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W. H. BUDD

2,616,643

FASTENING DEVICE

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Fig. 1.

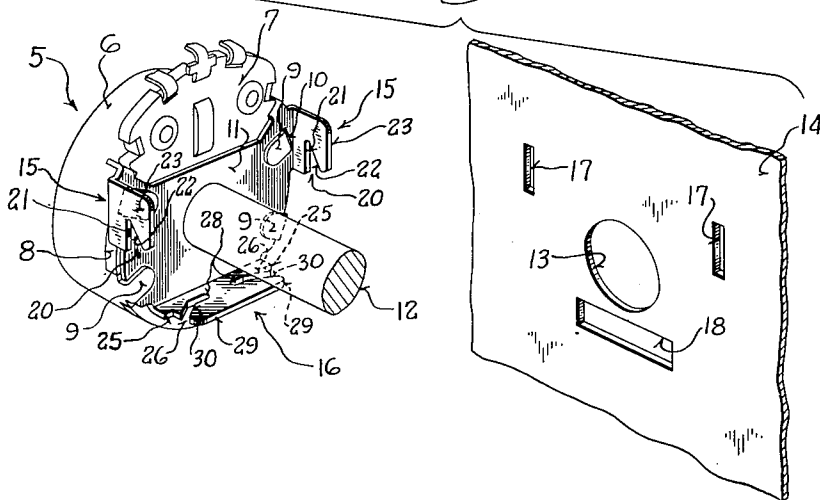


Fig. 2.

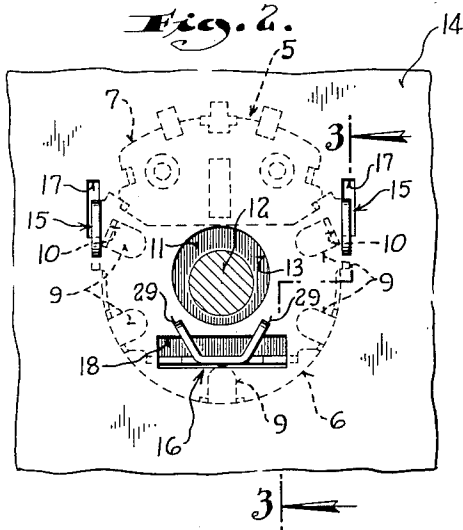
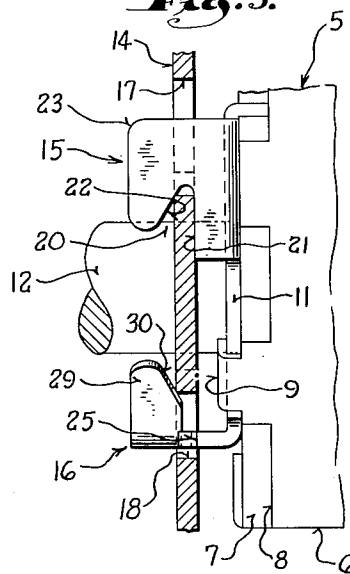


Fig. 3.



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FASTENING DEVICE

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6 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 of small radio receivers to supporting panels on the receivers.

In the past it has been suggested that such control instruments be attached to radio receiver panels by means of tangs projecting from the casings of the instruments through apertures in the panel and twisted or otherwise bent over the opposite side of the panel to prevent motion of the instrument relative to the panel. Examples of this past type of mounting for electrical control devices 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 S. Schellenger and Wilbert H. Budd.

One of the main objections to the aforementioned use of such tangs was their inability to maintain a connection between the control instrument and the panel tight and strong enough to positively preclude loosening of the instrument on its panel. In many instances, the tangs either stretched or bent out of their operative positions as a result of rough handling of the receiver during assembly or even during use of the receiver in the home. This was particularly true whenever the operating shaft of the instrument was accidentally subjected to a sharp blow.

Obviously, such loosening of the instrument on its panel seriously detracted from the quality of workmanship in the radio receiver. Moreover, loosening of the instrument also endangered and sometimes disrupted the grounding connection between the instrument casing and the panel which is essential for shielding purposes.

