Feb. 15, 1944. H. A. WILLIAMS ET AL 2,341,750

COMBINED VOLUME CONTROL AND SWITCH

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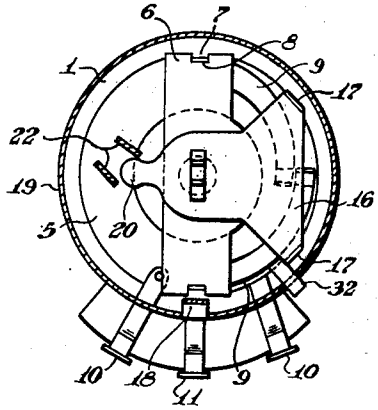


Fig. 2

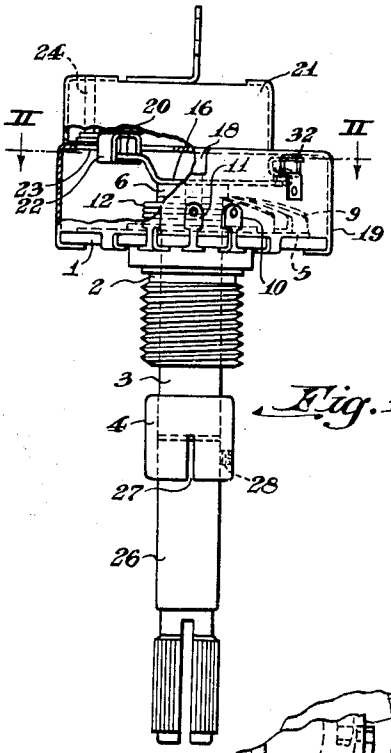


Fig. 1

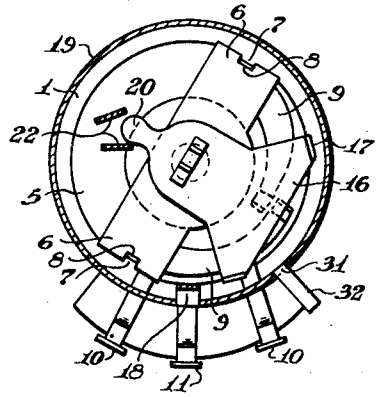


Fig. 3

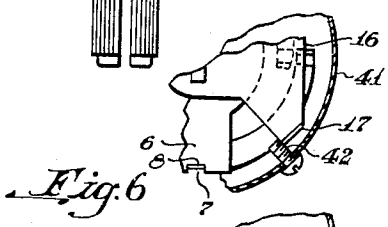


Fig. 6

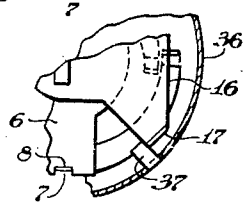


Fig. 5

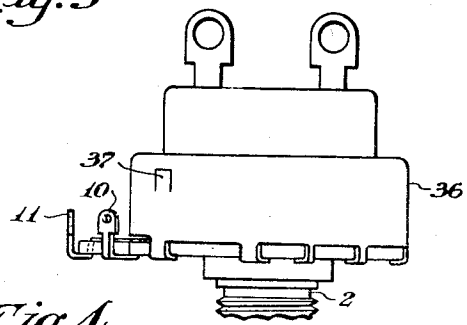


Fig. 4

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COMBINED VOLUME CONTROL AND SWITCH

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10 Claims. (Cl. 201—55)

This invention relates to electrical units for radios, and more particularly to a combined volume control and snap switch.

It is now common practice to switch a radio on and off by turning the same shaft that controls the volume of the radio. For this purpose the contact arm or control head of the volume control carries a member that at a certain point in the rotation of the contact arm engages and actuates a trigger by which the snap switch is turned on and off. Such a combined unit is shown in Hathorn Patent No. 2,127,686. However, there are still many cases in which the switch and volume control are separate units and are separately controlled. The usual combined unit is not favored for replacing only a volume control when the switch is a separate unit, because even though the switch of the combined unit is not wired into the circuit it still snaps on and off when the volume control is turned. Where spare parts are carried for replacement purposes this situation makes it necessary to carry both combined units and separate units in order to repair both types of radio sets.

