W. M. McCLINTOCK.

INTERLOCKING CONTACT RELAY.

APPLICATION FILED MAR. 30, 1908.

959,958.

Patented May 31, 1910.

2 SHEETS—SHEET 1.

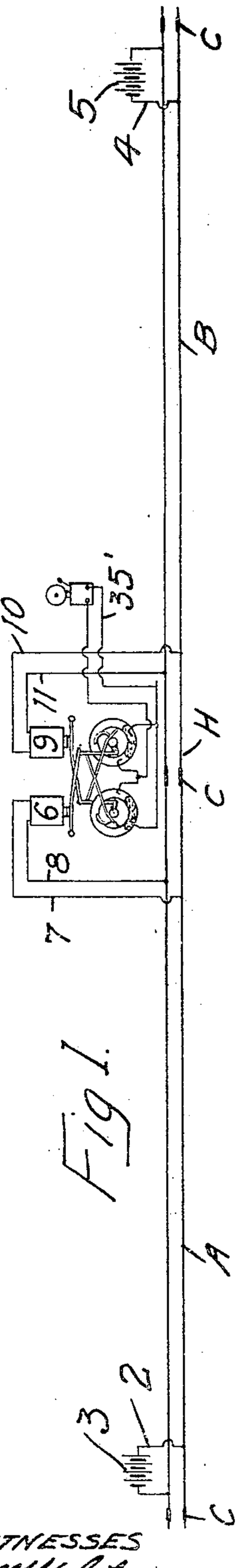

Fig 1.

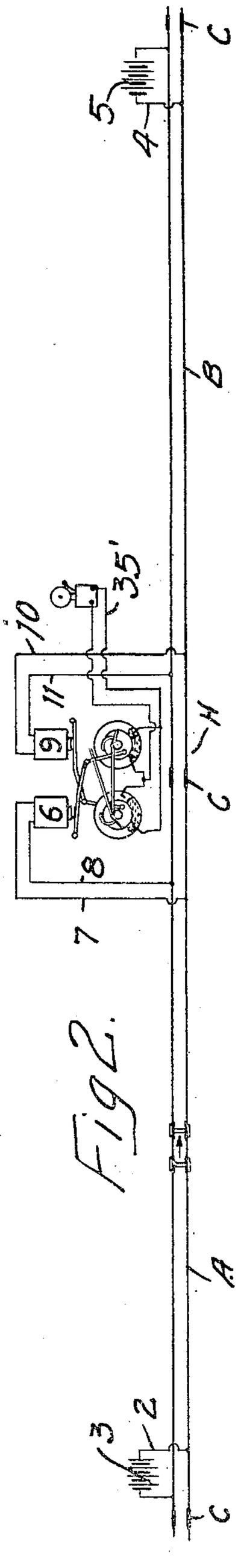

Fig 2.

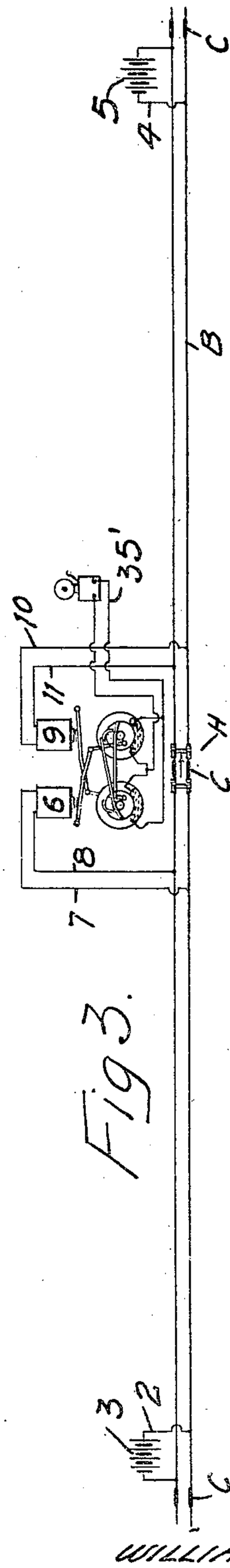

Fig 3.

