Nov. 4, 1952 W. L. BUSH ET AL 2,616,642

FASTENING DEVICE

Filed July 8, 1948

Fig. 1.

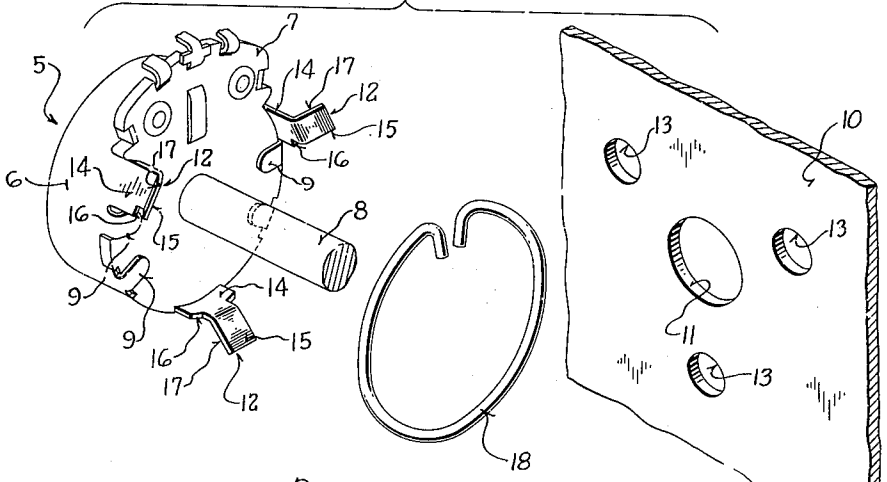



Fig. 2.

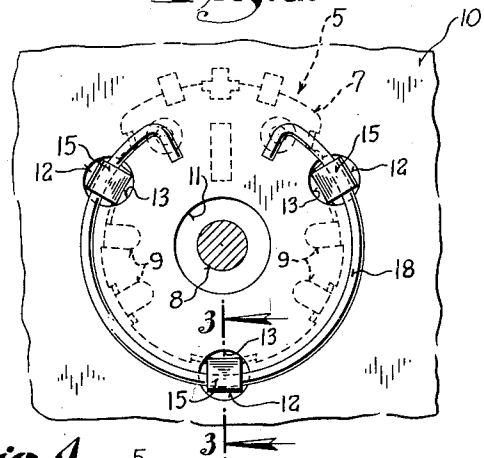



Fig. 3.

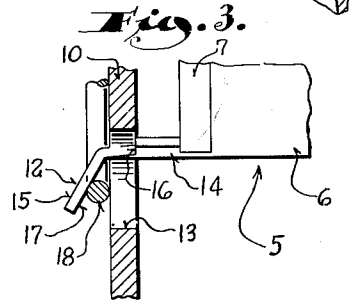



Fig. 4.

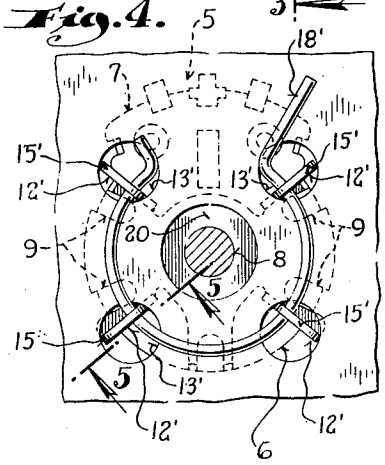



Fig. 5.

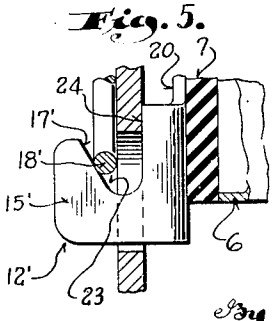
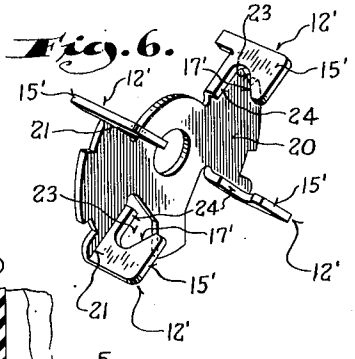



Fig. 6.




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2,616,642

## FASTENING DEVICE

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5 Claims. (Cl. 248—27)

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This invention relates to fastening devices and has particular reference to fastening devices of the type used for the attachment of electrical control instruments such as volume and tone controls for radio receivers to supporting panels on the receivers.

