

United States Patent

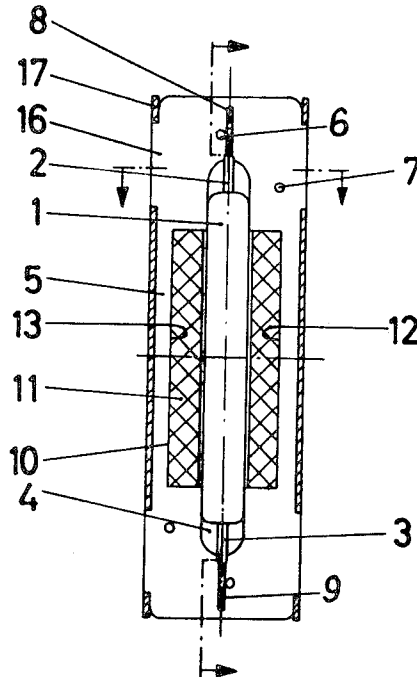
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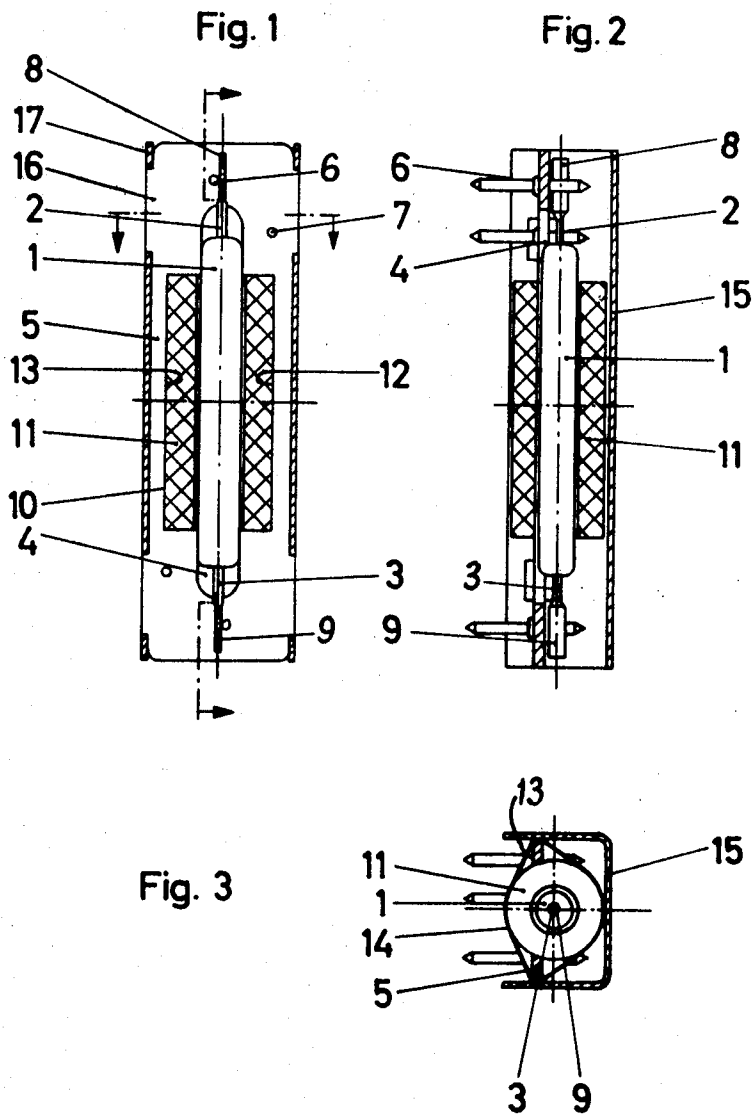
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| [33] | | Germany |
| [31] | | G 68 10 352 |

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- [54] **SEALED REED RELAY**
4 Claims, 3 Drawing Figs.
- [52] U.S. Cl. 335/151
- [51] Int. Cl. H01h 50/04,
H01h 51/28
- [50] Field of Search..... 335/151,
152, 154; 317/101 CP

ABSTRACT: A mounting structure for a reed relay and coil which holds both the coil and the reed envelope individually. The mounting structure has a baseplate of insulating material apertured to contact both the envelope and coil. The aperture is less in width in one area than the diameter of the envelope and in another area less in width than the coil diameter to contact both and them preferably against an enclosing member.





SEALED REED RELAY

The present innovation relates to a sealed reed relay comprising an excitation winding in the form of a self-supporting or air-spaced coil which is held in position by a baseplate of insulating material carrying the electrical connections, and which directly encloses the protective envelope or envelopes respectively. There is a particular need for a relay using this innovation especially in telecommunication and telephone systems, other communication transmission systems, as well as in controlling and regulating devices in which sealed reed relays are used to a steadily increasing extent, because such relays are featured by their insensitivity to environmental conditions, by a complete freedom from maintenance, and by a long service life.

