

June 10, 1958

H. F. OLSON ET AL

2,838,607

COMBINATION CHASSIS AND LOUDSPEAKER

Filed April 27, 1951

2 Sheets-Sheet 1

Fig. 1.

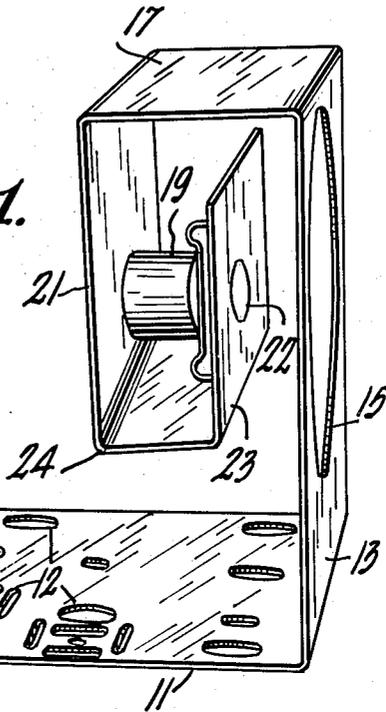
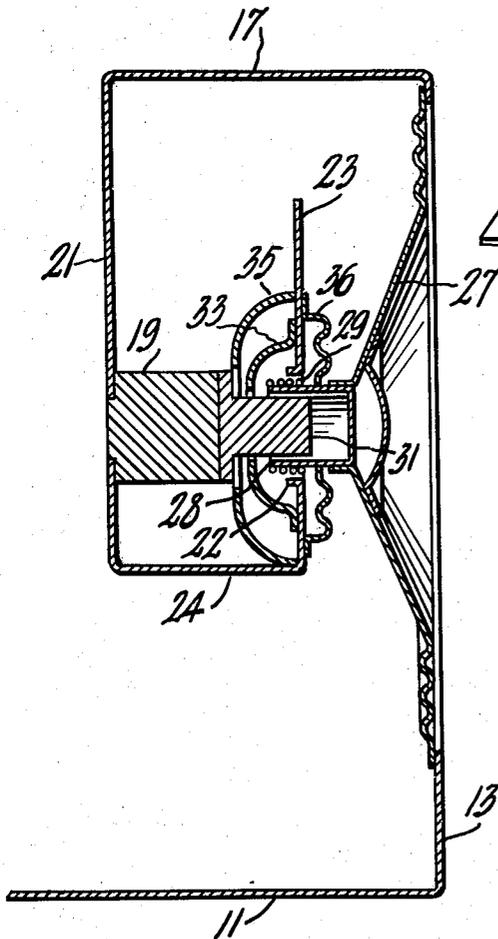


Fig. 2.