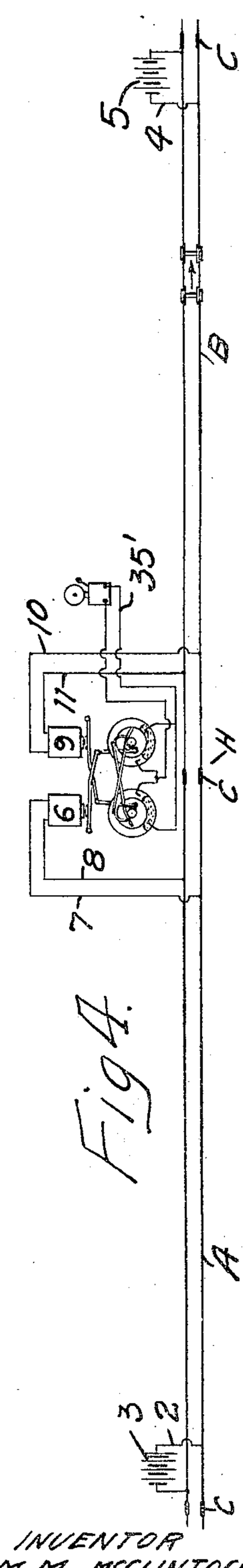

Fig 4.

WITNESSES

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2 SHEETS—SHEET 2.

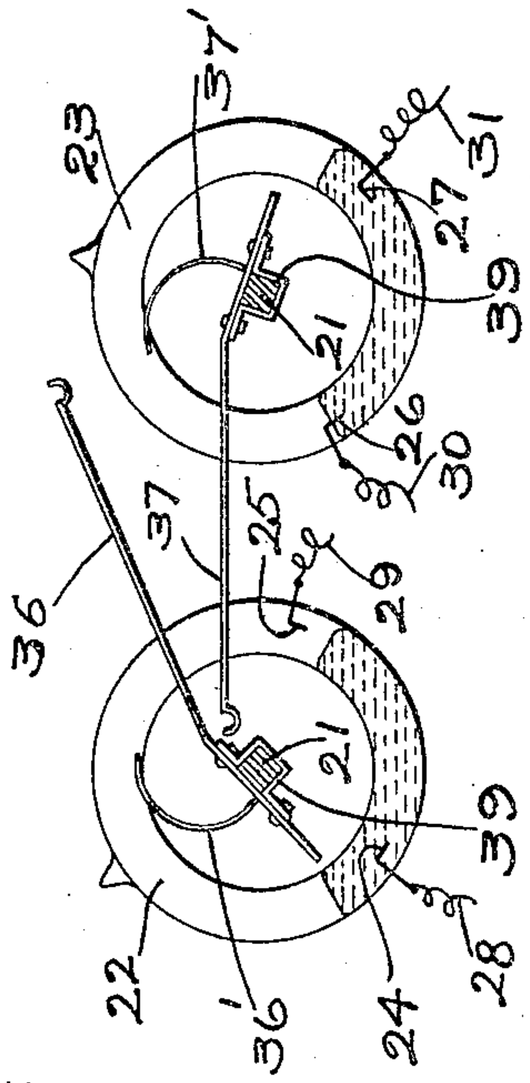

Fig. 6.

