

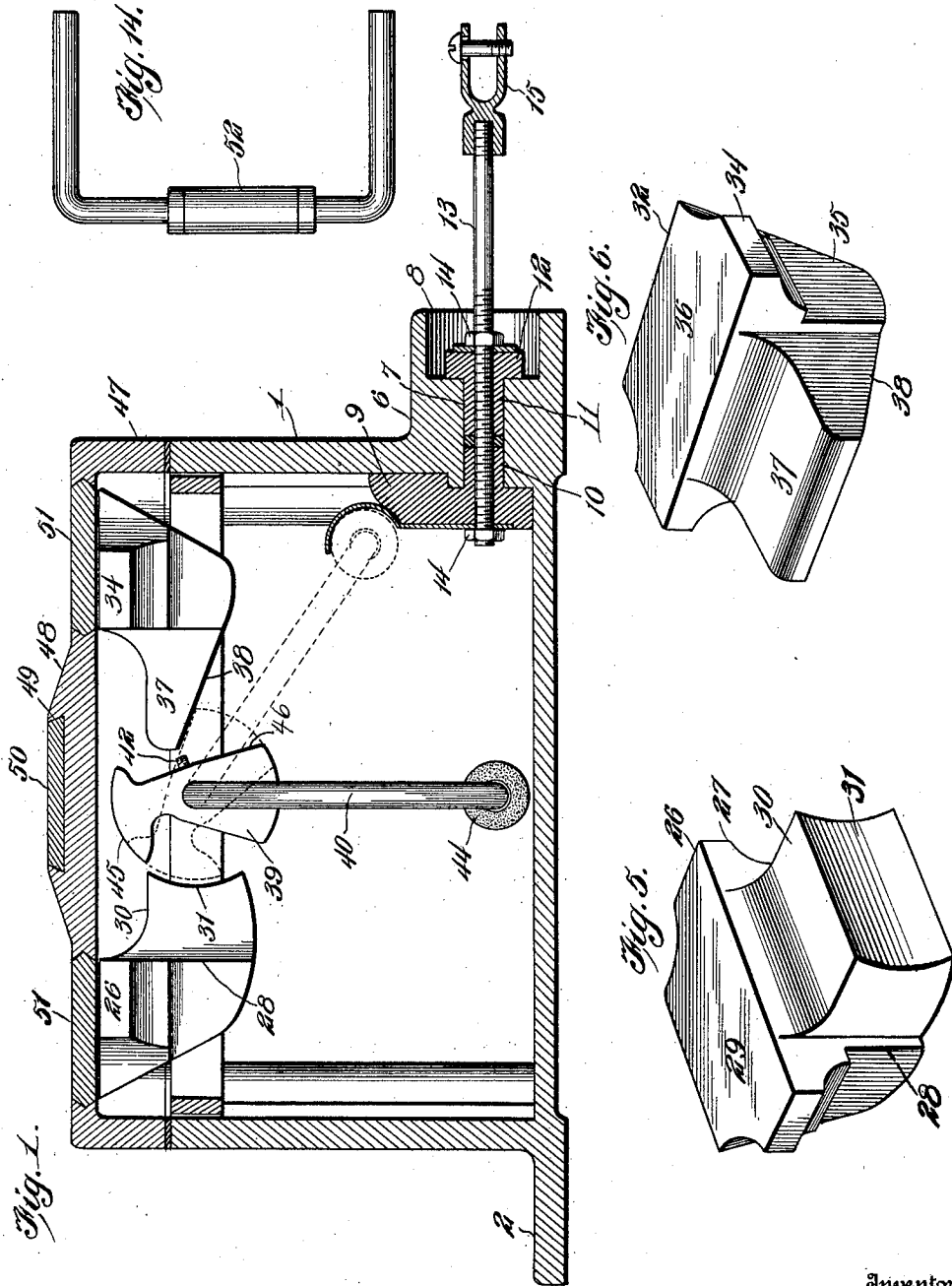
R. HIPPLE.
SWITCH BOX.

APPLICATION FILED MAY 19, 1909.