INVENTORS  
HARRY F. OLSON  
& JOHN PRESTON  
BY  
Corder & Henry  
ATTORNEY

June 10, 1958

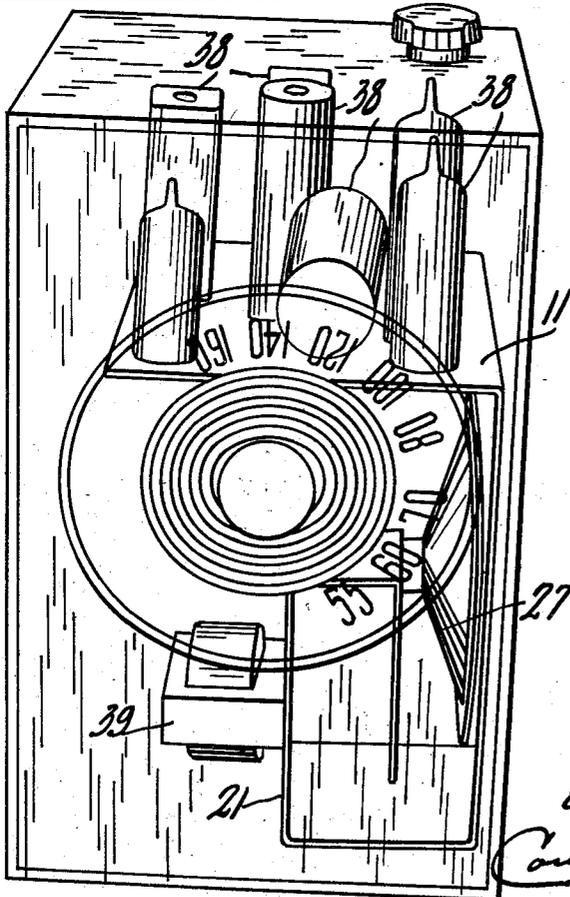
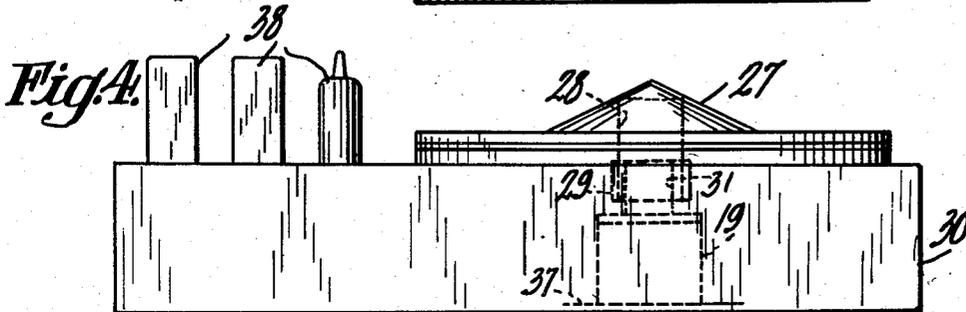
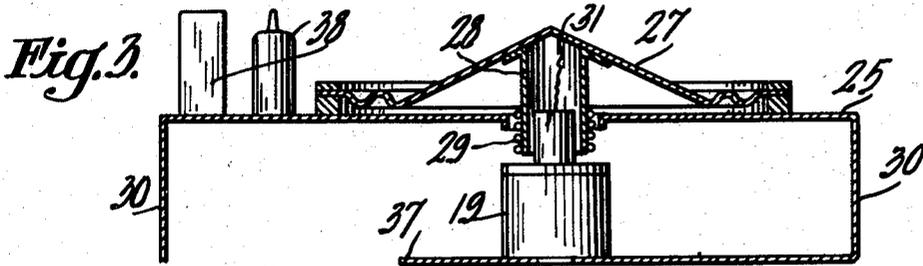
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COMBINATION CHASSIS AND LOUDSPEAKER

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INVENTORS  
HARRY F. OLSON  
& JOHN PRESTON  
BY  
*Condon & Haury*  
ATTORNEY

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2,838,607

**COMBINATION CHASSIS AND LOUDSPEAKER**

Harry F. Olson, Princeton, and John Preston, Metedeconk, N. J., assignors to Radio Corporation of America, a corporation of Delaware

Application April 27, 1951, Serial No. 223,388

4 Claims. (Cl. 179-1)

This invention relates to a combination chassis and loudspeaker. More particularly it relates to the type of loudspeaker in which the dishpan or part of the diaphragm support serves as the magnetic return path.

In prior art speakers employing dishpans, little change in the ordinary cone type of speaker has been made. Most of the effort has been directed toward reducing the number of parts necessary for the construction of the speaker itself and no effort has been made to fabricate the speaker and chassis as a unitary structure wherein a part of the chassis functions as a part of the speaker. Our invention is directed toward that end.

The combination speaker and chassis disclosed herein is a unitary structure. A minimum number of parts in the speaker construction is employed, and the construction offers a wide range of possibilities for design to secure compactness. According to our improvement, the chassis may be made of any magnetic metal, such as cold rolled steel. By utilizing part of the chassis for the magnetic path of the speaker and part of the chassis for supporting the speaker parts, we have simplified the loudspeaker to the extent that approximately one-half of the parts ordinarily used in chassis and speaker construction have been eliminated.

A primary object of our invention, therefore, is to provide a combined support and magnetic path for the speaker parts.

A second object of our invention is to avoid the necessity of using a separate mounting for attaching a loudspeaker to a radio or audio chassis.

Another object of our invention is to increase the efficiency of a loudspeaker by reducing the leakage flux in the magnetic path.

A further object of our invention is to provide a loudspeaker which will be economical and easy to manufacture, with improved performance.