In one sealed reed relay, known to the art, the excitation winding is wound in the form of a substantially prismatic body, on to a baseplate consisting of insulating material, in such a way that one lateral surface of the winding comes to lie in a form-locking manner on the baseplate, whereas the other lateral surfaces of the winding are designed in a self-supporting way enclosing between them the protective envelope or the protective envelopes respectively. By employing such a type of coil body, and by the arrangement of the excitation winding, it is possible to achieve the manufacturing technical advantage in that the excitation winding does not need to be wound directly on to the protective envelope or the protective envelopes, respectively, so that a subsequent equipping with the desired contact units, or the removal of one of the contact units, is possible without further ado. Despite this, there is achieved the advantage that the winding is positioned in close proximity to the reed contacts, so that the coil requires less windings. Another advantage is to be seen in that the baseplate is capable of being manufactured in a particularly simple way involving low costs, because there is provided a piece part which may be punched out of hard paper, and which is thus particularly suitable for mass production. Finally, it is to be emphasized as a further advantage, that the overall height of the sealed reed relay can be kept very small, thus resulting in particularly favorable building space conditions, for example, within the scope of printed circuits.

In other conventional relays of sealed reed type, however, where the excitation winding is mounted in the form of a self-supporting coil on a plate of hard paper carrying the electrical connections, a small assembly space is not produced. Moreover, in the known case, the holding arrangement for the coil requires special devices on the board or plate of insulating material, if the relay is supposed to be handled reliably.

It is the object of the present innovation to provide an improved type of sealed reed relay comprising a self-supporting excitation coil, overcoming these disadvantages.

In this way, the incorporation of the self-supporting coil in an opening of the baseplate, results in a particularly small overall height of the sealed reed relay. Moreover, from this there results the possibility of supporting the coil body in a simple way in the baseplate. To this end, in an advantageous further embodiment of the innovation, the width of the opening in the plate is smaller than the thickness or the diameter of the excitation coil respectively, so that the latter may be supported along two parallel generating lines in the opening. The mounting of the excitation coil is also substantially facilitated. To this end, in accordance with a particularly advantageous embodiment of the innovation, both the baseplate and the excitation coil may be wrapped up in a sealable or adhesive plastics film or sheet, or else, still more favorably, may be enclosed by a flexible plastics tubing, in particular by heat shrinking. Moreover, the innovation also ensures the advantage that the self-supporting coil permits a subsequent equipment with contact units, and that the baseplate thereof can be manufactured by involving low costs.

Further advantages and details of the innovation will now be explained with reference to FIGS. 1 to 3 of the accompanying

drawings showing one particularly favorable example of embodiment of a sealed reed relay, and in which:

FIG. 1 shows a longitudinal sectional view of the sealed reed relay employing the invention,

FIG. 2 shows a longitudinal sectional view which is 90° with respect to that of FIG. 1, and

FIG. 3 shows a cross-sectional view of the same relay with the plastics film or tubing applied thereto.

The sealed reed contact shown in FIGS. 1 to 3, consists of a protective envelope 1 into the face sides of which there are sealed the reeds or contact springs 2, 3. There may also be provided several such reed contacts which are then arranged parallel in relation to one another. The protective envelope 1 fits within an opening 4 provided in the baseplate 5 having the shape of an oblong plate of hard paper. The opening 4 is related to the diameter of the protective envelope 1 so that the latter is mechanically fixed in the transverse direction, but will not substantially project through the opening. As seen in FIG. 3, opening 4 is sized less than the diameter of the envelope to hold the envelope along its periphery outwardly of the diameter. In the longitudinal direction, the opening 4 somewhat extends beyond the face-sided limiting walls of the one or more protective envelopes 1, in order to compensate for manufacturing tolerances of the protective envelopes in the longitudinal direction. The baseplate 5 may have one of a number of widths, the width depending on the number of protective envelopes lying next to each other in suitable openings on the baseplate. In mass production of sealed reed relays as used particularly in the fields of telephone engineering, these different types of designs of the baseplate 5, however, neither has a disadvantageous effect upon the manufacturing technique, nor upon store-keeping because these parts, as already pointed out hereinbefore, are stamped or punched parts which are extremely simple and inexpensive in manufacture.

The baseplate 5, at the same time, also enables the mounting thereto of a plurality of connecting elements for establishing the electrical connections to the associated circuits. To this end the baseplate 5, within the range of its surface, contains a number of boreholes 6, 7 corresponding to the number of soldering terminals, into which short wire contact members are pressed. It is appropriate to press-in the wire contact members at such spaced positions, so that they will project on either side of the baseplate 5 with a short piece of their length. On the side facing the one or more protective envelopes 1, the wire contact members are then joined to the ends of the excitation winding, i.e. the wire contact members associated with the boreholes 6, are connected to the reeds or contact springs 2, 3 of the protective envelope 1, and the wire contact members associated with the boreholes 7, are connected to the ends of the winding. A soldering connection with the wire contact members which, to this end, are provided at their ends with leaf-shaped soldering lugs 8, 9, serves to retain the reed contacts in the desired position.