In the past it has been suggested that such control instruments be secured onto one side of a panel by means of tangs projecting from the instruments through slit-like apertures in the panel, with the tangs either twisted or folded over the opposite side of the panel to secure the instruments in place. Examples of this type of mounting for electrical control instruments are Patent No. 2,059,813 issued November 3, 1936, to Newton C. Schellenger, and Patent No. 2,352,454 issued June 27, 1944, to Newton C. Schellenger and Wilbert H. Budd.

One of the main objections to attaching electrical control instruments to their supporting panels in this manner, however, is that there is little assurance that the tangs will have sufficient strength to resist bending due to rough handling either during assembly of the radio receiver at the factory or during use of the radio in the home. Obviously, if the attaching tangs stretch or bend, the control instruments become loosened on their panels in a highly objectionable manner which reflects upon the quality of workmanship in the radio receiver.

Moreover, since the housing of control instruments of the character described must have positive electrical contact with the panels to which they are connected so as to effect electrical grounding of the housing for shielding purposes, it is highly important that the control instruments be securely fastened to their panels against loosening to guard against breaking of such ground connections. However, because of the necessity of maintaining a secure grounding connection between the control instrument and its panel, most manufacturers entirely avoid the use of fastening tangs, and instead provide their instruments with threaded mounting bushings surrounding the operating shaft of the instrument to enable the panel to be positively clamped between the instrument and a nut threaded on the bushing.

In recognition of the shortcomings of tang fasteners as suggested in the past, it is an object of the present invention to provide an improved fastening device for electrical control instruments such as tone and volume controls for small radios which will at all times securely hold the instrument against its supporting panel and which will preclude loosening of the instrument even though it may be subjected to rough handling during assembly of the radio receiver or during use of the receiver in the home.

More specifically it is an object of this invention to provide a control instrument of the character described with tangs projectable through holes in the supporting panel upon which the instrument is to be mounted, and to provide for securement of the instrument to the panel by means of a single spring retaining loop common to all of the tangs or tabs and snapped into place between inclined cam surfaces on the extremities of the tabs and the panel to firmly draw the part against the panel and hold the same against motion relative thereto.

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With the above and other objects in view, which will appear as the description proceeds this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

The accompanying drawing illustrates two complete examples of the physical embodiment of the invention constructed according to the best modes so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a perspective view of an electrical control device provided with the fastening means of this invention but showing the device separated from its supporting panel.

Figure 2 is an elevational view showing the control device attached to the panel and illustrating the cooperation between the single spring retaining element and the tabs which project through the panel from the control device;

Figure 3 is an enlarged fragmentary sectional view taken along the plane of the line 3—3 of Figure 2;

Figure 4 is a view similar to Figure 2 showing a slightly modified embodiment of the invention;

Figure 5 is an enlarged fragmentary sectional view taken through Figure 4 along the plane of the line 5—5; and

Figure 6 is a perspective view showing the construction and arrangement of the tabs for the fastening device of Figure 4.

Referring now more particularly to the accompanying drawing in which like numerals indicate like parts, the numeral 5 generally designates an electrical control instrument which may be assumed to be a tone or volume control for small radio receivers. The device includes a substantially cup-shaped metallic housing 6 having a cylindrical side wall, and the open end of the housing is closed by an insulating terminal plate 7 having a central aperture through which the operating shaft 8 of the device projects. A plurality of tangs 9 formed as extensions of the side wall of the housing are struck over the outer face of the terminal plate to hold the same in position closing the housing.

The instrument is adapted to be mounted upon one side of the panel 10, usually at its back, of a small radio receiver (not shown), and for this purpose the panel is provided with an aperture 11 to receive the operating shaft 8 of the instrument.

According to this invention, the control instrument 5 is provided with a number of attaching tangs or tabs 12 formed integral with the side wall of the housing 6 as continuations thereof. These tabs are projectable through holes 13 in the panel, and have neck portions 14 which project straight back from the side wall of the housing 6, and feet 15 on their outer extremities bent outwardly at an angle slightly more than 90° to the neck portions 14 of the tabs.

When the instrument 5 is applied to the back of the supporting panel, the tabs 12 project through the holes 13 of the panel and the feet 15 on the tabs are disposed at the opposite side, or front of the panel. The holes 13 in the panel, of course, are large enough to enable the angularly disposed feet 15 to be readily passed therethrough.