Briefly, in accordance with our invention we have provided a sheet of magnetic material shaped in such manner as to form a chassis, diaphragm support, magnetic path, and magnet support. The diaphragm supporting portion of the sheet is return bent to form an open U shape designed to receive a speaker magnet, the side and bottom walls of the U shape constituting the magnetic return path of the magnet. The magnetic material referred to in this paragraph and throughout this specification and the appended claims is of the class of substances usually referred to as ferromagnetic, but which do not become permanently magnetized, that is, have low or negligible retentivity.

Our invention, both as to its structure and operation, together with additional objects and advantages thereof, will be understood best by reference to the following specifications when read in connection with the drawing, in which:

Figure 1 is a perspective view of the chassis, speaker support, and magnetic structure of one form of our invention;

Figure 2 is an elevation of the embodiment of our in-

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vention taken along a center section of Figure 1, with additional parts to form a complete speaker;

Figure 3 shows an end elevation in section of a modification of our invention in the form of a flat type chassis;

Figure 4 is a side elevation of the modification illustrated by Figure 3; and

Figure 5 is a perspective view of a completed radio employing our invention.

Referring continuously to the drawings, in which like reference numerals in the several figures designate similar parts:

In Figure 1, there is illustrated a plate 11, which may be either base, or a side or a top plate, but which for convenience of reference is called herein a base plate, which is adapted to have mounted thereon various radio and audio components. For this purpose, apertures 12 are provided in the plate 11.

Extending upwardly from the base plate 11 is a diaphragm mounting member 13 having an opening 15 therein to receive the diaphragm of the loudspeaker. The diaphragm mounting member 13 is bent laterally to form a support 17 to form a magnet receiving part. The end of the support 18 is bent downwardly and then is return bent, giving a U-shaped magnet receiving receptacle. A magnet 19, which may be either a permanent magnet or electromagnet is rigidly secured to the back face 21, and extends into an aperture 22 in the inner face 23. The magnetic return path is through the U-shaped receptacle which is formed by a portion of the inner face 23, the bottom portion 24 and the back face 21.

Referring to Figure 2, which is a view in section of the embodiment of our invention shown in Figure 1, it will be seen that a cone 27 and the voice coil members have been added. The cone 27 is provided with a conventional voice coil form 28 carrying a voice coil 29. The voice coil form 28 is extended rearwardly from the speaker diaphragm or cone 27, and said voice coil 29 is thereby positioned in the air gap between the pole piece 31 of the magnet 19 and the aperture 22 in the inner face 23 of the magnet receiving receptacle 21, 23 and 24.

A magnet centering cup 33 of non-magnetic material is rigidly secured on the inner face 21 of the magnet receptacle to position the pole piece 31 in the aperture 22. A keeper 35 may be utilized to keep the pole piece 31 and the magnet 19 in contact with the inner face of the back face 21 of the magnet receptacle. A centering spider 36 is attached to the inner face 23 and the voice coil form 28 to align the voice coil 29 in the air gap between the pole piece 31 and the aperture 22.

Referring to Figures 3 and 4 it will be seen that instead of an upright form of chassis and loudspeaker, a flat type has been provided. This type includes a chassis platform 25 in which is provided an opening for the pole piece 31 and voice coil form 28. The edges of the chassis platform 25 are bent downwardly to form supporting sides 30. One of these sides 30 is provided with an extending portion 37 bent inwardly and disposed parallel to but spaced from the chassis platform 25. This extending portion 37 may stop short of the opposite side of the chassis. For the sake of rigidity, the extended portion 37 may continue across to the opposite side and be secured thereto.

The speaker cone 27 is secured to the upper face of the chassis platform 25 over the opening therein with the concave portion of the speaker cone 27 facing inwardly or downwardly toward the chassis platform 25. Because of this arrangement the voice coil form 28 is carried in the concave portion of the diaphragm or cone 27 and extends inwardly or downwardly into the opening provided in the chassis platform 25. A space is provided between the edges of the opening and the pole piece 31 of the magnet 19 to provide an air gap in the magnetic path

of magnet 19. The remainder of the magnetic path is composed of chassis platform 25, the supporting side 30, and the extended portion 37.

Radio and audio components 38, such as tubes, transformers, and the like, may be mounted on the upper portion of the chassis platform 25 in the conventional manner. Resistors, capacitors, and other circuit components would be mounted inside the chassis, also in the usual manner.

