United States Patent

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[54] COMBINATION RESISTOR AND SWITCHING CONTROLS

5 Claims, 3 Drawing Figs.

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[51] Int. Cl. H01c 9/08
[50] Field of Search 338/198, 200, 172, 215

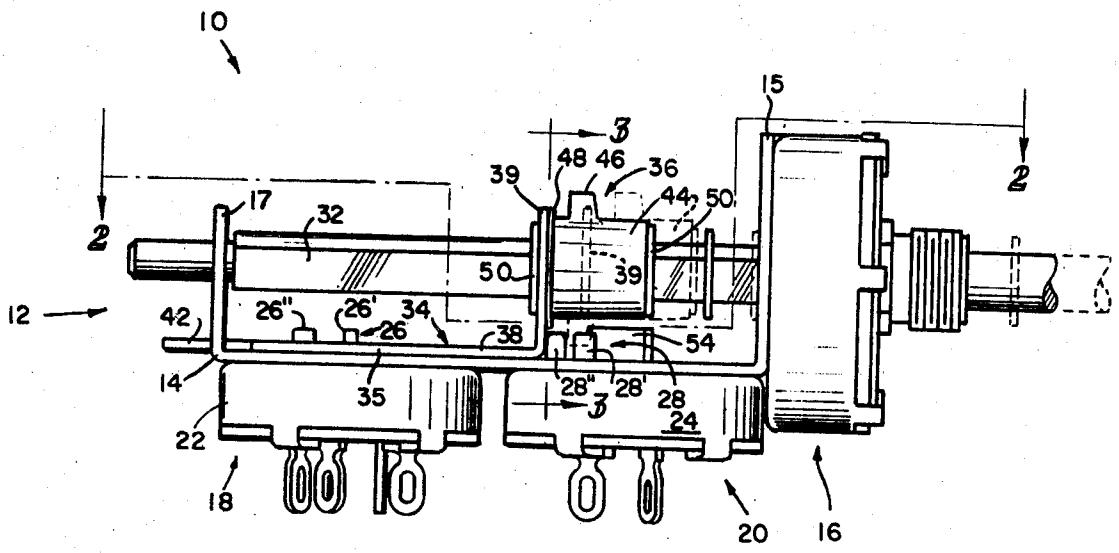
[56] References Cited

UNITED STATES PATENTS

2,020,000	11/1935	Schellenger	338/198 X
2,216,054	9/1940	Stearns	338/198 X
2,268,550	1/1942	Little et al.	338/198 X
2,942,221	6/1960	DiGirolamo	338/200
3,023,388	2/1962	DiGirolamo et al.	338/172

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ABSTRACT: A control means includes a variable resistor and two rotary switches, the resistor being responsive to the rotational displacement of a control shaft with the two switches being turned on and off through axial and rotational displacement of the shaft. A ramp means is provided in an interference path with an actuator means coupled to the shaft such that when the shaft is axially displaced the actuator means rides down the ramp to engage switch actuator means of one of the switches.



