C. M. CLEAVLAND.

ELECTRIC RAILWAY SIGNAL SYSTEM.

APPLICATION FILED JUNE 4, 1908.

925,622. Patented June 22, 1909.

Fig. 1.

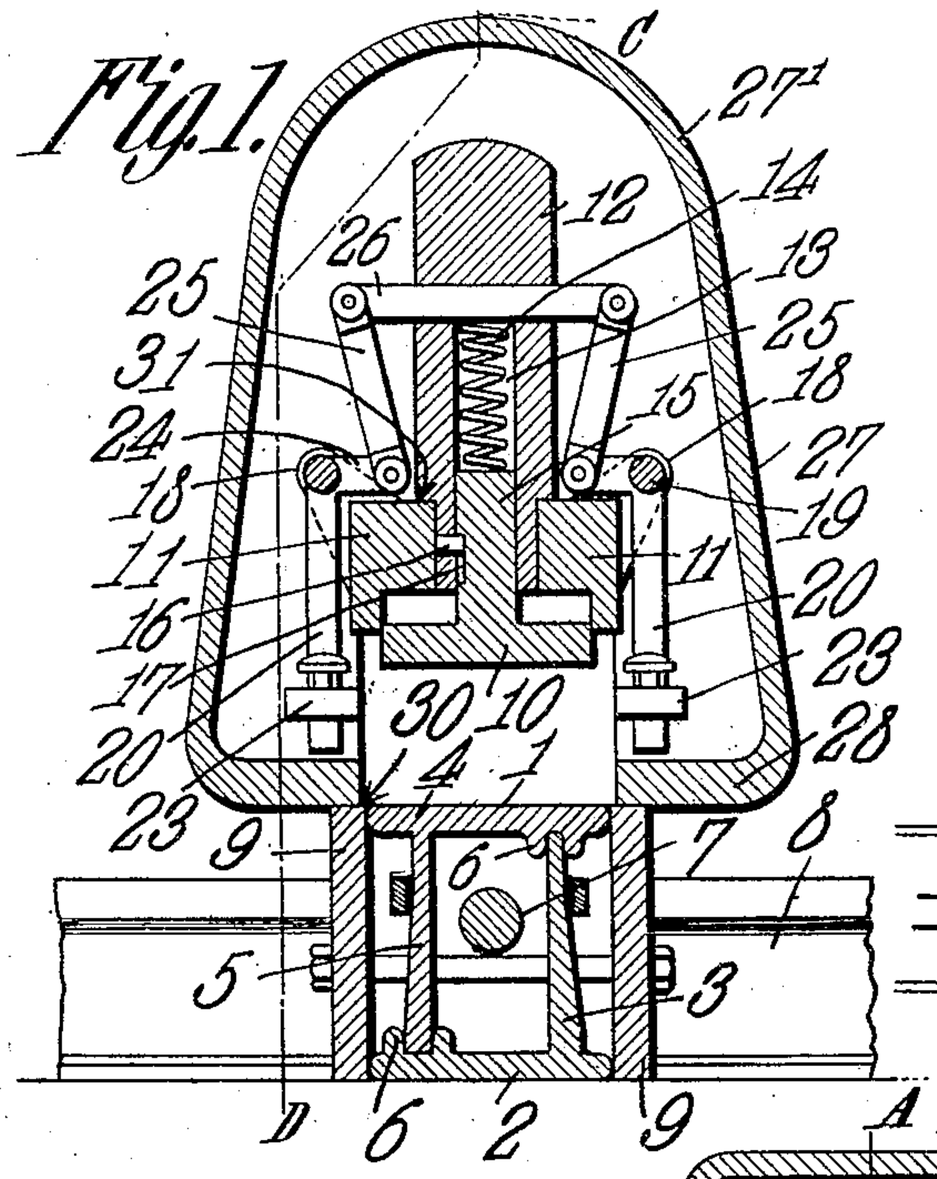


Fig. 3.

