

[54] **VARIABLE RESISTOR PROVIDED WITH MEANS FOR MEMORIZING A SET VALUE OF RESISTANCE**

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[51] Int. Cl.<sup>2</sup> ..... **H01C 10/44**

[58] Field of Search ..... **338/118, 119, 135, 155, 338/158, 176, 179, 183, 196, 198**

[56]

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[57]

**ABSTRACT**

A variable resistor having a slidable member carrying a rotatable roller and a movable push rod, wherein a contact provided on the periphery of the roller can be brought into contact with a conductive rail by operating the push rod with the slidable member held at any desired position. With this means, a preset value of resistance can be readily reproduced.

**9 Claims, 5 Drawing Figures**

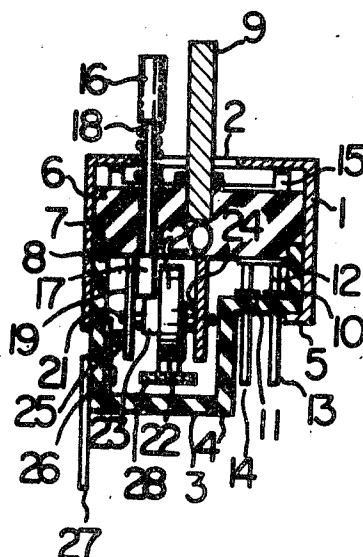
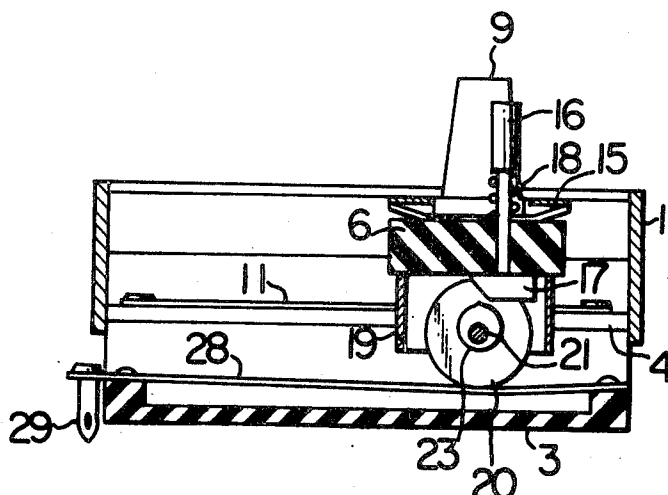


FIG. 1

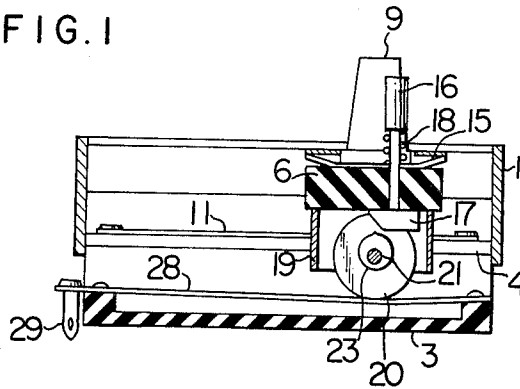


FIG. 3

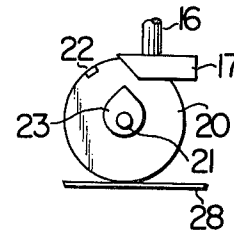


FIG. 4

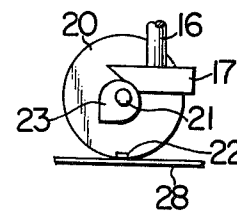


FIG. 2

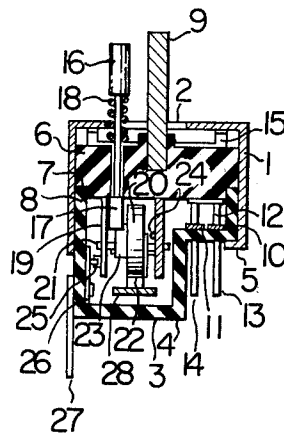
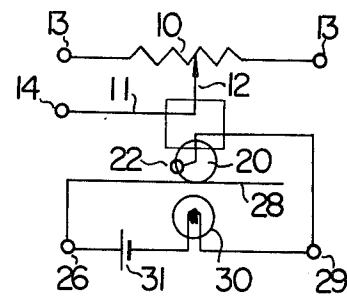


FIG. 5



# **VARIABLE RESISTOR PROVIDED WITH MEANS FOR MEMORIZING A SET VALUE OF RESISTANCE**

This invention relates to a variable resistor provided with means for memorizing a set value of resistance corresponding to a desired volume, balance position or the like and displaying a position corresponding to the set value of resistance by means of a light source, wherein the memorized set position can be changed at the will of the user.

