

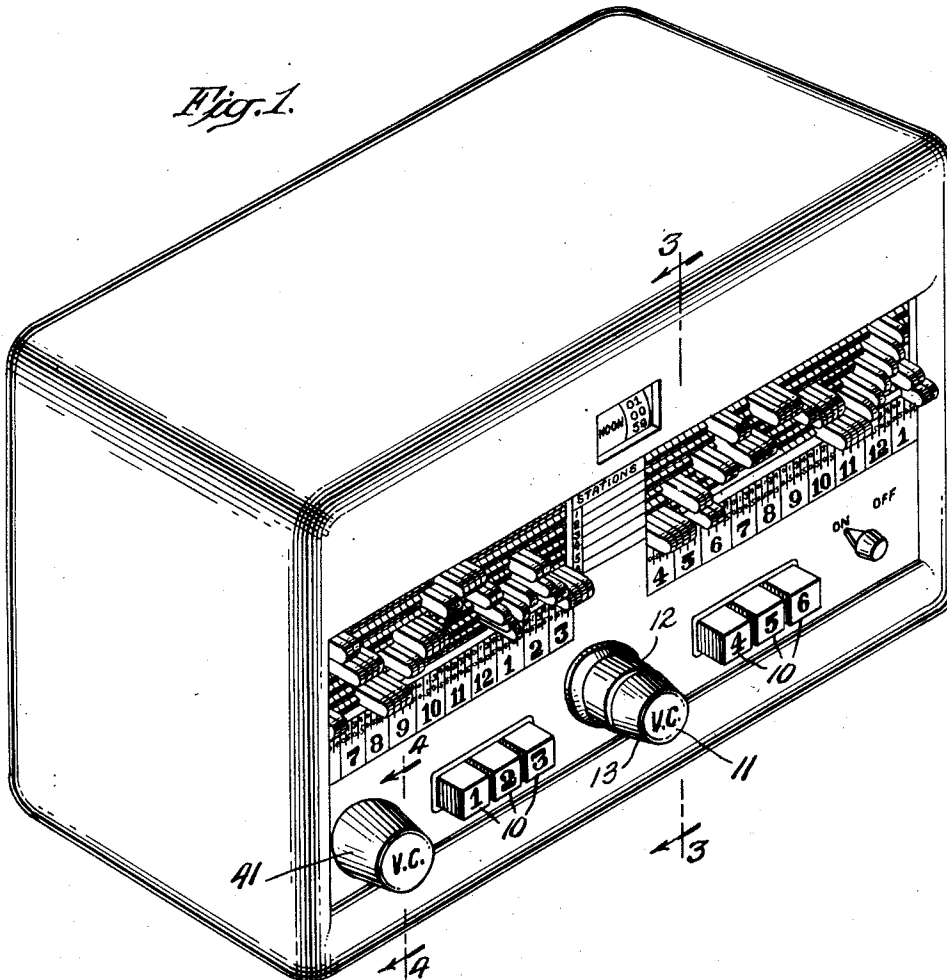
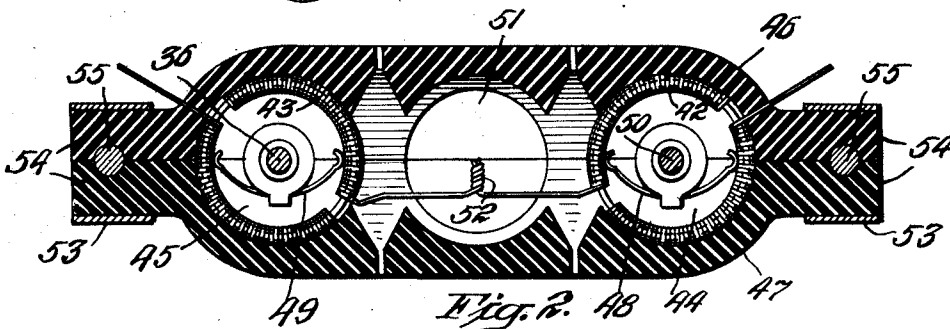
May 26, 1953

