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2,630,506

RELAY

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FIG. 1

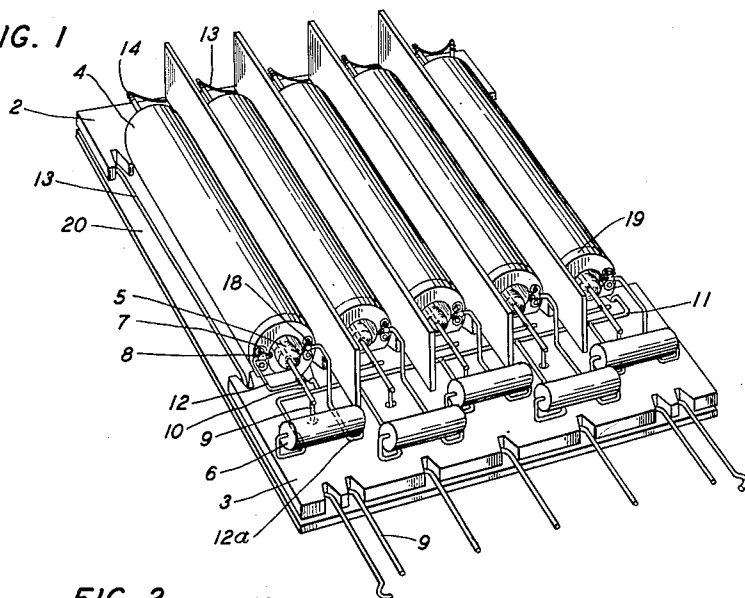


FIG. 2

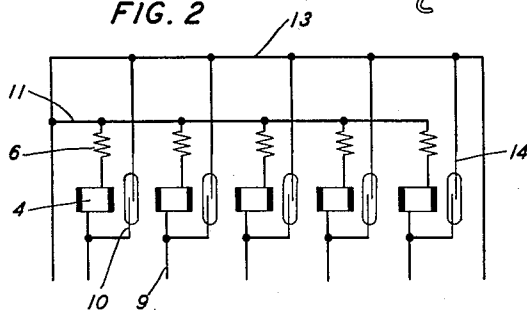


FIG. 3

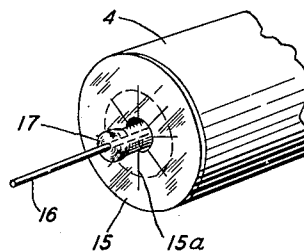


FIG. 4

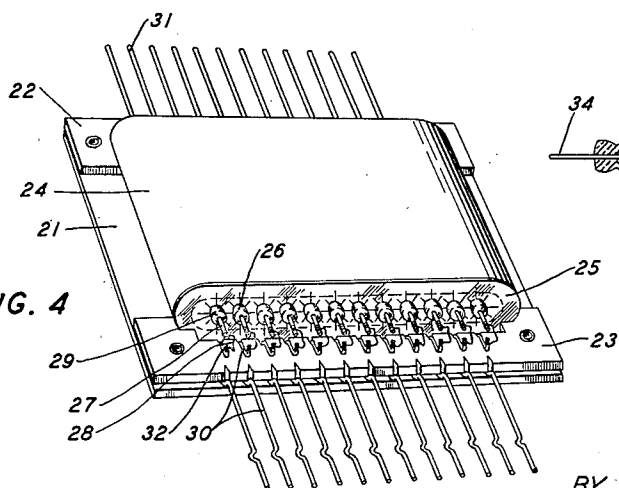
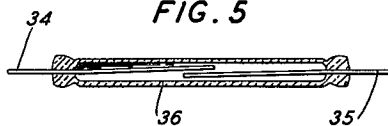


FIG. 5



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RELAY

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This invention relates generally to relays employing dry reed contacts within a hermetically sealed envelope which are activated by the surrounding coil and more specifically it relates to relays having an improved method of mounting the switch within the relay winding to avoid distortion of the switch contacts.

