April 24, 1934. J. J. MacGREGOR 1,955,756

SERIES AND PARALLEL SWITCH

Filed Oct. 14, 1933

FIG. 1

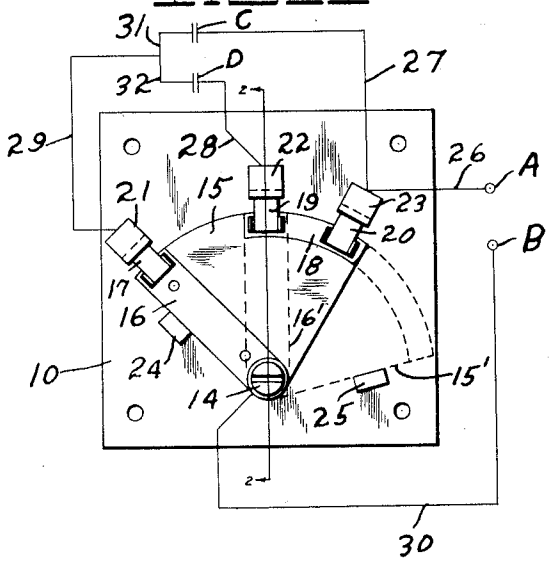
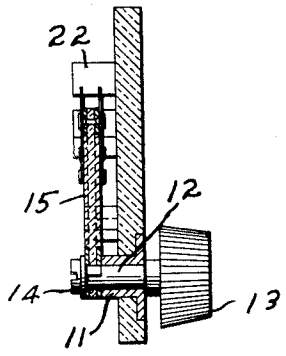


FIG. 2



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Patented Apr. 24, 1934 1,955,756

UNITED STATES PATENT OFFICE

1,955,756

SERIES AND PARALLEL SWITCH

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Application October 14, 1933, Serial No. 693,554

7 Claims. (Cl. 200—15)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

This invention relates to a switch and has for an object to provide an improved switch especially adapted for connecting electrical components such as condensers, resistances, inductances, etc., either in series or in parallel as may be desired, by merely turning a single switch actuating knob.

Another object is to provide an improved and facile means for disconnecting electrical components or for connecting them either in series or in parallel, as may be desired.

In certain phases of the radio and electrical arts, it is often desirable to make provision for changing components from a series to a parallel connection. The means employed prior to this invention have been cumbersome and have involved changing several wires or have employed a multipoint switch or a plurality of plugs or jacks. The means disclosed herein, however, permits the change to be made by the change in position of a single member.

With the above and other objects in view, this invention consists in the construction, combination and arrangement of parts as will be described more fully hereinafter.

In the drawing:

Fig. 1 is an elevational view of a switch made up in accordance with this invention;

Fig. 2 is a section on line 2—2 of Fig. 1.

There is shown at 10 an insulating panel on which the switch constituting this invention has been installed. Projecting through the panel is a bushing 11 through which passes a shaft 12, a knob 13 being mounted on one end of the shaft 12 for manipulating the same. Secured to the other end of shaft 12 by means of a screw 14 is a sector-shaped non-conductive member 15. Along one straight edge of the member 15 a conducting bar 16 terminates in a knife switch 17. Likewise secured to member 15 along the circular edge thereof is a conducting bar 18 to which is secured at each end thereof the knife switches 19 and 20.

Female switch elements 21, 22 and 23 are each fixedly mounted on the panel 10 in the path of movement of the knife switches 17, 19 and 20 as member 15 is pivoted about its shaft 12. Stops 24 and 25 projecting from the panel 10 limit the extreme movements of the member 15 on pivoting shaft 12. As will be obvious in Fig. 1, knife switches 17, 19 and 20 are so spaced that each knife switch will coact with a stationary switch element when member 15 is at one extremity of its position against stop 24, as shown in full lines. When the panel 15 has been moved to its other extreme position against stop 25, as shown in dotted lines at 15', the contact bar 16 will be moved to the position 16' so that knife switch 17 will make contact with the female switch element 22. When in this position the knife switches 19 and 20 will not make contact with any member and hence no current will then pass through the conducting bar 18.

