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 ROTARY SWITCH CONTACTS FOR TELEVISION TUNERS
 INCLUDING DIELECTRIC MATERIALS
 INTERPOSED THEREBETWEEN
 Filed May 2, 1963

3,221,114

Fig. 1.

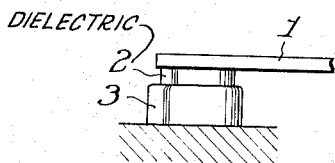


Fig. 2.

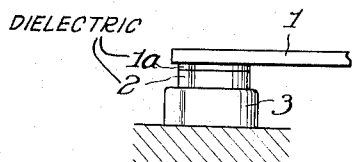


Fig. 3.

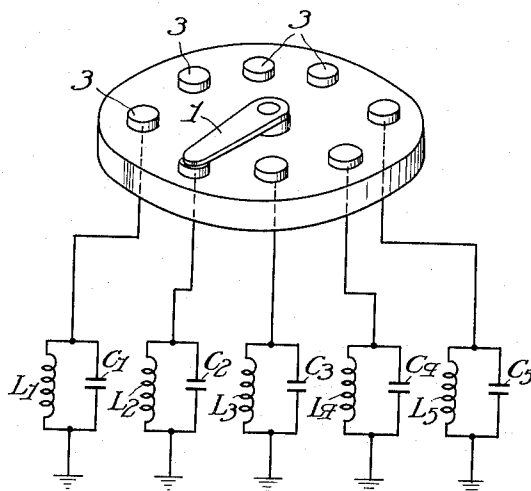
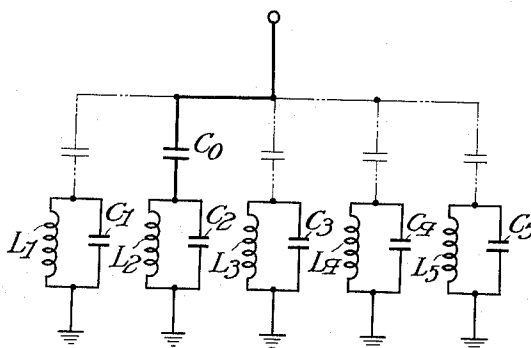


Fig. 4.



1

3,221,114

ROTARY SWITCH CONTACTS FOR TELEVISION TUNERS INCLUDING DIELECTRIC MATERIALS INTERPOSED THEREBETWEEN

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2 Claims. (Cl. 200—11)

This invention relates to changeover switches for tuners for television and for various other high frequency, alternating current uses.

More particularly, the invention relates to a new indirect-contact changeover switch for such uses.

Heretofore, in the case of ordinary electrical changeover switches, it has been the common practice to open or close circuits by directly contacting metal to metal constituting contacts connected to respective circuits or by separating such metals in contact. However, in such cases wherein metal is caused to contact metal directly, a so-called contact resistance is created between each pair of metals, whereby constantly occurring contact trouble such as adverse effect, of great or small degree, of this resistance on the connected circuit has been unavoidable.

The present invention contemplates solving such problems of contact as have existed heretofore.

More specifically, it is an object of the invention to provide a new indirect-contact changeover switch of extremely simple construction wherein a highly dielectric material such as barium titanate or titanium oxide is placed in contact with or bonded to the metal constituting one side of the switch contact, and the metal of the opposite side is caused to contact the other side of this highly dielectric material. In other words, the two metal contact members of the switch are caused to contact indirectly through a highly dielectric material interposed therebetween.

The precise nature, principle, and details of the invention will be more clearly apparent by reference to the following detailed description of preferred embodiments of the invention, when taken in conjunction with the accompanying drawing in which like parts are designated by the same reference numerals and letters, and in which:

FIGURES 1 and 2 are elevational views respectively showing contact parts of embodiments of the switch according to the invention;

FIGURE 3 is a schematic diagram, partly as a perspective view and partly as an electrical connection diagram, showing a television tuner; and

FIGURE 4 is an equivalent connection diagram of the case when the present invention is applied to the television tuner shown in FIGURE 3.

Referring to FIGURE 1, the embodiment shown has a simple construction wherein an arm 1 is used as the metal on one side of a switch contact and is provided at its moving end with a highly dielectric material 2, such as barium titanate or titanium oxide, bonded thereto, and the opposite surface of this highly dielectric material 2 is adapted to make and break contact with an opposite contact 3. As an alternative modification, the highly dielectric material 2 may be bonded to the contact 3, and the arm 1 caused to pass over the unbonded surface of this material 2.

In the embodiment shown in FIGURE 2, the arm 1, which is made of metal, is provided at its moving end with the dielectric 1a on one side of a switch contact

2

secured thereto, and a highly dielectric material 2 is bonded to the metal 3, the opposite surface of this material 2 being adapted to make and break contact with an opposite stationary contact. In this case, also, the highly dielectric material 2 may alternatively be bonded to the surface of the contact 3, and the dielectric 1a caused to pass over the unbonded surface of this material 2. In the circuits of the contacts 3 are inserted impedances consisting, respectively, of inductances and capacitors L_1 and C_1 , L_2 and C_2 , L_3 and C_3 , L_4 and C_4 , and L_5 and C_5 .

Furthermore, although not shown, a highly dielectric material can be inserted between two contact metals which have been separated beforehand, and the two metals can be caused to make or break contact simultaneously on the two opposite surfaces of the highly dielectric material, thereby to accomplish the same switching operation.

In all of the above cases, since a highly dielectric material is interposed between the contact metals of the switch according to this invention, an electrostatic capacity of large magnitude is generated between the metals when these metals are caused to contact indirectly. On the other hand, however, since there is no direct metal-to-metal contact, the instant switch is advantageous in that absolutely no contact resistance, as exhibited by conventional switch contacts, is created. Moreover, in the application of the present invention, since use is made of a highly dielectric material 2 of such a nature that the static capacity created between the contact metals becomes substantially larger than the capacitances of the capacitors of the circuit in which the instant switch is used, there is almost no possibility of the static capacity created at the contacts affecting the said circuit provided that the switch is used for high frequency alternating current uses.

FIGURE 4 indicates an equivalent connection diagram for the case wherein the present invention is applied to a television tuner such as that shown in FIGURE 3. The indicated meaning of FIGURE 4 is that, since the static capacity C_0 of large magnitude created between the contact metals is substantially larger than the capacitances $C_1, C_2, \dots$ of the capacitors within the circuit in which the switch is used, there is almost no effect on the said circuit, to said capacitors being connected in parallel inductances $L_1, L_2, \dots, L_5$, respectively.

Thus, it is to be observed that the present invention affords a very logical solution for the aforementioned problem of conventional switch contacts through the use of extremely simple means. Since the switching device according to the invention is designed for television use, the high frequency referred to denotes very high frequency (VHF) and ultra high frequency (UHF).

Although this invention has been described with respect to particular embodiments thereof, it is not to be so limited as changes and modifications can be made therein which are within the full intended scope of the invention, as defined by the appended claims.

I claim:

1. An indirect-contact rotary changeover switch for television tuners comprising a rotatable metal arm constituting a first contact; a plurality of second stationary metal contacts; a highly dielectric material bonded to the lower surface of said arm so as to be interposed between said first and second contacts thus facilitating indirect current flow between said first contact and the second contact selected in high frequency alternating current circuits to eliminate resistance.

3

2. The switch as defined in claim 1, wherein said second stationary contacts are radially arranged, contact being made by rotating said arm to one of said second contacts.

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5

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