An object of this invention is a relay employing dry reed contacts within a container mounted in such a manner as to be able to incur expansion and contraction of said envelope without distorting the relationship between the contained reed contacts.

Another object of the invention is to simplify the manufacturing of relays by the elimination of certain soldered connections.

A further object is to provide a small, efficient, and compact relay which can be used to replace larger relays, thus effecting an important saving of space.

A fourth object of the invention is the improvement of relays generally.

In the prior art relays comprising hermetically sealed tubes containing dry reed contacts have been so constructed that expansion or contraction of the said tube will produce some distortion of the desired relative positions of the enclosed dry reed contacts due to the manner in which the tube is mounted, thus causing conditions conducive to faulty operation of the relay. This invention will eliminate distortion from such causes and will allow the tube to contract or expand with negligible effect upon the relative positions of the contacts, thus insuring more reliable operation of the relay.

A feature of the invention is the use of twin eyelets on the spool head of the relay winding as rivets to eliminate a soldered joint inasmuch as the winding lead can be brought out of the winding and wound around a wire held to the spoolhead by the twin eyelets. The said wire can then be sent back towards the winding to provide the necessary slack in the winding lead brought out.

A further feature of the invention is the use of a star cellulose acetate washer cemented to one end of the coil. The switch is semisupported by the cellulose washer but is free to move in a longitudinal direction thus eliminating distortion of the switch should anything cause the expansion or contraction of the switch.

The above-enumerated objects and features will be more fully understood from the following detailed description of exemplary embodiments illustrated in the accompanying drawings, of which:

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Fig. 1 shows a perspective view of one species of the invention;

Fig. 2 shows a schematic circuit diagram of the relay shown in Fig. 1;

Fig. 3 illustrates a detailed perspective of the star acetate cellulose washer which freely supports one end of a switch;

Fig. 4 is a perspective view of another species of the invention; and

Fig. 5 illustrates the dry reed type switch used in this invention.

In Fig. 1 the base plate 20 supports all the individual coil winds. End pieces 2 and 3 are riveted to base plate 20 and are preformed so as to allow the passage of conductors between themselves and base plate 20. End pieces 2 and 3 also provide a seat for each of the individual coils. The three elements 20, 2 and 3 are constructed of a plastic material or any other suitable insulating material which preferably can be preformed.

Tube 5 which contains the dry reed contacts is arranged within coil 4 so that the flux path of coil 4 will pass through the contacts within tube 5. One of the contacts 10 of the switch shown in Fig. 5 rests in a cradle formed by conductor 9 and is soldered at the point of connection therewith. The other reed contact 14 of the switch is connected to common lead 13. Coil winding leads 18 and 8 are wound around the ends of conductors 12A and 12 respectively which are securely fastened to spoolhead 19 by twin eyelets such as 7. The coil winding wires 18 and 8 are soldered to the ends of conductors 12A and 12 respectively, which afterwards are bent down towards the eyelet holes, thus providing the necessary slack in the lead to the coil windings, eliminating one soldering operation and removing all possibilities of solder or resin getting into the eyelet holes to cause damage to the winding. Each resistance such as resistance 6 is connected in series to an associated coil winding such as 4 and all of the resistances shown connect to a common lead 11.

In Fig. 2 the reference characters correspond to those used in Fig. 1 insofar as they coincide. It can be seen from Fig. 2 that each individual relay can be operated independently of all of the others or any combination of individual relays can be operated. The theory of operation is as follows: A potential is supplied across a coil winding such as coil 4 and the flux passes through dry reed contacts 14 and 10 which are composed of a magnetic material. Passing the flux there-through creates a magnetic attraction and the dry reeds make contact. Upon deenergization

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of coil 4 dry reed contacts 14 and 10 will break contact due to the collapse of the magnetic field.

