United States Patent

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[54] **KNOB MEANS FOR ELECTRONIC DEVICE SLIDEABLE CONTROL**
2 Claims, 4 Drawing Figs.

[52] U.S. Cl. ..... 287/53 H
[51] Int. Cl. F16d 1/06
[50] Field of Search ..... 287/53 H, 138, 119, DIG. 13; 200/172; 174/46; 16/114 A, 116, 110; 285/DIG. 21

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ABSTRACT: An improvement in an electronic device of the type including a cabinet housing a slideably adjustable control means and having an opening for passing means for operating the control means. The improvement comprises providing knob means having a portion which can be passed through a narrow, elongate opening in the cabinet and snap connected to complementary means provided on the control means such that no additional fastener means other than the complementary means are required to maintain connection of the knob means to the control means.

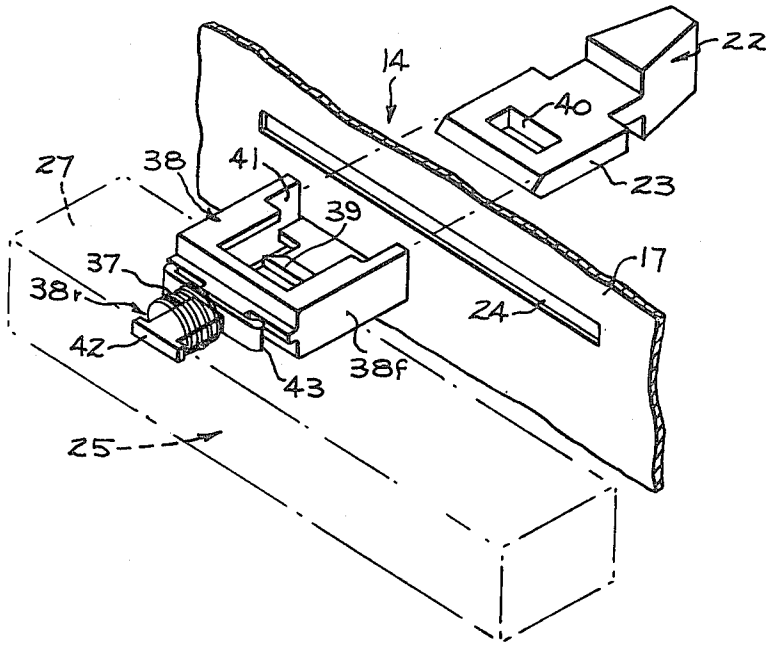


FIG. 1

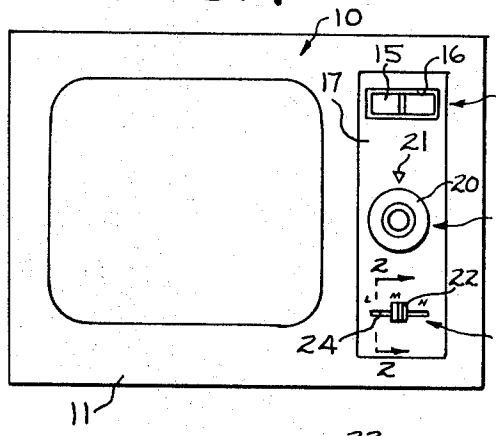
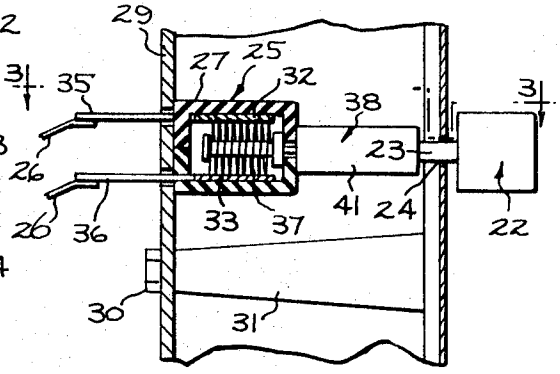


