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REMOTE CONTROL DEVICE

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Fig. 1.

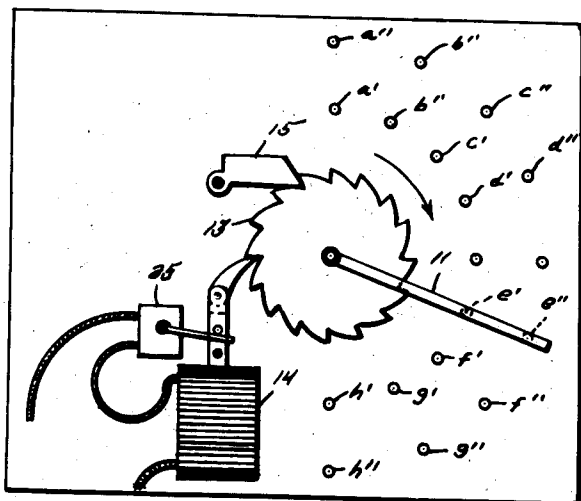
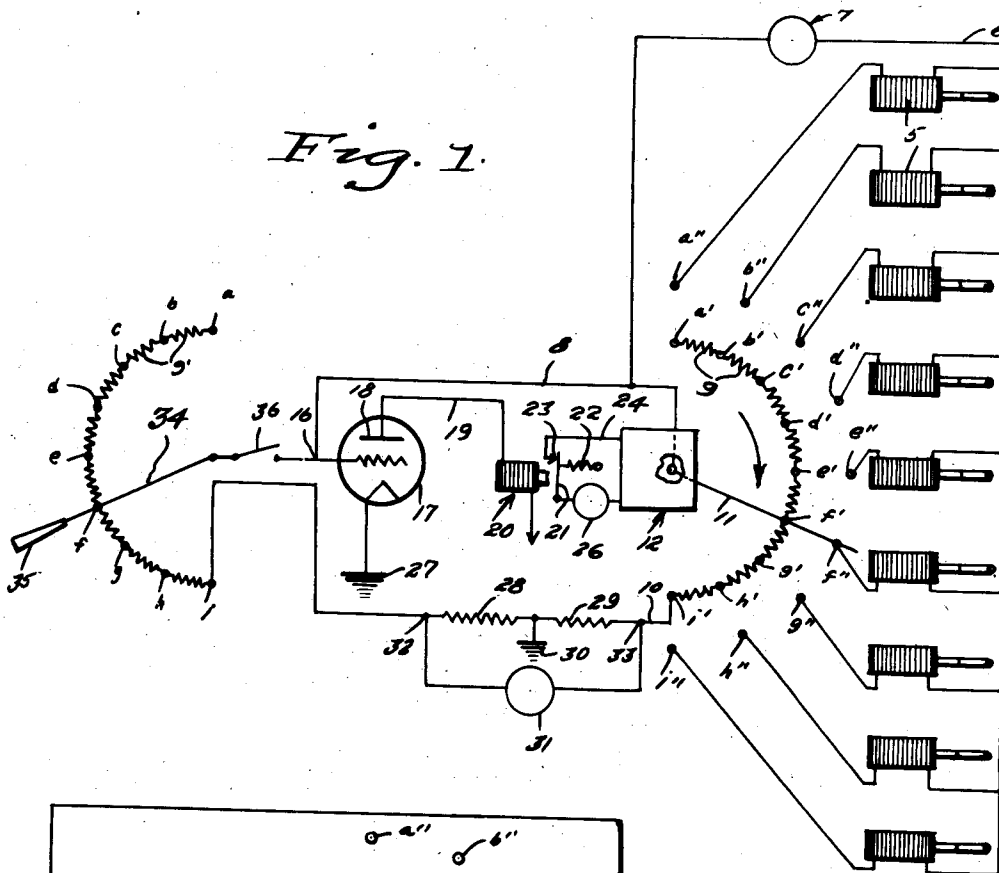


Fig. 2

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REMOTE CONTROL DEVICE

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1 Claim. (Cl. 172-239)

My invention relates to improvements in electrical remote control means of the type enabling selection for operation of a circuit or circuits at a point remote from a device, and the primary object of the invention is to provide a simple and efficient arrangement of this character.

Other important objects and advantages of my invention will be apparent from a reading of the following description taken in connection with the appended drawing, wherein for purposes of illustration I have shown a preferred embodiment of my invention.

In the drawing—

Figure 1 is a general schematic wiring diagram showing a device in accordance with the present invention.

Figure 2 is an elevational view of the electrically operated "stepper."

Referring in detail to the drawing, the numerals 5 designate each of a plurality of solenoids or other electrical agencies which are severally connected to the corresponding contacts a'' , b'' , c'' , d'' , etc., and to a common conductor 8 leading from one side of a source of operating voltage diagrammatically represented at 7, the remaining side of the source 7 being connected intermediate the ends of the line 8 leading to the remotely located selecting means. The said contacts are located concentrically with respect to another arcuate series of contacts a' , b' , c' , d' , etc., which are radially aligned with the first-mentioned contacts. Connected between adjacent ones of the contacts a' , b' , c' , d' , etc., are resistors, each of which is of a capacity of about 10,000 ohms. The contact i' is connected to the line 10 companion to the line 8 leading to the remote selecting means.

