T. W. VARLEY AND W. C. NEIN.

RAILWAY CROSSING SIGNAL.

APPLICATION FILED SEPT. 13, 1916. RENEWED FEB. 5, 1921.

1,390,067. Patented Sept. 6, 1921.

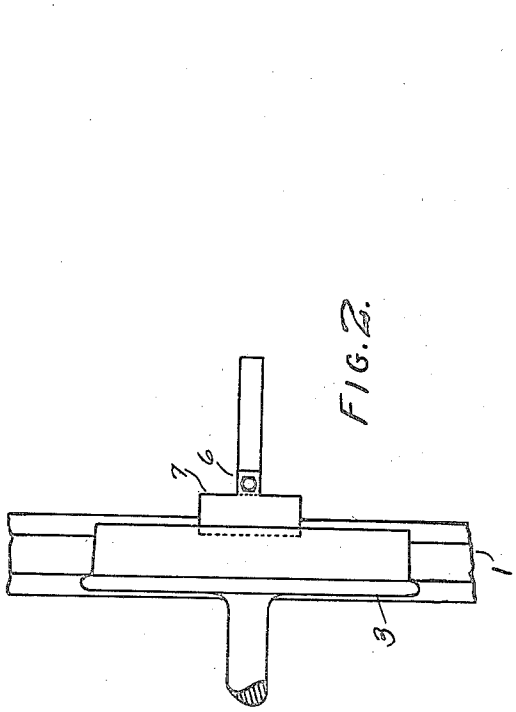


FIG. 2.

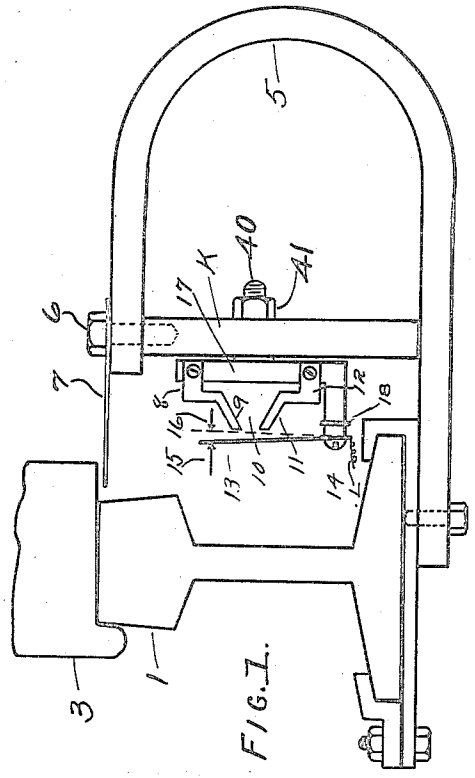


FIG. 1.

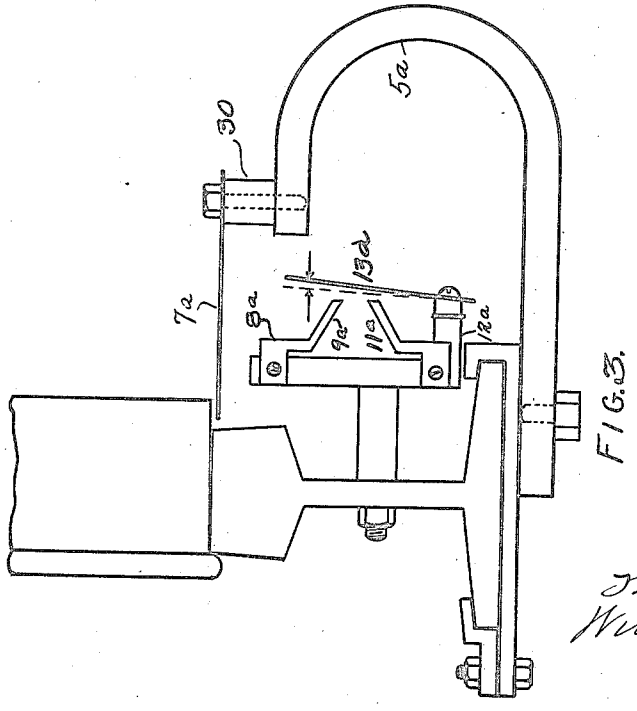


FIG. 3.

