C. E. MASON.

INTERLOCKING RELAY FOR RAILWAY SIGNALS.

APPLICATION FILED SEPT. 13, 1907.

1,169,273.

Patented Jan. 25, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

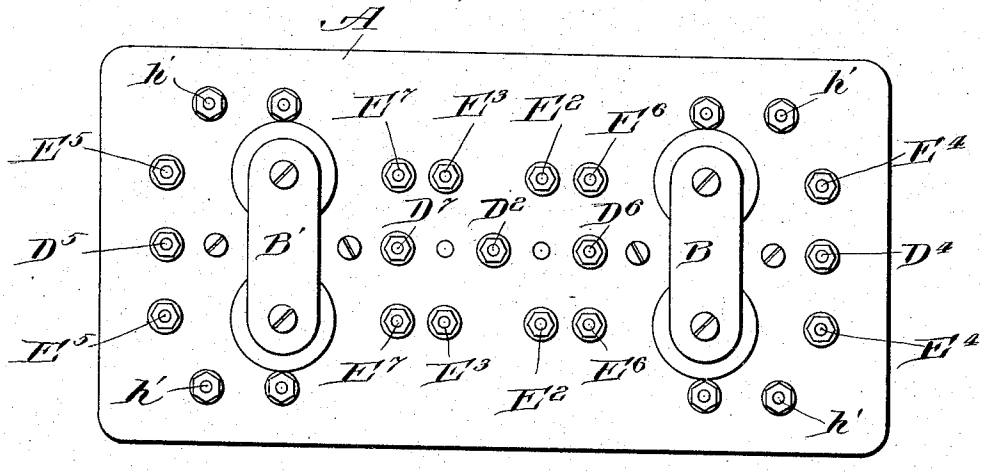
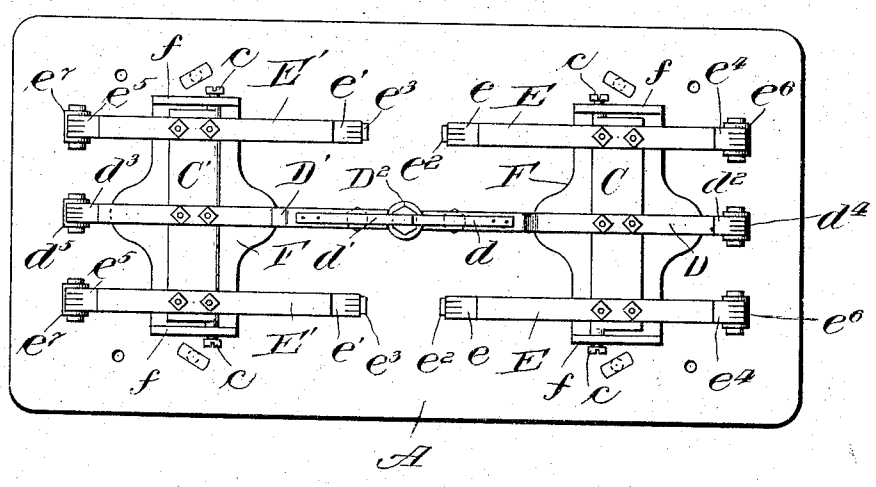


Fig. 2.



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THE COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

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2 SHEETS—SHEET 2.

Fig. 3.

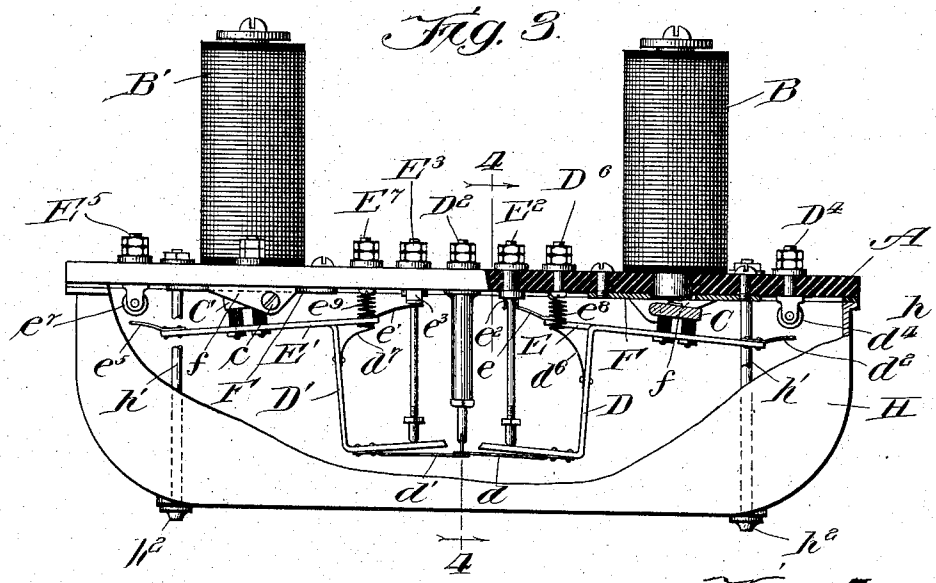


Fig. 4.