FIG. 2



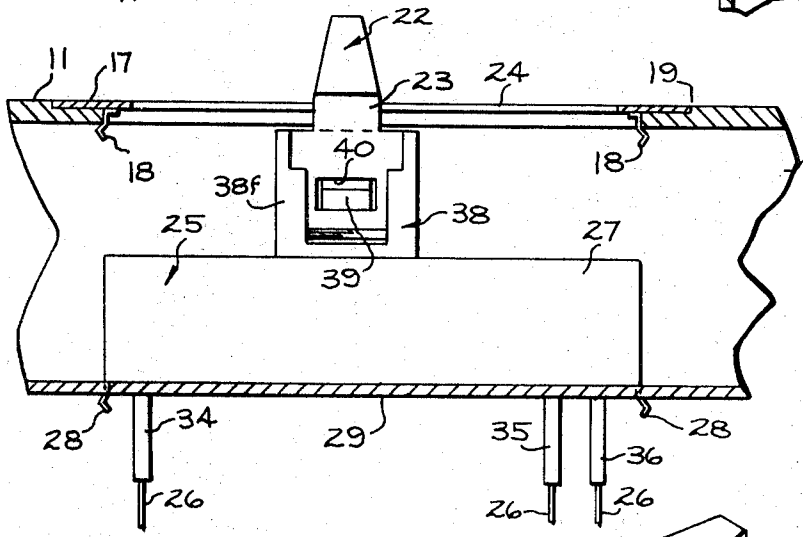


FIG. 3

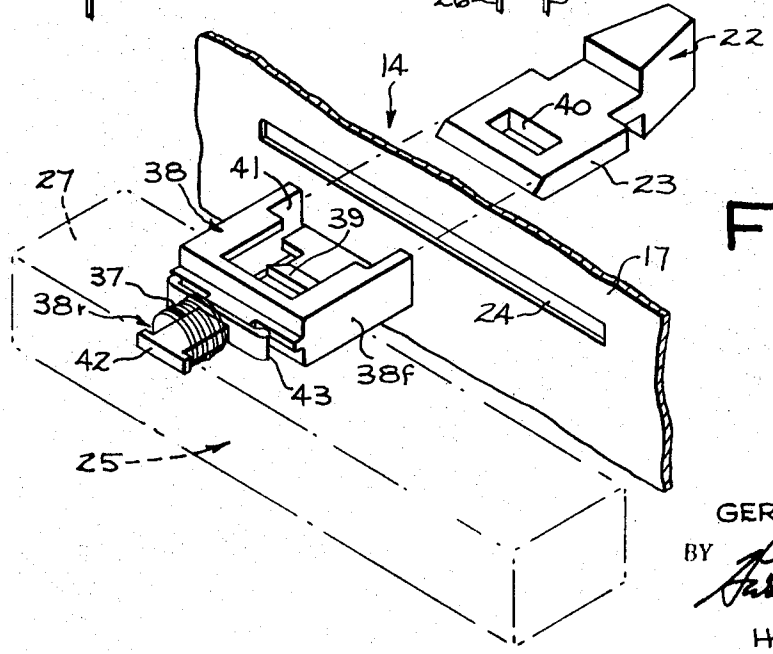


FIG. 4

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KNOB MEANS FOR ELECTRONIC DEVICE SLIDEABLE CONTROL

BACKGROUND OF THE INVENTION

This invention relates to an improvement in an electronic device of the type including a cabinet housing a slideably adjustable control means and having an opening for passing means for operating the control means, and, more particularly, this invention relates to the provision of improved knob means having a portion that can be passed through a narrow, elongate opening in the cabinet and snap connected to complementary means provided on the control means such that no additional fastener means are required to maintain connection of the knob means to the control means.

Heretofore, it has been known to employ slideable control means in electronic devices. For example, slideably adjustable resistor means have previously been used in electronic devices, such as radio receivers, to control the receiver audio volume level. In such prior art devices, the slideably adjustable resistor was mounted within the cabinet and included an operating lever having a distal end which was adapted to be passed outwardly from the cabinet through an opening provided in one of the cabinet walls. With these prior art arrangements, it was customary to provide knob means that were attached externally of the cabinet to the distal end of the lever by additional fastener means, such as setscrews, spring clips, glue and the like. Often, with these conventional systems, it was necessary that the knob means be carefully aligned with complementary means provided on the protruding distal end of the operating lever in order to achieve satisfactory connection therewith. Such prior art means were costly both to manufacture and to assemble.

