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MAGNETIC STRUCTURE FOR REED RELAYS

Filed Aug. 31, 1962

FIG1

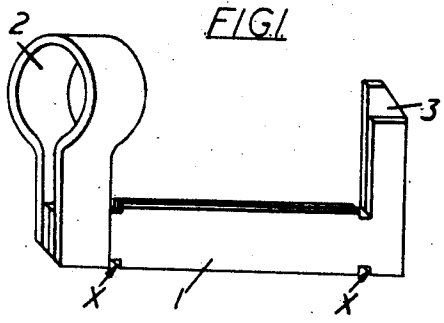


FIG2

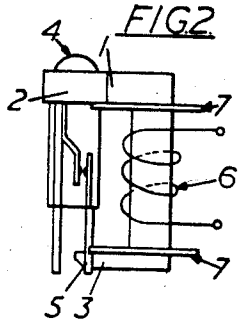
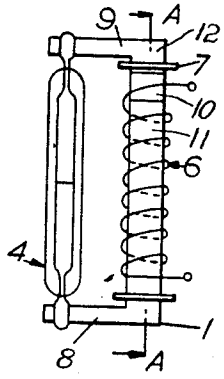


FIG3



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MAGNETIC STRUCTURE FOR REED RELAYS

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This invention relates in general to glass-sealed reed-type relays and in particular to the magnetic structure for supporting such relays in operative relationship with the associated energizing winding. Its principal object is to provide a magnetic structure for a relay of the above character which has a small magnetic reluctance, is compact in size and performs a mechanical supporting function.

In prior-art magnetic structures for glass-sealed reed relays, the two salient poles of such structures were welded to the ends of the reed relay contact extensions or the poles were in the form of clips which clamped the noted contact extensions. The operations required for welding the two contact extensions involved the use of special holding devices for supporting the relay while being welded and thus increased manufacturing costs. The clip type supporting arrangement is not completely satisfactory since the magnetic-contacting area between the contact extensions and the magnetic poles were necessarily large and since these connections were both electrical magnetic, poor electrical contact often resulted.

According to the present invention, the foregoing disadvantages are overcome by providing a magnetic structure which mechanically supports the relay during the noted contact welding and which reduces the number of welding operations per relay. It is thus another object of the invention to provide a magnetic structure for glass-sealed reed-type relays in which one pole is provided for mechanically supporting the reed relay and another pole is provided for supporting one contact extension of the relay in abutting relationship with the last-said pole to enhance welding operations.

A feature related to the above object resides in the arrangement wherein the support pole of the magnetic structure is arranged in the form of a ring which encircles the outside periphery of the relay.

Other objects and features of the invention will become apparent and the invention will be best understood when the specification is read in conjunction with the accompanying drawings comprising FIGS. 1 to 3 in which:

FIG. 1 shows a perspective view of the magnetic structure of the invention without any relay being associated therewith;

FIG. 2 shows a side view of the magnetic structure of FIG. 1 together with a relay mounted in position and an energizing coil surrounding the magnetic structure; and

FIG. 3 shows a magnetic structure having two insulated portions forming the pole pieces of the magnetic core.

Referring now to FIG. 1 of the drawings, the magnetic structure comprises a core formed from two L-shaped elements 1 and 3 of magnetic material of high permeability arranged side by side and a cylindrical ring 2 of high permeable material secured to the longer legs of the elements 1 and 3. Elements 1 and 3 may be secured together as by welding, and ring 2 may likewise be secured to elements 1 and 3 in a similar fashion. The inside dimension of the ring 2 corresponds to the outside dimension of the relay envelope to insure a snug fit.

The shorter legs of the L-shaped elements 1 and 3 may be of the same length or one may be shorter than the other to define a shoulder against which the contact extension of the relay will rest. Such a shoulder is shown in FIG. 1.

The elements 1 and 3 contain apertures indicated by "X" which provide a defining slot for holding the usual coil insulating washer in proper position.

Referring now to FIG. 2 of the drawings, the magnetic structure is shown with coil 6 encircling the core portion of elements 1 and 3 and with a reed relay 4 supported within ring 2. The shoulder end of the magnetic structure supports one of the contact extensions of the relay 4. As noted, the contact extension of the relay may be fixedly secured to the magnetic structure shoulder as by welding.

As a result of this arrangement, the length of the magnetic circuit is short and the magnetic flux escaping, for instance, from the top end 7 of the energizing coil 6 is received on ring 2 which becomes one of the polar pieces of the magnetic core. The magnetic flux will pass through the glass of relay to the movable magnetic contact member and through the contact gap thereof to the stationary magnetic member 5. Member 5, through clip 3 has assumed an opposite sign it being magnetically connected to the bottom end of the energizing coil 6.

The operating sensitivity of the relay is thus efficiently increased and the sealed contact devices can be easily replaced in case of failure without impairing the magnetic circuit.

It is obvious that slight modifications of the shape of said magnetic core will permit the use of other relays different from the illustrated type.

FIG. 3 illustrates the magnetic circuit of FIG. 1 modified for use with contact devices enclosed in sealed vessels of types other than those illustrated in FIG. 2. In this case, the magnetic core comprises two L-shaped pieces in which the two horizontal opposite and overlapped portions and the arms 8 and 9 are insulated therebetween along the horizontal portions carrying the energizing coil 6. The insulation can be easily obtained by interposing an insulating material strip 10 between said magnetic horizontal overlapped portions 11 and 12, tightening and locking the whole by a tape, which insulates said core from the coil. The core end, which was shaped in FIGS. 1 and 2 as a tubular ring will be now formed with a second clip clamping the other magnetic terminal of the relay.

While the principles of the invention have been described above in connection with specific apparatus and applications, it is to be understood that this description is made only by way of example and not as a limitation on the scope of the invention.

What is claimed is:

1. An external magnetic circuit for relays having electrical contacts of magnetic material sealed in protective envelopes with a portion of each contact extending out of the same end of said envelope, said circuit comprising a U-shaped structure of high permeable magnetic material defining a magnetic core section having first and second salient pole pieces, a flux generating winding mounted on said core section for generating a magnetic flux to operate said contacts in response to magnetic attraction therebetween, one of said pole pieces comprising a support portion for one end of said envelope independently of any said contact extension and the other of said pole pieces comprising a support portion for the other end of said envelope, the last-said portion electrically and magnetically contacting one only of said relay contact extensions.

2. An external magnetic circuit for relays having electrical contacts of magnetic material sealed in protective envelopes and having a portion of each contact extending out of the same end of said envelope, said circuit comprising a U-shaped structure of high permeable magnetic

material defining a magnetic core section having first and second salient pole pieces, a flux generating winding mounted on said core section for generating a magnetic flux to operate said contacts in response to magnetic attraction therebetween, one of said pole pieces comprising a cylindrical ring for encircling the said envelope at one end independently of any contact extension and the other of said pole pieces comprising a shoulder portion for supporting the other end of said envelope, the said shoulder portion electrically and magnetically contacting one only of said relay contact extensions.

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