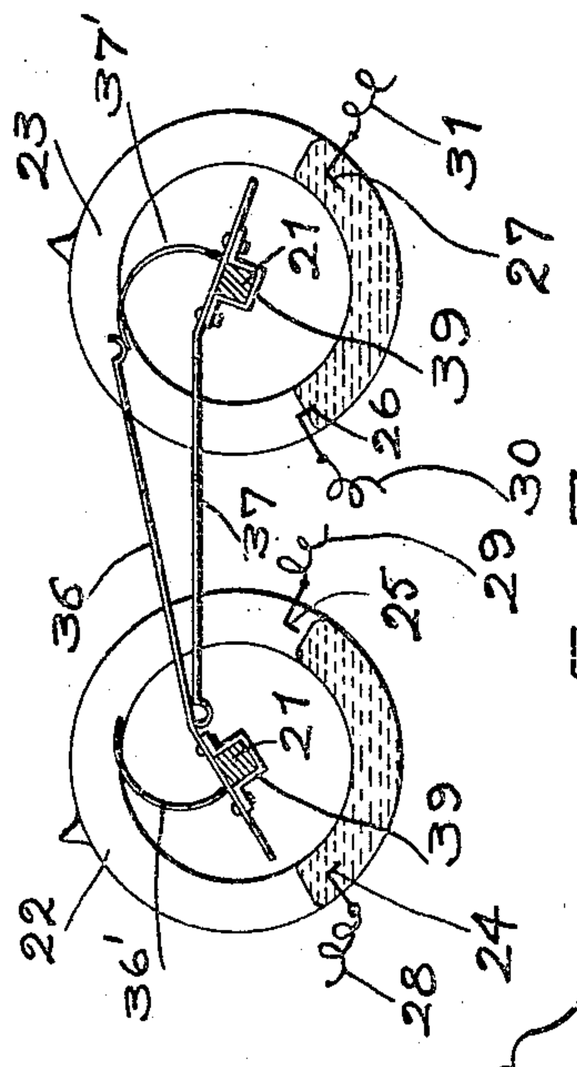

Fig. 7.