INVENTORS
Thomas W. Varley
William C. Nein
BY

ATTORNEY

UNITED STATES PATENT OFFICE.

THOMAS W. VARLEY AND WILLIAM C. NEIN, OF NEW YORK, N. Y.

RAILWAY-CROSSING SIGNAL.

1,390,067. Specification of Letters Patent. Patented Sept. 6, 1921.

Application filed September 13, 1916, Serial No. 119,881. Renewed February 5, 1921. Serial No. 442,890.

To all whom it may concern:

Be it known that we, THOMAS W. VARLEY and WILLIAM C. NEIN, citizens of the United States of America, residing at New York city, county of New York, and State of New York, have invented new and useful Improvements in Railway-Crossing Signals, of which the following is a specification.

This invention relates to "improvements in railway crossing signals" and more particularly to devices for controlling the operation of the signals.

According to the present invention, the desired control is effected by means of magnets along the track, the fields of which are altered by the wheels, or other magnetic parts, of a train, this change of field, or flux, distribution of magnets being detected by suitable devices acting as relays, which in turn control the circuits, for the signals.

The magnets are also arranged, upon the track, so that in the event of their being deranged, or removed from their normal position, the signals will act to disclose this condition, thus constituting what is known as a "closed circuit" system, in this case a closed magnetic circuit.

In the accompanying drawings, illustrating the invention,

Figure 1 shows details, partly in cross section, of a magnetic detector acting as a relay, in conjunction with a rail of a track, and a magnet.

Fig. 2 shows the top view of Fig. 1, illustrating the pole plate of the magnet in its relation to a wheel and the rail.

Fig. 3 is a similar view to Fig. 1, except that the detector support is fastened to the rail, and the pole plate is removed from direct magnetic contact with the magnet.

The contacting devices may be of a structure as shown in Figs. 1 and 2. In these figures, 1, represents a rail, while 3 represents a wheel of a car or engine truck resting upon the rail, other wheels (not shown), on the other side of the truck resting upon the other rail of a track (not shown) in a manner which is well understood.

Supported from the bottom of the rail by one end, is a U-shaped magnet 5, the other end being bent up in proximity with the top of the rail. Fastened to the top end of the magnet by bolt 6, is a soft iron plate 7, forming an enlarged pole piece as shown. In the magnetic gap between the poles of the magnet may be placed a body of iron or other suitable magnetic material 8, having a horn 9, separated by an air gap 10, from a similar horn 11, of a body 12, of magnetic material. Mounted adjacent the air gap 10 is a contact armature or tongue 13, which may be simply a strip of spring steel secured at 14, and biased to normally engage the back contact 15. Upon the other side of the tongue 13, is a forward contact 16, into engagement with which the tongue may be drawn by the magnetic flux between the horns 9 and 11. The tongue is retracted against the forward contact when it will occupy the position as indicated by the dotted line, when the magnetic pull of the tongue is sufficient to overcome its spring. It will be observed that in this position it does not quite contact with the horns. Conversely, when the spring is greater than the magnetic pull, the tongue will move into engagement with the back contact. The magnetic bodies 8 and 12, are carried on a suitable supporting piece 17 of non-magnetic material, which also carries the tongue 13, the tongue being suitably insulated from the support 17 by insulation 18. The support 17, is in turn carried by non-magnetic member K, in such a way as to allow the support to be rotated in a vertical plane for reasons as will be hereinafter shown. This mounting of the support 17 is effected by a stud 40, which is fixed to the support 17 and, passing through the member K, is secured by the nut 41, which is in screw-threaded engagement with the stud 40. When the nut is screwed tightly against the member K, the body 17 is clamped in any position to which it may be adjusted in a vertical plane. When the nut is loosened, the body may be turned, the stud turning with it in the hole in the member K, and, the nut being again tightened, the body 17 will be secured in the position to which it has been adjusted about the axis of the stud. The member K, is wedged between the poles of the magnet 5, and in addition held in place by the bolt 6. The apparatus is so adjusted that when there is no vehicle in the vicinity, the flux concentrated in the horns 9 and 11, and across the air gap 10, is sufficient to attract the tongue 13, into the dotted line position and against the forward contact. When, however, the vehicle wheel or truck comes opposite the magnet

