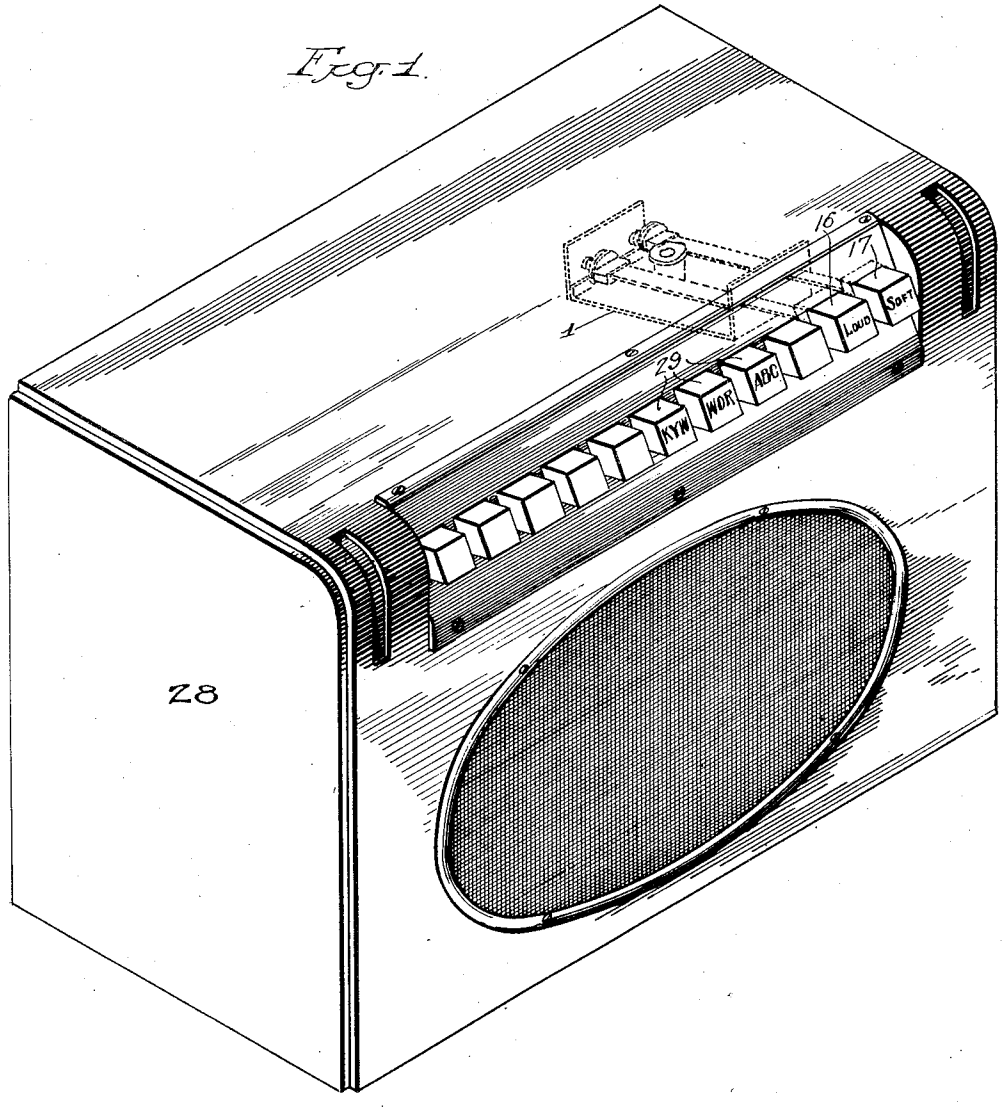
Feb. 7, 1939. G. J. BARRY 2,146,049

PUSH BUTTON VOLUME CONTROL DEVICE FOR RADIO RECEIVING SETS

Filed Jan. 25, 1938 2 Sheets-Sheet 1

Fig. 1.



