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2,264,124

RELAY

Filed June 27, 1940

FIG. 1

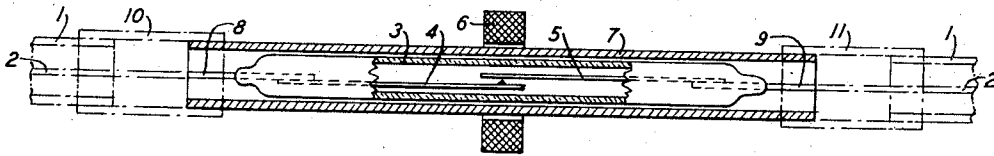


FIG. 2

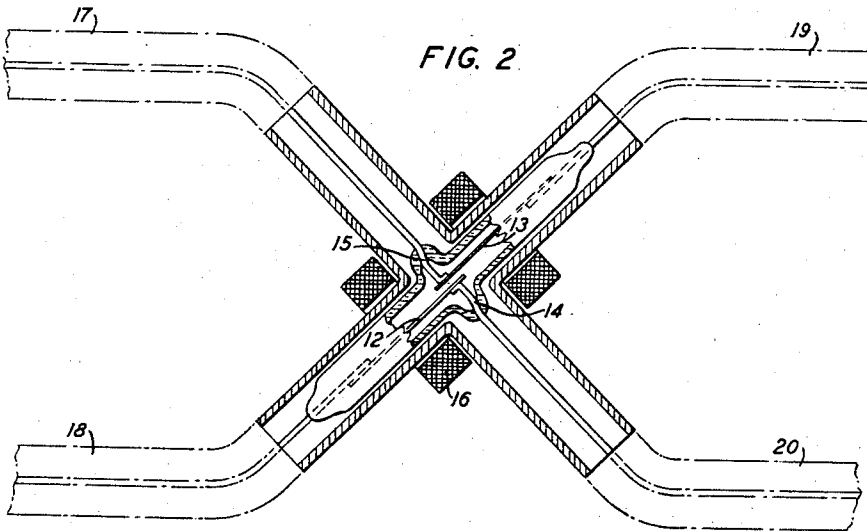


FIG. 3

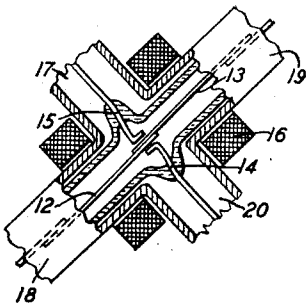
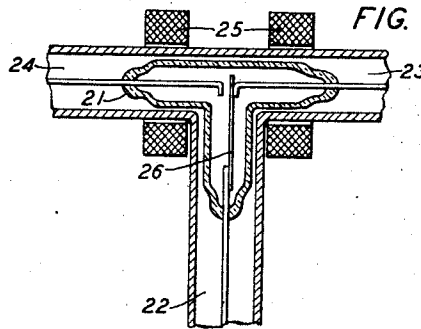


FIG. 4



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2,264,124

RELAY

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5 Claims. (Cl. 200—87)

This invention relates to switching means and particularly to such means employed in wide band and other high frequency transmission systems wherein the transmission channel consists of at least one conductor entirely enveloped by another.

In such transmission systems it is desirable that the enveloping and enveloped conductors be maintained in that relation to each other even at switching points. It is the object of the present invention to provide relay switching means which will effectively open and close the central conductor without breaching the enveloping conductor either for the purpose of bringing out connections from the central conductor or leading-in conductors to controlling means.

In accordance with one feature of the present invention, movable contact means for switching the central conductor of a coaxial line are placed within the enveloping conductor, connected to the central conductor and are controlled by electromagnetic means outside the enveloping conductor.

In accordance with another feature of the invention switching means for disconnecting one or more central conductors and making alternate connections between other central conductors are placed at junction points of a plurality of enveloping conductors and are controlled by electromagnetic means outside the junction of said enveloping conductors.

The relay device of this invention is of that type generally disclosed in Patent 2,187,115, granted to Ellwood and Holden January 16, 1940.

