

Sept. 18, 1928.

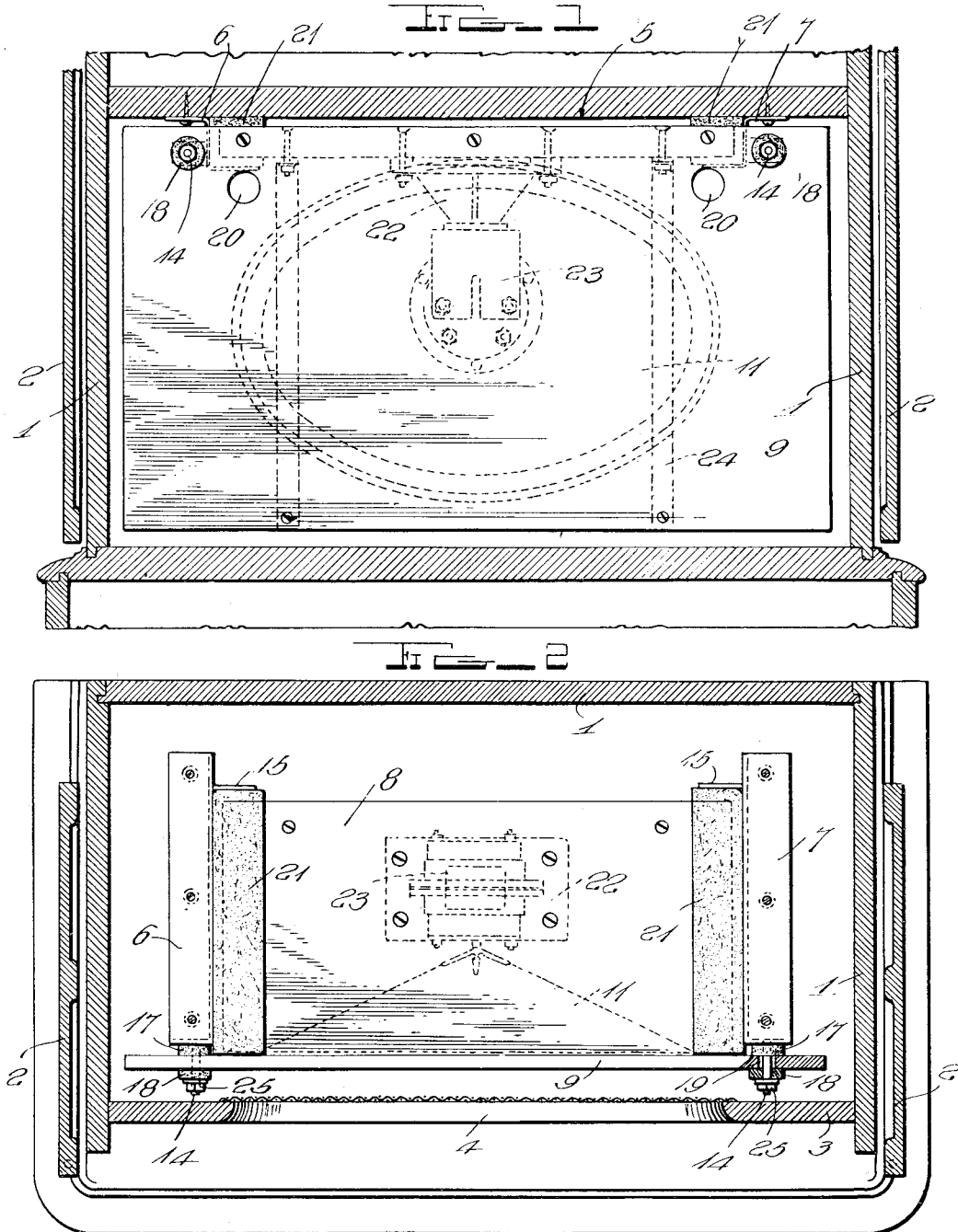
1,685,050

W. H. GERNS

ELECTROMAGNETIC SOUND REPRODUCER

Filed March 12, 1927

3 Sheets-Sheet 1