C and D are the electrical elements which it is desired to include in a circuit either in series or parallel relation. A wire 26 connects terminal A and switch contact 23. Another wire 27 connects switch contact 23 to electrical element C. Switch contact 22 is connected by wire 28 to electrical element D and electrical element C and D are connected to each other by wires 31 and 32 and to switch contact 21 by wire 29. Wire 30 connects screw 14 and conducting bar 16 to station B.

When the knob 13 is manipulated to place the member 15 in position against stop 24, the current passes from terminal A through wire 26 to switch 23. Here the current divides and part of it passes through wire 27 to electrical element C and the other part of it passes through knife switch 20, conducting bar 18, knife switch 19, switch contact 22, wire 28, to electrical element D. The currents from electrical elements C and D then unite through wires 31 and 32 in wire 29 and pass to switch contact 21, knife switch 17, conducting bar 16, and screw 14 to wire 30 and terminal B. Screw 14 may serve as a terminal for switch member 17. It will be seen that the current from terminal A has passed through electrical elements C and D in parallel on the way to terminal B.

If it is desired to place the electrical elements C and D in series, knob 13 is rotated to move the panel to the position 15' against the stop 25. In this position the current will then pass from terminal A through wire 26 to switch contact 23. No knife switch will be in connection with switch contact 23 and therefore all the current will continue on through wire 27 to electrical element C, to wire 31, to wire 32, to electrical element D and through wire 28 to switch contact 22. From switch contact 22 the current will pass to knife switch 17, which will now coact with switch contact 22, thence through conducting bar 16 (now in position 16') to screw 14 and wire 30 to terminal B. Wire 29 is dead ended.

Thus it will be seen that rotation of the knob 13 from one position to the other will cause electrical elements C and D to be either in series or in parallel, as may be desired.

It will be understood that the foregoing description and accompanying drawing comprehend only the general and preferred embodiment of

my invention, and that various changes in construction, proportion and arrangement of parts may be made within the scope of the appended claims without sacrificing any of the advantages of my invention.

The invention described herein may be manufactured and used by or for the Government of the United States for governmental purposes, without the payment of any royalties thereon.

I claim:

1. A series and parallel switch comprising mounting means, a pivotal support on said mounting means, a pivoted insulating member secured on said pivotal support, a switch member mounted on said insulating member, a terminal connected to said switch member, a pair of switch members mounted on said insulating member, said pair of switch members being spaced from said first mentioned switch member, conducting means connecting the switch members of said pair to each other, said first mentioned switch member and one switch member of said pair being at substantially the same distance from said pivotal support, a switch contact and a pair of switch contacts mounted on said mounting means, and stop means limiting the pivotal movement of said insulating member in each direction, each of said switch contacts being juxtaposed to one of said switch members when said switch member carrying insulating member is against one of said stop means, said first mentioned switch member being adapted to be juxtaposed to one of the pair of switch contacts when the switch member carrying insulating member is against said other stop with at least one of the other two switch members out of contact.

2. A series and parallel switch comprising mounting means, a pivotal support on said mounting means, a pivoted insulating member secured on said pivotal support, a switch member mounted on said insulating member, a terminal connected to said switch member, a pair of switch members mounted on said insulating member, said pair of switch members being spaced from said first mentioned switch member, conducting means connecting the switch members of said pair to each other, each of said three switch members being at substantially the same distance from said pivotal support, a switch contact and a pair of switch contacts mounted on said mounting means, and stop means limiting the pivotal movement of said insulating member in each direction, each of said switch contacts being juxtaposed to one of said switch members when said switch carrying insulating member is against one of said stop means, said first mentioned switch member being adapted to be juxtaposed to one of the pair of switch contacts when the switch carrying insulating member is against said other stop with at least one of the other two switch members out of contact.