The drawing consists of one sheet containing four figures showing various forms of the present device in cross-section. Fig. 1 shows a simple make-and-break device to be placed in the line of a coaxial cable. The coaxial cable here is represented by the sheath 1 and the central conductor 2 at either end of the contact arrangement. The contact arrangement itself consists of a glass envelope 3 within which are sealed two contact members 4 and 5 of resilient magnetic material. The envelope may be exhausted so that these contact members are in a vacuum or it may be filled with an inert gas which will prevent corrosion or oxidation of the contact members. The contact structure consisting of the glass envelope 3 and the contact members 4 and 5 is inserted in a conducting sheath 7 of substantially the same diameter as the sheath 1 of the coaxial cable. Contact members 8 and 9 are brought out of the envelope at either end for connection to the central conductor 2 of the

coaxial cable. In order to provide facility for making connection between the central conductor 2 and the terminals 8 and 9, sleeves 10 and 11 are provided which may be moved into contact with both the sheath 1 of the coaxial cable and sheath 7 of the contact device in the positions indicated. A coil 6 mounted externally to the sheath 7 is provided for operating the two resilient magnetic members 4 and 5.

Fig. 2 illustrates another form of this invention. In this case the two resilient magnetic members 12 and 13 are each provided with a back contact member 14 and 15 respectively, so that a four-way connection is provided. When the coil 16, external to the junction of the four coaxial conductors 17, 18, 19 and 20, is not energized, a circuit will be established from coaxial conductor 18 through to coaxial conductor 20 on the one hand and from coaxial conductor 17 through to coaxial conductor 19 on the other hand. When the coil 16 is energized then the circuit will be as indicated in Fig. 3 with a connection from coaxial conductor 18 through to coaxial conductor 19, the coaxial conductors 17 and 20 being now out of circuit.

Fig. 4 illustrates a third form of the invention where a simple transfer contact device is provided. In this case the envelope 21 may have three branches so that the coaxial conductor 22 may be switched from the coaxial conductor 23 to the coaxial conductor 24 or vice versa. In this case, the coil for energizing the resilient member 26 is provided in the form of the coil 25 shown external to the outer sheath of the coaxial conductor.

What is claimed is:

1. In a transmission system, a two-conductor line comprising a first conductor entirely enveloped by a second conductor, contact means included in said first conductor for breaking and restoring the continuity of said first conductor, said contact means being entirely enclosed within said second conductor, and means outside said second conductor for controlling said contact means.
2. In a transmission system, a two-conductor line comprising a first conductor entirely enveloped by a second conductor, contact means included in said first conductor for breaking and restoring the continuity of said first conductor, said contact means comprising a pair of magnetically influenced contacts sealed in an evacuated vessel, said vessel being entirely enclosed within said second conductor, and means out-

side said second conductor for influencing said contacts.

3. In a transmission system, a plurality of two-conductor lines each comprising a first conductor entirely enveloped by a second conductor, said lines formed into a junction wherein said second conductors are formed into an enveloping structure and said first conductors are connected to contact means for variously interconnecting said first conductors, said contact means being entirely enclosed within said structure, and means outside said structure for controlling said contact means.

4. In a transmission system, a plurality of two-conductor lines each comprising a first conductor entirely enveloped by a second conductor, said lines formed into a junction wherein said second conductors are formed into an enveloping structure and said first conductors are connected to contact means for variously interconnecting said first conductors, said contact means

comprising magnetically influenced contacts sealed in an evacuated vessel, said vessel being entirely enclosed within said enveloping structure, and electrical means outside said enveloping structure for influencing said contact means.

5. In a transmission system, a two-conductor line comprising a first conductor entirely enveloped by a second conductor, contact means included in said first conductor for breaking and restoring the continuity of said first conductor, said contact means comprising a pair of magnetic reeds mounted along a line parallel to said first conductor having their ends overlapping and normally out of contact with one another, and means external to said second conductor for producing a magnetic field extending through said reeds in the direction of said first conductor whereby said reeds will be strained until their ends come into contact with each other.

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