April 26, 1938. B. A. ENGHOLM 2,115,098

LOUDSPEAKER MOUNTING

Filed Dec. 26, 1935

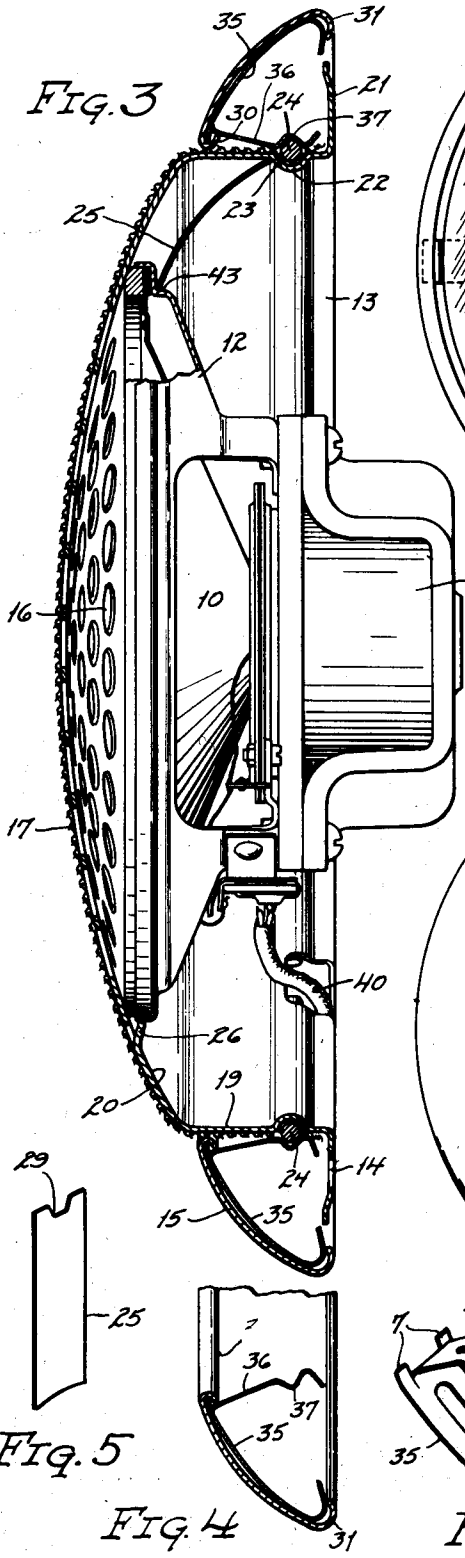


FIG. 3

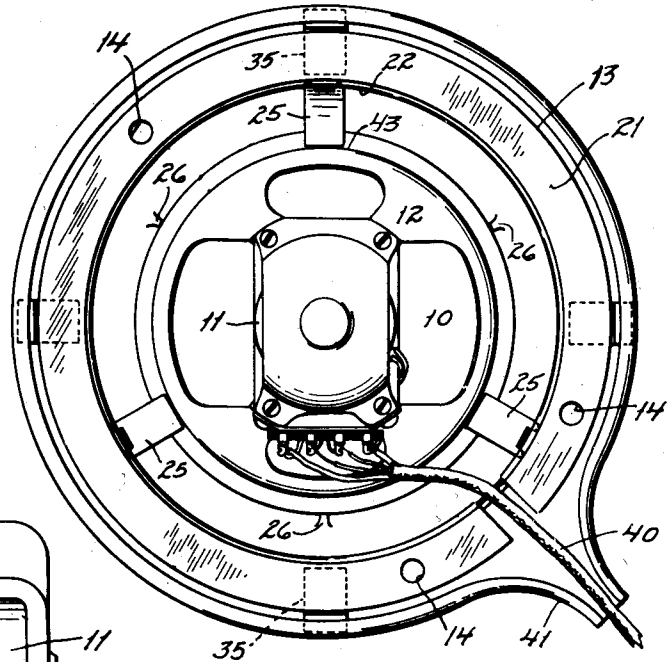


FIG. 2

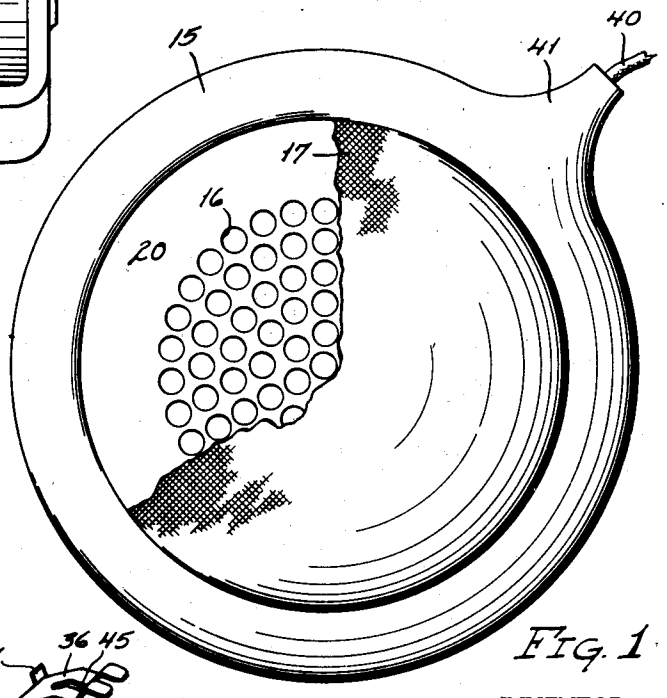


FIG. 1

FIG. 5

FIG. 4

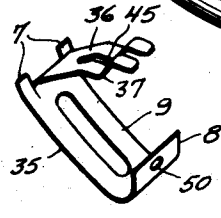


FIG. 6

INVENTOR.

BERNARD A. ENGHOLM

BY

Bates, Holwick, & Teare

ATTORNEYS

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LOUDSPEAKER MOUNTING

Bernard A. Engholm, Shaker Heights, Ohio, assignor to The Rola Company, Cleveland, Ohio, a corporation of Ohio

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11 Claims. (Cl. 179—179)

This invention relates to loud speaker mountings such as are used, for example, in radio receiving sets, and is illustrated as an adaptation for use in automobiles.

Heretofore, the usual practice in automotive application has been to mount the loud speaker on the fire wall beneath the instrument panel where it could be conveniently supported and readily connected to the receiving mechanism. There are certain objectionable features in this location. The dash enclosure has a definite cavity resonance varying in frequency with the dimension. Equal volume level cannot be had for all passengers due to front seat obstruction, motor noise and drafts which interfere with uniform sound transmission.

An object of my invention is to construct a speaker that may be mounted in an overhead position at substantially ear level to all passengers and yet will be sufficiently compact that its size will not be objectionable and will not interfere with the movement of the passengers into or out of the vehicle.

An additional object is to so construct the speaker that vibration of the vehicle will not interfere with the reception, and will not disengage any of the parts.

A further object of my invention is to construct spring fasteners, which may be effectively used for holding the various parts of a speaker together and which may be readily inserted or detached in an expeditious manner.