In view of this common deficiency of suggested types of tangs, many manufacturers of radio receivers have entirely avoided their use and achieve the desired rigidity between the control instrument and the panel by the use of a threaded bushing fixed to the control instrument and surrounding its operating shaft and over which a nut may be threaded to positively clamp the panel between the nut and control instrument.

Needless to say, however, the achievement of rigidity in the attachment of control instruments to their panels by the use of threaded bushings and nuts complicates the assembly of the control instruments and substantially increases costs.

It is an object of the present invention, therefore, to provide improved means for mounting control instruments of the character described to their supporting panels.

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More specifically it is an object of this invention to provide a control instrument of the character described with novel attaching tangs or tabs which when engaged with a supporting panel upon which the instrument is to be mounted wedge the panel between the instrument and inclined cam surfaces on the tabs to preclude shifting of the instrument relative to the panel.

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 hereindisclosed invention may be made as come within the scope of the claims.

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

Figure 1 is a perspective view of a control instrument provided with the attaching tabs of this invention, and showing a portion of the supporting panel to which the instrument is to be attached;

Figure 2 is an elevational view showing the instrument mounted on the back of the panel; and

Figure 3 is a sectional view taken along the broken line 3—3 of Figure 2.

Referring now more particularly to the accompanying drawing in which like numerals indicate like parts, the numeral 5 generally designates a control instrument which may be assumed to be a tone or volume control for a small radio receiver. The various parts of the instrument are housed within a substantially cup-shaped metallic casing 6 having a cylindrical side wall. The open end of casing is closed by an insulating terminal plate 7 resting against shoulders 8 on the side wall.

In the present case the terminal plate is fixed to the casing by means of tangs 9 extended from the side wall of the casing through slits 10 in a sheet metal stamping 11 overlying the terminal plate with the tangs folded inwardly flatwise against the outer face of the stamping. Thus, the tangs 9 also anchor the stamping 11 to the casing.

The operating shaft 12 projects from the instrument through suitable holes in the terminal plate 7 and the stamping 11, and when the instrument is mounted on the back of a support-

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ing panel 14, the shaft is adapted to pass through an aperture 13 in the panel to be accessible at the front of the panel for actuation by means of a knob (not shown) attached to the outer end of the shaft. When so mounted, the sheet metal stamping 11 is interposed between the panel and the instrument.

According to the present invention securement of the instrument to the panel is effected by means of a pair of relatively flat tabs 15 bent up from opposite side edges of the sheet metal stamping 11 and substantially parallel to one another. These tabs lie at opposite sides of the operating shaft 12 of the instrument and slightly thereabove, and cooperate with a third tab 16 bent up from the bottom of the sheet metal stamping beneath the operating shaft 12 and substantially crosswise of the tabs 15.

The pair of opposite tabs 15 project through slit-like apertures 17 in the supporting panel 14 with the inner sides of the tabs engaging the adjacent side edges of the apertures as seen in Figure 2 to preclude shifting of the control instrument relative to the supporting panel in a direction normal to the planes of the tabs 15. The tab 16 at the bottom of the stamping 11 projects through a substantially rectangular aperture 18 in the supporting panel beneath the hole 13 for the operating shaft, and the extremities of all of the tabs lie at the front of the panel.

The side edges of the tabs 15 facing the tab 16 have substantially V-shaped notches 20 cut therein, and one of the edges 21 of each of the notches provides a shoulder or abutment which abuts the back of the supporting panel to limit projection of the tabs through their respective apertures. The other edge 22 of the V-shaped notch in each tab 15 provides an inclined cam surface sloping outwardly and away from the shoulder 21 toward the notched edge of the tab. Hence, it will be apparent that the V-shaped notches in the tabs 15 provide feet 23 on the outer extremities of the tabs which point toward one side of the tab 16.

When the tabs 15 and 16 are projected through their respective holes in the supporting panel 14 to engage the shoulders 21 with the back of the panel, the control instrument is shifted downwardly across the back face of the panel in the direction in which the feet on the tabs 15 face. Such shifting of the instrument causes the panel portions ahead of the notched edges of the tabs 15 to be wedged in the V-shaped notches 20 between the inclined cam surfaces 22 and the shoulders 21 on the tabs.