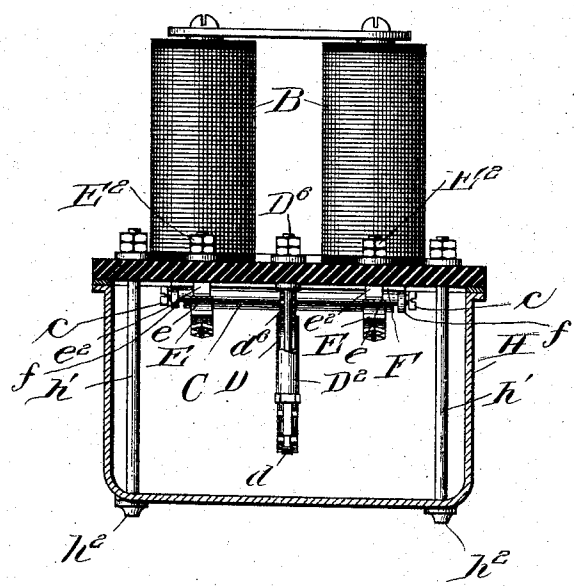


Fig. 5.

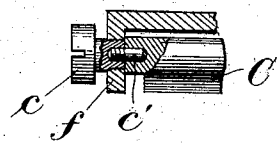
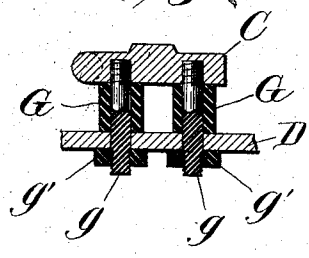


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES E. MASON, OF CHICAGO, ILLINOIS.

INTERLOCKING RELAY FOR RAILWAY-SIGNALS.

1,169,273. Specification of Letters Patent. Patented Jan. 25, 1916.

Application filed September 13, 1907. Serial No. 392,614.

To all whom it may concern:

Be it known that I, CHARLES E. MASON, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Interlocking Relays for Railway-Signals, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to railway signals and more particularly to an interlocking relay for use in crossing signal systems and the like.

My invention has for its object to simplify and improve the construction of relays of the character specified so as to render them more durable and more delicate and reliable in their operation.

To the above end my invention consists in a novel construction and arrangement of parts to be hereinafter pointed out with particularity in the claims.

For a full understanding of my invention, however, and of its various objects and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawings, wherein:

Figure 1. is a top plan view of a preferred form of relay; Fig. 2 is a bottom plan view of the relay with the casing removed; Fig. 3 is a view partly in side elevation and partly in longitudinal section, a portion of the casing being broken away for the sake of clearness; Fig. 4 is a section taken on line 4—4 Fig. 3 looking in the direction of the arrows; and Figs. 5 and 6 are details.

Referring to the drawings A indicates a base composed of insulating material, it being conveniently made of a slab of slate. B and B′ are magnets of any usual or suitable construction, mounted upon one side of the base, near opposite ends thereof, so as to have their axes perpendicular to the plane of the base. Since the base is intended to occupy a horizontal position, while the relay is in use, the magnets will normally be arranged vertically. On the under side of the base are arranged armatures C and C′ respectively, these armatures being preferably supported so as to swing about horizontal axes.

Each of the magnets, through its armature, is adapted to control one set of a pair of interlocked switch devices. To this end there is supported upon each armature a Z-shaped switch arm adapted to interlock with the switch arm on the other armature, together with one or more independent switch arms having any desired shape and being insulated from each other and from the interlocking arms. The interlocking arms are indicated at D and D′ respectively, while the additional, or as they are called, neutral, switch arms, are indicated at E and E′ respectively.

The parts are so proportioned that when the electromagnets are deënergized the contact pieces d and d' on the ends of the interlocking arms engage with each other and with a fixed contact connected to a terminal D^2 which terminal is arranged on the upper side of the base. At the same time the contact fingers e and e' on the inner ends of the arms E and E′ engage respectively with fixed contacts e^2 and e^3 arranged on the under side of the base and connected with terminals E^2 and E^3 respectively located on top of the base.