F. H. OWENS
VOLUME CONTROL

2,640,104

Filed Aug. 18, 1948

4 Sheets-Sheet 1



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4 Sheets-Sheet 2



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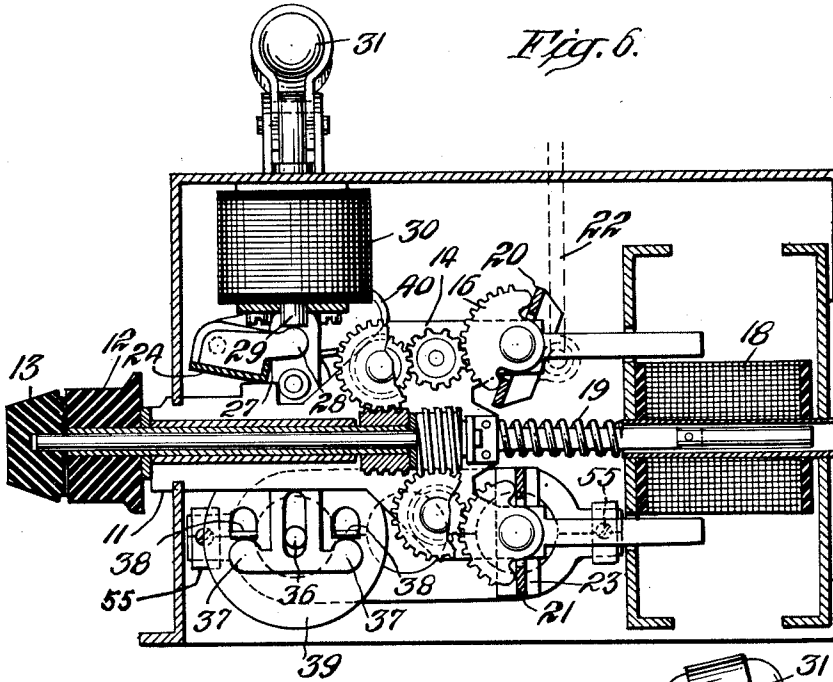
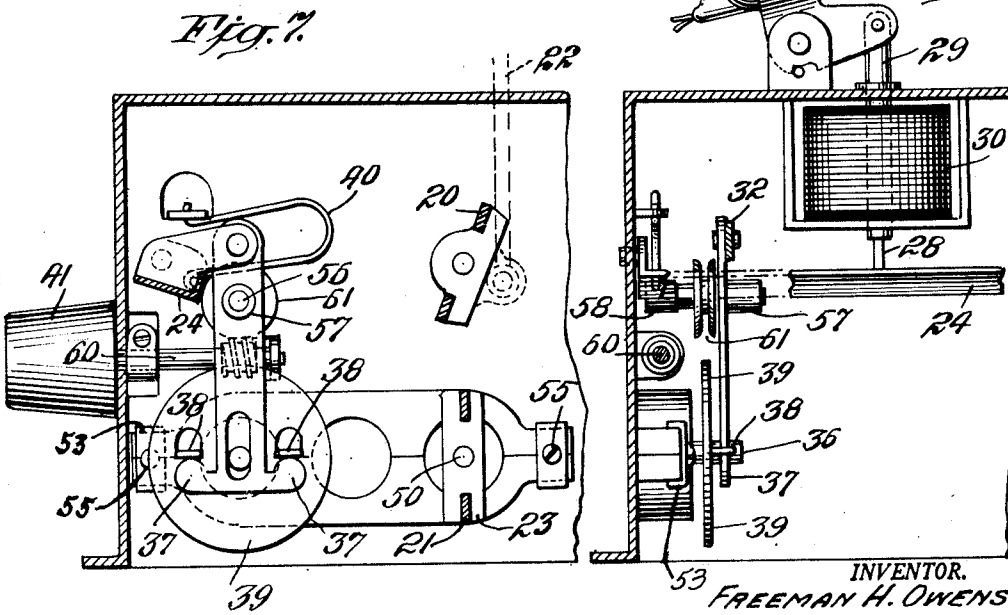
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4 Sheets-Sheet 4

