Nov. 24, 1931. A. J. MACY 1,832,869

ELECTRIC SWITCH

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Fig. 5

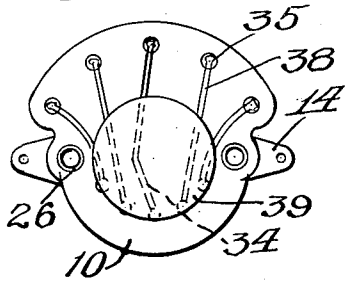


Fig. 2

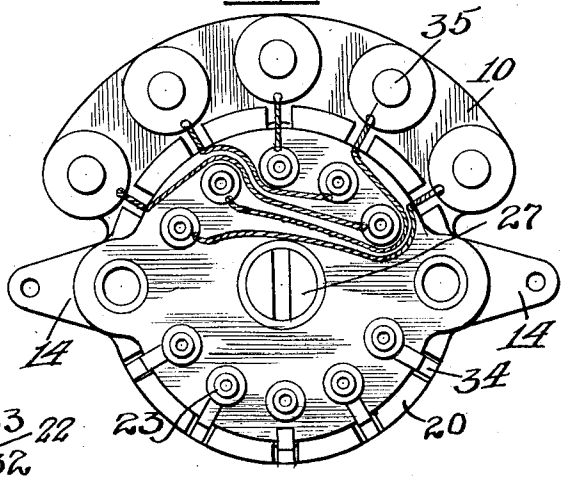


Fig. 1

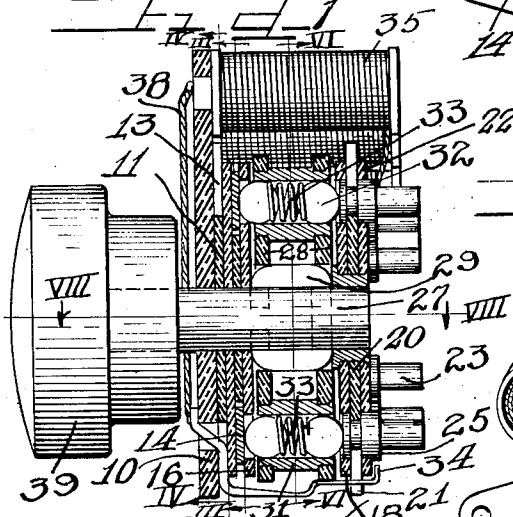


Fig. 3

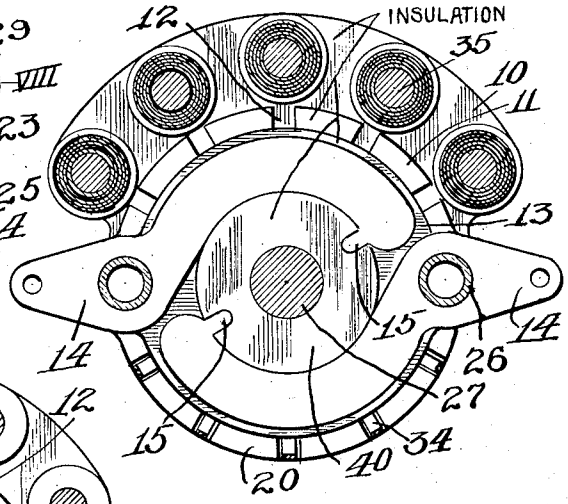
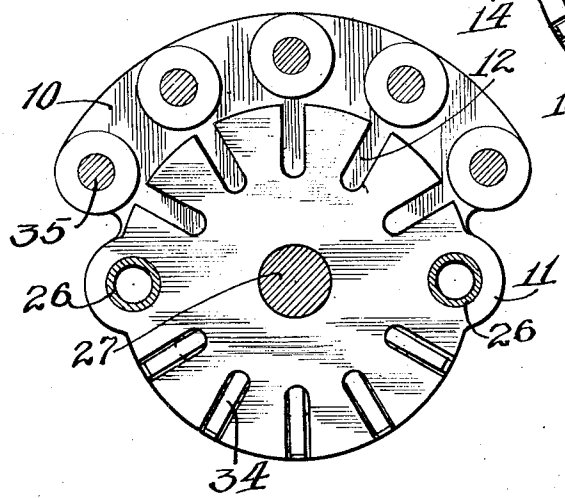