1,056,677.

Patented Mar. 18, 1913.

3 SHEETS—SHEET 1.



Witnesses

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D. W. Gould.

Inventor
Ritter Hipple

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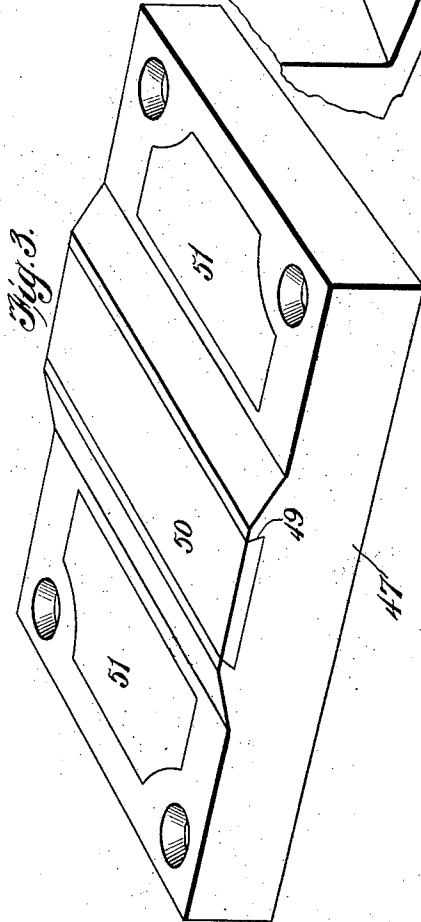