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Fig. 2

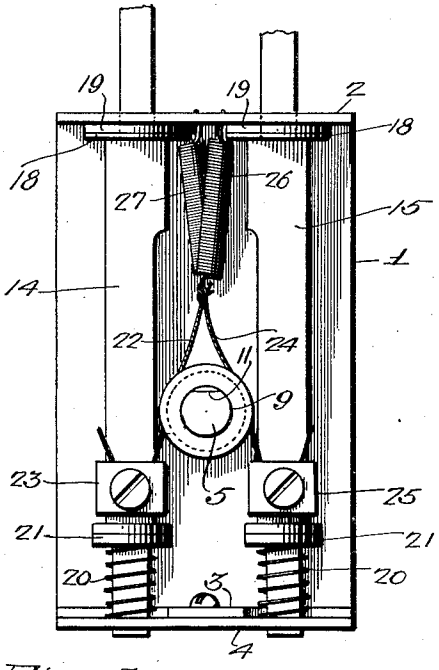


Fig. 4

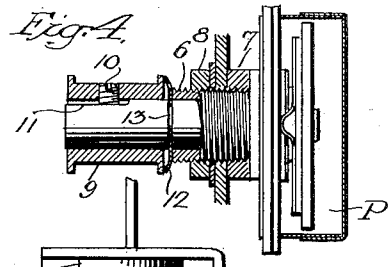


Fig. 3

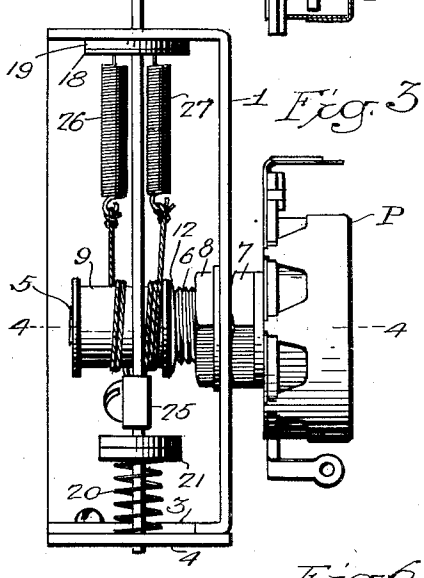


Fig. 5

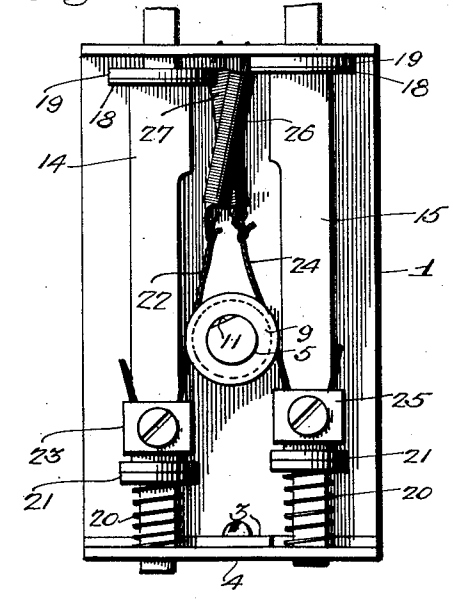
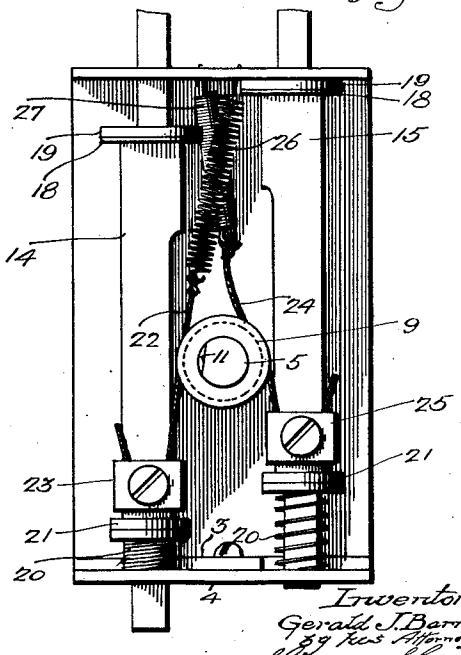


Fig. 6



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PUSH BUTTON VOLUME CONTROL DEVICE FOR RADIO RECEIVING SETS

Gerald J. Barry, Philadelphia, Pa., assignor to Philco Radio and Television Corporation, Philadelphia, Pa., a corporation of Delaware

Application January 25, 1938, Serial No. 186,902

5 Claims. (Cl. 201—48)

This invention relates to new and useful improvements in volume control devices for radio receiving sets and more particularly to push button operated volume control devices.

Recent trends in the design and style of radio receiving sets and cabinets therefor have for the most part centered about various novel systems for controlling the several adjustable units of the radio receiver. Prominent among these systems has been the introduction and adoption of a push button and plunger control system for tuning the radio receiver and the principal object of the present invention is to provide a similar push button and plunger system for operating the volume control device of such receiver which will harmonize in appearance with such push button tuning and other control elements.