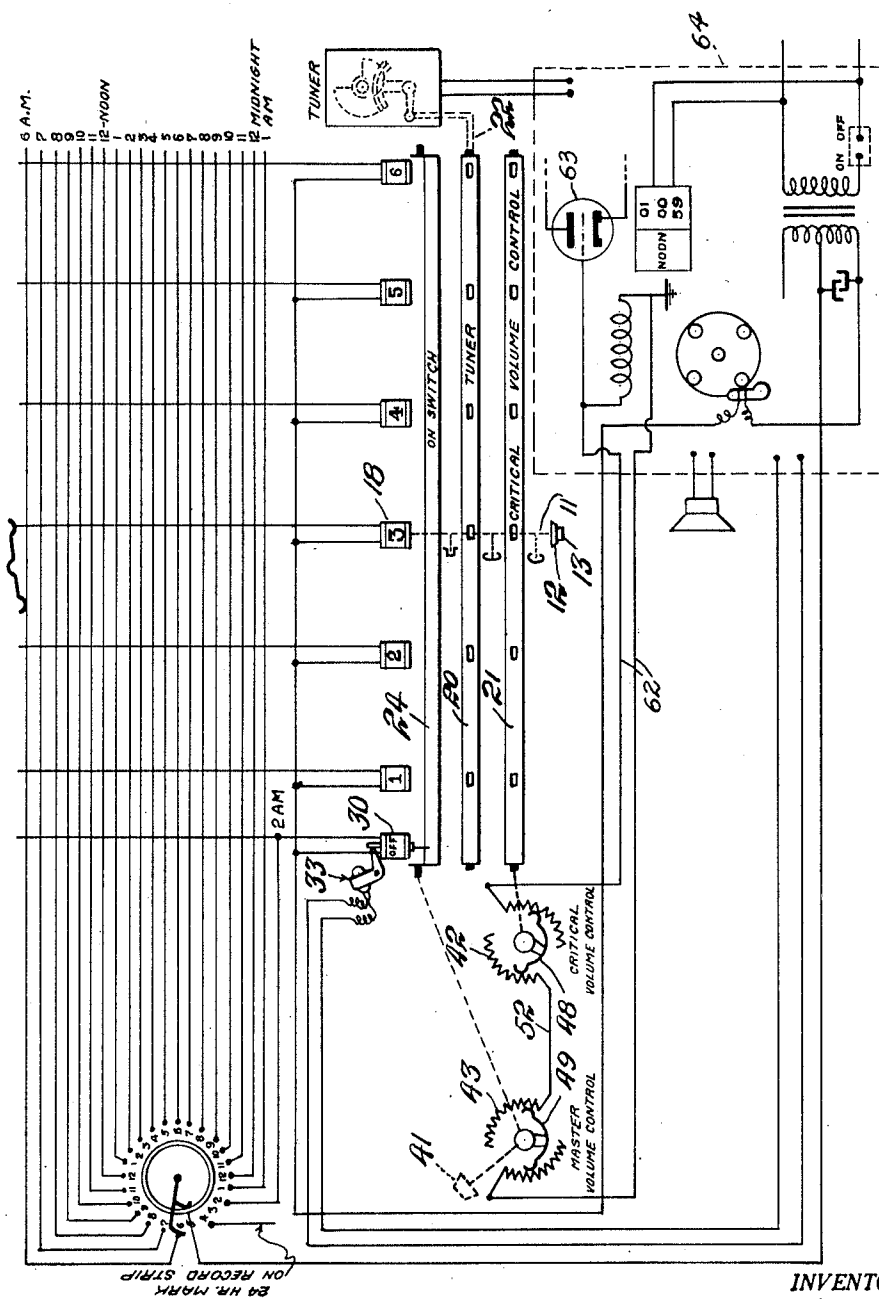


Fig. 9.