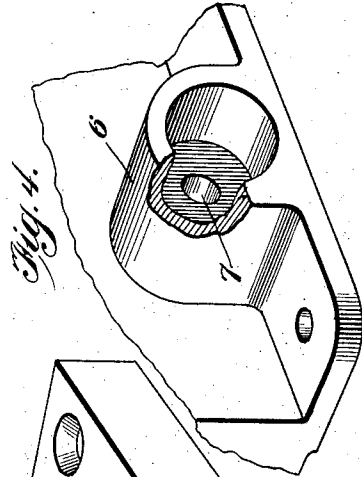
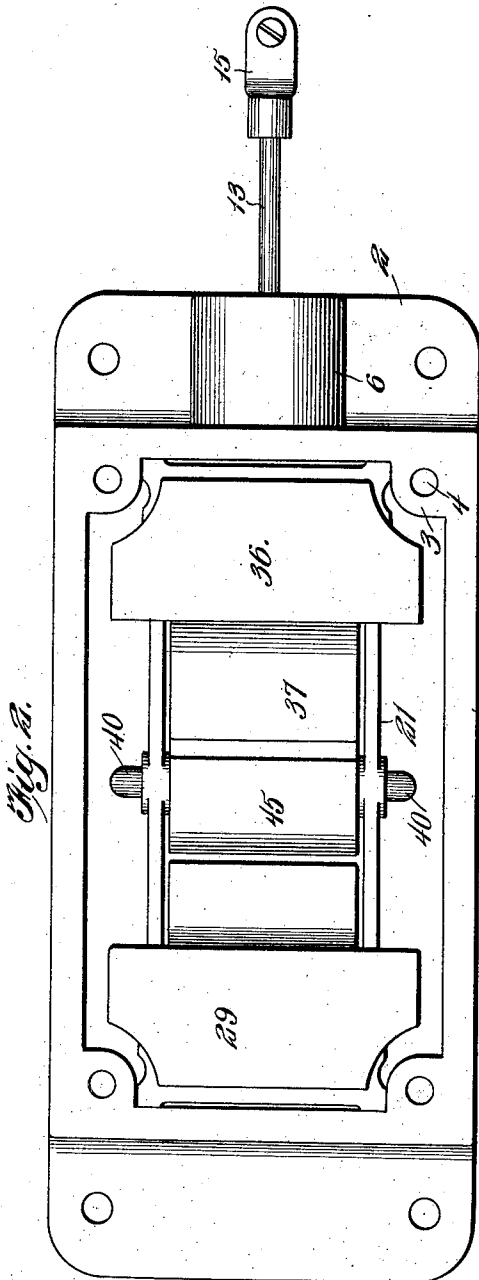
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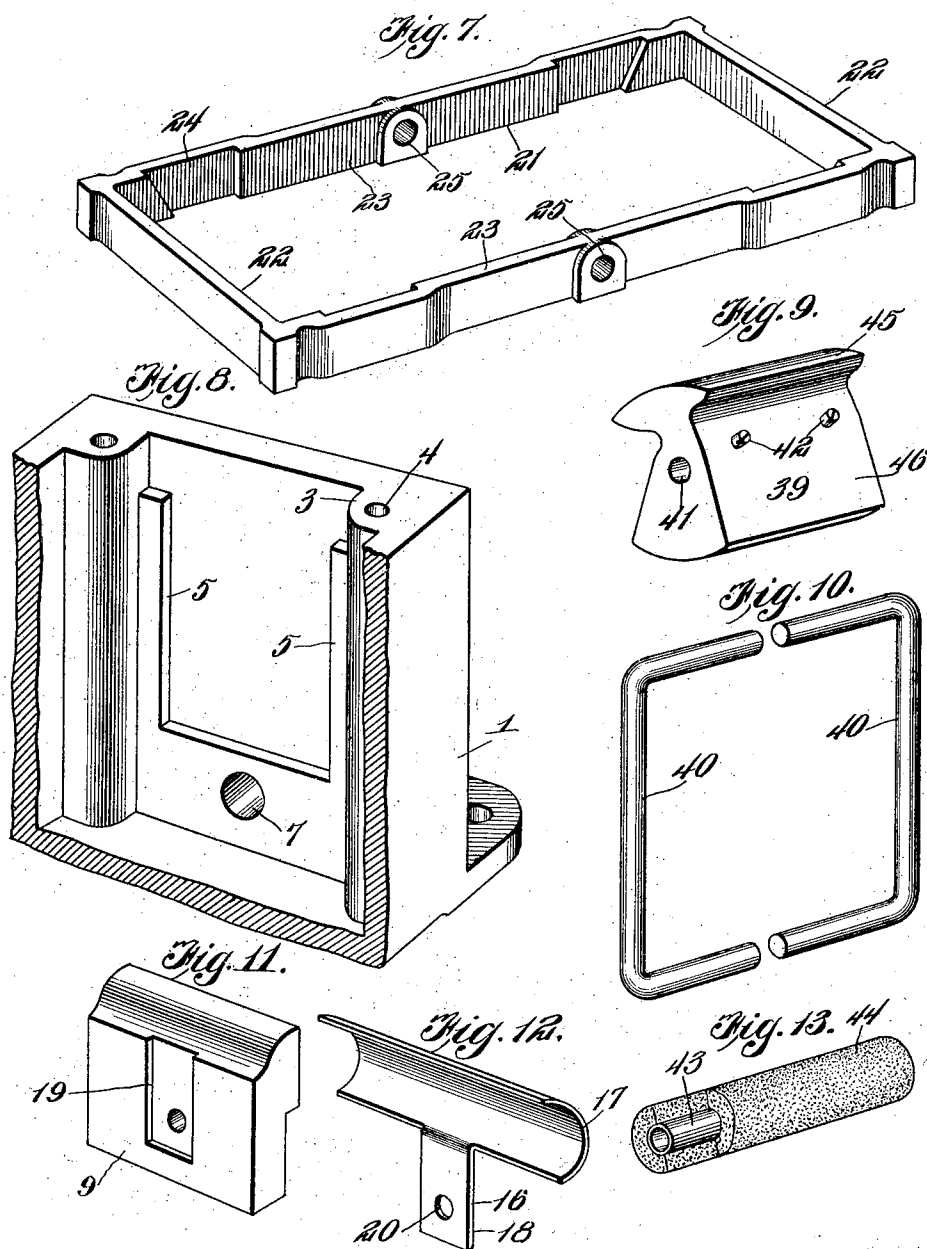
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UNITED STATES PATENT OFFICE.