Attention is directed to the fact that the hole 18 is made substantially wider than the thickness of the tab 16 received therein so as to accommodate shifting of the instrument relative to the panel in the manner described. In this respect, it will be seen that the hole 13 for the operating shaft also has a diameter substantially greater than that of the operating shaft.

The outer portion of the tab 16 is reduced slightly in width so that its extremity corresponds to the length of the hole 13 in the panel to preclude shifting of the instrument laterally in the plane of the tab 16. This reduction of the width of the tab 16 produces shoulders 25 at opposite sides thereof which cooperate with the shoulders 21 on the tabs 15 to provide a substantially three point engagement between the instrument and the back of the panel limiting insertion of the tabs through their respective holes in the panel.

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The opposite side edges of the tab 16 near its extremity also have notches 26 cut therein. These notches lead angularly inwardly toward the body of the stamping 11 for a short distance and then extend straight toward one another as at 28 parallel to the plane of the sheet metal stamping 11 so as to provide a substantially T-shaped extremity on the tab 16. The angular entrance to these notches thus define ears 29 at the opposite sides of the extremity of the tab, and the undersides of these ears have inclined cam surfaces 30 thereon.

The ears 29 are adapted to be bent flatwise toward the pair of tabs 15 when the instrument is in place on the back of the panel to dispose the ears edgewise over the front surface of the supporting panel 14 and to bring the inclined cam surfaces 30 on the undersides of the ears into engagement with the edge of the hole 18 nearest the tabs 15. Due to the inclined cam surfaces 30, however, it will be seen that their engagement with the side edge of the hole 18 during bending of the ears to the position shown in Figure 2 causes the instrument 5 to be forcefully shifted downwardly in the direction in which the feet on the tab 15 point to effect secure wedging of the edge portions of the holes 17 in the V-shaped notches 20 of the tabs 15 with a force which increases as the ears 29 approach parallelism.

Consequently it will be seen that portions of the supporting panel are not only wedged tightly against the inclined cam surfaces 22 on the feet of the tabs 15 but also against the inclined cam surfaces 30 on the undersides of the ears 29 to establish an exceptionally secure connection between the control instrument and its supporting panel in consequence to twisting of but a single attaching tang. When compared to previously suggested types of fastening tangs requiring twisting or binding of three or more tangs to effect attachment of the control instrument to its panel, it will be seen that the tangs of this invention materially speed up and simplify the connection of control instruments to their panels without sacrificing rigidity of the connection.

While the tabs 15 and 16 have been shown as an integral part of a sheet metal stamping 11 secured to the control instrument 5 over the terminal plate 7 thereof, it will be appreciated that the tabs may be formed as extensions of the side wall of the casing 6 of the instrument without departing from the spirit of the invention.

From the foregoing description taken in connection with the accompanying drawing, it will be readily apparent to those skilled in the art that this invention provides an exceptionally simple yet efficient means for securing a control instrument upon a supporting panel.

What I claim as my invention is:

1. Means for mounting a part against one side of a supporting panel, comprising: a pair of relatively flat substantially parallel spaced apart tabs on said part projecting therefrom through holes in the panel with their outer extremities at the opposite side of the panel; feet on the extremities of said tabs projecting edgewise in the same direction over the panel and having inclined cam surfaces on their undersides cooperating with said part to wedge the portions of the panel lying between the feet and said part therebetween; another tab on said part substantially crosswise to said pair of tabs and projecting through a third hole in the panel with its extremity at said opposite side of the panel; ears on said other tab

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bent toward one side thereof from the opposite edges of said other tab and disposed edgewise over the panel; and inclined cam surfaces on the undersides of said ears cooperating with said part to wedge the portions of the panel lying between the ears and said part therebetween, the cam surfaces on said ears reacting against the panel in a direction to effect tighter wedging engagement between said feet on the first designated tabs and said part.