Pivotaly supported at the center of the two series of contacts and resistors is the conductive arm 11 of the stepper mechanism which is generally designated 12 and which comprises the ratchet wheel 13, the solenoid core including the pivoted dog 14 to feed the ratchet wheel 13 in the direction of the arrow, and the pawl 15 normally preventing return rotation of the ratchet wheel 13 by suitable means (not shown) provided for this purpose, except when the pawl 15 is lifted out of engagement with the wheel 13 in resetting the mechanism. The line 8 is connected to the arm 11 as indicated in Figure 1 of the drawing.

Connected to the line 8 at 16 is the grid of a vacuum tube 17 whose plate 18 is connected at 19 to one end of the coil of the relay 20 whose remaining end is connected to positive of suitable

plate supply. The armature 21 of the relay is normally retracted away from the relay coil by a spring 22 so as to be out of engagement with the contact 23 which is connected at 24 to the solenoid 14 of the stepper 12 through its circuit breaker 25. The remaining end of the solenoid 14 is connected to a current source 26 which is connected to the relay armature 21. The heater of the tube 17 has one side grounded at 27 and the other side connected to a suitable heater supply source.

In the line 10 are connected the resistors 28 and 29 which have a ground 30 between them and a power source 31 connected to the line 10 outside of the resistors at the points indicated by the numerals 32(−) and 33(+). In an experimental embodiment of the invention the values of the resistors 28 and 29 were such as to produce 300 volts across the resistor 28 which was 20 volts less than the voltage across the resistor 29. Beyond the resistors 28 and 29 the line 10 is connected to the contact i which is the last one of a circular series of contacts a , b , c , d , e , f , g , h , and i which have resistors 9' similar in capacity to the resistors 9 already described, connected between the adjacent ones of the contacts. At the center of curvature of the series of contacts is pivoted the switch arm 34 which has a suitable handle 35 projecting therefrom to operate the switch arm 34 to engage selectively with the various contacts in accordance with which one of the solenoids or other electrical elements it is desired to select for operation at a point remote from the selecting means comprising the switch arm 34 and the handle 35. The line 8 is connected to the switch arm 34 through a suitable switch 36. It is evident from the foregoing that the sums of the resistors decrease downwardly from the upper ends of the semi-circular series.

Operation

Supposing it is desired to select for operation the remote circuit represented by the solenoid 5 connected with the switch point i' , the switch arm 34 is manually moved to engage the point i on the selector means, as shown in Figure 1. The manual switch 36 is then closed. A grid voltage of about 58 volts positive with respect to its filament is on the grid of the tube 17 at this point. The plate current of the tube flows in the tube and causes the relay 20 to close, thereby causing the stepper 12 to operate the conductive arm 11 in the direction indicated by the arrow so as to cut down the total of the

resistances 9. The current in the plate circuit of the tube 17 continues to flow as the resistance is thus reduced until a point in the travel of the arm 11 is reached at which the capacity of the resistors 9 equals the capacity of the selected point on the resistors 9. The voltage at this point on the grid of the tube will be about 10 volts negative with respect to its filament. This 10 volts negative acts as a bias on the grid and causes the plate current to cease flowing to the relay, so that the relay armature opens by the action of the spring 22, thereby stopping the stepper 12 and arresting the arm 11 on the point *f'* and on the contact *f'*, so that the current source 7 is then connected to supply energy to the corresponding one of the solenoids 8.

The same procedure and current flow takes place regardless which selection is made by the operation of the switch arm 34 by its handle 35.

When the described device is used in connection with an automatic phonograph, such as a public coin controlled phonograph, the solenoids 5 may be of well known selector solenoid type, but the invention is not, of course, restricted to any particular form of apparatus to be selectively operated.

While the switch 36 is open the voltage on the grid of the vacuum tube 17 is approximately 160 volts negative with respect to its filament, and plate current does not flow in the tube 17 and the relay 20 remains open. In this position of the parts the arm 11 of the stepper unit 12 is engaged with the contacts *a'* and *a''* with all of the resistance of the series 9 cut in. After an

operation of the device as described, resetting of the arm 11 is accomplished by retracting the pawl 15 and allowing the ratchet wheel 13 to be returned to its initial position by suitable means (not shown) provided for this purpose.

Although I have shown and described herein a preferred embodiment of my invention, it is to be definitely understood that I do not wish to limit the application of my invention thereto, except as may be required by the scope of the subjoined claim.

Having described the invention, what is claimed as new is:

In a self-balancing Wheatstone bridge circuit including a local resistor and a remote resistor, electrical elements connected for energization to corresponding points along said remote resistor, an electro-magnetic ratchet stepper comprising a separately energized circuit including a circuit breaker including means in said circuit between said local resistor and said remote resistor, an adjustable contactor for said local resistor connected between said local resistor and said stepper, said stepper comprising a contactor engaging said remote resistor to be moved step by step along said remote resistor as the stepper is operated to points on said remote resistor electrically corresponding to the points on said local resistor to which its contactor is successively adjusted, and a vacuum tube operated relay circuit operatively connected between said adjustable contactor and said stepper.

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