Fig. 4



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Fig. 6

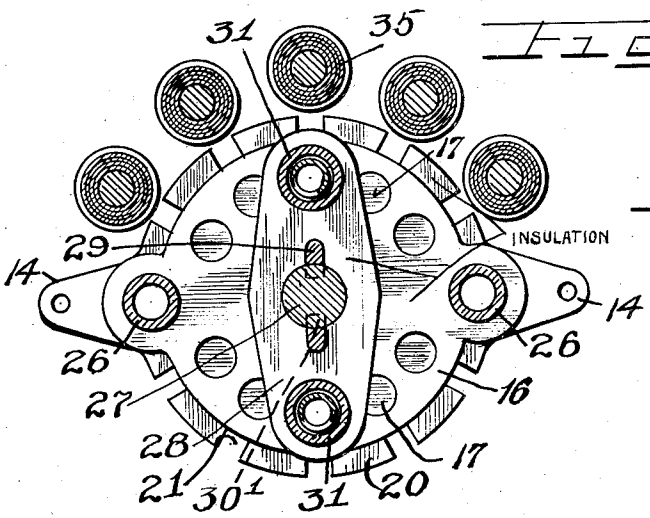


Fig. 7

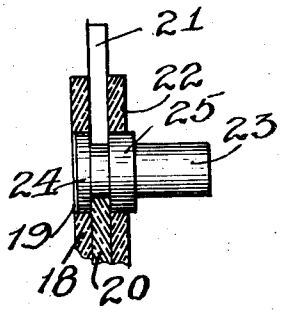


Fig. 8

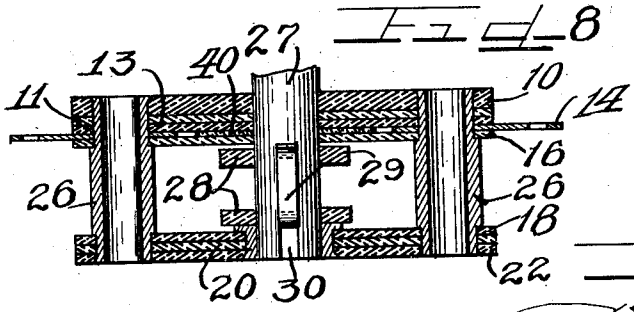
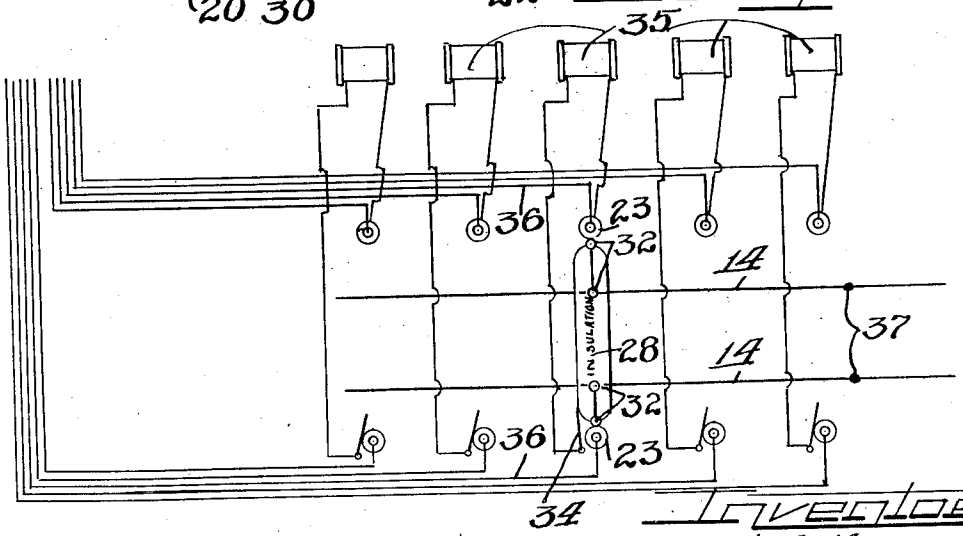


Fig. 9



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Patented Nov. 24, 1931 1,832,869

UNITED STATES PATENT OFFICE

ALFRED J. MACY, OF EVANSTON, ILLINOIS, ASSIGNOR TO BARITONE RADIO CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

ELECTRIC SWITCH

Application filed March 22, 1930. Serial No. 437,998.