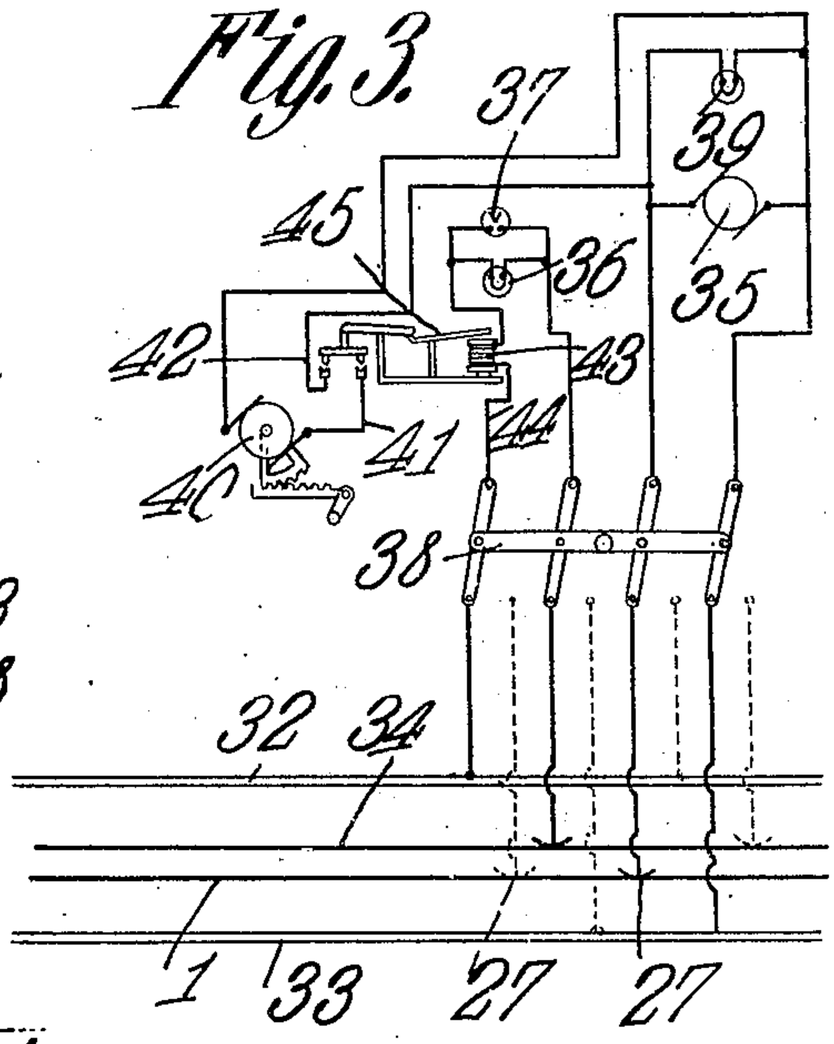