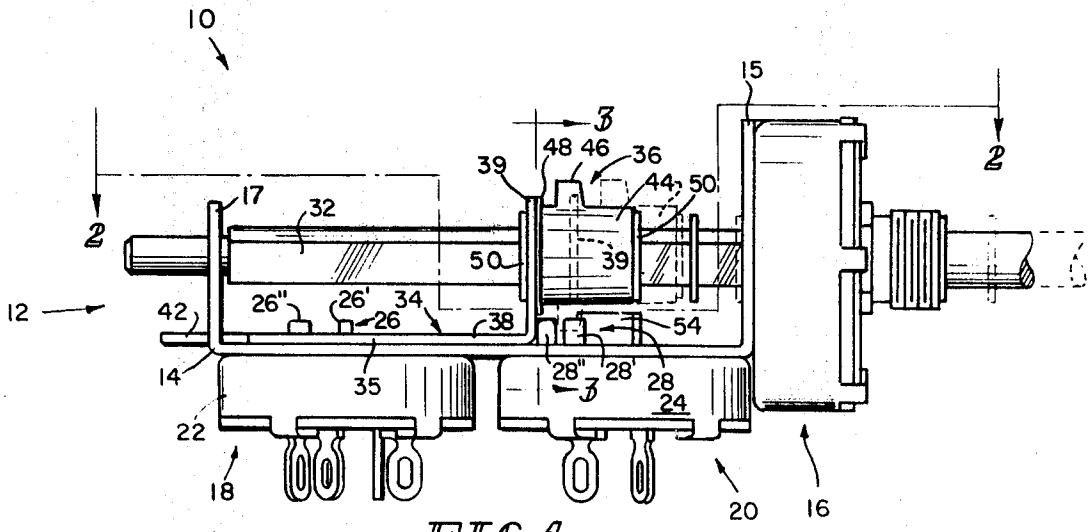


FIG. 1

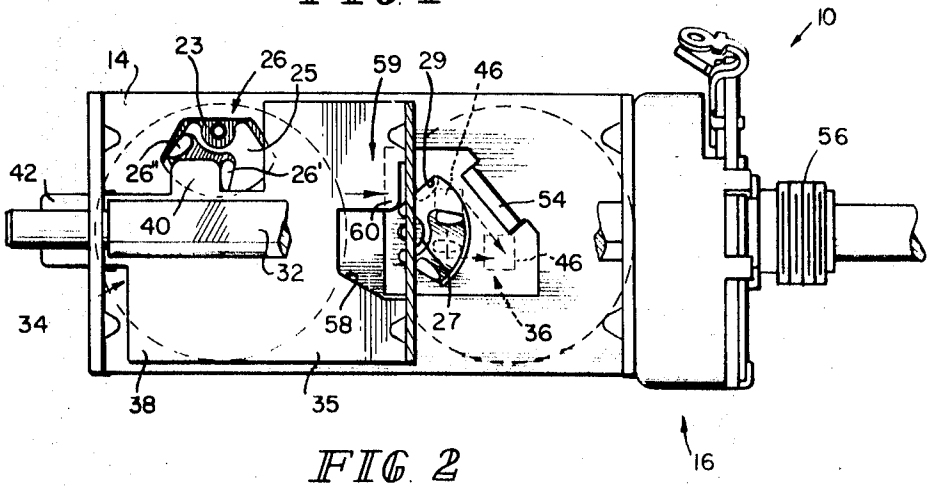


FIG. 2

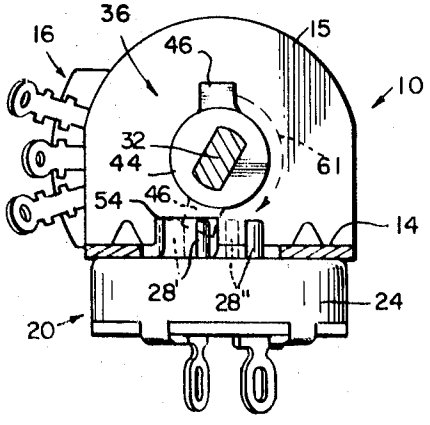


FIG. 3

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COMBINATION RESISTOR AND SWITCHING CONTROLS

This invention relates to a control means; and more particularly, it relates to an "on-off" switching means and volume control means for a television set.

Present day television sets are in many instances turned on and off through an axial displacement of a shaft which upon rotation also controls the audio volume of the set. In addition to a normal "on-off" switch, some televisions also employ the use of a "warmup" switch. Such switch is left in the normally "on" position to provide a very low voltage supply to the tubes and filament controls in the television receiver so as to provide an instant on condition and thus eliminate warmup time of the electrical components. Thus, in the normal day to day operation this warmup switch would be in the "on" position. However, there may be times when it would be desirable to manually turn off such switch. When again turning on the switch it is then necessary to not only turn on the primary on-off switch but it is also desirable to automatically turn on the warmup switch.

The present invention is directed to a control means for a television set wherein there is not only a normally operable "on-off" switch but there is also a normally "on" warmup switch and has as one of its objects the provision of a means of insuring that the warmup switch will automatically be turned on if for any reason it has been turned off.

Another object of the invention is to provide such a control means wherein the two switches are in tandem relation.