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UNITED STATES PATENT OFFICE

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VOLUME CONTROL

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10 Claims. (Cl. 178-44)

1

The invention here disclosed relates to apparatus for effecting volume control or other adjustments of radio receiving equipment or the like.

In copending patent applications Serial No. 540,292, filed June 14, 1944, now Patent 2,513,353 of July 14, 1950, and Serial No. 604,364, filed July 11, 1945, now Patent No. 2,452,067 dated October 26, 1948, of which this is a partial continuation, various adjustments such as for wave band selection, tuning and volume control are effected through the medium of certain station selecting members or slides.

While such adjustments may suit normal requirements, there may be the need or a desire at times to depart from such set adjustments. In such event, however, there should be return to the present adjustments, which may have been worked out with considerable care and attention and desire for the securing of best results from the selected stations.

Accordingly, it is a purpose of the present invention to enable volume control or other adjustments to be made as may be desired, but to insure that after such adjustment has served its purpose the parts will be automatically returned to the preset condition so that the adjustments which were originally worked out will thus be preserved.

It is a further purpose of the invention to accomplish all this with simple, rugged structure which can be produced and installed at low cost and which will be altogether practical and desirable.

Special objects of the invention also are to accomplish the foregoing in a compact, small size structure particularly suited to the automatic station preselector units as disclosed in the patent applications above identified.

Other desirable objects attained by the invention are set forth or will appear in the course of the following specification.

The drawings accompanying and forming part of the specification illustrate a present practical embodiment of the invention. Structure, however, may be modified and changed in various ways, all within the true intent and broad scope of the invention as hereinafter defined and claimed.

Fig. 1 in the drawings is a perspective view of a station selecting and volume controlling receiver having the present invention incorporated therein;

Fig. 2 is an enlarged sectional view of the volume control unit;

Fig. 3 is an enlarged broken vertical sectional

2

view as on substantially the plane of line 3-3 of Fig. 1 showing the master slide, which in this embodiment is used for setting up the other, secondary or station selecting slides, in the outer position, ready for reception of a selected station;

Fig. 4 is a similar cross sectional view as on substantially the plane of line 4-4 of Fig. 1, showing the master volume control knob coupled up through the friction drive mechanism for effecting arbitrary adjustments of volume independently of the critical adjustment which may have been previously set up for a particular station;

Fig. 5 is a broken vertical sectional view on substantially the plane of line 5-5 of Fig. 3, showing portions of the friction drive master volume control mechanism and the solenoid operated "on" and "off" switch;

Fig. 6 is a sectional view similar to Fig. 3, showing the master slide in the inward position for effecting station selecting and station volume control adjustments, the throwing of the switch to the "on" position and the returning of the master volume control to the normal position at which it may have been originally set at the factory, at the time of manufacture and testing of the set;

Fig. 7 is a broken sectional view similar to Fig. 4, showing the friction drive parts of the master volume control disconnected and the cam for returning the master volume control lifted by the "on" switch rocker as effected in the inward position of the master slide shown in Fig. 6;

Fig. 8 is a sectional view similar to Fig. 5, showing the friction drive parts in the uncoupled relation as effected by the raising of the switch closing rocker;

Fig. 9 is a simplified wiring diagram.

The radio receiver shown is like that disclosed in Patent No. 2,452,067 of October 26, 1948, in having individual station selecting slides at 10 and a master slide at 11.

The latter carries tuning and volume control knobs 12, 13, connected, respectively, by gearing 14, 15, with cams 16, 17, Fig. 3, on the slide.

When the slide is drawn in by the solenoid 18 or held in against the force of spring 19 by inward pressure on the exposed knobs, the cams 16, 17, will engage rockers 20, 21, to effect desired tuning and volume control adjustments.