Referring now to the drawing, Fig. 1 is a front view of a loud speaker embodying my invention; Fig. 2 is a rear view thereof; Fig. 3 is a section taken through the speaker on a scale larger than that shown in Fig. 2; Fig. 4 is a section through the outer ring showing the manner of holding the locking springs in place; Fig. 5 is a perspective view of the spring which is disposed between the cone housing and the casing, and Fig. 6 is a perspective view of the spring that is disposed between the casing and the spring, which is used for holding the enclosing ring in position on the casing.

The speaker illustrated has the usual parts, such as a cone-shaped diaphragm 10, a field structure 11, and a cone housing 12 that form part of the conventional speaker. The cone housing is disposed within a casing 13 that is provided with suitable openings 14 through which fastening members may extend for attaching the speaker to a supporting structure, which in the case of an automobile, is preferably the ceiling structure. A ring 15 extends around the casing and comprises a hollow member, the contour of which preferably conforms to the contour of the casing, so as to present a symmetrical dome-shaped appearance. That portion of the casing in front of the diaphragm is provided with openings 16 which facilitate the transmission of sound, while a covering 17, preferably of fabric, extends across the openings and provides an ornamentation on the exposed surface.

The casing is illustrated as a hollow member, which preferably has a cylindrical wall 18, one end of which terminates in an outwardly extending flange 21, and the other end of which terminates in a dome-shaped closure that is disposed in front of the diaphragm. In addition, the casing is shown as having an inwardly extending portion 22 that produces an annular groove in the exterior surface of the wall 18 and a circular shoulder 23 on the inner surface of the wall. The groove is utilized for receiving a clamping member 24, which is preferably made of spring wire, while the shoulder 23 is utilized as an abutment for locking springs 25 that operate to hold the speaker assembly within the casing. The casing, in addition, may have a plurality of shoulders 26 that engage the cone housing at spaced points and that operate to center it with reference to the casing. In the preferred arrangement, three of such shoulders are shown and are illustrated, as lugs that are struck inwardly from the convex wall of the casing.