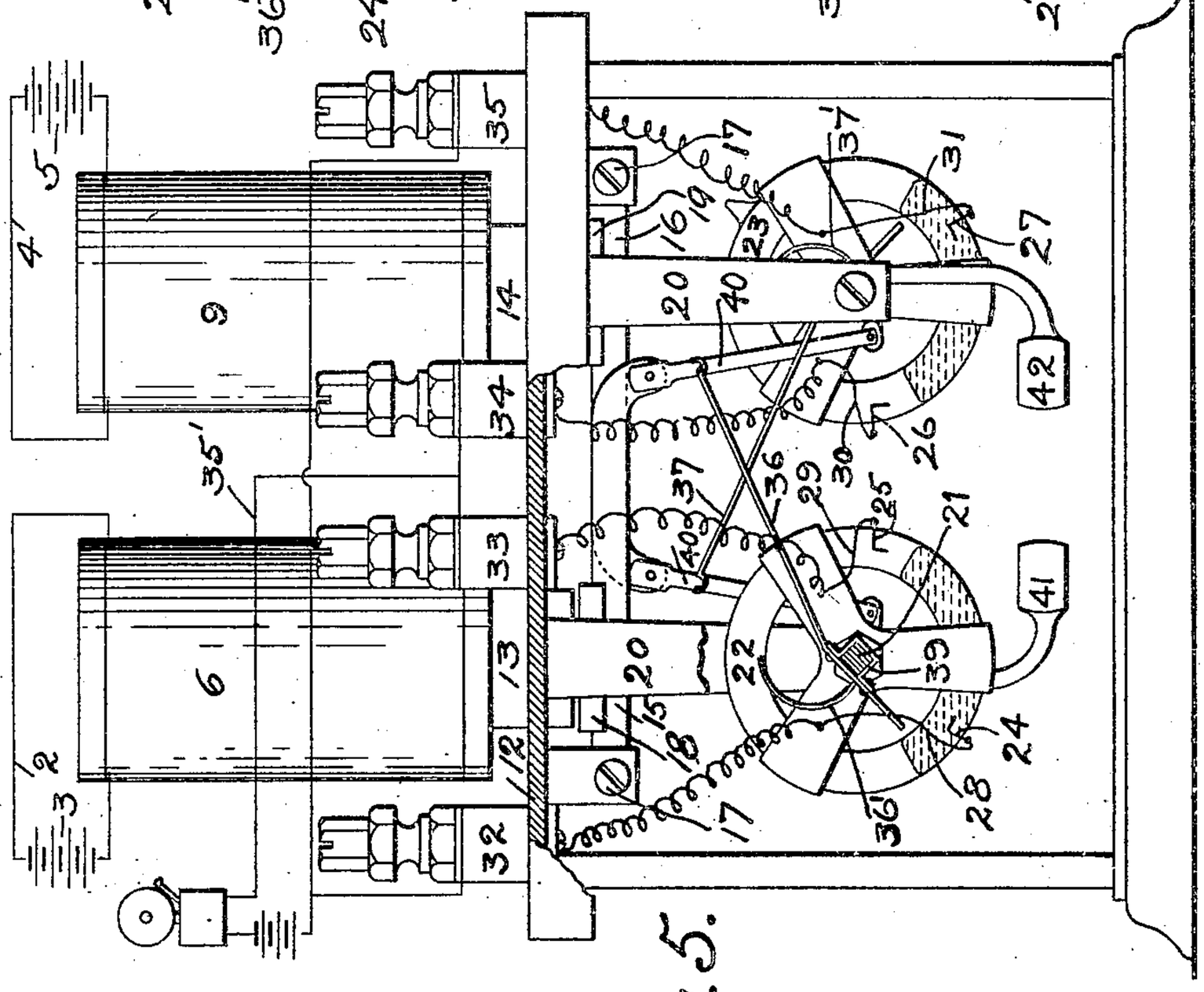

Fig. 5.

WITNESSES.
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UNITED STATES PATENT OFFICE.

WILLIAM M. McCLINTOCK, OF ST. PAUL, MINNESOTA.

INTERLOCKING CONTACT-RELAY.

959,958. Specification of Letters Patent. Patented May 31, 1910.

Application filed March 30, 1908. Serial No. 424,083.

To all whom it may concern:

Be it known that I, WILLIAM M. McCLINTOCK, of St. Paul, Ramsey county, Minnesota, have invented certain new and useful Improvements in Interlocking Contact-Relays, of which the following is a specification.

This invention relates to mechanically interlocking contact relays and the object of the invention is to provide means for operating electrical crossing bells or other signaling devices used on single track railways.

In some instances it is desirable that the signal should operate upon the passage of a train in one direction and be inoperative when the train is passing in the opposite direction. In other instances, such as the operation of highway crossing signals for steam roads it is necessary that the crossing bell or signal should be operated when a train is approaching the crossing but should be inoperative when the train is leaving the crossing.

The invention consists generally in various constructions and combinations, all as hereinafter described and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a diagrammatic view illustrating the application of my invention to a railway track. Fig. 2 is a similar view illustrating the position assumed by the parts of the relay when a train enters the insulated track section moving toward the right. Fig. 3 illustrates the position assumed by the parts when the train is partially in one insulated track section and partially in the other. Fig. 4 is a similar view illustrating the position of the parts when the train has moved past the relay and is leaving the crossing. Fig. 5 is a detail view illustrating the normal position of the relay. Fig. 6 is a detail view illustrating the position assumed by one of the circuit closing rings when the circuit is closed therethrough. Fig. 7 illustrates the means for preventing the other circuit closing ring from rotating beyond a predetermined point.

In the drawing, A represents one insulated track section and B the other, between which at H the highway crossing is located when the signal device is used in connection with a crossing. The sections A and B are insulated from one another and from the rest of the track by the insulating blocks C inserted in the rails in the usual way. A circuit 2 having a battery 3 connects the opposite rails of the section A and a circuit 4 having a battery 5 connects the rails of the section B. An electro-magnet 6 is in circuit through conductors 7 and 8 with the rails of section A, and a similar magnet 9 is in circuit with the rails of section B through conductors 10 and 11. The circuits through these magnets will be normally closed.