Another object of the invention is to provide a push button operated volume control device for radio receivers which is of relative simple construction and operation and comparatively inexpensive to manufacture and assemble.

These and other objects of the invention and the features and details of its construction and operation are hereinafter fully set forth and shown in the accompanying drawings in which:

Figure 1 is a view in perspective of a radio receiving set cabinet equipped with push button tuning and a push button volume control device in accordance with the present invention.

Figure 2 is a top plan view of a push button volume control device for radio receivers constructed according to the invention and showing the parts of said device in their normal inoperative positions.

Figure 3 is a view in side elevation of the disclosure in Figure 2.

Figure 4 is a fragmentary sectional view taken on line 4—4, Figure 3.

Figure 5 is a top plan view of the device as in Figure 2 showing the relation of the several parts thereof with one of the operating buttons pushed partially inward; and

Figure 6 is a view similar to Figures 2 and 5 showing the position of the parts with said button pushed inward the full extent of its permitted movement.

Referring now to the drawings, a push button volume control device made according to the invention comprises a base or frame structure 1 having front and rear upwardly extending end wall portions 2 and 3 respectively. The rear wall 3 of the frame structure 1 is considerably narrower than the width of the base portion of the said frame and secured to said rear wall 3 outwardly thereof is a supplemental wall member 4 the dimensions of which conform substantially to those of the front wall portion 2 of the frame 1.

An opening is formed in the base portion of the frame structure 1 as shown and the shaft 5 of a volume control potentiometer P of the conventional type is journalled within a sleeve or bushing 6 which forms a part of said potentiometer structure and passes through said opening. The potentiometer is secured with respect to said frame structure 1 by means of lock nuts 7 and 8 respectively on the bushing 6 as best shown in Figure 4 of the drawings. A collar or pulley device 9 is fixedly secured upon the upper portion of the potentiometer shaft 5 by means of a set screw 10 which engages a flat portion 11 on said shaft and a "C" type concavo-convex resilient washer 12 is interposed between the adjacent ends of said collar or pulley 9 and the sleeve or bushing 6 with its inner edge engaging a continuous slot or groove 13 formed circumferentially in said shaft 5 to provide a predetermined amount of friction tending to oppose rotation of the pulley 9 and shaft 5 for a purpose which will be fully explained hereinafter.

Rotation of the collar or pulley 9 and hence the potentiometer P to control the volume is effected by means of a pair of push rods and cords arranged as hereafter described. The push rods are identified by reference numerals 14 and 15 respectively and these are slidably mounted in the front and rear walls 2 and 4 at opposite sides of the collar or pulley 9 for movement parallel to the base portion of said frame 1. The forwardly projecting ends of the push rods or plungers 14 and 15 have mounted thereon suitably designed operating buttons 16 and 17 respectively.

Outward or forward movement of the push rods or plungers is positively limited by means of washers 18 which have a washer 19 of felt or the like secured to their forward faces for engagement with the inner surface of the front wall portion 2 of the frame 1 for the purpose of making operation of said plungers or push rods 14 and 15 substantially noiseless. On the other hand, movement of the push rods 14 and 15 in the opposite or inward direction is normally opposed by springs 20 which embrace the rearward ends of said push rods and operate between the wall 4 of the frame 1 and washers 21 secured on the push rods to constantly urge the latter forwardly to the limit of their outward movement as determined by the washers 18 and 19 on

each thereof, said washers 21 and springs 20 when compressed functioning also to positively limit inward movement of the push rods 14 and 15.

In order that inward displacement or movement of the push rods 14 and 15 may effect rotation of the pulley 9 and potentiometer P in opposite directions, one end of a cord 22 is connected to the push rod 14 adjacent the rear end thereof by means of a clamp or like element 23 and one end of a second cord 24 is similarly connected to the push rod 15 by the clamp 25. Each cord 22 and 24 is then wrapped several times loosely about the pulley 9 in respectively opposite directions so that, for example, said cord 22 and push rod 14 operates to effect a counterclockwise rotation of the pulley 9 as shown while said cord 24 and push rod 15 operate to effect clockwise rotation of said pulley and the forward ends of said cords 22 and 24 are connected respectively to springs 26 and 27 which are in turn connected to the front wall 2 of the frame structure 1 as shown in the drawings.