SUMMARY OF THE PRESENT INVENTION

In accordance with the present invention there is provided an improvement in an electronic device of the type which includes a cabinet housing a slideably adjustable control means and having an opening for passing means for operating the control means. Basically, the present invention comprises providing novel knob means having a portion which can be passed through a narrow, elongate opening in the cabinet and snap connected to complementary means provided on the control means such that no additional fastener means other than the complementary means are required to maintain connection of the knob means to the control means. Preferably, the knob means and the complementary means comprise tongue means integrally formed with a portion of the control means and groove means integrally formed with that portion of the knob means which can be passed through the narrow, elongate cabinet opening.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is illustrated in the accompanying drawings, wherein:

FIG. 1 is a front elevational view of an electronic device, a television receiver, incorporating a presently preferred form of the present invention;

FIG. 2 is a greatly enlarged fragmentary sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a fragmentary sectional view taken along line 3—3 of FIG. 2; and

FIG. 4 is a still further enlarged exploded view of the structure shown in FIGS. 2 and 3, with the generally conventional housing of the slideable control means being shown in shadow.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, and particularly to FIG. 1 thereof, there is illustrated an electronic device, a television receiver 10, of the type in which the present invention can be incorporated. The electronic device 10 has a generally rectangular, boxlike outer cabinet 11 and is provided with "on-off" switch means 12 by which the viewer can activate and deactivate the receiver 10; channel selector means 13 by which the viewer can select the particular station or channel he wishes to view; and audio volume control means 14 by which the viewer can adjust the audio volume level of the receiver 10.

As shown in FIG. 1, the "on-off" switch means 12, channel selector means 13 and audio volume control means 14 are operated by the viewer from the front wall of the receiver cabinet 11. The "on-off" switch means 12 comprises an electric toggle switch 15 of the so-called "butterfly" variety that is pivotally mounted by means (not shown) to at least partly extend through an opening 16 provided near the upper edge of a generally rectangular face plate 17, which is attached in a well-known manner by fastener means, such as spring clips 18 (FIG. 3) to cover a large rectangular opening 19 that is provided in the right portion of the front wall of the receiver cabinet 11.

The channel selector means 13 includes a rotary channel selector knob 20 that is connected by well-known means (not shown) to channel tuner means (not shown) which are housed within the cabinet 11. The face of the rotary channel selector knob 20 is provided with a circumferentially spaced series of indicia, which correspond to the available channels or stations, and the desired one of these channel indicia can be rotated by the viewer into alignment with pointer means 21 marked upon the face plate 17 adjacent the outer circumference of the selector knob 20.

As illustrated in FIGS. 1–4, the audio volume level control means 14, with which the present invention is particularly concerned, includes a novel audio volume control knob 22 that has a slim portion 23 which can be passed through a narrow, elongate opening 24 that is provided in the lower portion of the face plate 17 in the front wall of the receiver cabinet 11 and connected by novel means, which will be described in detail hereinafter, to slideable control means, such as a slideably adjustable electrical resistor pot 25, housed within the cabinet 11 and electrically connected by conductors 26 to the audio amplifier portion (not shown) of the receiver 10.

With the exception of the novel means which the present invention provides for connecting the novel audio volume level control knob 22 to it, the slideable resistor pot 25 is generally conventional and includes a rectangular boxlike plastic housing 27 that is attached by suitable fastener means, such as metal clips 28, to a mounting bracket 29 which is affixed by a screw 30 to a mounting boss 31 that extends rearwardly from the front wall of the cabinet 11. As best shown in FIG. 2, the housing 27 of the resistor pot 25 is fixed generally horizontally on the front wall of the generally vertically arranged mounting bracket 29, which is spaced behind the cabinet front wall and the face plate 17. The housing 27 for the slideable control means 25 contains a pair of vertically spaced, generally horizontally arranged parallel electrical contact plates 32 and 33 which are provided with electrical terminals 34, 35 and 36 that extend rearwardly through openings provided in the mounting bracket 29 for connection with the conductors 26. Also contained within the resistor pot housing 27 is an electrical bridging contact member, such as a metallic coil spring 37, which is captured between the contact plates 32 and 33 for slideable movement therebetween by a novel operating member 38 that is constructed and connected to the novel knob 22 in accordance with the present invention in such a manner that movement of the knob 22 in a first direction (to the right as seen in FIG. 1) causes an increase in the audio volume level, while, on the other hand, movement of the knob 22 in a second direction opposite the first (to the left as seen in FIG. 1) causes a decrease in the audio volume level. Suitable indicia, such as the L, M and H shown in FIG. 1, may be marked on the face plate over the narrow, elongate opening 24 for the knob 22 to respectively indicate low, medium and high levels of audio volume and the knob 22 can be aligned by the viewer with the desired audio level indicia.

