Sept. 19, 1961 R. RUBIN 3,001,053

COAXIAL SWITCH

Filed June 20, 1957

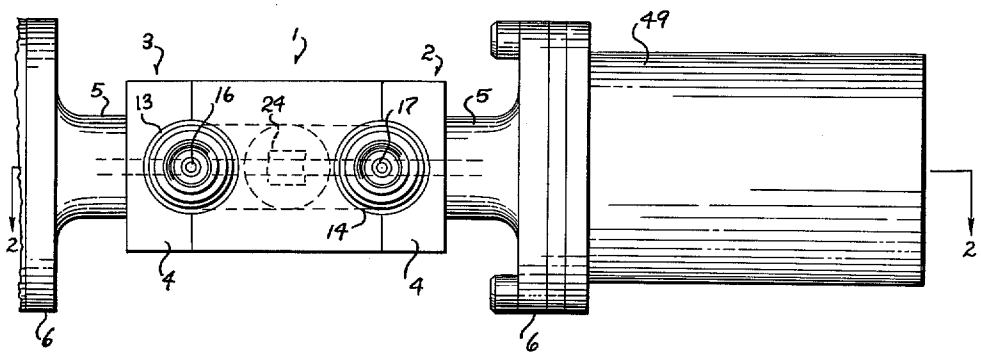


FIG. 1

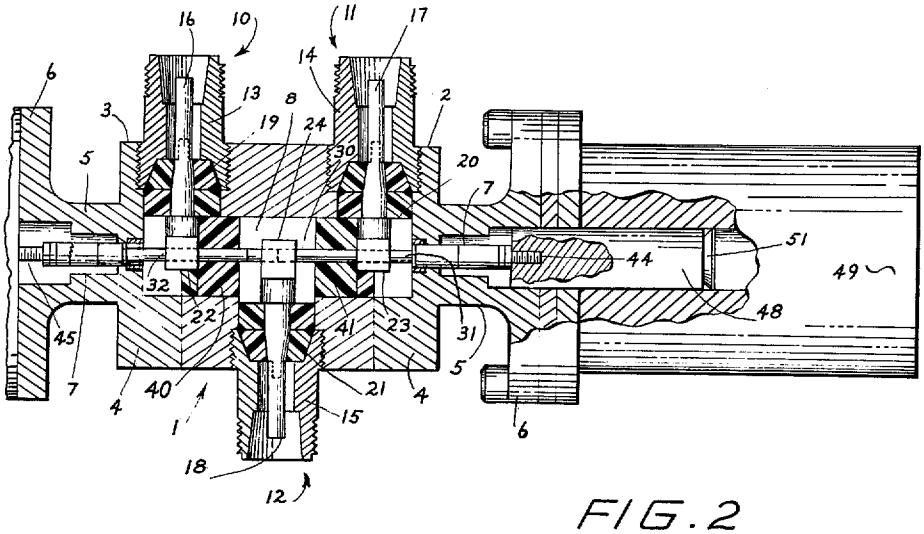


FIG. 2

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3,001,053

Patented Sept. 19, 1961

3,001,053

COAXIAL SWITCH

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Filed June 20, 1957, Ser. No. 666,939
2 Claims. (Cl. 200—153)

The present invention relates to a coaxial switch and ticularly to a switch adapted to connect one coaxial selectively with another line.

The present invention provides a structure adapted to nect a coaxial line selectively with one of a plurality other lines. Particularly in the present invention there rovided means by which a coaxial line may readily be nected with one of two other lines by the operation a longitudinally movable conductive rod. The co- al terminals to which the lines are connected are all unted on a common conductive housing with their er conductors in contact with the housing. The inner ductor of each terminal extends inwardly and termi- es at its inner end within the housing. Preferably the er ends of the inner conductors are longitudinally ned with one another and are adapted to be contacted the longitudinally movable conductive rod. The inner s of these inner conductors may be formed with a ring- ped structure through which the conductive rod may s. This rod should be of sufficient length to connect inner center conductors with either one of the adja- t inner conductors on longitudinal movement of the . Preferably the conductive rod is connected to a di- tric actuating member suitably controlled for longi- inal movement of the rod.

Thus, it is an object of the present invention to provide tructure in which a coaxial line may be selectively nected to one of two other lines and in which control the switching may readily and effectively be obtained electrical or, if desired, mechanical means.

A further object of the present invention is to provide tructure in which the switch means are built within ugged structure adapted to withstand shock and to form satisfactorily over long periods of time.

Further, the present invention is designed to provide a ucture in which the switch itself does not introduce a smatch into the system in which it is used.

These and other objects and advantages of the present ention will be more clearly understood when consid- d in connection with the accompanying drawings in ich

FIGURE 1 is a top plan fragmentary view of the in- ution, and

FIGURE 2 is a view taken along line 2—2 of FIG- E 1.

The arrangement is horizontally symmetrical as viewed the drawings, and therefore the portions shown broken ay at the left are symmetrical with those elements on right.