My invention relates to electric switches of a rotary type and which may be used in connection with program distributing systems for connecting a reproducer to any pair of a plurality of pairs of lines connected to radio receivers, so that the user may select any one of a number of programs.

My invention also relates to electric switches for program distributing or telephone systems where it is desirable that impedances be connected across the pairs of lines connected to a source of power when the lines are not connected to a telephone or other voice-reproducing device. It may also be employed to connect any pair of a plurality of pairs of lines to a load or to a source of power and to simultaneously control auxiliary circuits by auxiliary reciprocating switch means to indicate the position of the rotary switch element.

An object of my invention is to provide a switch having laminated walls made up of a plurality of plates, which may be stamped from thin sheets of insulating material.

Another object of my invention is to provide a switch having laminated walls made up of plates stamped from thin sheets of insulating material, but so arranged that the number of different shapes of stampings required has been reduced to the minimum.

Another object of my invention is to provide a switch having novel and exceedingly simple means of connecting the rotatable switch element with the rotatable shaft of the switch.

A further object of my invention is to provide in a unitary structure a rotary switch capable of connecting any pair of a plurality of pairs of lines to a reproducer together with auxiliary reciprocating switch means for connecting associated impedance coils, mounted on the switch, across the pairs of lines not connected with the reproducer.

Other objects and attendant advantages of my invention will become apparent from the detailed description which follows.

In the drawings:

Figure 1 is a central vertical longitudinal section of my switch, its shaft and the turning knob therefor being shown in elevation.

Figure 2 is a rear elevation view of the switch.

Figure 3 is a vertical transverse section taken through the switch substantially on the lines III—III of Figure 1.

Figure 4 is a detail elevation of the two front plates of the switch looking at the rear or inner faces thereof.

Figure 5 is a front elevation view on a reduced scale.

Figure 6 is a vertical transverse section on line VI—VI of Figure 1.

Figure 7 is a detailed sectional view showing certain parts to be hereinafter specifically referred to.

Figure 8 is a horizontal sectional view on line VIII—VIII of Figure 1.

Figure 9 is a wiring diagram showing the application of my switch.

In the drawings, Figures 1 and 8, the numeral 10 indicates the front plate of my switch. This plate may be economically stamped from a thin sheet of insulating material and may be made of two thicknesses of material when a very thin sheet is used. Other plates of insulating material will be mentioned later, and they too may be stamped from thin sheets. The arrangement of parts to be described is such that although, the front and rear insulating walls of the switch are made up of a plurality of thin plates, yet the assembled structure is amply stiff and rugged. Lying next to the plate 10 is a plate 11 of insulating material, and this plate has a plurality of slots 12 arranged about its periphery, as shown in Figure 4.

Placed against plate 11 is a plate 13, of insulating material, and lying against this plate is a pair of spaced conducting segments 14, Figure 3, having a projection 15. The segments 14 are maintained in spaced relation by an insulating plate 40 having a pair of peripheral slots in which the extensions 15 are entered.

Covering the conducting segments 14 is an insulating plate 16, Figure 6, and this plate has a plurality of radially spaced apertures 17, so that a conducting member may pass therethrough to contact with the segments in a manner to be described later.

The insulating plates 10, 11, 13 and 16 form the front wall of the switch.

An insulating plate 18, Figures 7 and 8, similar to plate 16 and having a plurality of radially spaced apertures 19, is positioned in spaced relation to plate 16 to admit of the insertion of a rotatable switch element between them.

Against the plate 18 is an insulating plate 20, similar to plate 11, and having slots 21 in its periphery. Against the plate 20 is the rear insulating plate 22, similar to plates 16 and 18, and this plate also has a plurality of radially spaced apertures. It will now be obvious that the plates 11 and 20 are interchangeable, and that a single stamping will make available a plate for use in the positions occupied by plates 13, 16, 18 and 22.

Referring particularly to Figure 7, the numeral 23 indicates a metallic contact pin having a head 24 and a shoulder 25. The reduced portion between the head and the shoulder lies in a slot 21 in the plate 20, and the head and the shoulder are entered in the apertures in plates 18 and 22 respectively.

Figure 8 shows the manner in which the several insulating plates and the contact segments are held assembled. Tubular members 26 having circumferentially reduced end portions are entered in apertures in the plates and the segments, and the ends of the tubular members are then expanded or pressed.