It is among the objects of this invention to provide a combined volume control and snap switch which is suitable for replacing either similar units or separate volume control units, which does not require manipulating the switch of the combined unit when only the volume control is in circuit, which can be quickly converted for use as a replacement for either type of unit, and in which the conversion means is simple but effective.

In accordance with this invention a snap switch is mounted on the housing of a volume control in the usual manner with the switch trigger projecting through an opening into the control housing. This housing encloses the resistance element and electric contact member slidably engaging the element over which the contact member is moved by a manually rotatable control shaft. Means, such as a projection, is carried by the contact member for operatively engaging the switch trigger at one end of the path of travel of the contact member. This projection actuates the trigger to turn the switch on and off when the control shaft is turned. The projection has transient engagement with the trigger by which is meant that after it turns on the switch it moves away from the trigger. Means is provided for limiting the movement of the trigger-actuating projection to keep it from actuating the switch. This stop means may be a lug fastened to the side wall of the volume control housing and projecting into the path of movement of a projection carried by the rotatable contact member or it may be a screw or tongue projecting inwardly from the control housing. The stop means is so located that it stops the movement of the contact member and trigger-actuating projection before the latter can move the trigger. The unit as thus constructed is intended for replacement of volume controls only, in cases where the switch is a separate unit. In case the unit is to replace a similar combined unit the stop lug or screw is removed from the housing, or the tongue is not bent into operative position, so that the trigger-actuating projection can engage the trigger and turn the switch on and off in the same way as has been customary with these units heretofore.

The invention is illustrated in the accompanying drawing in which Fig. 1 is an enlarged side view of one of my units with the switch and control housings partly broken away; Fig. 2 is a horizontal section taken on the line II—II of Fig. 1 and showing the stop lug in operative position; Fig. 3 is a view similar to Fig. 2 with the stop lug removed from operative position so that the switch is turned off; Fig. 4 is a side view of the combined unit rotated 90° from that of Fig. 1 and showing a modified embodiment of the invention; Fig. 5 is a fragmentary view, similar to Fig. 2, of the modification of Fig. 4 with the tongue in operative position; and Fig. 6 is a fragmentary view, similar to Fig. 2, showing a removable screw stop.

Referring to the drawing, an insulating base 1 is provided with a central opening from the bottom of which a threaded bushing 2 projects. Extending through this bushing and rotatably mounted therein is a control shaft 3 provided at its outer end with a socket 4. Mounted on the base member is an electrical resistance element 5 encircling the control shaft and spaced therefrom. On the inner end of the shaft there is a rectangular insulating member 6 provided in its opposite ends with notches 7. The bottom of this member is engaged by the body of a metal contact member having upturned lugs 8 that project into the notches so that the contact member will be turned by member 6. The central portion of the contact member is spaced from the control shaft. Projecting toward each other from the ends of the contact member body is a pair of spring contact fingers 9 having downturned ends that engage and slide upon the resistance element. Terminal members 10 are connected to the opposite ends of the resistance element while an intermedial terminal member 11 is electrically connected to the contact member, preferably by means of a resilient wire 12 (Fig. 1) coiled around the control shaft beneath the contact member to which it is attached. This gives a positive electrical connection regardless of the position of the contact member.

The insulating member 6 is rigidly connected to the control shaft, and the rotation of the con-

tact member is limited, through the medium of a rigid arm 16 tightly clamped against member 6 by the upset inner end of the shaft. At one side of member 6 this arm has a pair of laterally spaced upturned ears 17 that engage one side or the other of a detent 18 pressed in from the side of the metal control housing 19 to limit the rotation of the control head in both directions. Arm 16 is provided on the opposite side of member 6 with an offset switch-actuating projection 20.

The snap switch 21, of well-known construction, is rigidly mounted on the control housing with its trigger 22 extending into that housing through a small opening 23 therein. The trigger has ears that are adapted to receive between them the switch-actuating projection 19 by which the trigger is swung on the pivot 24 to turn the switch on and off. The trigger is so mounted that projection 19 has transient engagement with it.

The combined unit as described thus far is of conventional form and operates in a well-known manner when the control shaft is turned. To permit different types of knobs to be used with this unit the socket 4 is provided into which any standard control shaft 26, having any desired type of knob-attaching end, can be inserted. The inner diameter is the same as the outer diameter of shaft 26, so a tight friction fit is assured. Assembly of the two parts of the control shaft is facilitated and the friction grip is increased by providing the socket wall with a longitudinal slot 27. As an added precaution or as an alternative to a friction fit, a small set screw 28 may be threaded in the socket wall with its inner end bearing against shaft 26.