The upper rocker 20, is shown as having connections at 22 for effecting tuning adjustments, and the lower rocker 21, is shown as having connections at 23 for effecting volume control adjustments.

Hence the master slide 11 with its tuning and

volume control knobs 12, 13, may be used to effect desired tuning and volume control adjustments and, as disclosed in the issued patent identified, these settings may be transferred over to the correspondingly placed cams on a station selecting slide, which cams may be then locked in those particular positions so that thereafter that particular station selecting slide, when actuated, will bring in the station represented by that tuning adjustment and at the volume selected by that volume control adjustment. Thus, one after another of the station selecting slides 10 may be set up, through the medium of the master slide, to bring in different desired stations at the selected sound level for each of such stations.

In addition, the master slide may be utilized itself as a station selecting slide, for after setting up all the station selecting slides 10—six of them in the illustration for six different stations—the master slide 11 may be adjusted to bring in a seventh station at a desired sound level and left at that adjustment so that each time it is actuated it will bring in that seventh station at the sound level selected.

A third rocker, 24, is shown pivoted on the chassis or frame 25, at 26, above the master and secondary slides, in position to be raised by fixed cam shoulders 27 on the upper edges of the slides. This rocker, as particularly shown in Fig. 6, carries a lever 28 for lifting the core 29 of the solenoid 30 to rock the mercury switch 31 into the "on" position.

This third rocker, 24, is utilized in the present disclosure for the additional purpose of returning the master volume control to its original or normal position in the set.

For such purpose the rocker 24 is shown as carrying a lever 32 near one end, Figs. 4 and 5, having a dependent link 33 pivotally connected therewith at 34, said link being slotted at 35 and guided over the shaft 36 of the master volume control and carrying at its lower end a double armed cam 37 engageable with the lugs 38 of disc 39 fixed on the volume control shaft, with these lugs in horizontal alignment as in Fig. 6.

The spring 40 tensions the rocker 24 and the cam carrying link 33 into the lowered position shown in Figs. 4 and 5 and, in the present disclosure, this spring has the additional function of coupling the master volume control knob 41 into operative connection with the master volume control.

Fig. 2 shows how both the critical volume control 42 which is actuated from rocker 21, and the master volume control 43 which can be adjusted from knob 41, may be in the shape of circular windings held in corresponding sockets 44, 45, between companion insulating blocks 46, 47, and engaged by brushes or bridging elements 48, 49, carried by the shafts 50 and 36.

The duplicate insulating blocks 46, 47, are shown as having a third intermediate circular recess or chamber 51 between the end chambers for a fader coil, as disclosed in copending patent application Serial No. 44,853, filed August 18, 1948, now Patent No. 2,584,155, but when this fader coil is not used, as in the present disclosure, the critical and master volume control units may be directly connected together by wiring 52.

The companion members of the volume control case are shown held together by clamps 53 about the reduced end extensions 54 of the case, and the screws 55 for mounting the unit on the end wall of the chassis are shown as extending through these end clamps.

It will be appreciated that the master volume control as represented at 43, 49, in Fig. 2, may be set at the factory at some intermediate position selected by an expert as tending to bring out best results in that particular set. In effecting these results the critical volume control 42, 48, may be set at some initial or intermediate position and the master volume control be adjusted by shaft 36 to a position of normally effective results, and the disc 39 then be secured in position on the shaft 36 with the lugs 38 in horizontal alignment so that with the next actuation of the rocker 24 the master volume control will be brought back to this same position of normally best volume control.

The critical volume control 42, 48, on the other hand, is adjusted by the user of the set to bring out results desired by that user from various tuned-in stations. The setting may be high for one station and low for another station, and these settings are made without touching the master volume control which therefore remains at a constant value for all the various critical volume adjustments for different stations brought in by the set.

To enable the master volume control to be utilized for varying volume from a particular station without destroying the critical volume adjustment theretofore made for that station, the master volume control knob 41 is operative only when the master slide is in the "out" position, as in Figs. 3, 4 and 5.