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FIG. 2

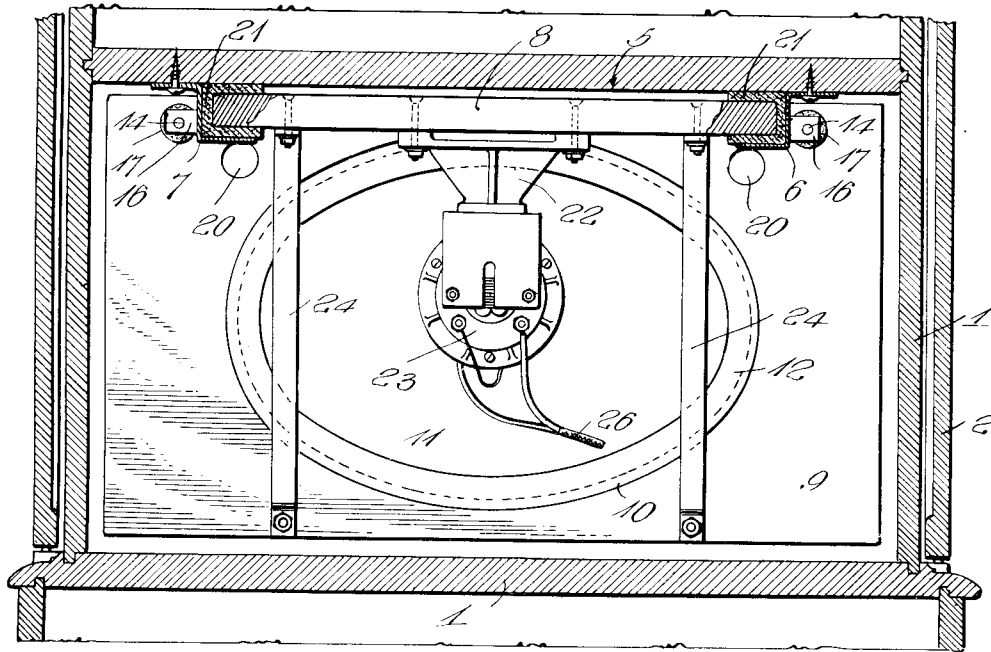


FIG. 4

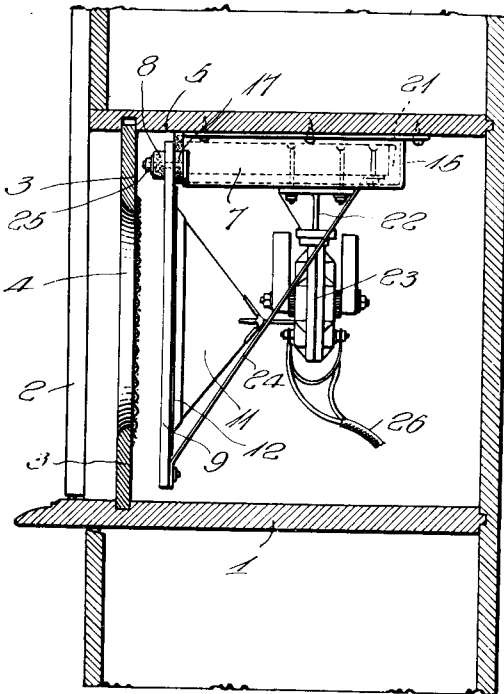
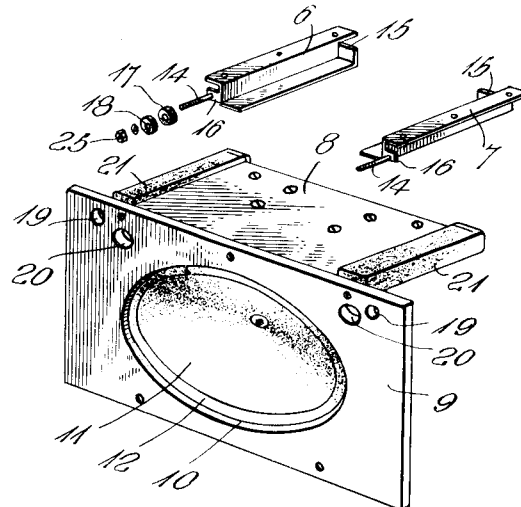


