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W. B. ELLWOOD
ELECTROMAGNETIC SWITCH

2,264,746

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FIG. 1

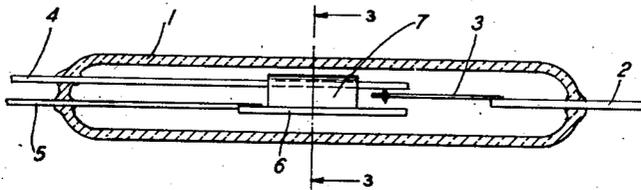


FIG. 2

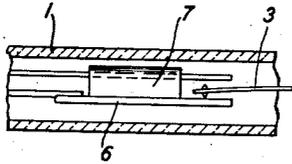
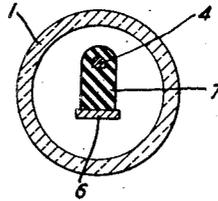


FIG. 3



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ELECTROMAGNETIC SWITCH

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2 Claims. (Cl. 200—87)

This invention relates to switches and particularly to electromagnetically operated switches.

The object of the invention is to provide a relay unit contact device which is economical, reliable and easily replaceable.

A feature of the invention is a contact arrangement for transfer operation consisting essentially of contacts of magnetic material sealed in a vessel either evacuated or filled with an inert gas which may be operated by an external magnetic force whereby costly contact metals are eliminated. To secure transfer operations two magnetic elements are placed lengthwise in the vessel and are slightly overlapping but normally out of contact with each other. To one of these elements is secured by insulation a third and non-magnetic member which is normally in contact with the other said magnetic element. When an external magnetic force is applied to this unit the two magnetic members which form part of the magnetic circuit as well as part of the electrical circuit of the device are moved together whereby the contact from the second magnetic element is transferred from the non-magnetic element to the first magnetic element since the external magnetic force acts to diminish the air-gap between the two said magnetic elements. The construction of this device involves the use of an insulating member to maintain constant separation between the said non-magnetic element and its associated magnetic element, whereby the second magnetic element thus effectively travels between the two.

Another feature of the invention is the use of a movable contact assembly. In this type relay where the part corresponding to the armature in a normal relay and the part corresponding to the front contact in a normal relay are both part of the magnetic circuit and both are subject to movement when energized, the part corresponding to the back contact of a normal relay must be made comparatively flexible and caused to move with the front contact since the direction of movement of such front contact is toward the back contact.

This contact device is of the general nature shown in Patent 2,187,115 to Ellwood et al., January 16, 1940.

The drawing consists of a single sheet showing three cross-section views of the contact unit.

Fig. 1 shows a cross-section of the unit when taken lengthwise. 1 is a glass envelope which may be evacuated or filled with an inert gas to prevent corrosion or oxidation. 2 is a terminal entering the envelope to which is attached a

resilient magnetic member 3. At the other end of this device a non-magnetic member 4 and a conducting member 5 are sealed into the glass. A magnetic member 6 is attached to the conducting member 5 in any well-known manner, for instance, by welding. The non-magnetic member 4 and the magnetic member 6 are held to a permanent degree of separation by an insulating piece 7. The non-magnetic member 4, the magnetic member 6 and the insulating piece 7 may be slightly movable as a unit.

As shown in Fig. 1 the contact device is non-operated and a connection is made between the non-magnetic member 4 and the magnetic member 3. In Fig. 2 the device is shown in its operated position with contact being made between the magnetic member 6 and the magnetic member 3. This illustrates how the insulating piece 7 prevents the non-magnetic member 4 which is tensioned downwardly from following the non-magnetic member 3 when it moves into contact with the magnetic member 6. Fig. 3 shows a cross-section on the lines 3—3 to illustrate one method by which the insulating piece 7 may be attached to the non-magnetic member 4 and the magnetic member 6.

This contact device may be operated by a coil external to the envelope 1 whereby the magnetic members 3 and 6 become part of the magnetic circuit as well as part of the electrical circuit of the device.

What is claimed is:

1. A magnetically operated switch structure comprising a pair of magnetic reeds mounted longitudinally in an evacuated or inert gas-filled tube with their inner ends overlapping but normally out of contact with each other, a third non-magnetic element mounted longitudinally and permanently spaced from its companion magnetic reed by insulation whereby said non-magnetic member and its companion magnetic reed will flex as a unit, said non-magnetic member being normally in contact with the other of said magnetic reeds, and means for producing a magnetomotive force along the axis of said tube for causing the normal air gap between said magnetic reeds to shorten to cause a transfer of contacts between said elements.

2. A magnetically operated switch structure comprising an evacuated or inert gas-filled tube, a magnetic reed sealed into one end of said tube and extending parallel to the axis of said tube, another magnetic reed sealed into the other end of said tube and extending parallel to the axis of said tube, the other ends of said magnetic

reeds overlapping each other and normally out of contact with each other, a non-magnetic member sealed into the first end of said tube with its other end overlapping the end of said second magnetic reed and normally in contact therewith, insulating means permanently separating said non-magnetic member and said first reed whereby upon the movement of said magnetic reeds

toward each other the contact between said second reed and said non-magnetic member will be broken and a contact between said magnetic reeds will be established, and means for energizing said contact device by a field extending along the axis of said tube.

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