As shown in Figures 1 and 8, a shaft 27 is mounted for rotation in the assembled plates. The shaft is slotted, as at 30, and apertured as at 30′, and a C-shaped member 29 is entered in the slot 30 and its ends are pressed into the aperture 30′ to offer, in effect, a pair of longitudinally extending outstanding members on the shaft. A pair of spaced arms 28 of insulating material, are mounted on the shaft 27, Figure 6, and the member 29 enters a slot in the arms to compel the arms to rotate with the shaft.

The arms 28 are held in spaced relation to each other by means of metallic tubular members 31 having circumferentially reduced end portions which are entered in apertures in the arms, near the ends thereof, and the ends of the tubular members are expanded or pressed.

Housed in the tubular members 31 are metallic ball contacting members 32, impelled outwardly by a spring 33 positioned between them. A pair of telescoping metallic caps with the spring 33 housed in the caps may be substituted for a pair of ball contacting members and the spring shown in Figure 1.

It will now be obvious that as the shaft 27 is rotated the contacting balls 32 will connect the contact segments 14 with the pins 23, and that with the switch shown in the drawings, it is possible to connect any pair of five pairs of lines connected to the pins with a loud speaker, or other device connected to the pair of segments.

As shown in Figures 1 and 2, a plurality of thin springy contacting fingers 34, secured at one end on the front lower portion of the switch, extend through the peripheral slots in the plate 20 of the rear wall of the switch, and are bent so that they may contact with the shoulder 25 of the pins 23 when not hold out of contact by being pressed downwardly by the tip of the insulating arm 28. The front end of the finger 34 is entered in a slot in plate 11 and clamped between the plate 12 and 13, and an extension of the finger is passed through an aperture in plate 10 and then connected to the impedance coil, by a wire 38.

It will be clear that when the switch is turned to connect a given lower contact pin with the conducting segment, the finger 34 is pushed out of contact with that pin, and the other fingers are in contact with their cooperating pins.

Impedance coils 35 are suitably mounted on the upper portion of plate 10. The wiring diagram, Figure 9, shows how the coils are employed in connection with a program distributing system. The diagram shows five pairs of incoming lines and five impedance coils, but it will be necessary to deal with only one pair of incoming lines in describing the operation of the switch.

A pair of incoming lines 36, which may carry a program from a radio receiver (not shown) are connected to a pair of contact pins 23. Current flows through the contact pins, through the contacting members 32 and then through the segments 14 to wire 37 connecting the segments with a loud speaker (not shown). The impedance coil 35 is connected to one of the pair of incoming lines and to the finger 34 which is held out of contact with the pin 23 by the insulating arm 28. It will be obvious that when the switch is turned to disconnect the incoming lines from the loud speaker, the finger 34 will contact with the pin 23 and the impedance coil will then be a load substituted for that of the loud speaker.

While I have shown my switch arranged to connect any pair of a plurality of pairs of incoming lines to a loud speaker, or the like, and have also shown it as a means for connecting an impedance across the incoming lines while they are not connected to the loud speaker, it will be obvious that it may be used in telephone and signaling systems other than that discussed.

It will also be evident that when the switch is to be used simply as a selector switch, with the contact segments connected to a load or a source of energy, the walls of the switch may be built up of plates similar to plates 11 and 16.

I am aware that many changes may be

made and numerous details of the construction may be varied through a wide range without departing from the principles of this invention, and I, therefore, do not purpose limiting the patent granted herein, otherwise than necessitated by the prior art.

What is claimed is:

1. In an electric switch, a laminated wall comprising a plurality of apertured plates of insulating material, means to retain the plates in clamped relation to each other, and a contacting segment positioned in the wall between certain of the said plates and having portions exposed for contact through the apertures.

2. In an electric switch, an insulating plate having a peripheral slot, a contacting member entered in the slot and having outstanding portions engaging the front and rear faces of the plate, and another insulating plate arranged to retain the said contacting member in the slot in the first named plate.

3. In an electric switch, a wall formed of a plurality of apertured insulating plates, one of said plates having a plurality of peripheral slots, contacting pins entered in the slots, the said pins being received by and held against movement by the other plates of the wall.

