the signal zone upon the other road, while at the same time other features of the signal apparatus, to wit, the lamps, are under the sole control of the cars upon the crossing road, and always indicate the condition of that road to an approaching motorman.

It is evident of course that other forms of variable signal might be employed, other forms of circuit controller and the various details of construction and arrangement of circuits varied without departing from the distinguishing features of my invention.

Having, therefore, described my invention, I claim:

1. In a signaling apparatus for railroad crossings, the combination of a variable signal normally set at danger, an insulated section of rails on the main road extending a certain distance either side of the crossing, signal actuating means extending a certain distance from the crossing along the crossing road and adapted to be operated by a passing car, and means operated by a car entering the insulated section of the main road to insure the retention of the signal at danger while such car is on said insulated section.

2. In a signaling apparatus for railroad crossings, the combination of a variable signal normally set at danger, an insulated section of rails on the main road extending a certain distance either side of the crossing, signal actuating means extending a certain distance from the crossing along the crossing road and adapted to be operated by a passing car to set the signal at safety when no car is on the insulated section of the main road, and means operated by a car entering the insulated section of the main road to in-

sure return to and the retention of the signal at danger while such car is on said insulated section.

3. In a signaling apparatus for railroad crossings, the combination of a variable signal normally set at danger, an insulated section of rails on the main road extending a certain distance either side of the crossing, signal actuating means extending a certain distance from the crossing along the crossing road and adapted to be operated by a passing car to set the signal at safety when the car approaches the crossing and to reset it at danger when the car has left the crossing, and means operated by a car entering the insulated section of the main road to insure the retention of the signal at danger while such car is on said insulated section.

4. In a signaling apparatus for railroad crossings, the combination of a variable signal normally set at danger, an insulated section of rails on the main road extending a certain distance either side of the crossing, signal actuating means extending a certain distance from the crossing along the crossing road and adapted to be operated by a passing car, said signal actuating means comprising an electric circuit closed by the approaching car, and circuit breaking means controlled by the car on the insulated section of rails on the main road.

5. In a signaling apparatus for railroad crossings, the combination of a variable signal normally set at danger, an insulated section of rails on the main road extending a certain distance either side of the crossing, signal actuating means extending a certain distance from the crossing along the crossing road, and adapted to be operated by a passing car, said signal actuating means comprising an electric circuit closed by the car when approaching, and opened by the car when leaving the crossing, and circuit breaking means controlled by the car on the insulated section of the main road.

6. In a signaling apparatus for railroad crossings, the combination of a variable signal normally set at danger, an insulated section of rails on the main road extending a certain distance either side of the crossing, signal actuating means extending a certain distance from the crossing along the crossing road and adapted to be operated by a passing car, said signal actuating means comprising an electric circuit, a normally open switch in said circuit, a normally excited magnet holding said switch closed, and a shunt short circuit around said magnet normally broken between the two lines of rails of the insulated section of the main road.

7. In a signal system the combination of a signal lantern, a movable colored translucent shutter therefor, an electric lamp therein, electrically operated means for moving said shutter and circuit connections to said lamp and shutter operating means, said circuit connections comprising a switch adapted to send the current alternately through the lamp alone and through both lamp and shutter operating means.

8. In a signaling apparatus for railroad crossings, the combination of a variable signal normally set at danger, comprising a signal lantern, a normally closed colored translucent shutter therefor, an electric lamp therein, an electromagnet for opening said shutter, circuit connections to said lamp and magnet, including a switch adapted to send current either through the lamp alone or through both lamp and magnet, means for supplying current to said circuit located along the crossing road at either side of the crossing and adapted to be operated by a passing car, an insulated section of the main track extending on each side of the crossing, a second electromagnet, battery and circuit therefor normally operating to hold the switch in position to send the signaling current through both lamp and shutter operating magnet, and a shunt short circuit for said second magnet broken only by the gap between the two lines of insulated rails of the main track.

Signed at New York, N. Y. this 17th day of May, 1907.

HOWELL W. SOUDER.

Witnesses:
A. PARKER SMITH,
M. G. CRAWFORD.