It is a feature of this invention that means is provided for preventing the switch from being actuated, so that the unit will operate like a volume control without a switch. Accordingly, a small rectangular opening 31 (Fig. 3) is punched in the side wall of the volume control housing 19 near detent 18 and a tongue-like metal lug 32 (Fig. 2) is mounted in this opening. The lower end of the lug is spot welded to the outside of the control housing below opening 31. The upper portion of the lug extends through this opening and projects into the path of movement of one of the ears 17 on arm 16 and thus limits or stops the movement of the contact member and of the related parts that rotate with it as they are moving toward switch-opening position. The position of the lug relative to stop detent 18 is such that it stops the switch-actuating projection 20 just as it reaches the switch trigger but before it can move the trigger. Therefore, the switch remains in either "off" or "on" position, depending on which side of detent 18 the lug is located, regardless of the position of the contact member, and in so far as operation is concerned the switch might just as well be absent. The control shaft thus turns smoothly from one end to the other of its path of rotation.

In case this unit is used for replacing a similar combined unit so that it is necessary to use the switch for its intended purpose as a circuit breaker, the lug 32 is mounted so that it can be removed from inside the housing. For this purpose the portion of the lug inside of the control housing is doubled back on itself with the upper end extending back out through opening 31. To render the lug inoperative its projecting upper end is gripped by pliers and pulled until either the lug is out of the way of projection 17 or is entirely outside of the housing. If desired the lug can be twisted off the casing and discarded. As the movement of the contact member and switch-actuating projection 20 is no longer restrained by the lug, the projection 20 can travel far enough to snap the trigger. The unit is then the same in construction and operation as the conventional combined volume control and switch.

A modification is illustrated in Figs. 4 and 5 which uses a stop member that normally is in inoperative position, unlike lug 32. In this embodiment the side wall of the volume control housing 36 is cut through to provide a small tongue 37 attached at its lower end to the housing. The tongue is left in its original position (Fig. 4) as a part of the housing wall if the switch is to be operated. In case the unit is used to replace only a volume control so that the operation of the switch is not desired, tongue 37 is pushed inwardly by any suitable instrument into the path of one of the ears 17, as shown in Fig. 5, care being taken that the ear is on the right side of the tongue at the time it is pushed in. Otherwise, the tongue might lock arm 16 against rotation.

In the further modification shown in Fig. 6 the volume control housing 41 is provided in its side wall with a circular opening in which a screw 42 is threaded. The screw is long enough to project into the path of projection 17 on control arm 16 and thus prevent the switch from being operated. If operation of the switch is desired, the screw can be removed.

According to the provisions of the patent statutes, we have explained the construction and operation of our invention and have illustrated and described what we now consider to represent its best embodiment. However, we desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

We claim:

1. In a combined volume control and snap switch, the combination with a resistance element, an electric contact member engaging said element, manually operable means for moving said member along said element, a snap switch mounted adjacent said contact member, a trigger for snapping the switch on and off, means carried by the contact member adapted to have transient engagement with the trigger to actuate it, and a circular housing for the volume control, of means attached to the side wall of the housing for limiting the movement of the trigger-actuating means to keep it from operating the switch, said limiting means being manually movable radially of the housing whereby to render the switch operable or inoperable as desired.

2. In a combined volume control and snap switch, the combination with a resistance element, an electric contact member engaging said element, manually operable means for moving said member along said element, a snap switch mounted adjacent said contact member, a trigger for snapping the switch on and off, means carried by the contact member adapted to have transient engagement with the trigger to actuate it, and a housing for the volume control provided with an opening, of a tongue-like stop member adapted to extend inwardly from said housing opening for intercepting said trigger-actuating means to keep it from operating the switch, said stop member being manually movable in a direction transverse to the path of movement of said trigger-actuat-

ing means whereby to render the switch operable or inoperable as desired.