In the embodiment illustrated there is provided a cen- l housing 1 comprising preferably a solid piece of con- ctive material, having suitable openings formed there- and described hereafter. This center section or hous- 1 may have secured to it a pair of end members and 3 positioned at either end of the housing 1 and ured thereto by suitable means, such as a plurality of ews extending through the members 2 and 3, into the using 1. These members 2 and 3 are each formed h inner sections 4 coextensive with the ends of the using 1. A neck 5 and outer flange 6 comprise a por- n of these elements 2 and 3. An opening 7 extends ntrally and longitudinally through each of the elements and 3 and is longitudinally aligned with an opening 8 t extends centrally through the housing 1.

A plurality of coaxial line terminals are secured in

the housing 1. These comprise the terminals 10, 11 and 12. The outer conductors of these terminals, respectively, 13, 14 and 15, are mounted in and conductibly connected to the housing 1. The inner conductors, respectively, 16, 17 and 18, are insulated from the outer conductors by a suitable dielectric member, such as the discs 19, 20 and 21, respectively. These inner conductors 16, 17 and 18 extend inwardly and each terminates in a contacting element, preferably formed by rectangular elements 22, 23 and 24, respectively. Each of these elements 22, 23 and 24 are provided with longitudinally aligned openings passing therethrough. If desired, the inner conductors may be made in several sections with the innermost portions tapered toward the rectangular contact or terminal, and with the outermost ends of the inner conductors being provided with slits for improved contact with the lines to which they may be connected.

Longitudinally positioned within the housing 1 and opening for passage 8 is a dielectric rod 30 which extends the length of the opening 8 and into the members 2 and 3 through the passage 7. Conductive sleeves 31 and 32 are secured on this rod. Sleeve 31 is in contact with the contact 23 while sleeve 32 is in contact with the contact 22 of the inner conductors 17 and 16, respectively. These sleeves are adapted to bridge the distance between the contacts to which they are respectively engaged and the contact 24 of the inner conductor 18, selectively dependent on the longitudinal location of the dielectric rod 30. This rod 30 may be moved longitudinally in either direction over limited distances to selectively and electrically engage the contact 24 with either of the contacts 22 or 23, dependent upon the direction of movement of the rod 30. This rod 30 is supported for longitudinal movement by a plurality of dielectric supports, such as the ring 40 and ring 41, positioned coaxial within the opening 8. The extreme ends of the rod 30 are formed with enlarged end sections to which are connected the threaded caps 44 and 45. These threaded caps 44 and 45 may be of metal and supported within the end sections 2 and 3. A conductive rod 48 may be threaded to these members 44 and 45, with the rods 48 each acting as armatures in the coils 49. A resilient plastic bevelled disc 51 may be screwed or otherwise secured to the free end of the rods 48 to act as a resilient cushion when the rods are actuated.

The coils 49 are wound to actuate the rod 30 in opposite direction. Thus, by energizing coil 49 the rod 30 may be moved toward the right, establishing contact between the coaxial terminal 12 and terminal 11 with the inner conductors being connected through the sleeve 31 and the outer conductors through the housing. If the rod 30 is actuated to move in the opposite direction, contact will be established between the coaxial terminal 12 and terminal 10 with the inner conductors being connected through the sleeve 32 and the outer conductors being connected through the housing.

I claim:

1. A multiposition switch for selectively connecting a plurality of coaxial transmission lines comprising an elongated hollow body, a plurality of spaced coaxial transmission lines, the inner conductors of which extend into said body to a position substantially centrally thereof and terminate in conducting loops aligned symmetrically about a common longitudinal axis of said body with the plane of each loop generally perpendicular to said axis, an elongated member mounted for longitudinal movement in said body substantially centrally in sliding contact with all said loops solely along an inside surface of each loop which surrounds and contacts the outside surface of said member, the maximum cross section of said elongated member lying within a projection of said loop inside surfaces, said member having alternate electrically insulating and

electrically conducting sections, one of said conducting sections having a length substantially equal to the distance between adjacent ones of said inner conductors, and means for causing longitudinal movement of said member.

2. A multiposition switch which normally resides in one of first and second positions for selectively connecting a center coaxial transmission line to first and second end coaxial transmission lines comprising, an elongated hollow body, said center and said end coaxial transmission lines, the inner conductors of which extend into said body to a position substantially centrally thereof and terminate in conducting loops aligned symmetrically about a common longitudinal axis of said body with the plane of each loop generally perpendicular to said axis, an elongated member mounted for longitudinal movement in said body substantially centrally in sliding contact with all of said loops solely along an inside surface of each loop which surrounds and contacts the outside surface of said member, the maximum cross section of said elongated member lying within a projection of said loop inside surfaces, said member having a first conducting section connecting said center transmission line loop to one of said end transmission lines when in said first position, said member having a second conducting sect connecting said center transmission line loop to the ot end transmission line loop when in said second posit said member having an insulating section separating first and second conducting sections, said insulating tion lying between said center and said one end transi sion line loops with said member in said second posit said insulating section lying between said center and other end transmission line loops with said membe said first position, whereby said insulating section sl through said center transmission line loop during swi ing.

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Disclaimer

3,001,053.—*Richard Rubin*, Natick, Mass. COAXIAL SWITCH. Patent dated Sept. 19, 1961. Disclaimer filed Oct. 27, 1966, by the assignee, *Andrew Alford*.

Hereby enters this disclaimer to claims 1 and 2 of said patent.

[*Official Gazette January 24, 1967.*]