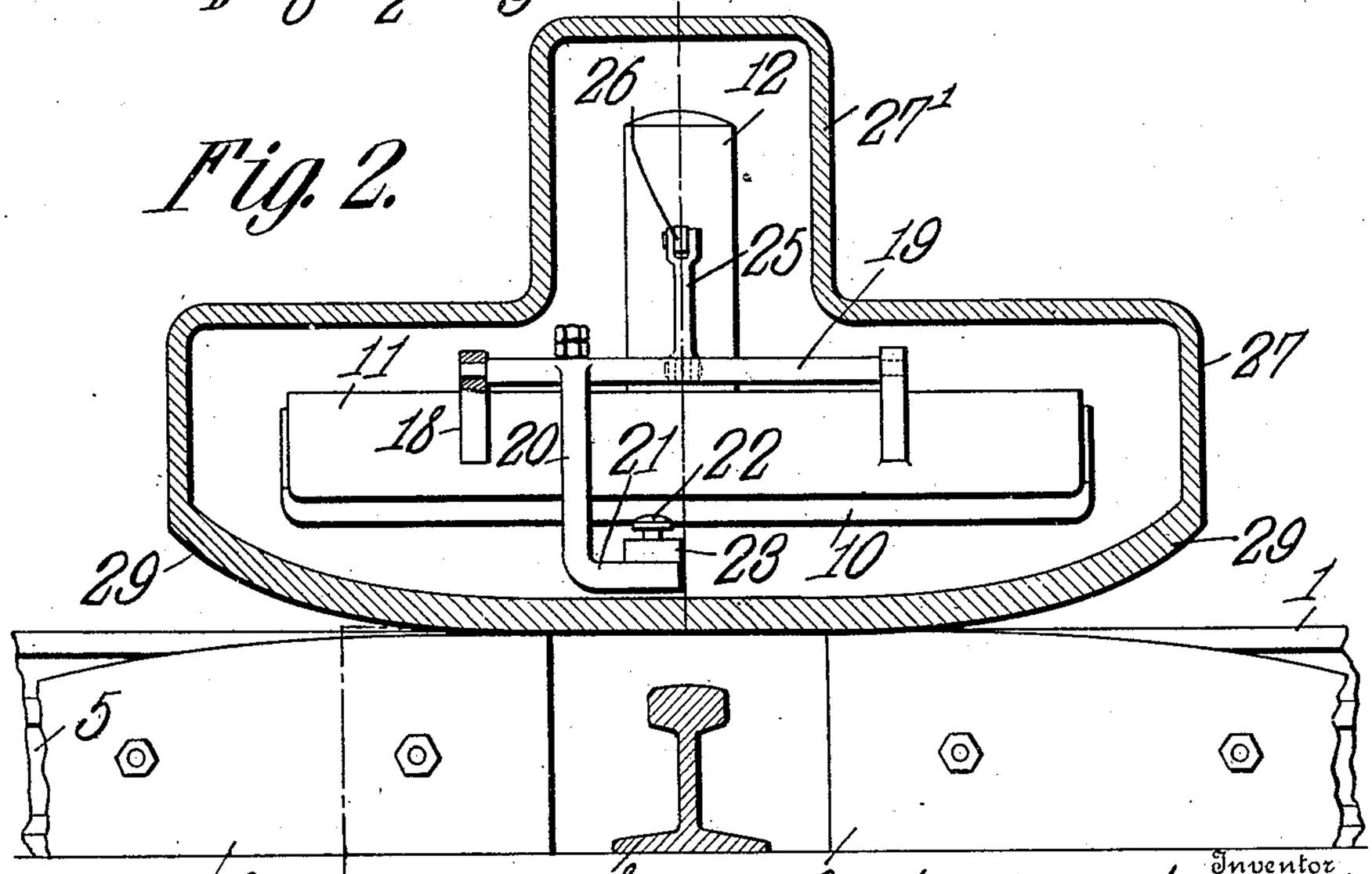


Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

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ELECTRIC RAILWAY SIGNAL SYSTEM.

No. 925,622. Specification of Letters Patent. Patented June 22, 1909.

Application filed June 4, 1908. Serial No. 436,672.

To all whom it may concern:

Be it known that I, CHARLES M. CLEAVLAND, a citizen of the United States, residing at Wausau, in the county of Marathon and State of Wisconsin, have invented a new and useful Electric Railway Signal System, of which the following is a specification.

This invention has reference to improvements in electric railway signaling systems, and is designed as an improvement upon the system set forth in Letters-Patent #863,509, granted to me on August 13, 1907.

In accordance with the invention set forth in said Letters-Patent there was provided a system whereby approaching trains are warned when they arrive within a danger zone. For this purpose the train carries an independent source of electrical energy for sending a signal to another train and also a receiving apparatus in the form of a visual alarm which is actuated from the source of energy of the said other train. In connection with this system there is provided a novel form of traveling contact, and it is to such a contact that the present invention more particularly relates.

The said invention comprises means for causing the traveling contact or runner to ride over spur tracks or conducting rails in its path and also to provide improvements in the general structure of the traveling contact or runner.

The invention will be best understood from a consideration of the following detail description taken in connection with the accompanying drawings forming a part of this specification, in which drawings—

Figure 1 is a cross section taken on the line A—B of Fig. 2. Fig. 2 is a longitudinal section on the line C—D of Fig. 1. Fig. 3 is a diagram illustrating the electric circuits.

Referring to the drawings, there is shown a conductor rail 1. This rail is hollow and is generally rectangular in cross section, although not confined to such shape. As shown, it consists of a base member 2 and side member 3 formed integral therewith and also of a top member 4 and side member 5 formed integral with the top member. Each side member is formed near one edge of the respective top or bottom member. Near the other edge each top and bottom member has formed two spaced parallel ribs 6 shaped to receive the free end or edge of the corresponding side member of the respective opposed top or bottom member. There is thus formed a hollow two-part conductor rail with the parts securely anchored together and within the rail there is provided a space for the reception of telephonic or telegraphic or other conductors, such for instance as feeding conductors for the hollow conducting rails. One of such conductors is shown at 7, and may be taken as typical of any kind of conductor adapted to be carried within the conductor rail 1.

Let it be assumed that in the path of the conductor 1 there is a spur rail 8, which may be taken as typical of any interruption in the continuity of the conductor 1. This means that the conductor 1 must be broken at the point where it is crossed by the spur rails 8. Bolted to each side of the conductor rail 1 are plates 9 extending backward from the ends of the conductor 1 adjacent to the spur rail 8 and gradually decreasing in height from the point adjacent the spur rail 8 backward for a sufficient distance. The highest portion of the plate 9 extends slightly above the top of the conductor 1.

The contact shoes consist of a plate or bar 10 adapted to engage on the upper surface of the conductor 1. This bar is movable in a vertical direction between two guide members 11 spaced apart and shaped to receive and guide the bar 10. The guide members 11 may be made of two parts suitably joined together, or they may be made in one piece. At an intermediate point the guide members 11 carry a movable post 12 capable of vertical movement with reference to the said guide members and at its lower end entering a suitable passage formed through the guide members. The post 12 is bored out from its lower end as shown at 13, to receive a helical spring 14 and a stem 15 formed on the bar 10. The spring 14 tends to force the plate away from the post 12 by engaging the upper end of the stem 15 within the bore or passage 13 but the movement of the plate 10 away from the post 12 may be limited by a pin 16 projecting from said post into a slot 17 in the stem 15, or any other means for connecting the two parts together in a manner to permit

the small relative movement necessary for the carrying out of the invention, may be used.

Formed on each member 11 or on opposite sides of a single member where a single member 11 is used, are projecting ears 18 in which are journaled the two ends of a rock-shaft 19. Each rock-shaft 19 has formed on it a downwardly-projecting arm 20 terminating in an angle extension 21 from which rises a pin 22 forming the journal for a roller 23, the arrangement being such that the roller 23 is free to rotate on a substantially vertical axis.

Projecting toward the post 12 from each shaft 19 midway of the length thereof, is a short angle arm 24 overriding the corresponding portion of the bar or support 11. The arm 24 is connected by a link 25 to the corresponding end of a rod or bar 26 extending laterally through the post 12, but this bar 26 may be replaced by suitable ears formed on the post 12. Fast to the support 11 is an inclosing casing 27 formed with a central upward projection or turret 27′, and its lower face is formed laterally flat, as indicated at 28. The front and rear ends of the casing 27 are upturned in a longitudinal direction, as indicated at 29. Extending centrally and longitudinally through the casing 27 is a slot 30, of a width slightly greater than the width of the conductor rail 1. The width of the slot 30, however, is such that while ample to receive the conductor rail 1 it will not receive the plates 9, and consequently the bottom 28 of the casing 27 immediately adjacent to the slot will engage the slanting upper edges of the plates 9 when the shoe is brought into operative relation with the plates 9.