2. Means for mounting a part against one side of a supporting panel, comprising: a pair of relatively flat substantially parallel spaced apart tabs on said part projecting therefrom through holes in the panel with their outer extremities at the opposite side of the panel, the side edges of said tabs facing in the same direction having substantially V-shaped notches cut therein to define shoulders on the tabs engageable with said side of the panel, and inclined cam surfaces sloping outwardly away from the plane of the opposite side of the panel toward the notched edges of the tabs, and the portions of the panel adjacent to said notched edges of the tabs being wedged into said V-shaped notches; another tab on said part substantially crosswise to said pair of tabs and projecting through a third hole in the panel with its extremity at said opposite side of the panel; ears on the extremity of said other tab bent toward the notched edges of said pair of tabs from the opposite edges of said other tab and disposed edgewise over the panel; a shoulder on said other tab engaged with said side of the panel; and inclined cam surfaces on the undersides of said ears engaged with the portions of the panel bounding said third hole under substantial pressure and reacting against the panel in a direction to effect tighter wedging engagement of the panel in the V-shaped notches of said pair of tabs.

3. The mounting means set forth in claim 1 wherein said tabs project through elongated slit-like holes in the panel and have portions engaging the edges of the holes to preclude shifting of the part relative to the panel in the plane of the panel.

4. Means for mounting a part against one side of a supporting panel comprising: a sheet metal stamping having a substantially flat body portion adapted to be fixed to said part in a position interposed between the part and the panel; spaced apart substantially parallel tabs bent up from opposite side edges of said stamping and substantially perpendicular thereto, said tabs being projectable through holes in the panel so as to have their extremities lie at the opposite side of the panel; a third tab bent up from another edge of the stamping and substantially perpendicular thereto, said third tab lying crosswise of said pair of tabs with one side thereof facing in the direction of one side edge of each of said pair of tabs, said third tab likewise being projectable through a hole in the supporting panel to have its extremity lie at the opposite side of the panel; means on said stamping engageable with the first designated side of the panel to limit insertion of the tabs through their respective panel holes; feet on the extremities of said pair of tabs pointing toward said third tab and having inclined cam surfaces on their undersides to effect wedging of portions of the panel therebeneath upon shifting of the part relative to the panel in the plane

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thereof in the direction toward which the feet on said pair of tabs point; and ears on the opposite side edges of said third tab having inclined cam surfaces on their undersides which are adapted to be engaged with the portions of the panel bounding the hole through which said third tab projects upon bending of said ears toward the side of said third tab facing said pair of tabs to dispose the ears over the opposite side of the panel, such bending of the ears engaging the inclined cam surfaces thereof with the panel with an increasing pressure as the ears approach parallelism with one another tending to shift said part in said direction to increase the wedging action between the feet on said pair of tabs and the panel.

5. Means for mounting a part against one side of a supporting panel comprising: a relatively flat metallic stamping secured to said part and confined between it and the panel; spaced apart tabs bent up from said stamping and projecting through holes in the panel with their outer extremities at the opposite side of the panel; substantially parallel feet on the extremities of said tabs projecting edgewise in the same direction over said opposite side of the panel and having inclined cam surfaces on their undersides cooperating with abutments on the stamping to wedge the portions of the panel lying between the feet and said abutments therebetween; another tab on said stamping substantially crosswise to said feet and projecting through a third hole in the panel with its extremity at said opposite side of the panel; ears on said other tab bent toward one side thereof from the opposite edges of said other tab and disposed edgewise over the panel; and inclined cam surfaces on the undersides of said ears cooperating with abutments on the stamping adjacent to said other tab to wedge the portions of the panel under said ears, the cam surfaces on said ears reacting against the panel in a direction to effect tighter wedging engagement between the panel and the inclined cam surfaces on the undersides of the feet on said pair of tabs.

6. The mounting means set forth in claim 5 wherein said pair of tabs project through substantially close fitting slit-like apertures in the panel to preclude shifting of the part relative to the panel in a direction normal to the feet on said pair of tabs, and wherein said third tab projects through an elongated substantially rectangular aperture in the panel and has portions at its opposite side edges engaged with the ends of said aperture and cooperating with said pair of tabs and the inclined cam surfaces on the tabs to preclude shifting of said part relative to the panel in the plane thereof.

WILBERT H. BUDD.

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