The means for holding the diaphragm assembly and casing in assembled relationship preferably comprises three leaf springs, each of which has one end engaging the shoulder 23 in the casing, and the other end engaging a circular shoulder 43 on the rear side of the cone housing. The springs are uniform in length, and are longer than the distance between the shoulders 23 and 43, and hence, it is necessary to snap the springs into position. Thereafter, the tendency of the springs to assume their normal length will effectively hold the speaker assembly in proper position with reference to the casing. Each leaf spring is shown as having a notch 29 on one end thereof, into which a screw driver may be inserted to facilitate the removal of the springs whenever desired.

To hold the covering material 17 in taut condition upon the casing, I prefer to utilize a split ring 24 which is made of wire, having spring like characteristics and which is adapted to rest within the groove 22. The material 17 is drawn over the face of the casing, and is tucked beneath the clamping ring 24, and thereafter, the spring ten-

sion in the ring holds the material tightly in place.

The ring 15, which surrounds the casing is preferably circular in form and has an inturned flange 30 on its inner periphery and an inturned flange on its outer periphery. These two flanges are preferably utilized for holding springs 35, which are disposed at spaced intervals around the ring, and which are utilized for locking the ring to the casing. To this end, each spring may have a base portion 9, one end of which has a flange 8 that is adapted to seat within the flange 31, and two tabs 7 which are adapted to seat within the flange 30. An arm 36 is shown as extending upwardly from the base between the tabs, and as having a slot 45 which divides it into a fork so as to increase the flexibility of it. If desired, the spring may have an opening 50 in the flange 8 into which a pointed tool may be inserted to facilitate removal of the spring whenever desired.

Claims drawn to the fastener construction are set forth in my divisional application, Serial No. 83,838, filed June 6, 1936.

In the preferred arrangement, each arm 36 has the forked portions bent to provide a groove, as at 37, that will extend over and engage the ring 24. Thus, the ring 15 and its associated springs 35 may be assembled, as a unit, and then assembled into the speaker by movement of it in an axial direction toward the casing until the spring arms 36 snap into position around the clamping ring 24. The ring 15 thus operates to conceal the fastening members, which pass through the openings 14, and also to conceal the cable 40, which carries the various current carrying conductors to the loud speaker. If desired, the ring 15 may have a tab 41 projecting radially and outwardly therefrom to conceal the short run of the cable, which normally would be exposed in those installations, wherein the speaker is located a short distance from the edge of the vehicle frame.

An important advantage of the present invention is the fact that the diaphragm assembly is supported by resilient means, and therefore, its reception is not apt to be distorted or impaired by the vibration of the moving article. A further advantage of my invention is the fact that the diaphragm assembly may be quickly and readily attached to the casing in a simple and expeditious manner, and that the component parts are thereafter automatically retained in simple position with reference to each other. In addition, the loud speaker may be supported on the ceiling, where it will not be struck by the passengers and where the reproduction will not be distorted by motor noises.

I claim:—

1. In a loud speaker, a diaphragm assembly including a cone housing, a casing enclosing the housing, and having a groove therein, the groove providing a shoulder on the inner surface thereof, a plurality of yieldable members engaging the shoulders and bearing against the cone housing for locking the casing and housing together, a covering for the housing, and a clamping ring resting in the groove, and engaging the covering, and holding it in taut position upon the casing.

2. In a mounting for sound reproducing apparatus, the combination of a sound reproducing device, an outwardly extending support adapted to be secured upon a wall, ceiling or other surface and conceal said sound reproducing device therebehind, said support having a cylindrical wall portion with a grill-like area at the outer end thereof through which sound waves may pass, and a plurality of spring struts extending at an angle between the cylindrical wall of said support and said sound reproducing device for securing said sound reproducing device over the grill-like area and behind said support.

3. In a mounting for sound reproducing apparatus, the combination of a sound reproducing device having an outwardly extending diaphragm supporting frame, an outwardly extending support adapted to be secured upon a baffle forming surface and conceal said sound reproducing device therebehind, said support having side walls and an end portion perforated throughout the area covered by said diaphragm supporting frame, means for centering said sound reproducing device behind said support and over its perforated area, and a plurality of bowed pressure exerting struts extending at an angle from the side walls of said outwardly extending support and engaging said diaphragm supporting frame for securing said sound reproducing device against the rear side of said support.