When both magnets are energized the engagement between the fixed and movable contacts just described is interrupted and engagement is effected between contact fingers e^4 and e^5 arranged on the outer ends of the arms E and E′ and fixed contacts e^6 and e^7 arranged on the under side of the base and connected respectively to terminals E^4 and E^5 on the upper side of the base. At the same time auxiliary contacts d^2 and d^3 on the outer ends of the members D and D′ respectively (where such auxiliary contacts are desired) engage with fixed contacts d^4 and d^5, respectively, arranged upon the lower side of the base and connected to terminals D^4 and D^5 respectively on top of the base. The arms D and D′ are electrically connected to terminals D^6 and D^7 respectively by means of flexible leads d^6 and d^7 respectively. Similarly the arms E and E′ are connected to terminals E^6 and E^7 by means of flexible leads e^8 and e^9. The terminals D^6 and D^7 as well as the terminals E^6 and E^7 are located on the top of the base. It will therefore be seen that all of the electrical connections which it is neces-

sary to make outside of the contacts effected by the switches themselves may be made on one side of the base and, by arranging all of the terminals symmetrically as illustrated, the wiring of the relay is simple and easily accomplished. The wiring has not been shown, since this will vary, of course, with the nature of the signal circuits.

It is a purpose of the present invention to do away with the necessity for springs or other auxiliary means for carrying the movable contact members into one operative position upon deënergization of the magnets. To this end each of the armatures is preferably formed of a flat strip or plate which is pivoted near one edge thereof so that upon deënergization of the corresponding magnet coil the armature drops quickly and forces the movable contact fingers against the fixed contacts, as indicated in Fig. 3, with considerable pressure. A very satisfactory method of supporting the armatures consists in providing a bracket F secured to the under side of the base plate in any suitable manner and having ears f through which may be passed screws c arranged to engage with the ends of the armature. I prefer to make the major portion of the screws of brass on account of its cheapness and to provide a small trunnion portion c' on the end of each screw to act as the pivot.

Considerable difficulty has been experienced in providing a cheap and reliable insulated connection between switch arms of the character shown and the armatures and one of the features of the present relay comprises a novel form of support for the movable switch members. This support is most clearly shown in Fig. 6 where C is the armature and D one of the interlocking switch arms. G, G are a pair of bone bushings arranged between the members C and D and spacing them apart. g g are studs, also of bone, passing through the switch arm and the bushings into the armature. g' g' are nuts upon the outer ends of the studs, these nuts firmly tying all of the parts together.

In order to shield all of the more delicate parts and at the same time permit them to be readily inspected I provide a casing H preferably of glass which is secured to the bottom of the base and completely incloses all of the mechanism beneath the base. A rubber gasket, or the like, h is preferably interposed between the casing or the base to make the joint perfectly tight. The casing may be secured in place in any suitable manner, as for example, by means of rods h' which pass through the base and through the casing and are provided with heads or projections h^2 on the lower ends thereof which act as feet for supporting the casing.

The contact fingers and the surfaces of contacts e^2 and e^3 are preferably made of platinum, and the contacts e^6 and e^7 in the form of carbon rollers, but it will, of course, be understood that other materials may be employed when desired.

While I have described with particularity a preferred construction and arrangement of parts, I do not desire to be limited thereto except to the extent specifically pointed out in the appended claims.

Having now fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a relay, a pair of vertical magnets, a pair of armatures pivotally mounted beneath said magnets so as to swing about horizontal axes, a contact piece arranged between said armatures, interlocking contact arms carried by said armatures in planes at right angles to the axes of the magnets and coöperating with said contact piece, additional contact pieces arranged on opposite sides of each of said armatures, and switch arms carried by each of said armatures and arranged to engage at their one end with the coöperating contacts on one side of the armatures when the magnets are deënergized and at their other end with the coöperating contacts on the other side of the armature when the magnets are energized.

2. In a relay, a pair of vertical magnets, a pair of armatures pivotally mounted beneath said magnets so as to swing about horizontal axes, a contact piece arranged between said armatures, and contact arms carried by said armatures in planes at right angles to the axes of the magnets and having interlocking contact with each other and coöperating with said contact piece.

In testimony whereof, I sign this specification in the presence of two witnesses.

CHARLES E. MASON.

Witnesses:
WM. F. FREUDENREICH,
HARRY S. GAITHER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."