Still another object of the invention is to provide such a control means wherein the two switches are responsive to an axial and rotational displacement of a control shaft which is also rotatable to operate a variable resistance control.

Yet another object of the invention is the provision of such a control means having a ramp means to insure that an actuator means coupled to the control shaft will be rotationally displaced as the control shaft is axially displaced from a predetermined position.

These and other objects of the invention will become apparent from the following description taken in conjunction with the accompanying drawings wherein:

FIG. 1 is a side elevation of tandem switches and a variable resistor arranged in accordance with present invention;

FIG. 2 is a view taken along lines 2—2 of FIG. 1; and

FIG. 3 is a cross-sectional view of FIG. 1 along lines 3—3.

Generally speaking the objects of the invention are accomplished by providing a control means which includes a variable resistance means responsive to a rotatable and axially displaceable control shaft, first and second actuator means carried by the control shaft, first and second switching means including first and second switch actuator means responsive to the actuator means upon axial displacement of the control shaft, and ramp means in an interference path with one of the actuator means. Upon axial displacement of the control shaft from a predetermined position, one of the actuator means is caused to ride the ramp so as to cause rotational movement of the control shaft and further cause engagement of the one actuator means with a switch actuator means to actuate the switch.

Referring now to the drawings and more specifically to FIGS. 1 and 2, reference number 10 indicates a control means, such as used in a television receiver. The control means includes a mounting means 12 which includes a base member 14 having at its extremities first and second upright support members 15 and 17. Carried on the first upright member 15 is a variable resistor means 16. Variable resistor means 16 provides the function of a volume control for the television receiver. Such a resistor includes a resistive path and wiper nibs which are displaced by rotation of a shaft to ride over the resistive path to vary the resistance of the unit in a manner well known in the art. First and second switching means 18 and 20 are located on the underneath portion of

base member 14. First switching means 18 includes a switch housing 22 and a switch actuator means 26. Switching means 18 serves primarily as an "on-off" switch for the television. Switch actuator means 26 includes tabs 26' and 26'' carried by pivotal plate 23 and extending through aperture 25, the pivotal plate being carried by base member 14. Second switching means 20 includes a housing 24 and switch actuator means 28. Switch actuator means 28 includes tabs 28' and 28'' carried by pivotal plate 27 and extending through aperture 29, plate 27 being carried by base member 14. Switching means 20 provides a very low voltage supply to the tubes and filament controls in the television receiver so as to provide an instant on condition and thus eliminate warm up time of the electrical components.

Variable resistor means 16 and first and second switching means 18 and 20 are secured and attached to the mounting frame means 12 by some suitable means such as by resistance welding or mechanically staking. The control 10 is actuated and manually controlled by way of an external knob (not shown) through shaft 32. The shaft is supported in the variable resistor means 16 and rotatably carried thereon to provide rotational movement of the wiper nibs of a standard variable resistor. The shaft 32 projects rearwardly from the variable resistor means 16 and is coupled to first and second actuator means 34 and 36. First actuator means 34 includes an L-shaped member 38 having a main body portion 35 which is slidably carried on the top surface of the base plate 14 and an upturned portion 39, a tongue 40 extending from the main body 35, and tab 42 extending from the main body. The upturned portion 39 of the L-shaped member 38 is coupled to control shaft 32. Tab 42 protrudes through the second upright support member 17 of the base plate 14. Thus the L-shaped member 38 is slidably carried on base plate 14 and is coupled to shaft 32 at one end and at the opposite end is trapped from lateral displacement by way of tab 42.

Second actuator means 36 includes a control hub 44 having located thereon a cam means 46. The control hub 44 is carried on the shaft 32 on the double D section of the shaft so as to prevent rotational movement between the hub and the shaft. The hub 44 is axially located on the shaft 32 between two E-rings 50. Also located between the E-rings 50 is the upright portion 39 of the L-shaped member actuator 38. To overcome the problem of dimensioning and tolerance in the sandwiching of the E-rings 50 and eliminate "rattling," upturned support 39 and hub 44, a spring washer 48 is positioned between the hub 44 and the upturned portion 39. Axial movement of the shaft 32 will axially displace first and second actuator means 34 and 36.