Normally, the weight of the bar 10 and post 12 is such as to cause these parts to assume the position shown in Fig. 1, with the post 12 resting upon the upper face of the support 11, the lower end of the post 12 where it enters the support 11 being of reduced diameter so as to form shoulders 31 which will rest upon the said supports 11 when the post is in its lowermost position. Under these conditions the bar 10 is forced downward by the spring 14 as far as permitted by the pin 16. The links 25 act on the rock-arms 24 and cause a rotative movement of the shafts 19 sufficient to carry the arms 20 laterally away from the central vertical plane of the shoe or traveling contact. This is the position assumed by the parts named when the shoe is elevated either by suitable mechanism for the purpose or by the lower face of the shoe engaging the plates 9 and riding upward. Suppose, now, that the shoe is lowered by riding down the plates 9 over the downwardly-sloping edges thereof. Ultimately the conductor 1 enters through the slot 30 into the casing 27 and finally makes contact with the bar 10. As the shoe is further lowered the bar 10 is elevated and through the spring 14 elevates the post 12. The post 12, when elevated carries the link 25 to rotate the shafts 19 in a direction to bring the lower end of the arms 20 toward each other. This, however, does not take place until the rollers 23 have dropped below the upper edge of the top member 4 of the conductor rail 1, this edge overhanging the side members 3 and 5. As the shoe continues to move downward the rollers 23 are ultimately brought into contact with the outer faces of the side members 3 and 5 and further upward movement of the post 12 is thereby prevented. However, in the practical operation of the invention the shoe has not yet reached its lowermost position and consequently the bar 10 is forced still upward with relation to the support 11. This is permitted by the compression of the spring 14 which in turn reacts through the post 12 to cause the rollers 23 to bear with strong force upon the side members 3 and 4 of the conductor rail 1, thus insuring good electrical contact. When a shoe approaches the spur rail 8 or any other break in the continuity of the conductor 1, the shoe should be elevated in order to prevent electrical or mechanical contact with some crossing member, then the plates 9 in the path of the shoe cause the latter to rise by engagement of the face 28 of the casing 27. As soon as the shoe begins to rise the spring 14 on the bar 10 causes the latter to be depressed to the extent permitted by the pin 16 and the weight of the bar 10 acts on the post 12 and causes the whole structure to fall, thus moving the contact rollers 23 outward away from the side members 3 and 5 of the conductor 1, and this movement is sufficient to bring these members so far into the casing 27 that when the shoe is elevated the rollers 23 will not strike the overhanging edges of the top member 4 of the conductor 1.

In the diagrammatic representation of Fig. 3, the traffic rails are indicated at 32 and 33 while there are shown two intermediate conductors 1 and 34, it being understood that the conductor 34 is in all respects similar to the conductor 1 already described with reference to Fig. 1. In Fig. 3, the traveling contacts or shoes are indicated generally by the reference numeral 27 used in Fig. 1 to designate the exterior casing.

Each train carries a source of electrical energy indicated in Fig. 3 as the dynamo 35, although any other suitable source of current may be used. The train also carries a visual signal 36 and a volt meter 37 in multiple in the signal circuit, and the signal circuit also includes a pole-changing switch 38 which is of ordinary construction. In order that the engineman may be informed as to the opera-

tion of the circuit, a series lamp 39 is included in the dynamo circuit and if necessary or desirable a switch may be installed in this circuit, or the lamp may be arranged to burn continuously.

In order to provide for the automatic stoppage of a train, an electric motor 40 may be installed on each train, such motor being connected through suitable gearing to the reversing lever or the engineman's brake valve, or both. This motor is arranged in normally open circuit 41 with the dynamo, and the switch 42 of this circuit is under the control of an electro-magnet 43 connected by conductors 44 into the signal circuit. When the signal circuit is energized the electro magnet 43 is also energized and attracts an armature 45 operating to close the switch 42, thus energizing the motor 40 from the dynamo and automatically actuating the reversing lever, engineman's brake lever or other train-controlling devices.

