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SHIELDED REED SWITCH

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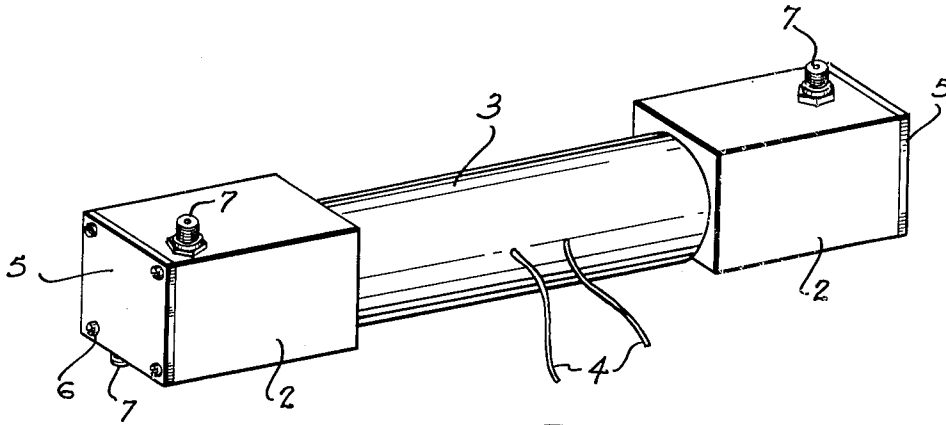


FIG. 1.

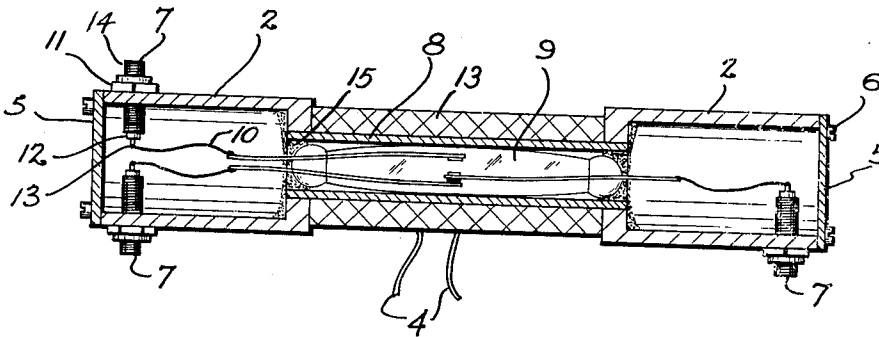


FIG. 2.

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SHIELDED REED SWITCH

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1 Claim. (Cl. 200—87)

This invention relates to a shielded reed switch.

Reed switches are well known and in widespread use and these devices have been used in both single throw and double throw versions. The fast and effective switching action of the reed switch has resulted in its wide application.

A need has arisen most particularly in the field of telemetry for a small current switch that is simple, compact, and rugged. Because of the very low level of currents that are to be handled, such a switch must not be susceptible to outside electrical interference. The switches used at present for this application are cumbersome and expensive.

The object of the present invention is to provide a small, compact, rugged switch that is simple to manufacture and which is shielded from outside electrical interference when in use.

A further object of this invention is to provide a switch that will effectively switch very small current (down to 10^{-12} amperes).

These and other objects of the invention are achieved by enclosing a reed switch in a shielding container made of metallic and non-magnetic material.

In drawings which illustrate an embodiment of the invention,

FIGURE 1 is a three-quarter view of a completely assembled shielded reed switch, and

FIGURE 2 is a cross-section through the switch of FIGURE 1 showing detailed construction features.

Referring now to FIGURE 1 a shielded reed switch is shown comprising a metallic housing made up of two end housings 2 connected by a tubular neck portion of reduced diameter (not showing in this figure). The neck portion has an operating coil 3 wound around it with leads 4 that can be connected to a source of D.-C. voltage. End plates 5 are fastened to the ends of the housings 2 by bolts 6. Other means of fastening these end plates may be used. Terminal posts 7 are screwed into tapped openings in end housings 2.

FIGURE 2 shows a cross-section through the switch of FIGURE 1 and gives detail of the internal construction. A reed switch 9 is positioned in tubular neck portion 8 and is held in position by a potting (sealing) compound 15 that is poured in to fill the space between the reed switch and the inside of the tube portion. Any standard reed switch having a glass or other non-metallic envelope can be used. End leads 10 from the reed switch are connected to terminal posts 7. In a preferred form of the invention the terminal posts 7 are micro-dot connectors available commercially. These connectors com-

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prise a threaded sleeve 14 which passes through an opening in housing 2 and are locked in position by nut 11. A central rod 13 passes concentrically through the terminal post and is positioned and insulated from the outer threaded sleeve by means of insulator 12. In practice coaxial cables from external circuits are connected to terminal posts 7 and are arranged so that the centre conductor contacts central rod 13 while the outer shielding conductor contacts the threaded sleeve 14 and thereby housing 2.

The device shown in FIGURE 2 is a single pole double throw switch. If a single throw switch is required the extra terminal post can be readily omitted in the end housing 2. The reed switches that may be conveniently used in this invention are commercially available types.

The material used for the shielding housing (tubular portion 8, end housings 2, and end plates 5) must be metallic, non-magnetic, and a good conductor. The preferred metals are aluminum and copper.

This shielded switch will have its main application in switching extremely low D.-C. currents (down to 10^{-12} amperes and from D.-C. to 1 kilocycle). In addition, it could be used as an R-F switch up to about 150 megacycles. The insertion loss of this switch has been measured and up to 25 megacycles it was found to be too small to measure. At 100 megacycles the insertion loss was between $\frac{1}{4}$ and $\frac{1}{2}$ db.

I claim:

- A shielded reed switch for small currents comprising:
 - (a) an enclosed, metallic, non-magnetic housing formed of two box-like end structures, interconnected by a tubular neck of reduced diameter,
 - (b) a reed switch having electrical terminals positioned in the said tubular neck,
 - (c) sealing compound filling the space between said reed switch and inner wall of said tubular neck,
 - (d) an operating coil wound around the said tubular neck,
 - (e) at least two coaxial type connectors each comprising central and outer conductors passing through the walls of the said box-like end structures, and
 - (f) electrical connections from the terminals of said reed switch to the central conductors of said coaxial connectors.

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