RITTER HIPPLE, OF WILLIAMSPORT, PENNSYLVANIA.

SWITCH-BOX.

1,056,677.

Specification of Letters Patent.

Patented Mar. 18, 1913.

Application filed May 19, 1909. Serial No. 496,899.

To all whom it may concern:

Be it known that I, RITTER HIPPLE, a citizen of the United States, residing at Williamsport, in the county of Lycoming and State of Pennsylvania, have invented new and useful Improvements in Switch-Boxes, of which the following is a specification.

The invention relates to an improvement in switch boxes designed primarily for connection with railway systems in which a series of switch boxes are arranged at appropriate intervals in the road bed and successively energized to drive the car motor, the energization being automatically affected by the presence of the car above the box and each box automatically deenergized immediately succeeding the passage of the car thereover.

The main object of the present invention is the provision of a switch box in which the energizing and automatic contact is secured through the medium of a magnetic pull induced by the proximity of the traveling vehicle, the pole pieces and armature through which the magnetic effect is secured being constructed to insure a more effective contact between the service current contacts than is possible with the ordinarily constructed pole pieces.

A further object of the invention is the provision of independently and structurally distinct pole pieces and the use of an armature having a specific formation in accordance with the structure of the different pole pieces, one of said pole pieces being constructed to induce the usual magnetic alining movement of the armature while the other is constructed to induce a pull at an angle to the first mentioned pole piece, the arrangement of the pole pieces serving to aggregate their effect upon the armature and thereby induce positive holding of the armature in place to secure desired contact against the possibility of loosening of such contact from any cause other than the demagnetization of the pole pieces.

The invention will be described in the following specification, reference being had particularly to the accompanying drawings, in which:—

Figure 1 is a longitudinal sectional view partly in elevation of a switch box constructed in accordance with my invention. Fig. 2 is a plan of the same with the cover removed. Fig. 3 is a perspective view of the cover. Fig. 4 is a broken sectional detail

showing the connection of the main conductor to the box. Fig. 5 is a perspective of one of the pole pieces. Fig. 6 is a similar view of the other pole piece. Fig. 7 is a perspective view of the bridge member. Fig. 8 is a broken perspective of one end of the casing. Fig. 9 is a perspective of the armature. Fig. 10 is a perspective of the contact arm. Fig. 11 is a perspective of the fixed contact block. Fig. 12 is a perspective of the fixed contact. Fig. 13 is a broken perspective of the movable contact. Fig. 14 is an elevation of a slightly modified form of contact arm.

Referring particularly to the accompanying drawings, wherein similar numerals indicate like parts throughout the several views, the improved switch box comprises an approximately rectangular casing 1 including bottom, side and end walls, holding lips 2 being projected in alinement with the bottom beyond the end walls to provide for securing the box in place. The junctures of the side and end walls are formed to provide reinforcing bosses 3 in each of which there is formed a threaded opening 4 for the securing of the cover in place, as will presently appear. Each end wall between the post 3 is formed with vertically extending strips 5 which terminate an appropriate distance from the upper edge of the wall and form a means for removably supporting the bridge piece to be presently described.

One end wall immediately above and including the lip 2 is provided with a circular projection 6 in which is centrally formed an opening 7 extending through and communicating with the casing, the diameter of the opening adjacent the outer end of the projection 6 being enlarged to form a pocket 8. A contact holder 9 is secured against the end wall of the casing from which the projection extends, said holder fitting between the strips 5 and having a lateral projection 10 fitting within and extending a portion of the length of the opening 7. A filler block 11 is fitted within the remaining portion of the opening 7 having a head 12, resting in the pocket 8. A service connector 13 is passed through the filler block and through the contact holder 9, nuts 14, beyond the contact holder and filler block, serving to secure these parts in applied position. The filler block and contact holder are, of course, of insulating material, and the connector 13,

which may be of any desired length, is provided at its outer or free end with a coupling 15 whereby the service conductor may be electrically connected. A contact strip 16, hereinafter termed the fixed contact, is secured to the holder 9, said strip preferably including an approximately semicircular head 17 and a depending tie plate 18, the latter being designed to fit in a recess 19 formed in the holder 9 and to be formed with an opening 20 for the passage of the connector 13 therethrough, whereby the fixed contact is secured in place by the connector and is in electrical communication therewith. The head of the fixed contact is disposed at right angles to the vertical plane of the casing, and is preferably of a length corresponding to the distance between the posts 3.