As stated above, the cords 22 and 24 are wrapped loosely about the pulley 9 so that when the push rods 14 and 15 are in their forward inoperative position the said cords 22 and 24 will be comparatively slack as shown in Figure 2 of the drawings. Consequently, after either of the push rods is actuated inwardly thus tightening its cord upon the pulley to rotate the same in one direction, and upon release of such push rod to allow it to return to its forward inoperative position its cord will become increasingly slack thus loosening the grip thereof upon the pulley 9 so that it will remain in the position to which rotated. Thus either the same push rod may be successively actuated inwardly to effect step-by-step rotation of said pulley in the same direction to its ultimate limit as controlled by movement of the potentiometer P, or said pulley may be actuated in a like step-by-step manner in the opposite direction by inward actuation of the other push rod.

Further in regard to the above, to insure that the pulley 9 will remain in the position to which it is rotated by a single actuation of either push rod 14 or 15 which such push rod is released and returned to inoperative position by its spring 18, sufficient friction must be provided to hinder rotation of the shaft 5. There is some friction for said pulley 9 in addition to that inherent in the potentiometer P due to the contact arm thereof which is pressed against the resistance block. This friction may be supplemented by the concavo-convex resilient washer 12 which is interposed between said pulley 9 and the bushing 6 within which the shaft 5 is journalled. The friction thus provided, while necessarily sufficient to hold the pulley 9 and shaft 5 in the position to which successively rotated, whether in the same or opposite directions, must, of course, not be sufficient to prevent actual rotation of said pulley upon inward actuation of either push rod 14 or 15.

The invention is mounted within a radio receiving set cabinet 28 as illustrated, for example, in Figure 1 of the drawings with the push buttons 16 and 17 on the push rods 14 and 15 constructed and arranged to harmonize in appearance and position with the push buttons 29 which operate to control the tuning and other units of the radio receiver. The potentiometer P is connected into the radio receiving set circuit in such manner, for example, that counterclockwise rotation of the pulley 9 with respect to Figures 2, 5 and 6 of the drawings effected by inward movement of the push rod 14 will correspondingly actuate said potentiometer to cause the sound reproduced by the loud speaker to increase while clockwise rotation of said pulley 9 effected by inward movement of the push rod 15 will actuate the potentiometer to decrease the volume of the sound. Accordingly, in operation of the device, to increase or decrease the volume of sound reproduced by the radio receiving set, it is only necessary that the push buttons 16 and 17 be selectively actuated inwardly with the result that the mechanisms associated therewith including the cords 22 and 24 will operate as hereinabove described to rotate the pulley 9 and potentiometer P in respectively opposite directions until the desired sound volume is obtained.

While a particular embodiment of the invention has been herein illustrated and described, it is not intended that the invention be precisely limited to that form of device, but that changes and modifications in construction and arrangement may be embodied or incorporated therein within the scope of the annexed claims.

I claim:

1. In a cabinet type radio receiving set, the combination with a volume control device comprising a rotary potentiometer having a shaft normally hindered against rotation by friction, a frame structure supporting said shaft and fixedly secured within the radio cabinet, a pair of push rod elements slidably mounted in said frame structure and projecting externally of said radio cabinet, means tending to urge the push rod elements outwardly of the radio cabinet, and a pair of cables having a portion of their length wrapped about the shaft in opposite directions with one corresponding end of each of said cables connected by means of a spring to the frame structure and the other corresponding end of each cable connected to one of said push rod elements adjacent the inner end thereof, said cables being of such length that in the outermost inoperative position of the push rods, they are substantially slack and loosely embrace the shaft, so that upon inward actuation of either of the push rod elements such slack in the cable connected thereto will be taken up and said cable caused to firmly grip said shaft and rotate the same and said potentiometer in a predetermined direction and upon outward movement of such push rod will again become slack thus releasing its grip on the shaft to allow the latter to remain in the position to which rotated for the purpose of permitting further rotation of said shaft in the same direction by a subsequent inward actuation of the same push rod or in an opposite direction by inward actuation of the other push rod.

2. In a cabinet type radio receiving set, the combination with a volume control device comprising a rotary potentiometer having a shaft normally hindered against rotation by friction, of a pulley fixed on said shaft, a frame structure supporting said shaft and fixedly secured within the radio cabinet, a pair of push rod elements slidably mounted in said frame structure at opposite sides of said pulley and projecting externally of said radio cabinet, means tending to urge the push rod elements to the limit of their outward movement, and a pair of cables having a portion of their length wrapped about the pulley in opposite directions with one corresponding end of each of said cables connected by means of a spring to the frame structure and the other corresponding end of each cable connected to one of said push rod elements adjacent the inner end

thereof, said cables being of such length that in the outermost inoperative position of the push rods they are substantially slack and loosely embrace the pulley so that upon inward actuation of either of the push rod elements such slack in the cable connected thereto will be taken up and said cable caused to firmly grip said pulley and rotate the same and said potentiometer in a predetermined direction and upon outward movement of such push rod will again become slack thus releasing its grip on the pulley to allow the latter to remain in the position to which rotated for the purpose of permitting further rotation of said pulley in the same direction by a subsequent inward actuation of the same push rod or in an opposite direction by inward actuation of the other push rod.