3. In a combined volume control and snap switch, the combination with a resistance element, an electric contact member engaging said element, manually operable means for moving said member along said element, a snap switch mounted adjacent said contact member, a trigger for snapping the switch on and off, means carried by the contact member adapted to have transient engagement with the trigger to actuate it, and a housing for the volume control provided with an opening, of a tongue-like lug attached to said housing and projecting into the path of movement of said trigger-actuating means to stop the latter before the switch can be operated, said lug having a portion projecting out of said opening for pulling the lug out to permit the trigger-actuating means to move far enough to operate said trigger.

4. In a combined volume control and snap switch, the combination with a resistance element, an electric contact member engaging said element, manually operable means for moving said member along said element, a snap switch mounted adjacent said contact member, a trigger for snapping the switch on and off, means carried by the contact member adapted to have transient engagement with the trigger to actuate it, and a housing for the contact member, of a projecting member carried by said contact member, and means permanently attached to the housing and projecting into the path of movement of said projecting member for intercepting it before said trigger-actuating means can operate the switch, said intercepting means being manually movable in a direction transverse to said path whereby to render the switch operable or inoperable as desired.

5. In a combined volume control and snap switch, the combination with a resistance element, an electric contact member engaging said element, manually operable means for moving said member along said element, a snap switch mounted adjacent said contact member, a trigger for snapping the switch on and off, means carried by the contact member adapted to have transient engagement with the trigger to actuate it, and a housing for the volume control provided with an opening, of a lug attached to said housing and projecting into the path of movement of said trigger-actuating means for intercepting it before it can operate the switch, said lug being doubled back upon itself to provide an end portion extending out through said opening, said end portion being adapted to be pulled to remove the lug from said path whereby the trigger-actuating means can operate the trigger.

6. In a combined volume control and snap switch, the combination with a resistance element, an electric contact member engaging said element, manually operable means for moving said member along said element, a snap switch mounted adjacent said contact member, a trigger for snapping the switch on and off, means carried by the contact member adapted to have transient engagement with the trigger to actuate it, a projecting member carried by the contact member, and stop means adapted to be engaged by said projecting member for limiting the extent of movement of said contact member after the switch has been actuated, of bendable means projecting into the path of movement of said projecting member for intercepting it before it reaches said stop means and before said trigger-actuating means can operate the switch, said intercepting means being manually bendable transversely of said path whereby to render the switch operable or inoperable as desired.

7. In a combined volume control and snap switch, the combination with a resistance element, an electric contact member engaging said element, manually operable means for moving said member along said element, a snap switch mounted adjacent said contact member, a trigger for snapping the switch on and off, means carried by the contact member adapted to have transient engagement with the trigger to actuate it, and a housing for the volume control provided with an opening in its side wall, of a separate lug attached to the outside of the wall of said housing and projecting through said opening into the path of movement of said trigger-actuating means for intercepting it before it can operate the switch, said lug being doubled back upon itself to provide an end portion extending out through said opening, said end portion being adapted to be pulled to pull the lug out through said opening.

8. In a combined volume control and snap switch, the combination with a circular resistance element, a rotatable electric contact member engaging said element, a control shaft operably connected to the contact member for rotating it, a snap switch mounted adjacent said contact member, a trigger for snapping the switch on and off, and a trigger-actuating member carried by the contact member and projecting laterally from its axis of rotation for transient engagement with the trigger, of a projecting member carried by said contact member and projecting laterally from its axis of rotation, and a stop member normally projecting into the path of movement of said projecting member for intercepting it before said trigger-actuating member can operate the switch, said stop member being bendable to remove it from said path whereby to render the switch operable.

9. In a combined volume control and snap switch, the combination with a resistance element, an electric contact member engaging said element, manually operable means for moving said member along said element, a snap switch mounted adjacent said contact member, a trigger for snapping the switch on and off, means carried by the contact member adapted to have transient engagement with the trigger to actuate it, and a housing for the volume control, of a detent formed from the wall of said housing and adapted to be projected inwardly into the path of movement of said trigger-actuating means to stop the latter before the switch can be operated.

10. In a combined volume control and snap switch, the combination with a resistance element, an electric contact member engaging said element, manually operable means for moving said member along said element, a snap switch mounted adjacent said contact member, a trigger for snapping the switch on and off, means carried by the contact member adapted to have transient engagement with the trigger to actuate it, and a housing for the volume control, of a tongue cut in the wall of said housing and normally remaining in its original position as a part of said wall, said tongue being bendable inwardly into the path of movement of said trigger-actuating means to stop the latter before the switch can be operated.

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