

March 24, 1942.

W. B. ELLWOOD

2,277,215

RELAY CONTACT DEVICE

Filed June 27, 1940

FIG. 1

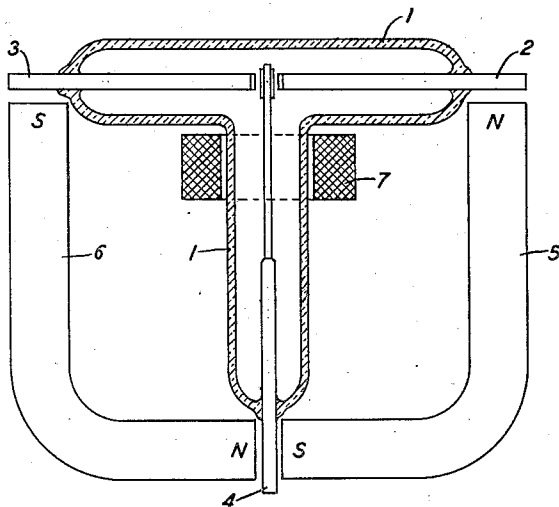
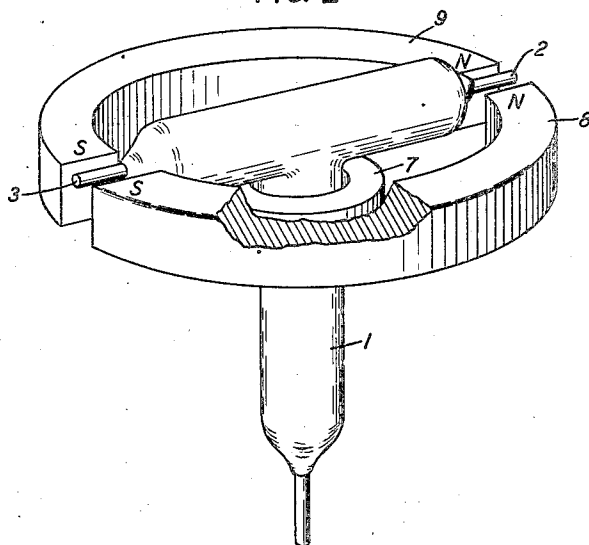


FIG. 2



INVENTOR
W. B. ELLWOOD

BY

BY John A. Hall
ATTORNEY

ATTORNEY

UNITED STATES PATENT OFFICE

2,277,215

RELAY CONTACT DEVICE

Walter B. Ellwood, New York, N. Y., assignor to
Bell Telephone Laboratories, Incorporated,
New York, N. Y., a corporation of New York

Application June 27, 1940, Serial No. 342,628

1 Claim. (Cl. 200—93)

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 the vessel is made T-shaped with a magnetic element in each of the elements of the T which form part of both the magnetic circuit and the electrical circuit of the device.

According to another feature of the invention polarized operation may be secured through the disposal of permanent magnets in external relation to the magnetic elements sealed within the said vessel.

According to another feature, coils for the electromagnetic influence of the magnetic elements sealed within the unit may be placed on the vertical leg of the T or two coils may be placed on the two horizontal elements of the T.

Another feature of the invention resides in the use of channel-shaped members for the two horizontal elements whereby stiffness and permanent alignment of these parts is achieved.

Still another feature is the use of a composite magnetic element comprising a main portion of hydrogenized iron braced with a channel piece of permalloy. The hydrogenized iron is especially useful since it resists oxidation and corrosion and the permalloy lends its qualities of low permeability.

Figure 1 is a vertical sectional view of a relay unit.

Figure 2 is a perspective view, partly in section, of a modification of the relay unit.

In general, the contact device consists of an envelope of glass 1 which may be evacuated or may be filled with an inert gas to prevent corrosion or oxidation of the contacts. This envelope 1 is in the form of a T with two stationary contacts 2 and 3 sealed into the upper branches and a contact 4 sealed into the vertical branch and made resilient so that it may move from contact with member 2 to contact with member 3. All

of these contacts 2, 3 and 4 are of magnetic material and form part of the magnetic circuit of the relay as well as parts of the electric circuit controlled thereby.

A coil 7 placed about the vertical leg of the T will energize the device and cause the movement of the resilient magnetic member 4. In Fig. 1 two permanent magnets 5 and 6 are arranged between the end portions of the horizontal and vertical parts of the T. In Fig. 2 a somewhat different arrangement is shown with two semi-circular permanent magnets 8 and 9 arranged only between the end portions of the horizontal part of the T. With either arrangement polarized operation of the device may be secured.

If the member 4 is made stiff enough it will, under non-energized condition of coil 7, be positioned between the contact members 2 and 3, making contact with neither. Then, in accordance with the direction in which the coil 7 is energized the upper end of member 4 will move into contact with either member 2 or 3.

On the other hand, the member 4 may be resilient enough so that it will remain in contact with the last member toward which it was moved and will only leave this position when the coil 7 is energized to move it in the opposite direction.

What is claimed is:

A magnetically operated polarized relay contact structure comprising a T-shaped vessel having two stationary magnetic elements and one movable magnetic element forming parts of both the magnetic circuit and the electrical circuit thereof sealed within said vessel, immersed in an inert gas and influenced by permanent magnetic and electromagnetic fields external to said vessel, said movable magnetic element being a flexible reed secured at one end by being sealed through the vertical stem of said vessel, said reed being sufficiently stiff to normally remain out of contact with either of said stationary magnetic elements, said stationary magnetic elements being each sealed through one of the horizontal arms of said vessel, permanent magnets having poles contiguous to the external ends of said stationary elements to polarize one of said elements north and the other south and a coil encircling the said vertical stem of said vessel.

WALTER B. ELLWOOD.