3. A series and parallel switch comprising mounting means, a pivotal support on said mounting means, a pivoted insulating member secured on said pivotal support, a switch member mounted on said insulating member, a terminal connected to said switch member, a pair of switch members mounted on said insulating member, said pair of switch members being spaced from said first mentioned switch member, conducting means connecting the switch members of said pair to each other, said first mentioned switch member and one switch member of said pair being at substantially the same distance from said pivotal support, a switch contact and a pair of switch contacts mounted on said mounting means, and stop means limiting the pivotal movement of said insulating member in each direction, each of said switch contacts being juxtaposed to one of said switch members when said switch carrying insulating member is against one of said stop means, said first mentioned switch member being adapted to be juxtaposed to one of the pair of switch contacts when the switch carrying insulating member is against said other stop with at least one of the other two switch members out of contact, said switch contacts being adapted to be connected by conducting means from a source of power, said conducting means being also connected to a pair of electrical components, said conducting means connecting in series to one switch contact of said pair, to one of said electrical components, to the other of said electrical components and to the other of said pair of switch contacts, connecting both of said electrical components to said first mentioned switch contact and connecting said terminal back to said source of power whereby a circuit is completed in parallel through said electrical components when the switch carrying insulating member is against one stop with each switch member in contact with its switch contact and is completed in series through said electrical components when said insulating member is against said other stop member with said first mentioned switch member in contact with one of said pair of switch contacts.

4. A series and parallel switch comprising mounting means, a pivotal support on said mounting means, a pivoted insulating member secured on said pivotal support, a switch member mounted on said insulating member, a terminal connected to said switch member, a pair of switch members mounted on said insulating member, said pair of switch members being spaced from said first mentioned switch member, conducting means connecting the switch members of said pair to each other, each of said three switch members being at substantially the same distance from said pivotal support, a switch contact and a pair of switch contacts mounted on said mounting means, and stop means limiting the pivotal movement of said insulating member in each direction, each of said switch contacts being juxtaposed to one of said switch members when said switch carrying insulating member is against one of said stop means, said first mentioned switch member being adapted to be juxtaposed to one of the pair of switch contacts when the switch carrying insulating member is against said other stop with at least one of the other two switch members out of contact, said switch contacts being adapted to be connected by conducting means from a source of power, said conducting means being also connected to a pair of electrical components, said conducting means connecting in series to one switch contact of said pair, to one of said electrical components, to the other of said electrical components and to the other of said pair of switch contacts, connecting both of said electrical components to said first mentioned switch contact and connecting said terminal back to said source of power whereby a circuit is completed in parallel through said electrical components when the switch carrying insulating member is against one stop with each switch member in contact with its switch contact and is completed in series through said electrical components when said insulating member is against said other stop member with said first mentioned switch member

in contact with said other switch contact of said pair.

5. A series and parallel switch comprising mounting means, a shaft pivotally supported on said mounting means, an insulating panel secured on said shaft, a switch member mounted on said insulating panel, a terminal on said panel, conducting means connecting said switch member to said terminal, a pair of switch members mounted on said panel, said pair of switch members being spaced from said first mentioned switch member, conducting means connecting the switch members of said pair to each other, each of said three switch members being at substantially the same distance from said pivoting shaft, and three switch contacts mounted on said mounting means, stop means limiting the pivotal movement of said insulating panel in each direction, each of said switch contacts being juxtaposed to one of said switch members when said panel is against one of said stop means, said first mentioned switch member being adapted to be juxtaposed to the intermediate switch contact when the panel is against said other stop with at least one of the other two switch members out of contact.

6. A series and parallel switch comprising mounting means, a shaft pivotally supported on said mounting means, an insulating panel secured on said shaft, a switch member mounted on said insulating panel, a terminal on said panel, conducting means connecting said switch member to said terminal, a pair of switch members mounted on said panel, said pair of switch members being spaced from said first mentioned switch member, conducting means connecting the switch members of said pair to each other, each of said three switch members being at substantially the same distance from said pivoting shaft, the distance between said first mentioned switch member and the adjacent switch member of said pair being different than the distance between the switch member of said pair, and three switch contacts mounted on said mounting means, stop means limiting the pivotal movement of said insulating panel in each direction, each of said switch contacts being juxtaposed to one of said switch members when said panel is against one of said stop means, said first mentioned switch member being adapted to be juxtaposed to the intermediate switch contact when the panel is against said other stop with at least one of the other two switch members out of contact.

7. In a switch, a series of contacts, a terminal connection for each unit of said series, a second series of contacts coacting severally with the units of said first named series and movable with respect thereto, a terminal connection for a unit of said second named series, a conductive tie-member between other units of said second named series, and means for moving said tie-member and its associated units out of coacting relation with units of said first named series and at the same time moving the unit of said second named series having a terminal connection out of coacting relation with a unit of said first named series and into coacting relation with another unit of said first named series.

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