In Figure 5, there is shown a completed radio of the compact table model type made in accordance with our invention. In this figure are shown the radio and audio components 38 mounted on the base plate 11 of the chassis shown in Figures 1 and 2. An output transformer 39 is mounted on the back surface 21, and connections are made to the voice coil.

The loudspeaker may be a dynamic type employing either a permanent magnet or electromagnet and operates in the same manner as a conventional loudspeaker. In the embodiment shown in Figure 5, measurement indicates that the flux density in the air gap of our combination loudspeaker and chassis and a conventional loudspeaker are essentially the same, where the same magnet and voice coil and the same air gap spacing were employed. A comparison of the operation of our loudspeaker and chassis indicates that our invention has an equal quality of sound reproduction.

The amount of steel used in our invention is considerably less for several reasons. In the first place, mounting brackets, bolts and nuts are unnecessary. Secondly, parts are not duplicated. Thirdly, the steel parts in our combination loudspeaker and chassis perform two functions: that of supporting and mounting the loudspeaker assembly, and providing the magnetic path.

It will be apparent from the description of our improved combination loudspeaker and chassis that it is compact and simple to manufacture and that it eliminates a separate mounting arrangement.

Although, we have illustrated and described several embodiments of our invention, it will undoubtedly be apparent to those skilled in the art that many other forms thereof, as well as variations in those shown, are possible without departing from the spirit of our invention or the scope of the appended claims.

We claim:

1. A combination loud speaker and chassis comprising a unitary magnetic chassis formed by bending a single sheet of magnetic material so as to provide at least a first and second face in spacial, substantially parallel relationship, said first face having an aperture therein, a third parallel face interposed between said first and second faces and having an aperture therein, a diaphragm having its outer periphery contiguous with said first face in axial alignment with said apertures, a voice coil form secured to said diaphragm and extending toward said second face, through said aperture in said third face and spaced apart therefrom, a voice coil on said form, and a magnet mounted on said second face extending into a region of magnetic cooperation with said voice coil.

2. A combination loud speaker and chassis comprising a unitary magnetic chassis formed by bending a single

sheet of magnetic material so as to provide at least a first and second face in spacial, substantially parallel relationship, said first face having an aperture therein, a third parallel face interposed between said first and second faces and having an aperture therein, a diaphragm having its outer periphery contiguous with said first face in axial alignment with said apertures, a voice coil form secured to said diaphragm and extending toward said second face, through said aperture in said third face and spaced apart therefrom, a voice coil on said form, a magnet mounted on said second face and having a pole tip thereon extending into a region of magnetic cooperation with said voice coil, and a centering member mounted on said third face and connected to said voice coil form to hold said voice coil form in spacial alignment with said pole tip.

3. A combination loud speaker and chassis comprising a unitary magnetic chassis formed by bending a single sheet of magnetic material so as to provide at least a first and second face in spacial, substantially parallel relationship, said first face having an aperture therein, a third parallel face interposed between said first and second faces and having an aperture therein, a diaphragm having its outer periphery contiguous with said first face in axial alignment with said apertures, a voice coil form secured to said diaphragm and extending toward said second face, through said aperture in said third face, and spaced apart therefrom, a voice coil on said form, a magnet mounted on said second face and having a pole tip thereon, said pole tip extending into a region of magnetic cooperation with said voice coil, and a keeper mounted on said pole tip and connected to said third face to maintain a uniform air gap therebetween.

4. A combination loud speaker and chassis comprising a unitary magnetic chassis formed by bending a single sheet of magnetic material so as to provide at least a first and second face in spacial, substantially parallel relationship, said first face having an aperture therein, a third parallel face interposed between said first and second faces and having an aperture therein, a diaphragm having its outer periphery contiguous with said first face in axial alignment with said apertures, a voice coil form secured to said diaphragm and extending toward said second face, through said aperture in said third face, and spaced apart therefrom, a voice coil on said form, a magnet mounted on said second face and having a pole tip thereon, said pole tip extending into a region of magnetic cooperation with said voice coil, a keeper mounted on said pole tip and connected to said third face to maintain a uniform air gap therebetween, and a centering member on said third face connected to said voice coil form to hold said voice coil in spacial alignment with said pole tip.

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