Shoulders 16 on the neck portions 14 engage the back of the panel to position the feet 15 at the front of the panel with their undersides 17 spaced outwardly a slight distance from the front plane of the panel, as shown best in Figure 3, so that the feet thus provide overhanging ledges on the tabs all of which extend radially outwardly from the axis of the control shaft 8.

Since the feet 15 are disposed at an angle slightly greater than 90° to the neck portions 14 of the tabs, it will be noted that the undersides of the feet facing the front plane of the panel provide cam surfaces which slope outwardly away from the panel toward the outer extremities of the feet. Although not essential, the tangs are preferably located equidistant from one another along the side wall of the housing 6 with the neck portions 14 of the tabs concentric to the axis of the operating shaft 8. According to this invention the control instrument is adapted to be retained in position upon the back of the supporting panel 10 by means of a single retaining device 18 engageable with all of the tabs on the control instrument. The retaining device comprises a single loop of spring wire disposed flatwise against the front face of the panel under the feet 15 of the tabs and contracted into engagement with the inclined cam surfaces 17 on the tabs under substantial spring force. The contractive force of the spring wire 18 acting on the inclined cam surfaces 17 in this manner tends to move the feet 15 outwardly of the supporting panel 10, and firmly draws the shoulders 16 on the tabs against the back of the panel and thus securely holds the control device 5 connected thereto.

Hence, it will be noted that the spring wire loop 18 securely wedges itself between the panel and the feet 15 on the tabs to preclude separation of the control instrument from the panel, while the engagement between the side edges of the tabs and the sides of the holes 12 in the panel preclude rotation or lateral shifting of the control instrument relative to the panel.

It will be obvious that the spring wire loop 18 may be provided with sufficient contractive force as to prevent accidental displacement thereof even though the control instrument is subjected to severe handling. In this connection it is to be noted that the cam surfaces 17 on the undersides of the feet 15 have relatively little



incline, and hence can have practically no camming effect upon the spring wire loop tending to force the loop outwardly from beneath the feet even when a deliberate attempt is made to pull the instrument away from the panel 10.

In the embodiment of the invention illustrated in Figures 4, 5, and 6, the tabs 12' are formed as an integral part of a metallic cover plate 20 flatwise covering the outer face of the terminal plate 7 and held in position thereagainst by means of the tangs 9 folded over from the cylindrical side wall of the housing 6. The cover plate 20 is a sheet metal stamping, and has four tabs 12' bent up out of the plane of the plate to lie substantially at right angles thereto. These tabs are bent along substantially radial bend lines 21 so that the tabs lie substantially edgewise to the axis of the operating shaft 8 of the control instrument.

The tabs 12' are not necessarily equispaced from one another but are nevertheless circumferentially spaced from each other and equidistant from the axis of the operating shaft. In this case also, the tabs have feet 15' on their outer extremities projected forwardly through holes 13' in the panel so that the feet lie at the front of the panel. Inclined cam surfaces 17' are likewise provided on the undersides of the feet 15' but in the present instance the cam surfaces are formed by substantially V-shaped notches 23 cut into the inner edges of the tabs so that the cam surfaces 17' slope inwardly toward the plane of the adjacent face of the panel 10 from the inner edges of the tabs. The sides of the notches opposite the inclined cam surfaces 17' also provide shoulders 24 which abut against the back of the panel to be drawn tightly thereagainst by the expansive force of a spring wire loop 18' snapped into the notches 23 and hence wedged between the inclined cam surfaces 17' and the front of the panel.

In this case also it will be noted that while the force of the expansive spring wire loop 18' assures against separation of the control device from the supporting panel, the engagement of the opposite side edges of the tabs 12' with the sides of the holes 13' precludes rotation or lateral shifting of the control instrument relative to the panel.

While it will be apparent that the fastening means of this invention may employ either an expansive or contractive spring wire loop it will also be readily appreciated that the tabs 12 and 12' may have inclined cam surfaces thereon formed to make use of either type of spring. In the Figure 1 embodiment this would merely entail bending of the feet 15 inwardly toward a point substantially centrally located between the tabs; and in the Figure 4 embodiment a contractable spring wire loop could be employed if the notches 23 were formed in the outer side edges of the tabs 12'.

From the foregoing description taken in connection with the accompanying drawing, it will be readily apparent to those skilled in the art that the fastening means of this invention provides an exceptionally simple but secure manner of mounting an electrical control instrument to its supporting panel without entailing twisting or bending of the tab elements of the fastening means over the panel.