The variable resistors in the prior art have no means for memorizing a set value of resistance. Therefore, if such a variable resistor is used for volume or balance control, the desired listening position has to be found every time when the control is made, which is very inefficient.

An object of the invention is to provide a variable resistor provided with means for memorizing a set value of resistance corresponding to the desired volume, balance or the like of the user, so that the desired listening position can be readily found out.

The above and other objects, features and advantages of the invention will become more apparent from the following description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a longitudinal sectional view of an embodiment of the variable resistor provided with a set resistance memorizing means according to the invention;

FIG. 2 is a transversal sectional view of the same;

FIGS. 3 and 4 are views for illustrating the operation of a roller in the same variable resistor; and

FIG. 5 is a circuit diagram showing the electric circuit of the same variable resistor.

An embodiment of the invention will now be described with reference to the drawings. Referring to FIGS. 1 and 2, reference numeral 1 designates a metal case having a channel-shaped sectional profile. Its top wall is formed with a longitudinal elongate opening or slot 2. Fitted in its open bottom and held by a bent portion 5 is a frame member 4 having a stepped wall portion 3. Disposed within the case 1 is a move means or slidable member 6 having notches 7 formed on opposite sides of lower edges thereof and slidably engaged with the top of the respective side walls 8 of the frame member 4. The slidable member 6 has a manual knob 9 extending from a top portion thereof and penetrating the slot 2 of the case 1. Extending from the slidable member 6 are brushes in electric and frictional contact with respective resistor element 10 and contact element 11 provided on the frame member 4. The resistor element 10 and contact element 11 are electrically connected respectively to an outer terminal 13 and an intermediate terminal 14 which are led to the outside of the frame member 4. While only the outer terminal 13 is shown, actually there are two outer terminals that are led to the outside of the frame member 4. Numeral 15 is a slidable spring interposed between the top of the slidable member 6 and the underside of the top wall of the case 1.

Part 16 is a push rod mounted penetrately in the slidable member 6 for vertical movement and having one end thereof penetrating the slot 2 formed in the top wall of the case 1 and the other end thereof projecting from the underside of the slidable member 6 provided with a cam operating member 17. The cam operating member 17 has a slanted face. The push rod 16 is up-

wardly urged by a spring 18 fitted on its portion projecting from the top of the slidable member 6. The cam operating member 17 also serves as a stopper for preventing the push rod 16 from being upwardly withdrawn. A rectangular hollow roller support 19 made of a conductive material extends from the underside of the slidable member 6. It is open at its lower end and partly extends within the stepped wall portion 3 of the frame member 4. The cam operating member 17 secured to the push rod 16 extends within the roller support 19. Also extending within and rotatably carried by the roller support 19 is a roller 20 made of a nonconductive material and having a rotatable pin 21. It has a contact member 22 of a conductive material secured to a portion of its periphery. The contact member 22 is in electric connection to the rotatable pin 21. One side of the roller 20 is integral with a coaxial cam 23 such that the cam operating member 17 of the push rod 16 is located in the neighborhood of the cam 23. Preferably, the cam 23 is eccentric with the roller 20. Fitted on the rotatable pin 21 is a lead spring 24 intervening between the roller 20 and the roller support 19 for electric connection of them. A contact 25 is provided to electrically connect the roller support 19 and a switch terminal 27 provided on the outer side of the frame member 4 through a conductive plate 26 provided on the inner wall of the stepped wall portion 3 of the frame member 4. Numeral 28 designates a rail made of a conductive material having some resiliency. It substantially extends in the space within the stepped wall portion 3 of the frame member 4 and in the same direction as the resistor element 10. The rail 28 has a length within the movable range of the slidable member 6, and the roller 20 is in contact with it. Numeral 29 designates another switch terminal electrically connected to the rail 28 and provided on the outer side of the frame member 4. The operation of the above system will now be discussed. To adjust the resistance, the knob 9 is moved to move the slidable member 6. With the movement of the slidable member 6, the brushes 12 secured to the underside thereof slide over the respective resistor element 10 and contact element 11. In this way, a desired resistance value can be taken out from between one of the outer terminals 13 and the intermediate terminal 14.