4. In a mounting for sound reproducing apparatus, the combination of a sound reproducing device of the electro-dynamic type having an outwardly extending diaphragm supporting frame, a dished outwardly extending supporting member adapted to be secured at its inner end upon a baffle forming surface and conceal said sound reproducing device therebehind, said support having a cylindrical wall portion and an end portion perforated throughout the area covered by said diaphragm supporting frame, bosses upon the inside surface of said supporting member for centering said diaphragm supporting frame within said supporting member and over its perforated area, and a plurality of bowed spring steel struts extending at an angle from points upon the cylindrical wall portion adjacent the inner end of said dished supporting member and engaging said diaphragm supporting frame for securing said sound reproducing device upon said supporting member.

5. In a mounting for sound reproducing apparatus, the combination of a dished outwardly extending supporting member having a grill-like area at its bottom and an open rim adapted to engage a baffle forming surface and support a sound reproducing device therebehind, a sound reproducing device, means upon said supporting member for centering the sound reproducing device over the grill-like area thereof, said supporting member also having a recessed spring receiving seat disposed adjacent the open rim thereof, and a flexible spring steel strut extending from said recess and cooperating with said centering means to secure said souhd reproducing device firmly upon and behind the grill-like area of said supporting member.

6. In a mounting for sound reproducing apparatus, the combination of a supporting member having a grilled outwardly disposed portion adapted to support a sound reproducing device and a rearwardly extending flange adapted to be secured upon a baffle forming surface, a sound reproducing device, means upon said supporting member for centering the sound reproducing device within the outwardly disposed portion thereof, said supporting member having a plurality of recessed spring receiving seats formed in its rearwardly extending flange, and a flexible spring steel strut disposed in a bowed position between each of said recesses and exerting a pressure

upon said sound reproducing device, whereby the latter will be held in firm contact against the back of the grilled outwardly disposed portion of said supporting member.

7. In a mounting for sound reproducing apparatus, the combination of a supporting member adapted to be secured upon a baffle forming surface and conceal a sound reproducing device therebehind, said support having an outwardly extending cylindrical portion and a perforated end portion, a sound wave pervious fabric disposed over the perforated end portion of said supporting member having its edge extending slightly over the cylindrical portion thereof, and a finishing ring disposed about the cylindrical portion of said supporting member over the edge of said fabric and engaging said baffle forming surface.

8. In a mounting for sound reproducing apparatus, the combination of a supporting member adapted to be secured upon a surface and conceal a sound reproducing device therebehind, said supporting member having an outwardly disposed convexed portion with a grilled area through which sound waves may pass, means for securing said support upon a surface, a sound pervious fabric disposed over the convexed surface of said supporting member, and a finishing ring disposed over the edge of said fabric and about said supporting member for concealing said securing means and holding said fabric thereupon.

9. In a mounting for sound reproducing apparatus, the combination of a dome-like supporting member adapted to suport and conceal a sound reproducing device therebehind, said supporting member having a cylindrical portion adapted to be secured upon a surface and a convexed end portion having a grilled area through which sound waves may pass, means for securing said support upon a surface, a sound pervious fabric disposed over the convexed surface of said supporting member, a finishing ring disposed over the edge of said fabric and about the cylindrical portion of said supporting member for concealing the means which secures said support upon said surface, and concealed spring means for securing said finishing ring upon said support and yieldingly against said surface.

10. In a concealing support for sound reproducing apparatus, the combination of a supporting member having a perforated and dished central portion behind which a sound reproducing device may be secured and a rim by which it may be secured upon a baffle forming surface with the dished central portion extending outwardly therefrom, a sound pervious fabric disposed over the outside of said perforated and dished central portion of the supporting member, a finishing ring disposed about the dished portion of the supporting member and over the edge of said fabric adapted to engage the baffle forming surface and cooperate with said fabric to conceal said supporting member, and spring means disposed between said supporting member and the underside of said finishing ring for yieldingly holding said ring upon said supporting member and in engagement with said baffle forming surface.

11. In a loud speaker, the combination of a diaphragm assembly including a housing, a casing enclosing the assembly, and having means thereon for engaging the housing at spaced points so as to center it with reference to the casing, a plurality of flat leaf springs, having means therein engaging the housing and casing respectively, and allowing them to be locked together solely by spring tension.

BERNARD A. ENGHOLM.