The electro-magnets are mounted on a suitable base 12 and have pole pieces 13 and 14. Levers 15 and 16 are pivoted at 17 and carry armatures 18 and 19 which are attracted when the pole pieces 13 and 14 are energized. Hangers 20 are provided on the plate 12 having bearings for shafts 21 whereon the circuit closing rings 22 and 23 are mounted. These rings are hollow and composed of a non-conducting material such as glass and contain a conducting fluid such as mercury which is inserted into the hollow rings and the air exhausted therefrom. These rings correspond substantially to those shown and described in a certain pending application for United States Letters Patent, filed by me January 16, 1906, Serial No. 296,245, and further detailed description thereof in this application will be unnecessary. The rings are provided with terminals 24, 25, 26 and 27 which project into the path of the conducting fluid in the rings and are connected by conductors 28, 29, 30 and 31 with binding posts 32, 33, 34 and 35 on the plate 12. These posts are connected with an alarm circuit 35′.

Links 40 pivotally connect the levers 15 and 16 with arms 41 and 42 secured respectively on the shafts of the rotating circuit closers. These arms act as counter weights to draw the armatures 18 and 19 away from the pole pieces of their respective magnets when the magnets are deënergized, and when such a condition obtains in the magnets the circuit closers will be rotated to close the signal circuits therethrough.

The operation of the device is as follows: The device is designed to be used on closed track circuits and the normal position of the parts is illustrated in Fig. 1, that is, the armature 18 is attracted toward the pole piece 13 of the magnet 6 and the armature 19 is attracted toward the pole piece 14 of the magnet 9. This movement of the arma-

tures will raise the levers 15 and 16 and rotate the shafts of the circuit closers through their connection with the links 40. Assuming now the magnet 6 to be connected with the rails of the insulated track section A and the magnet 9 to be similarly connected with the rails of the section B, if a train should pass on to the section A moving toward the right, the magnet 6 will immediately be short circuited and becoming deënergized will allow its armature to drop and the circuit closing ring 23 to rotate toward the left or in a direction opposite to the movement of the hands of a clock. As soon as the terminal 26 contacts with the mercury or other conducting fluid, the auxiliary or signal circuit will be closed and the alarm sounded, thus indicating that a train is approaching the crossing in section A and moving toward the right. The arm 37 and the curved spring 37′ move with the ring and assume the position shown in Fig. 6. The magnet 9 is not in any way affected, the circuit remaining closed therethrough. When the train reaches the joint between the sections A and B and is partially on one section and partially on the other the magnet 9 will be short circuited and its armature will drop and the circuit closing ring 22 will rotate toward the right from the position shown in Fig. 6. The arm 36 swinging with the circuit closing ring will strike the spring 37′ and the ring will be prevented from rotating a sufficient distance to allow the terminal 25 to contact with the conducting fluid. The circuit therefore through the ring 22 will remain broken and the signal will be silent, (see Fig. 3). Assuming now that the train has passed entirely off from section A and on to section B the magnet 6 will become energized and attract its armature 18 and will rotate the ring 23 with its arm 37 and spring 37′ toward the right, and break the auxiliary circuit established through the ring 23. The magnet 9 will be short circuited and the ring 22 revolved toward the right, but the arm 37 will be in the path of the spring 36′ and will prevent the ring 22 when the magnet is subsequently deënergized from turning sufficiently to close its contacts. Thus a train moving on section A toward the right will cause the signal to be operated, but the signal will be silent when the train has passed on to section B and during the time it is traveling in said section. Assuming now that the train has passed off of both sections, both magnets can become energized and attract their respective armatures. This causes both rings to be rotated and returns them to their normal position (see Fig. 1).

I have illustrated a single signal or alarm circuit for the two circuit closers, but obviously an independent circuit may be provided for each circuit closing ring if preferred.