A bridge member 21 is arranged to be supported upon the upper ends of the strips 5, the height of the material forming said bridge being such as to dispose the upper edge thereof approximately in alinement with the upper edge of the casing walls when the bridge piece is in place. Said bridge piece is of skeleton construction including end bars 22 and side bars 23, the latter being formed on their inner surfaces near each end with a recess or cutaway portion 24 and being centrally between said recesses inset beyond the normal plane of the side bars, so that at the central portion the bridge piece is of less width than adjacent the end. Centrally of each side bar 23 there is formed in any appropriate manner a bearing opening 25, for a purpose which will presently appear.

The bridge piece 21 is designed to support the pole pieces for the operation of the movable contact, each pole piece coöperating with the transversely alined pair of recesses 24 in the bridge piece. These pole pieces are of distinctly different character, and one of the important features of the present invention resides in this specific construction and the advantages pertaining thereto.

One of the pole pieces, as 26, comprises a block of material readily susceptible to magnetic influence and including a body 27 having the relatively lower portion of its side walls formed, as at 28, for coöperation with the recesses 24 in the bridge piece, the upper surface 29 of the body serving as a contact surface and being, by the construction described, supported some distance above the upper edge of the side bars of the bridge piece. Projecting forwardly from the body 27 is a nose 30, the forward surface of which is concaved at 31 in accordance with the swing of the armature, this construction of pole piece being similar to that in ordinary motors or the like. The other pole piece 32 has a body 33 corresponding in all respects to the body of the first mentioned

pole piece, being formed on its sides, as at 35, for coöperation with the recesses 24 of the bridge piece and having an upper or contact surface 36. The nose 37 of this pole piece differs, however, from the nose of the other pole piece in that the lower surface 38 of the nose 37 is a plain surface which when in place in the bridge piece projects into the path of movement of the armature, as shown in Fig. 1.

With the respective pole pieces in applied positions, as shown in Fig. 1, it will be noted that the operative face 31 of one pole piece is rounded, while the face of the opposing pole piece is flat. Furthermore, the nose 37 of the pole piece 32 has a greater extent longitudinally of the casing than the nose 30 of the pole piece 26, so that the operative face 38 of the pole piece 32 terminates closer to the bearings 25 of the bridge piece.

Mounted between the bearings 25 is an armature 39, said armature being supported on U-shaped rods 40 with their terminals passed through the bearings from the outer side and engaging in a central opening 41 in the armature, set screws 42 securing the parts in applied position. The remaining terminals of the rods 40 depend below the side bars of the bridge piece and are secured in a hollow sleeve 43 inserted within a carbon contact roller 44, said roller forming what will be hereinafter termed the movable contact. From the construction described it is obvious that the movable contact is pivotally or swingingly supported from the bridge piece, it being understood that the proportions of the parts are such that in the movement of the armature a sufficient distance in one direction the movable contact 44 will engage and snugly fit the head 17 of the fixed contact 16, as shown in dotted lines in Fig. 1.

The armature 39 is peculiarly constructed for coöperation with the particular pole pieces, one end of said armature having a rounded face 45 designed to coöperate with the rounded face 31 of the pole piece 29, while the opposing end of the armature is on its upper surface formed with a flat or plane contact 46 to coöperate with the contact 38 of the pole piece 32. The armature is, of course, so mounted that in a swinging movement thereof the curved face 45 will ride into close proximity but avoid direct contact with the curved face 31 of the pole piece 26, as is usual in magnetically influenced armatures. In connection with the other pole piece, however, it will be noted that the contact face 38 of the pole piece 32 overlies the contact face 46 of the armature so that if a sufficient movement of the armature is had there will result a direct contact between the faces 38 and 46.