What we claim as our invention is:

1. Means for anchoring an instrument upon the back of a panel from the front thereof, comprising: a number of relatively flat spaced apart

tabs on said instrument projecting therefrom through holes in the panel and grouped about a point located centrally between them and edgewise substantially radial to said point with their flat sides lying in planes substantially normal to the panel; a spring ring lying flat against the front of the panel and coacting with the tabs to hold the instrument on the panel; all of said tabs being on the same side (circumferentially) of the spring ring and having integral feet thereon lying in the planes of the tabs, said feet projecting laterally edgewise over the spring ring with their under edges in contact therewith and receding from the plane of the front of the panel toward the outer ends of the tabs so that said under edges of the feet provide cam surfaces which hold the spring ring under tension, whereby the radial force engendered upon the cam surfaces by the spring ring is resolved into a force which draws the instrument toward the back of the panel; and abutment means on the instrument contiguous to said tabs and held tightly pressed against the back of the panel under the force of the spring ring acting through said cam surfaces.

2. Means for anchoring an instrument upon the back of a panel from the front thereof, comprising: a plurality of relatively flat spaced apart tabs on the instrument projecting therefrom through locating holes in the panel to thereby hold said instrument against rotation and lateral shifting on the panel, said tabs being grouped about and substantially equi-distant from a point located substantially centrally between them, and the tabs being arranged with their flat sides in planes substantially radial to said point and normal to the panel, said tabs having notches in one edge thereof and all of said notches extending in the same radial direction with respect to said central point, one edge of the notch of each tab providing a shoulder engaging the back of the panel and the other edge of each notch providing an inclined cam surface which is spaced from but converges toward the front of the panel and the bottom of the notch; and a spring ring lying flatwise against the front of the panel and engaged in said notches to exert a radial force upon said converging edges of the notches which force is resolved thereby into a force which draws said shoulders on the tabs against the back of the panel and effects clamping of the panel between the shoulders and the spring ring to thereby hold the instrument firmly in position on the panel.

3. The anchoring means set forth in claim 2 wherein said tabs are bent up from a metallic cover plate secured to the instrument to lie between the instrument and the back of the panel.

4. As an article of manufacture, means providing for attachment of an instrument on the back of a panel from the front thereof, comprising: a metallic cover plate securable to an instrument to be mounted upon the panel; a number of relatively flat spaced apart tabs integral with the cover plate and bent up to one side thereof with their flat sides substantially normal to the plane of the plate and substantially radial to a point located substantially centrally between the tabs and from which the tabs are substantially equi-spaced, said tabs having notches in one edge thereof all extending into the tabs in the same radial direction with respect to said central point, the edges of said notches which are adjacent to the plate lying in a common plane substantially parallel to the plate, and said tabs being wider at their base portions adjoining the plate so that said substantially coplanar edges of the notches provide shoulders adapted to engage the back of a panel upon which the instrument is to be mounted, and the other edges of said notches converging toward the bottoms of the notches so as to provide inclined cam surfaces which are adapted to be disposed at the front of a panel upon which the instrument is to be mounted when the tabs are inserted through apertures in the panel and held spaced a uniform distance from the front of the panel by said shoulders, so that a spring ring snapped into said notches between their converging edges and the front of the panel may exert a radial force upon said cam surfaces, which radial force will be resolved by the cam surfaces into a force on the tabs normal to the cover plate by which said shoulders on the tabs are drawn firmly against the back of the panel upon which the instrument is to be mounted.

5. Attaching means for mounting an instrument upon the back of a panel from the front thereof, comprising: a metallic cover plate securable to the instrument and having a number of relatively flat spaced apart tabs bent therefrom and arranged with their flat sides in planes normal to the plate and substantially radial to a central point about which the tabs are grouped and from which the tabs are substantially equidistant, said tabs being wider at their base portions adjoining the plate than at their outer end portions, and having notches in one edge thereof all extending in the same direction with respect to said central point, one edge of each notch being on the wider portion of the tab and said edges lying in substantially a common plane normal to the planes of the sides of the tabs, and the other edges of the notches being convergent to the first designated edges toward the bottoms of the notches; and a spring ring engaged in said notches and biased toward the bottoms thereof to react between said convergent edges thereof and the front of a panel having holes through which the tabs may project from its rear, and by its radial force and its engagement with the converging edges of the notches draw the shoulder defining edges of the notches against the back of the panel and thus firmly clamp an instrument to which the cover plate is attached onto the back of the panel.



WILKIE L. BUSH.
JOSEPH G. VEATCH.


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