4. In an electric switch, a laminated wall comprising a plurality of apertured plates of insulating material, a pair of contacting segments positioned in the wall between certain of the said plates and having outwardly extending portions, and an insulating plate positioned between the said segments and having slots to receive the outstanding portions of the segments.

5. In an electric switch, a wall, contacting members mounted on the wall, a shaft journaled in the wall, the said shaft having a transverse bore therethrough, and having a transverse longitudinally extending open slot in one end thereof, an arm mounted on the shaft, the said arm having a longitudinally extending slot, contacting means on the arm adapted to contact with the contact members in the wall, means arranged to removably secure the said arm to the said shaft, the said means including a C-shaped member entered in the slot in the said shaft and in the slot in the said arm and having its ends entered in the transverse bore in the said shaft.

6. In an electric switch, spaced front and rear walls, opposed alined contacting members mounted on said walls, a pair of arms mounted on a shaft and between the said walls, tubular means securing the arms in spaced relation to each other, contacting members slidably housed in the said tubular means, and spring means housed in the tubular means and between the contacting members therein to impel them into contact with the contacting members mounted on the walls of the switch.

7. In an electric switch, spaced front and rear walls, alined and spaced opposed contacting members mounted on the walls of the switch, a revolvable switch member positioned between the walls to selectively connect the alined opposed spaced contacting members, a plurality of reciprocable switch fingers extending between the front and rear walls of the switch and adapted to normally contact with the contacting members in the rear wall of the switch, and means arranged to push the said switch fingers out of contact with the contacting members in the rear wall when the revolvable switch member is in contact with the said contacting members.

8. In an electric switch, a plurality of spaced contacting members, a revolvable switch member adapted to be revolved in consecutive contact with the said contacting members, a plurality of reciprocable switch fingers arranged to normally contact with the said contacting members, and means arranged to push a switch finger out of contact with one of the said contacting members when the said revolvable switch member is in contact with that contacting member.

9. In an electric switch, a plurality of spaced contacting members, a revolvable switch member adapted to be revolved into consecutive contact with the said contacting members, a plurality of reciprocable switch fingers normally in contact with the said contacting members, and means on the said revolvable switch member arranged to disconnect a switch finger from a contacting member when the said revolvable switch member is in contact with that contacting member.

10. In an electric switch, a conducting segment, a plurality of spaced opposed contact pins, a switch arm revolvable between the said segment and the said contact pins to selectively connect the said pins in circuit association with the said segment, and an apertured insulating plate overlying the said conducting segment whereby a plurality of alternately spaced insulating and conducting surfaces are traversed by the said revolvable switch arm.

11. In combination, a pair of conducting segments, a plurality of spaced pairs of contact pins adapted to be connected to pairs of lines, a revolvable switch arm adapted to selectively connect a pair of lines through their connected contact pins in circuit association with the said pair of conducting segments, a plurality of impedance coils, reciprocable switch means normally connecting the said impedance coils across pairs of lines through associated pairs of contact pins, and means operable by the said revolvable switch arm to disconnect an impedance coil and its associated reciprocable switch means from a con-

tact pin when the said switch arm is in contact with that contact pin.

12. In a unitary structure, spaced front and rear walls, a pair of conducting segments in the front wall, a plurality of spaced contact pins in the rear wall, means to retain the walls in spaced relation to each other, a switch arm revolvable between the walls to selectively connect the said contact pins with the said conducting segments, a plurality of impedance coils mounted on a wall, a plurality of reciprocable switch fingers mounted on the front wall and extending to normally contact with certain contact pins on the rear wall, wires connecting the said impedance coils with certain other of the said contact pins and with the said reciprocable switch fingers, and means on the said switch arm to selectively reciprocate the said reciprocable fingers.

13. In combination, a plurality of pairs of lines, a plurality of contact pins connected to the lines, a pair of segments, a revolvable switch member arranged to selectively connect a pair of lines with the said segments by connecting a pair of contact pins with the said segments, a plurality of reciprocable switch fingers adapted to normally contact with certain of said contact pins, a plurality of impedance coils each normally connected across a pair of lines in circuit association with a contact pin and a reciprocable switch finger, and means arranged to disconnect an impedance coil from its associated pair of lines when the pair is connected to the said pair of segments, the said means including a member on the said revolvable switch arm in operative association with a reciprocable switch finger.

In testimony whereof I have hereunto subscribed my name at Chicago, Cook County, Illinois.

ALFRED J. MACY.