In this relation of parts a shaft 56 journaled in an elongated bearing 57 carried by the dependent link 33, lowers a spiral gear 58 thereon into mesh with a companion gear 59 on the shaft 60 of the master volume control knob and carries a pair of friction discs 61 thereon into gripping engagement with the disc 39 of the master volume control unit.

Therefore, with the set in the normal operating condition, with all slides, the master slide and the several station selecting slides in the released outward position shown in Fig. 1, the master volume control knob 41 is coupled up through friction gearing 61, 39, with the master volume control unit 43, 49, and may be used as desired to modify and alter the volume as then set by the critical volume control at 42, 48, previously adjusted for the particular station then coming in.

The invention thus makes it possible for anyone desiring to change the volume at any reception period, to suit individual tastes or possibly special reception conditions.

As soon, however, as a slide is operated either to continue that station or to change to another station, the master volume control will, through the lifting of the double armed cam 37, be returned, as shown in Figs. 6, 7, and 8, to its original setting as first fixed, for instance, at the factory. In so doing the critical volume control is not disturbed and remains where it was set for any particular station.

Also, it follows, that the master volume control gearing is entirely disconnected, as shown at 61, 39, in Figs. 7 and 8, when a slide is pushed or pulled in, so that any volume adjustment at that time must be by way of the critical volume control at 42, 48. Then when any one of the station selecting slides is operated it will effect actuation of the critical volume control to set the volume for the value predetermined and preselected for that particular station.

Both critical and master volume controls are independently adjustable. Adjustment of the

critical volume control does not affect the master volume control, but the master volume control may be adjusted to supersede or alter that effected by the critical volume control. This will be clear from consideration of Figs. 2 and 9, which show the master volume control at 43 as preset at some intermediate value at the factory and the critical volume control at 42 as adjusted at some intermediate point by the user of the set. Connected together as they are at 52, it follows that the master control can be turned in opposite directions from a more or less usual or normal intermediate position, either to increase or reduce volume, without changing adjustment of the critical control, and to the same effect the critical volume control at 42 may be adjusted either way from a more or less normal intermediate position such as shown, to increase or reduce volume without touching the master control. This is of importance in permitting the user of the set to control volume at any time by employing the master volume control without disturbing the critical control. And, in the end, the operation of a slide to continue reception from a given station or to change over to a new station actuates the critical volume control to return the volume to that previously determined for that particular station and returns the master volume control to its normal state as first set at the factory, for instance.

The wiring diagram, Fig. 9, being generally similar to that disclosed in Patent 2,513,353, need be referred to only for the purpose of seeing how the master volume control 43, 49, when operable by the master control knob 41 is operative by reason of its direct connection 52 with the critical volume control 42, 48, to supersede the control normally exercised by the latter. This view also indicates the critical volume control as normally positioned from the critical volume control rocker 21.

It will be seen that the serially connected volume controls are in turn connected by lead lines 62 to the audio-amplifier stage 63 of the receiver with which the control described herein is utilized, this receiver being designated generally at 64. This form of volume control is shown in the Mallory-Yaxley Radio Service Encyclopedia, at page 118, Control Circuit No. 35, in the January 1937 edition. It will be understood that the control described and claimed herein may be utilized in any similar type of standard volume control as normally used in commercial receivers.

What is claimed is:

1. Volume control apparatus for a radio receiving set or the like comprising a critical volume control adjustable to establish a selected sound level for normal use, a master volume control having a normal preset condition and adjustable for superseding control exercised by said critical volume control, said critical volume control and said master volume control being adjustable independently of each other and being connected to jointly control the volume and to each exercise control of volume independently of the other, means for effecting actuation of said critical volume control and means operative on each actuation of said critical volume control by said last mentioned means for returning said master volume control to a normal, preset condition whereby said master volume control may be adjusted to change volume of sound without altering adjustment of the critical vol-

ume control and be automatically returned to preset position of adjustment.