When a train is moving from right to left the operation described will be repeated except that the magnets and the circuit closing rings will be reversely affected from the order described above.

I claim as my invention:

1. The combination, with a track having a highway crossing and insulated track sections on each side of said crossing, of normally closed relay circuits connected respectively with said insulated track sections, a normally open signal circuit, said signal circuit comprising hollow vacuum receptacles containing a conducting fluid and having contact points and said relay circuits comprising relays to control said contact points.

2. The combination, with a track having a signaling point or station and track sections insulated from one another upon each side of said station, normally closed relay circuits connected with said track sections and short circuited by the presence of a train on said sections, a normally open signal circuit, means including vacuum rings containing a conducting fluid and having contact points controlled by said relay circuits to close said signal circuit when a train is approaching the signaling station on either of said insulated track sections and to allow said signal circuit to remain open when the train has passed from one track section to the other and is leaving said signaling station.

3. The combination, with a track having insulated track sections and normally closed relay circuits, of a normally open signal circuit, circuit closers controlled by said relay circuits and arranged to close said signal circuit, said circuit closers comprising hollow rings containing a conducting fluid and having contact points and actuated through said relay circuits to close said signal circuit, and a mechanism arranged to prevent the operation of one of said circuit closers.

4. The combination, with a track having insulated track sections, and normally closed relay circuits, of a normally open signal circuit, circuit closers comprising hollow vacuum rings containing a conducting fluid and having contact points adapted to close said signal circuit through said conducting fluid, means whereby said rings will be rotated when said relay circuits are broken, and means carried by one of said rings to prevent the closing of the circuit through the other ring, substantially as described.

5. A circuit closing device comprising hollow vacuum rings containing a conducting fluid and having contact points adapted to be immersed in said fluid, a signal circuit connected with said contact points, means whereby said rings will be rotated to close the circuits therethrough, arms carried by said rings and springs arranged to contact with said arms and limit their movement

and prevent the closing of the circuit through one ring when the circuit has been previously closed through the other ring.

6. In a signaling device, the combination, with a signal circuit normally open, of circuit closing vacuum rings containing a conducting fluid and having contact points adapted to be immersed in said fluid and connected with said signal circuit, said rings being arranged to rotate toward one another, arms mounted on said rings and normally out of contact with one another, and one arm moving with its circuit closing ring when the circuit is closed therethrough to limit the movement of the other arm and prevent the closing of the circuit through the second ring and means moving with said other arm and engaging the first named arm and temporarily locking its circuit closer in a non-closing position, substantially as described.

7. In a signaling device, the combination with a signal circuit normally open, of rotating circuit closers, arms mounted thereon and normally out of contact with one another, one arm moving with its circuit closer to limit the movement of the other arm and prevent the closing of the circuit through the second circuit closer and means moving with said other arm and engaging said first named arm and temporarily locking its circuit closer in a non-closing position.

8. In a signaling device, the combination with a signal circuit normally open, of circuit closers comprising hollow rings containing a conducting fluid and having contact points adapted to close said signal circuit through said conducting fluid, means whereby said rings will be rotated to close the circuits there through, and means set by the movement of one circuit closer to prevent the closing of the circuit through the other circuit closer, substantially as described.

9. In a signaling device, circuit closers each having a long and a short arm mounted thereon, the long arm of one closer opposing the short arm of the other closer and normally out of contact therewith, the short arm of one closer moving therewith into the path of the long arm of the other closer and preventing the closing of the circuit through said other closer, substantially as described.

10. In a signaling device, circuit closers comprising hollow rings containing a conducting fluid and having contact points adapted to close a circuit through said conducting fluid, means whereby said rings will be rotated to close the circuit there through and means set by the movement of one circuit closer to prevent the closing of the circuit through the other circuit closer, substantially as described.

In witness whereof, I have hereunto set my hand this 12 day of March 1908.

WILLIAM M. McCLINTOCK.

Witnesses:

RICHARD PAUL,

C. G. HANSON.