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POLARIZED SINGLE-COIL RELAYS

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Fig.1

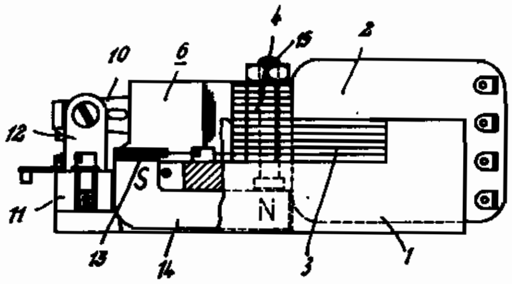
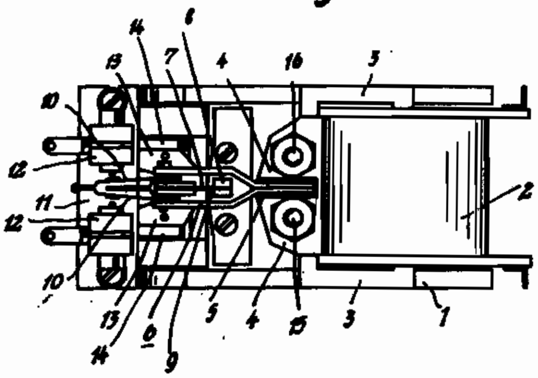


Fig.2



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ALIEN PROPERTY CUSTODIAN

POLARIZED SINGLE-COIL RELAYS

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This invention relates to improvements in polarized single-coil relays.

A polarized single-coil relay with a divided direct-current flux forming a closed circuit through the ends of the armature is well known. In such a relay one pole of the polarizing permanent magnet is arranged in the neighborhood of the two pole shoes; the other pole of the permanent magnet is arranged below the center of rotation of the armature. Since in the known relay the armature must have a very short length, the distance between the poles of the permanent magnet must be chosen accordingly small. Since the attractive force of the permanent magnet is dependent upon its dimension a bar magnet of such a small length is not sufficient for the permanent flux. To attain a sufficient attractive force a horse-shoe magnet must be employed if the distance between the poles is dependent upon half the length of the armature and if the length of the armature is small. However, horse-shoe magnets of sufficient attractive force require large dimensions. Thus in the known relay it is necessary to arrange the horse-shoe magnet beneath the mounting plate of the relay so that the height of the mounting frame is dependent upon the height of the horse-shoe-shaped permanent magnet. Since the parts of the relay, such as the coil, the armature and the contact arrangement are arranged above the mounting plate and only the horse-shoe magnet is placed beneath this plate there results a hollow space beneath the mounting plate and within the mounting frame that cannot be utilized.

As the distance between the poles of the permanent magnet must be relatively small in view of the fact that the permanent magnet on the one hand is arranged below the center of rotation of the armature and on the other hand below the pole shoes of the alternating flux circuit and since the pole of the permanent magnet arranged below the center of rotation of the armature must be extended in the upward direction through pole shoes to the plane of the armature, the further disadvantage is presented in that between the permanent magnet arranged below the center of rotation of the armature and the pole shoes of the alternating flux circuit there remains a relatively small air gap so that the dispersion of the permanent magnet cannot be neglected.

The disadvantages of the known relay are removed according to the invention. The object of the invention is to provide a relay of the smallest dimensions.

According to the invention the permanent flux enters the soft iron circuit from a point lying on one side of the center of rotation of the armature and returns to the permanent magnet from the armature on the other side of the center of rotation of the armature.

According to the invention the permanent flux is carried off from the armature in a direction perpendicular to the movement of the armature. Such a measure has the advantage that a strong permanent magnet having a small dispersion may be mounted in the relay. Since in carrying off the flux according to the invention the production of a breaking torque is avoided also in the case of the smallest air gap, the flux may be carried off from the armature even in the neighborhood of the contacts.

The relay according to the invention has the further advantage that a permanent magnet of the bar type may be employed instead of a horse-shoe magnet, since the distance between the poles of the permanent magnet may be made equal to the length of the armature. However, since the armature is secured above the mounting plate as is the case with the known relays, an L-shaped permanent magnet is preferably employed, in which the pole arranged on the short end of the magnet is opposite to the point of the armature where the flux is carried off.

In Figs. 1 and 2 of the accompanying drawings is shown an embodiment of the invention in diagrammatic form, in which similar numerals denote similar parts in both views. Fig. 1 shows a side elevational view of the relay according to the invention and Fig. 2 a top view thereof.

The coil 2 and the soft iron armature 3 thereof are arranged within the casing frame 1 partly broken away. The soft iron core 3 forms a closed circuit through the pole shoes 4, the air gap 5 being maintained constant in which one end of the resiliently mounted armature 6 oscillates. The armature 6 is secured to the clamping block 8 through the spring 7. 9 denotes the axis of rotation of the armature. To the end of the armature 6 away from the soft iron pole shoes 4 are secured the contact springs 10 which contact with the stationary contact 12 secured to the contact block 11. Between the center of rotation 9 of the armature and the contact making end of the armature are arranged beneath the armature 6 the surfaces 13 carrying off the flux. The polarizing permanent magnet 14 whose rear side lies in the same plane as the bottom plate of the casing frame is L-shaped. The shorter end of the magnet 14 denoted by the reference character S forms the south pole and is opposite to the surface 13 of the armature 6, carrying off the flux. The long end of the permanent magnet 14 denoted by N forms the north pole of the permanent magnet and is arranged beneath the pole shoes 4. The screws 15 and 16 consisting of soft iron and whose invisible free ends contact with the north pole of the permanent magnet are embedded in the pole shoes 4. The alternating flux forms a closed circuit through the pole shoes 4 and through the armature end capable of being oscillated in the air gap. The permanent flux circuit extends from the north pole of the permanent magnet on the one hand through the screw 15 to one of the pole shoes 4 of the alternating flux circuit and from the other pole shoe 4 to the armature end capable of being oscillated in the air gap. The permanent flux forms a closed circuit through the ends of the armature and flows from the center of rotation 9 back into the south pole of the permanent magnet through the surface 13 carrying off the flux. On the other hand the permanent flux which divides itself extends from the north pole of the permanent magnet through the screw 16 to the other pole 4 of the alternating flux circuit and extends also through the ends of the armature and returns on the other side of the center of rotation 9 of the armature to the south pole of the permanent magnet through the surface 13 carrying off the flux.

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