By the peculiar form of contact faces of the pole pieces and armature the movement

of the armature is materially accelerated, the movable contact snapped into fixed contact and the close engagement of the respective contacts maintained under all conditions so long as the pole pieces are energized. This is due to the fact that the curved faces of the pole piece and armature will ordinarily induce such movement of the armature as to aline the magnetic lines of force, and this effect is also present in the plane faces of the pole piece and armature except that in the latter the tendency to the alinement induces direct contact, hence the pull is continually and gradually increased as the armature moves toward the pole piece until the maximum effect is gained by contact. If, however, the engagement of the service contacts is had just prior to the contact between the plane faces of the pole piece and armature it will be appreciated that the pull between these parts will tend with increasing force to maintain such contact.

A cover 47 is designed to be secured upon the casing 1, said cover including a central raised portion 48 formed with a transversely arranged dovetailed recess 49 to receive a service contact plate 50, the cover in those portions directly overlying the respective contact faces 29 and 36 of the pole pieces being formed for the reception of magnetic contact plates 51. These plates are preferably formed with edges having angularly related portions so that in casting the cover the plates are secured in position against possibility of withdrawal.

If desired fuses 52, of any ordinary construction, may be arranged in the rods 40 to guard against burning the car apparatus from any excess current.

Having thus described the invention what is claimed as new, is:—

1. The combination with a switch box, of a contact holder secured thereto, a contact strip secured to the holder and adapted for connection with a service conductor, a bridge member mounted within the box and formed adjacent each end with oppositely disposed recesses, a pole piece formed with an arcuate face and removably supported in the recesses at one end of the bridge member, a second pole piece removably supported in the recesses at the opposite end of the bridge member and provided with a flat face disposed approximately tangentially to a circle concentric with the arcuate face of the first-mentioned pole piece, an armature mounted for movement in the box and formed with an arcuate face and with a flat face to magnetically coöperate with the faces of the respective pole pieces, a contact member carried by and movable with the armature and adapted to engage the con-

tact strip in the swing of the armature under the maximum magnetic influence of the pole pieces, and a cover for said box having a service contact plate.

2. A contact switch box, including a fixed contact adapted for connection with a service conductor, a movable contact arranged to engage the fixed contact, and magnetically operated means for actuating said movable contact, said means including two pole pieces, and an armature having two faces, one of said pole pieces having an arcuate face concentric with the path of movement of one of the faces of the armature, the other of said pole pieces having a face arranged in approximate parallelism with a diameter of the path of movement of the first-mentioned face of the armature, the other face of the armature being flat and moving in a path intercepted by the face of the second pole piece.

3. A contact box, including a fixed contact adapted for connection with a service conductor, a movable contact arranged to engage the fixed contact, and magnetically operated means for actuating the movable contact, said means including two pole pieces and an armature having an arcuate face, and a flat face, one of the pole pieces having an arcuate face concentric with the path of movement of the arcuate face of the pole piece, and the other of said pole pieces having a face disposed in the path of movement of the flat face of the armature and disposed at such an angle to the flat face of the armature when the latter is in inoperative position, that said flat face of the pole piece has its maximum pulling effect on the flat face of the armature when the arcuate faces of the armature and pole piece are near their neutral positions.

4. A contact box, including a fixed contact adapted for connection with a service conductor, a movable contact arranged to engage the fixed contact, and magnetically operated means for actuating the movable contact, said means including two pole pieces, and a pivoted armature having an arcuate face and a flat face, one of the pole pieces having an arcuate face to coöperate with the arcuate face of the armature, the other pole piece having a flat face terminating adjacent the pivot of the armature and disposed parallel to a diametric line of the arcuate face of the first pole piece passing through the pivot of the armature.

In testimony whereof I affix my signature in presence of two witnesses.

RITTER HIPPLE.

Witnesses:

ELBERT A. PORTER,
WM. RUSSELL DEEMER.