Simultaneously with the frictional movement of the slidable member 6, the roller 20 rolls over the rail 28. If the push rod 16 is downwardly depressed against the biasing force of the spring 18 at any desired position of the slidable member 6, the slanted face of the cam operating member 17 is brought into engagement with the cam 23. By further depressing the push rod 16 the cam 23 is pushed, so that the roller 20 is rotated in unison with the cam 23 without the slidable member 6 being moved. At this time, the contact 22 provided on the periphery of the roller 20 eventually comes into contact with the rail 28. FIGS. 3 and 4 illustrate the operation when the push rod 16 is depressed. If a light source 30 and a power supply 31 are connected between the switch terminals 27 and 29, the light source 30 is turned on when the contact member 22 comes into contact with the rail 28. Subsequently, by moving the slidable member 6 with the depressing force removed from the push rod 16, the contact member 22 becomes separated from the rail 28 due to the rolling of the roller 20 with the movement of the slidable member 6. As a result, the light source 30 is turned off. When the rol-

ler 20 is again brought to the afore-mentioned selected position, the contact member 22 touches the rail 28, so that the light source 30 is turned on again. In other words, the selected position of the slidable member 6 can be known from the burning of the light source 30. If the contact is set by pushing the push rod 16 at a different position of the slidable member 6, the light source 30 will burn at that position. In this way, a position corresponding to a desired volume, balance, etc., can be memorized. In order to permit only a single position to be memorized, the range of the rotational angle of the roller 20 should be less than 360°. In other words, if it is desired to memorize only a single position, the slidable range of the slidable member should be selected such that the range of the rotational angle of the roller 20 is less than 360°.

In the above embodiment, the rail 28 has some resiliency sufficient to ensure smooth rotation of the roller 20 in unison with the cam 23 without ever causing the movement of the slidable member 6 at the time of depressing the push rod 16.

While the above embodiment has concerned with a slidable variable resistor, the invention can of course be applied to a rotary variable resistor as well. Also, in place of the light source it is possible to employ various other memory display means.

What we claim is:

1. A variable resistor provided with means for memorizing a set value of resistance comprising a move means movable over a resistor element of the variable resistor, a roller rotatably mounted on said move means, a contact member provided on the periphery of said roller, and a conductive rail having a length within the movable range of said move means, said conductive rail being always in contact with the periphery of said roller, said contact member and said rail constituting a switch in which said contact member is adapted to be made to come into contact with said rail at any desired position of said move means when said move means is operated to vary the resistance value of the variable resistor.

2. A variable resistor provided with means for memorizing a set value of resistance according to claim 1, which further comprises a vertically movable push rod carried by said move means, said roller being adapted to be forcibly rotated to bring said contact member into contact with said rail by operating said push rod at any

desired position of said move means.

3. A variable resistor provided with means for memorizing a set value of resistance according to claim 1, which further comprises a display means operated by the switch constituted by said contact member and said rail.

4. A variable resistor provided with means for memorizing a set value of resistance according to claim 1 wherein said move means comprises means of slidable type.

5. A variable resistor provided with means for memorizing a set value of resistance comprising a move means movable over a resistor element of the variable resistor, a roller rotatably mounted on said move means, a contact member provided on the periphery of said roller, a cam secured to one side of said roller and coaxial therewith, a conductive rail having a length within the movable range of said move means and always in contact with the periphery of said roller, and a vertically movable push rod carried by said move means, said move means being movable to vary the resistance of the variable resistor, said contact member being adapted to be made to come into contact with said rail with the forced rotation of said roller in unison with said cam caused by depressing said push rod at any desired position of said move means.

6. A variable resistor provided with means for memorizing a set value of resistance according to claim 5, wherein said cam comprises an eccentric cam.

7. A variable resistor provided with means for memorizing a set value of resistance according to claim 5, wherein said push rod is provided at a lower portion thereof with a cam operating means having a slanted face, said slanted face of said cam operating means being adapted to be urged against the periphery of said cam to cause forced rotation of said roller at the time of depressing said push rod.

8. A variable resistor provided with means for memorizing a set value of resistance according to claim 5, wherein said contact member is adapted to be electrically connected to switch terminals provided on the outer side of a housing of the variable resistor.

9. A variable resistor provided with means for memorizing a set value of resistance according to claim 5, wherein said move means comprises means of slidable type.

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