In the complete system open switches or draw bridges or other conditions which will present danger elements for the approaching train will be made to operate the signals and also the train-controlling mechanism.

Should it occur that a train becomes stalled or delayed from any cause whatsoever, then the terminals of the conductors leading into the train from the shoes 27 may be utilized for the purpose of receiving the terminals of a telephone set so that communication with a distant point may be had over the conductors 1 and 34.

What is claimed is:—

1. In a device of the class described, a collecting shoe comprising a casing and having a slot for the reception of a conducting rail, a bar housed in said casing and adapted to move both with and independent of said casing, collecting devices also housed in the casing and movable therewith and also movable to and from the conducting rail independent of the movement of said casing, and elastic connections between the movable bar and collecting devices whereby the bar has a limited movement without moving the collecting devices.

2. A hollow conductor rail made of a bottom member and one side member formed in one piece, and a top member and the other side member formed in one piece.

3. A hollow conductor rail made of a bottom member and one side member formed in one piece, and a top member and the other side member also formed in one piece, the said top and bottom members each being formed with longitudinal spaced ribs to receive the outer edge of the side member of the respective other bottom or top member.

4. In an apparatus of the class described, a conducting rail having its continuity broken, inclined guides or tracks approaching the break in the conductor and flanking said conductor, a collecting shoe adapted to said rail and including an inclosing casing adapted to engage the guides or tracks, and means for carrying the collecting devices out of contact with the rail before the shoe is elevated above the same.

5. In a device of the class described, a collecting shoe having a movable bar, collecting means carried by said shoe, means under the control of the movable bar and acting on said collecting means to move them into and out of operative position, the bar having a limited movement independent of the collecting devices, and a spring interposed between the bar and the means for actuating the collecting devices.

6. In a device of the class described, a collecting shoe for taking current from a conducting rail located along the line of way, comprising a bar adapted to engage the collecting rail and movable to and from the same, contact devices adapted to move into and out of operative relation to the conducting rail, a member connected and controlling the collecting devices and movable in the same direction as the movable bar and in turn connected to and controlled by the said movable bar, and elastic connections between the movable bar and the member controlling the collecting devices.

7. In a device of the class described, a conducting rail along the line of way, and having its continuity broken, inclined tracks on each side of the break in the conducting rail, and a collecting shoe adapted to the conductor and having collecting means movable into and out of operative relation with the rail by the depression or elevation of the shoe, and an inclosing casing for the operation portion of the shoe, said casing being slotted for the reception of the rail or conductor and shaped to engage the inclined track flanking the conducting rail on each side of a break in the continuity thereof.

8. In a device of the character described, a contact shoe comprising a plate or bar, a guide for the same in which the plate or bar is movable vertically, a vertically movable post carried by the guide, a spring within the post and engaged by the bar, connections between the bar and post whereby the bar has a limited movement independent of the post, rock shafts carried by the guide, a rock arm on each shaft carrying a contact means, another rock arm on each shaft, and links connecting the last named rock arms to the movable post.

9. In a device of the character described, a contact shoe comprising a plate or bar, a guide for the same in which the plate or bar is movable vertically, a vertically movable

post carried by the guide, a spring within the post and engaged by the bar, connections between the bar and post whereby the bar has a limited movement independent of the post, rock shafts carried by the guide, a rock arm on each shaft carrying a contact means, another rock arm on each shaft, links connecting the last named rock arms to the movable post, and an inclosing casing for the shoe having a longitudinal slot through its lower face for the reception of a conducting rail.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

CHARLES M. CLEAVLAND.

Witnesses:

H. M. DUNFIELD,

J. N. MANSON.