5, the wheels and axles and portions of the truck being usually made of iron, a path of decreased magnetic reluctance between the pole piece 7 and the head of the rail will be provided, magnetism will be diverted from the path leading across the horns 9 and 11, and the air gap 10, the tongue 13 will spring away from the horns and the tongue will disengage with contact 16, and move into engagement with contact 15. Electrical connection to the tongue may be made by conductor L. The magnetic path provided by the vehicle having been removed by the passage of the vehicle out of operative range, magnetism will again pass between the horns 9 and 11, with sufficient strength to attract the tongue 13. It will now be seen that certain contacts are normally held closed and that the passage of the vehicle alters the magnetic flux of the track device, so that the contactor is moved to effect a change in the electrical connections. This may be taken advantage of to set in operation a signal, such as a crossing signal, or to terminate the operation of the same.

Referring more particularly to Fig. 1, the object of supporting the detecting device, consisting of horns 8, 12, etc., is, so as to be able to rotate it in a vertical plane to enable the device to be adjusted so that the magnetic pull of the horns upon the tongue may be varied by turning the whole at right angles to the position shown whereby the flux of the horns to the tongue may be varied as desired. Instead of the device as shown in Fig. 1, a somewhat similar device may be used, as shown in Fig. 3, with, however, this distinction, in Fig. 1 the flux through the tongue is altered by shunting out of the flux due to the passage of, in this case, a wheel, whereas in Fig. 3 the change of flux from the horns to the tongue is obtained by a different arrangement of magnetic circuits, as follows: The magnetic members 8^a and 12^a with their horns 9^a and 11^a in conjunction with the tongue 13^a, suitably supported as in Fig. 1, but in this case from the web of the rail, acts as the detector proper, the plate 7^a being magnetically separated by a block 30, from the magnet 5^a, the magnet 5^a, as in Fig. 1, being supported from the base of the rail. The detector is supported from the rail to insure its action in case the magnet is removed from the rail, from any cause, the loss of magnetic flux from the horns 9^a and 11^a to tongue 13^a, causing the tongue to move to its back contact.

While the invention has been illustrated in what are considered its best application, it may have other embodiments without departing from its spirit and is not, therefore, limited to the structures shown in the drawings.

What we claim as new and desire to secure by Letters Patent is:

1. In a contact device, the combination with a railway track extending along a fixed right of way of a U shaped magnet having one end in magnetic contact with one rail only of said track and its other end separated from said rail by an air gap, magnetic members, having a gap between them, extending between the poles of said magnet, a magnetic armature across said gap and contacts controlled by said armature, the first mentioned gap being adapted to have its flux varied by the passage of a wheel on said rail, to change the flux through the said magnetic members and armature to operate the last.

2. In a contact device, the combination with a railway track extending along a fixed right of way, of a U shaped magnet having one end in magnetic contact with one rail only of said track, the other end being separated from said rail by an air gap and having an expanded pole piece along the rail, magnetic members, extending between the poles of said magnet, said magnetic members being supported independently of said magnet and having an air gap between them, a magnetic armature across said gap and contacts controlled by said armature, the first mentioned gap being adapted to have its flux varied by the passage of a wheel on said rail to change the flux through the said magnetic members and armature to operate the last.

In testimony whereof, we have signed our names to this specification in the presence of the subscribing witness, this 12 day of September, 1916.

THOMAS W. VARLEY.
WILLIAM C. NEIN.

Witness:
MARY W. WALLACE.