While it has been known previously to employ slideable control means, generally similar to the slideable resistor pot 25, it previously has been customary to mount the slideable

bridging contact member, such as the spring **37**, on a slideable lever (not shown) which had a distal end that was adapted to be passed outwardly from the cabinet through an opening in the cabinet which was, of course, necessarily much larger than the narrow, elongate opening **24** which can be employed in accordance with the present invention. With these prior art arrangements, it was common practice to provide knob means which were attached externally of the cabinet to the distal end of the old operating lever by additional fastener means such as setscrews, spring clips, glue and the like. Often with these prior art systems, it was necessary that the knob means be carefully aligned with complementary means provided on the distal end of the old operating lever in order to achieve satisfactory connection therewith. Such prior art knob means were costly both to manufacture and assemble.

As illustrated in FIGS. **1–4**, the present invention comprises providing the improved novel knob means **22** having the slim portion **23** which can be passed through the narrow, elongate opening **24** in the cabinet **11** and snap connected to complementary means provided on the slideably adjustable control means **25** such that no additional fastener means other than the complementary means are required to maintain connection of the knob means **22** to the control means **25**. In the form of the present invention illustrated, the knob means **22** and the complementary means are formed of plastic, with the complementary means comprising tongue and groove means **39** and **40**. As best shown in FIG. **4**, the tongue means **39** is formed integrally on a generally channellike receptacle portion **41** that is formed on the front end **38***f* of the novel operating member **38** which is substituted by the present invention for the old operating lever as the means for slideably adjusting the lateral position of the bridging contact spring member **37** relative to the stationary contact plates **32** and **33**. And, the groove means **40** is formed integrally on the slim rear portion **23** of the knob **22** that is passed through the narrow, elongate cabinet opening **24** provided in the lower portion of the face plate **17**. As illustrated, the groove means **40** comprises an opening which extends completely through the bight area of the channellike receptacle portion **41**. Of course, the rear end **38***r* of the novel operating member **38** has a generally conventional configuration, being formed with means, such as the illustrated shoulders **42** and **43**, for retaining the coil spring bridging contact member **37** thereon and for preventing withdrawal of the operating member **38** from the control means housing **27** without disassembly of the housing **27**.

While various types of plastics and forming processes may be employed to form the aforedescribed novel knob means **22** and operating member **38**, good results have been inexpensively obtained by molding the novel operating member **38** and its integrally formed tongue means **39** from ZYTEL 101 plastic and by molding the novel knob means **22** and its integrally formed groove means **40** from CYCOLAC EP3510 plastic.

As best indicated in FIGS. **3** and **4**, the novel knob **22** of the present invention can be easily connected to the slideable control means **25** simply by inserting the slim rear end portion **23** of the knob **22** rearwardly through the narrow, elongate opening **24** in the front of the cabinet **11** and into the channellike receptacle portion **41** on the front end **38***f* of the novel operating member **38** until snap connection occurs between the complementary tongue and groove means **39** and **40**. With the aforedescribed novel arrangement of the present invention it has been found that the knob means **22** and the slideably adjustable control means **25** can be satisfactorily retained connected to one another without the need for any additional fastener means other than the complementary tongue-and-groove means **39** and **40** and that the aforedescribed novel means provided by the present invention substantially reduce the costs of manufacture and assembly over the aforenoted prior art arrangements.

While in the herein illustrated form of the present invention the slideably adjustable control means **25** and the improved operating member **38** and knob means **22** provided therefor have been shown as being generally horizontally arranged, it should be understood that they may alternatively be vertically arranged or arranged positioned at angles to either the horizontal or vertical planes.

It should be apparent to those skilled in the art that while there has been described what is considered to be the preferred embodiment of this invention in accordance with the patent statutes, changes may be made in the disclosed apparatus without actually departing from the true spirit and scope of this invention.

What is claimed is:

1. Control means, comprising:

knob means having a generally planar portion, said portion having a depression formed therein, said depression extending transversely to the longitudinal axis of said knob means, said knob means further having detent deflecting means formed therein;

operating member means having a first end adapted to slidably engage an adjustable means, and having a second end adapted to engage said generally planar portion of said knob means;

said second end of said operating member means comprising first and second lateral wall means, floor means connected to the bottom edges of said wall means near the distal ends of said wall means and said first end of said operating member, said floor means having a ramplike abutment disposed transversely thereacross and in a direction substantially perpendicular to said wall means for engaging said depression in said knob means whereby said floor means is resiliently deflected in the area intermediate the points of connection to said bottom edges of said wall means and to first end of said operating member upon engaging said deflecting means.

2. The invention as defined in claim **1**, further including at least one abutment extending inwardly of said operating member from the upper edge of said wall means for retaining said knob means after engagement thereof.

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