The wire contact members which are led out on the other side of the sealed reed relay, may be inserted into corresponding plug-in holes of a printed circuit board, and, if so required, may be connected thereto by way of dip soldering.

The baseplate 5 also represents the holding element for the excitation winding. To this end, the baseplate 5 is provided with an opening 10 extending in the coil axis, limiting the space for building in the excitation coil 11, in both the axial and the sideways direction. In this way the baseplate 5 performs quite a number of different functions as it simultaneously serves as a holding arrangement for the reed contacts, the connecting elements and the excitation coil and, in addition thereto, also acts as a spatial limitation for the winding. As will be shown hereinafter, the baseplate still performs a further function.

The employed coil body is a self-supporting type of coil 11 having the shape of a circular cylindrical body as shown in FIG. 3. When employing several sealed contacts 1, the excitation coil 11 will have to have a correspondingly suitable other shape which, however, must safeguard that the winding is

likewise situated in the closest proximity of the reed contacts. Such coils mostly only consist of wire windings and of the binding agent holding them together, practically a lacquer. If so required, it is already sufficient to provide the wire windings or the turns of the wire, in particular at the beginning and the end of the excitation winding, with a lacquer coating serving to hold together the turns of the wires, or to treat them with another type of binding agent.

The manufacture of such types of self-supporting coils is made by way of series production employing winding forms in which the turns of wire or wire windings are given the desired coil shape.

After the self-supporting coil 11 has been inserted in the opening 10 of the plate, there will already result a relatively stable structure, because the coil is gripped along two parallel generating lines 12, 13, in a form-locking manner by the longitudinal edges of the opening 10. To this end the width of the opening 10 in the plate is made smaller than the width or the diameter of the excitation coil 11 respectively, which is only inserted to such an extent in the opening 10 of the baseplate 5 that one or more sealed reed contacts 1 can be inserted into the remaining free winding space, similar to the mounting of the envelope 1.

The mounting of the excitation coil 11 to the baseplate 5 can be effected by the mere fitting of the coil onto the protective envelope 1 or the reed contacts respectively. In so doing, the opening 10 as provided in the baseplate 5, acts as the one support for the excitation coil 11, whereas the reed contact 1 or the reed contacts respectively, act as the abutment. Moreover, it is possible for the excitation coil 11 to be additionally mechanically firmly connected to the baseplate 5 by providing special mounting parts, such as snap-action, spreading or offsetting parts. For effecting the mechanical connection of both the excitation coil 11 and the baseplate 5 it is also possible for the latter to be coated or sealed in common with an artificial resin. Furthermore, an improvement in the stability can be achieved in a particularly favorable manner in that both the baseplate 5 and the excitation coil 11 are wrapped in

common with a heat sealable or adhesive plastics film or, even better, are enclosed by a common plastics tubing 14 which is applied, in particular, by way of heat shrinking.

After the soldering lugs 8, 9 of the reed contacts and the wire ends of the coil 11 have been connected as described hereinbefore, to the associated wire contact members, the sealed reed relay may be encapsulated. To this end there is used a U-shaped shielding bracket 15 sheet metal which is connected to the baseplate by employing a kind of snap-catch device.

For this purpose, the baseplate 5 is provided adjacent its ends, with engaging noses or portions 16 by which it engages in slots 17 of the shielding sheet metal 15. This shielding sheet metal 15, as is well known, preforms the function of a magnetically conductive envelope for effecting simultaneously a shielding against external or stray magnetic fields, and for guiding the own magnetic field as generated by the coil 11.

What is claimed is:

1. A sealed reed structure comprising a reed-retaining, generally cylindrical envelope, an excitation winding surrounding said envelope, and a mounting plate of insulating material for supporting said envelope and coil, a plurality of terminals protruding from said mounting plate and connected to reeds of said envelope, and an opening in said mounting plate for holding said envelope and coil in place relative to one another.

2. A structure as claimed in claim 1, wherein the width of the opening in said baseplate is smaller than the diameter of the excitation coil and said excitation coil is supported in said opening along two parallel generating lines.

3. A structure as claimed in claim 1, wherein said baseplate extends parallel to the axis of said envelope and said plate opening has a first area of width less than the diameters of said envelope and a second area of width less than the diameter of said coil to firmly hold the envelope and coil thereagainst.

4. A structure as claimed in claim 2, wherein there is a U-shaped enclosing member and means for affixing said plate in said member to position said coil against said member.

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