2. Volume control apparatus for a radio receiving set or the like comprising a critical volume control adjustable to establish a selected sound level for normal use, a master volume control having a normal preset condition and adjustable for superseding control exercised by said critical volume control, said critical volume control and said master volume control being adjustable independently of each other and being connected to jointly control the volume and to each exercise control of volume independently of the other, means for effecting actuation of said critical volume control, means operative on each actuation of said critical volume control by said last mentioned means for returning said master volume control to a normal, preset condition whereby said master volume control may be adjusted to change volume of sound without altering adjustment of the critical volume control and be automatically returned to preset position of adjustment and means for preventing actuation of said master volume control when said first mentioned means is operative to effect adjustment of said critical volume control.

3. Volume control apparatus for a radio receiving set or the like comprising a critical volume control adjustable to establish a selected sound level for normal use, a master volume control having a normal preset condition and adjustable for superseding control exercised by said critical volume control, said critical volume control and said master volume control being adjustable independently of each other and being connected to jointly control the volume and to each exercise control of volume independently of the other, means for effecting actuation of said critical volume control, means operative on each actuation of said critical volume control by said last mentioned means for returning said master volume control to a normal, preset condition whereby said master volume control may be adjusted to change volume of sound without altering adjustment of the critical volume control and be automatically returned to preset position of adjustment and means for enabling adjustment of said master volume control only when said critical volume control is effective.

4. Volume control apparatus comprising in combination station selecting slides, a critical volume control, means on said slides for adjusting said critical volume control to different values, a master volume control connected to vary the volume from that determined by the critical volume control and provided with means for manual adjustment of the same and means operated by said slides for automatically returning said master volume control to a predetermined neutral condition each time one of said slides is operated.

5. A critical and master volume control unit comprising a split insulating casing having separate cavities, critical and master volume control windings disposed in said cavities and connected together and brushes rotatably disposed in said cavities in cooperative engagement with said windings and adjustable independently of each other.

6. A volume control unit comprising a two-part split insulated casing having cavities formed between the split sections of the casing, volume control windings in said cavities, brushes rotatably held between the sections and cooperating with said windings, clamps holding the ends of

7

the split sections together and mounting screws extending through said clamps.

7. Volume control comprising independently rotatably adjustable brushes and volume control windings engaged thereby, station selecting slides, a rocker positioned for actuation by said slides, an "on" switch controlled by said rocker, a link operated by said rocker and operating connections from said link to effect actuation of one of said volume control brushes for returning said one volume control brush to a predetermined position each time the "on" switch is operated by the rocker.

8. A volume control unit having a rotatably adjustable element, station selecting slides, a switch operating rocker positioned for actuation by any one of said station selecting slides, a link connected with said rocker and operating connections between said link and said rotatably adjustable member of the volume control for automatically returning said volume control to a predetermined preset position each time one of the station selecting slides is operated.

9. A volume control unit having a rotatably adjustable element, station selecting slides, a switch operating rocker positioned for actuation by any one of said station selecting slides, a link connected with said rocker and operating connections between said link and said rotatably adjustable member of the volume control for

8

automatically returning said volume control to a predetermined preset position each time one of the station selecting slides is operated, including a double armed cam, said rotatably adjustable element having lugs positioned for engagement by both arms of said double armed cam.

10. Volume control mechanism comprising, in combination, a critical volume control for establishing the sound level selected for different stations, station selecting slides having means for individually adjusting said critical volume control to the sound level selected for the different stations, a master volume control adjustable to fix a predetermined normal sound level for all stations and further independently adjustable and connected to supersede the sound level adjustments effected by said critical volume control and means controlled by said station selecting slides for rendering said master volume control independently operative for superseding control when said station selecting slides are in the station selected position and for returning said master volume control to the position of normal adjustment when any one of said slides is actuated to effect station selection.

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No references cited