3. In a cabinet type radio receiving set, the combination with a volume control device comprising a rotary potentiometer having a shaft normally hindered against rotation by friction, of a pulley fixed on said shaft, a frame structure supporting said shaft and fixedly secured within the radio cabinet, a pair of push rod elements slidably mounted in said frame structure at opposite sides of said pulley and projecting externally of said radio cabinet, means for limiting movement of said push rod elements in each direction, means tending to urge the push rod elements to the limit of their outward movement, a pair of cables having a portion of their length wrapped about the pulley in opposite directions with one corresponding end of each of said cables connected by means of springs to the frame structure and the other corresponding end of each cable connected to one of said push rod elements adjacent the inner end thereof, said cables being of such length that in the outermost inoperative position of the push rods they are substantially slack and loosely embrace the pulley so that upon inward actuation of either of the push rod elements such slack in the cable connected thereto will be taken up and said cable caused to firmly grip said pulley and rotate the same and said potentiometer in a predetermined direction and upon outward movement of such push rod will again become slack thus releasing its grip on the pulley to allow the latter to remain in the position to which rotated for the purpose of permitting further rotation of said pulley in the same direction by a subsequent inward actuation of the same push rod or in an opposite direction by inward actuation of the other push rod, and means operative to hold said pulley in the position to which rotated during intervals between successive inward actuations of either of said push rods.

4. In a cabinet type radio receiving set, the combination with a volume control device comprising a rotary potentiometer having a shaft normally hindered against rotation by friction, of a pulley fixed on said shaft, a frame structure supporting the shaft and fixedly secured within the radio cabinet, a pair of push rod elements slidably mounted in said frame structure at opposite sides of said pulley and projecting externally of the radio cabinet, means tending to urge the push rod elements to the limit of their outward movement, means for deadening noise due to operation of said push rods, a pair of cables having a portion of their length wrapped about the pulley in opposite directions with one corresponding end of each of said cables connected by means of a spring to the frame structure and the other corresponding end of each cable connected to one of said push rod elements adjacent the inner end thereof, said cables being of such length that in the outermost inoperative position of the push rods they are substantially slack and loosely embrace the pulley so that upon inward actuation of either of the push rod elements such slack in the cable connected thereto will be taken up and said cable caused to firmly grip said pulley and rotate the same and said potentiometer in a predetermined direction and upon return outward movement of such push rod will again become slack thus releasing its grip on the pulley to allow the latter to remain in the position to which rotated for the purpose of permitting further rotation of said pulley in the same direction by a subsequent inward actuation of the same push rod or in an opposite direction by inward actuation of the other push rod.

5. In a cabinet type radio receiving set, the combination with a volume control device comprising a rotary potentiometer having a shaft normally hindered against rotation by friction, of a pulley fixed on said shaft, and frame structure supporting the shaft and fixedly secured within the radio cabinet, a pair of push rod elements slidably mounted in said frame structure at opposite sides of said pulley and projecting externally of the radio cabinet, means for limiting movement of said push rod elements in each direction, means tending to urge the push rod elements to the limit of their outward movement, means for deadening noise due to operation of said push rods, and a pair of cables having a portion of their length wrapped about the pulley in opposite directions with one corresponding end of each of said cables connected by means of a spring to the frame structure and the other corresponding end of each cable connected to one of said push rod elements adjacent the inner end thereof, said cables being of such length that in the outermost inoperative position of the push rods they are substantially slack and loosely embrace the pulley so that upon inward actuation of either of the push rod elements such slack in the cable connected thereto will be taken up and said cord caused to firmly grip said pulley and rotate the same and said potentiometer in a predetermined direction and upon return outward movement of such push rod will again become slack thus releasing its grip on the pulley to allow the latter to remain in the position to which rotated for the purpose of permitting further rotation of said pulley in the same direction by a subsequent inward actuation of the same push rod or in an opposite direction by inward actuation of the other push rod.

GERALD J. BARRY.