In Fig. 3 a portion of coil 4 is shown. Glued to the end of coil 4 is a cellulose acetate star washer 15 having a hole in the center thereof through which switch 17 passes and also having slits such as 15A extending radially from this hole. The slits allow more flexibility in the star washer 15 so that switch 17 can freely move in a longitudinal direction in the instance of any expansion or contraction. Thus, any outside force on coil 4 will not be transmitted to switch 17, since the cellulose acetate washer 15 will readily flex. Dry reed contact 16 is also shown in this view.

The relay shown in Fig. 4 comprises a plurality of switches encased within one winding 24. A cellulose acetate star washer 25 is cemented to one end of a winding 24. A series of holes have been formed in the washer, each hole supporting one of the switches such as 26 or 29. Furthermore, each hole has a series of slits extending radially from it to provide for more flexibility so that a minimum of strain will be produced within the switches in case of any expansion or contraction of the switch. Dry reed contacts such as 27 are connected to conductors such as 32 or 30 by means of flexible conductors such as 28.

There is, therefore, nothing to impede the longitudinal movement of switch 29 except the small amount of friction present in the cellulose acetate washer and leads such as 23, which offer only a negligible physical resistance. Coil 24 is mounted on base plate 21 which is of a plastic material or any other suitable insulating material which can be readily preformed to a desired shape. End pieces 22 and 23 which are riveted to base plate 21 can be preformed of the same material.

It is to be noted that conductors such as 30 and 31 are sandwiched in between base plate 21 and end pieces 23 and 22 respectively to provide ruggedness and compactness to the relay. Because of the common winding 24, all of the switches in this relay make or break contact together.

In Fig. 5, the dry reed switch used in the relay shown in Figs. 1 and 4 is illustrated. Tube 36 can be made of glass, plastic, or other suitable material and contains dry reed contacts 34 and 35 which are longitudinally arranged within tube 36 and are fastened at either end of tube 36 in such a manner as to form a hermetically sealed pair of contacts. A low melting point glass can be used to seal the reed contacts within the tube.

It is to be understood that the form of this invention, herein shown and described, is to be taken as a preferred example of the same, and various changes in the shape, size, and arrangement of parts may be resorted to without departing from the scope or spirit of the invention.

What is claimed is:

1. A relay comprising a base of insulating material, coil means arranged on said base for producing an electromagnetic field, a plurality of switches arranged side by side within said coil

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means, each of said switches comprising a hermetically sealed tube and a pair of reeds for carrying contacts secured at respective ends of said tube and extending longitudinally within said tube, and flexible washer means covering one end of said coil means, said flexible washer means having orifice means therein with a plurality of slits extending radially therefrom, one end of each of said switches being rigidly mounted on said base and the other ends of said tubes resting in said orifice means, said washer means thereby guarding against distortion of the desired relative position of the pair of dry reed contacts within said tubes upon the application of a physical force to said tubes.

2. A relay comprising a base of insulating material, a plurality of switches each comprising a hermetically sealed glass tube and a pair of longitudinally arranged reed contacts of magnetic material secured at respective ends of said glass tube, flux producing coil means common to all of said plurality of switches, said switches being arranged side by side within said common coil means, said common coil means being secured upon said base, a flexible plastic washer cemented to one end of said common coil means, said washer having a series of orifices therein and a plurality of slits extending radially from each of said orifices, one end of each of said glass tubes being supported in one of said orifices, the other end of each of said switches having the reed contact, which extends out of the glass tube, rigidly soldered to a terminal.

3. A relay comprising a base of insulating material, coil means mounted on said base, a hermetically sealed vessel positioned within said coil means, a pair of reed contacts of magnetic material secured at the respective ends of said vessel and extending longitudinally within said vessel, a terminal portion integral with one of said reed contacts and extending exteriorly from one end of said vessel, means for mechanically connecting said terminal portion to said base, and supporting means for resiliently supporting the other end of said vessel to permit longitudinal motion of said vessel with respect to said coil means, said supporting means comprising a flexible washer having a radially slotted orifice therein, and means for affixing said washer to one end of said coil means, the said other end of said vessel extending through said orifice.

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