FIGS. 1 and 2 illustrate the control means 10 as being in a rest position wherein the television receiver is turned "off." It can be seen that the tongue 40 on first actuator means 34 positions the switch actuator means 26 in an "off" condition. Second switch means 20 is illustrated as being in an "on" condition as shown in FIG. 2. However, since second switch means 20 provides a low voltage input to the electrical components in the television receiver, no picture or audio reception is apparent to the viewer. During this mode of operation the voltage to the television receiver is only sufficient to keep the electrical components warm and in a standby condition. As shown in FIG. 1, second actuator means 36 is rotationally displaced with its cam means 46 in an upward position such that there will be no interference between the cam means and tabs 28' and 28'' when control shaft 32 is axially displaced to turn on switch means 18. Control shaft 32 can be rotated without interfering with tabs 28' and 28'' to select the desired volume by way of the variable resistor 16 after the set has been turned on.

In providing the feature of maintaining small voltage to the electrical components of the television, it is desirable, that provision be made in the control so that upon manual operation, the television may, if desired, be completely (that is, both switch means) turned off. Thus, after control shaft 32 has been axially displaced to turn switch means 18 to an "off"

position (FIG. 1, solid lines of cam means 46) the control shaft 32 may be manually rotated in the direction of the arrow 61 of FIG. 3 causing cam means 46 to rotate into an interference path with switch actuator means 28 to move second switch means 20 to an off position. However, in providing such a function it is necessary when again turning on the set, to not only turn on first switching means 18 but to also turn on second switch means 20. Because the operator may not recognize the condition of the switch, the operator may turn "on" first switching means 18 by pulling shaft 32 but may not remember to rotate the shaft so as to rotate second switch actuator 36 which would turn on second switching means 20. To overcome this problem there is provided a ramp means 54. Ramp means 54 may be formed from some suitable means such as by lancing base member 14. As shown in FIG. 2, ramp means 54 lies in an interference path of the axial movement of the cam means 46 after shaft 32, with hub 44, has been rotated to the lower "off" position. Then, as shown in FIG. 2, when shaft 32 is axially pulled, cam means 46 is rotated from the one dotted position to the other dotted position as the shaft 32 is axially moved.

To further insure that switch actuator means 28 is rotated upon axial movement of the shaft 32 there is provided a locating means 59 coupled to first actuator member 34. Such locating means includes a window 58 to provide clearance over and around the actuator means 28 and includes an interference shoulder 60. Shoulder 60, when axially moved, will strike one of the upturned legs 28' or 28'' of switch actuator means 28 thereby pivoting switch actuator means 28. It should be noted that the movement of the switch actuator means 28 and the relocation of cam means is such that upon axial movement of the shaft 32 to the left, as viewed in FIG. 2, cam means 46 will again nest between the tabs 28' and 28'' of the actuator means 28.

To mount the control means 10 there is provided on the variable resistor 16 a threaded portion 56 which can be received in a control panel for the mounting of the control means 10 thereto.

Thus there is provided a control means which is especially adaptable for use in a television set having a warmup switch. The use of the ramp means ensures that upon axial displacement of the control shaft, the warmup switch will be actuated to an "on" position as needed.

What is claimed is:

1. A control means comprising a variable resistance means carried by and responsive to a rotatable and axially displaceable control shaft, first and second actuator means carried by said control shaft, first and second switching means including respectively first and second switch actuator means responsive to said actuator means upon axial movement of said control shaft, and ramp means in an interference path with one of said actuator means, axial displacement of said control shaft causing said one actuator means to ride said ramp so as to cause rotational movement of said control shaft and cause engagement of said one actuator means with said second switch actuator means to actuate said second switching means.

2. A control means according to claim 1 wherein each of said switch actuator means includes two tabs carried by a pivotal plate.

3. A control means according to claim 1 wherein said one actuator means includes a hub carried by said shaft and a cam means extending from said hub.

4. A control means according to claim 1 further including locating means coupled to said control shaft, axial movement of said shaft causing engagement of said locating means with said switch actuator means.

5. A control means according to claim 4 wherein said locating means includes a window in said other actuator means and a shoulder of said window in an interference path with said switch actuator means.