FIG. 5



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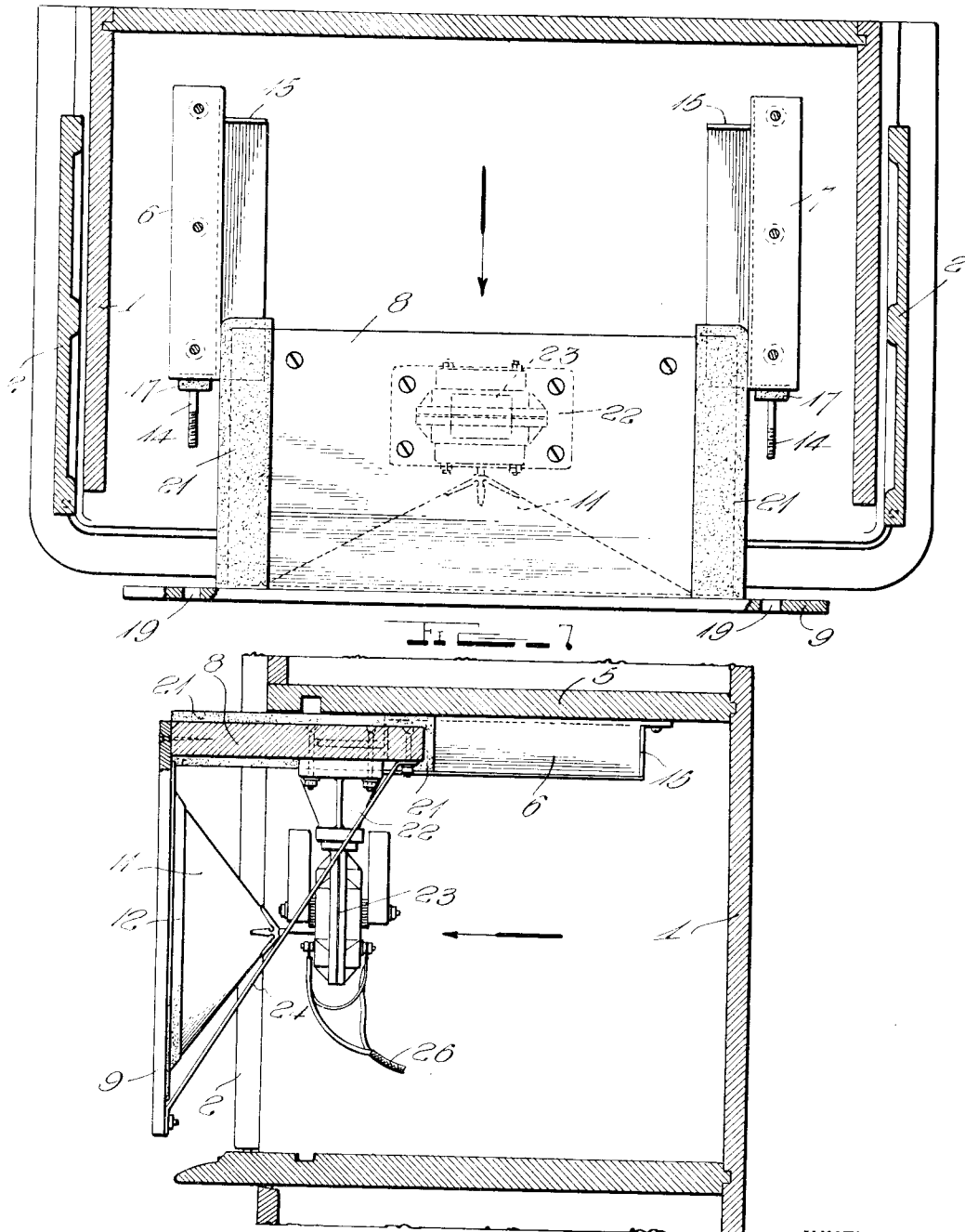
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FIG. 6



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UNITED STATES PATENT OFFICE.

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ELECTROMAGNETIC SOUND REPRODUCER.

Application filed March 12, 1927. Serial No. 174,869.

My invention relates broadly to broadcast receiving apparatus and more particularly to a loud speaker reproducer system for broadcast receiving apparatus.

5 One of the objects of my invention is to provide a construction of loud speaker reproducer which may be readily mounted within a cabinet with associated radio receiving apparatus for efficient reproduction of sound
10 without interference from mechanical shock and vibration.

Another object of my invention is to provide a mounting for a loud speaker reproducer within a cabinet structure with means
15 for insulating the loud speaker reproducer from interference occasioned by mechanical shock or vibrations which normally tend to introduce microphonic noises into the reproducer and thereby detrimentally affect the
20 sound reproduction.

Another object of my invention is to provide a construction of cone type sound reproducer which may be removably mounted
25 within a broadcast receiver cabinet in association with radio receiving apparatus and acoustically insulated against interference from microphonic noises set up adjacent the sound reproducer.

Another object of my invention is to provide a construction of electromagnetic sound reproducer which may be suspended from a shelf-like frame arranged to be moved horizontally into or withdrawn from a radio receiving apparatus cabinet structure, the shelf-like frame being acoustically insulated from
35 the cabinet structure for preventing interference from microphonic noises and limiting acoustic feed back in the receiving apparatus.

Still another object of my invention is to provide a construction of loud speaker system for cabinet type radio broadcast receivers by which the production and assembly of a cabinet type receiver can be facilitated by the insertion of the loud speaker system into a
40 compartment of the cabinet or the removal of the loud speaker therefrom for connection with the output of the radio receiving apparatus.

My invention will be more fully understood
50 from the following specification by reference to the accompanying drawings, in which:

Figure 1 is a front view of the loud speaker system shown in position within the radio receiving apparatus cabinet structure; Fig. 2
55 is a lateral cross-sectional view taken through

the radio receiving apparatus cabinet structure showing the electromagnetic sound reproducer mounted in position; Fig. 3 is a rear view of the loud speaker system in mounted position; Fig. 4 is a cross-sectional view taken
60 through the cabinet structure showing the electromagnetic sound reproducer mounted in position therein; Fig. 5 is a perspective view showing the electromagnetic sound reproducer and the bracket members by which
65 the sound reproducer may be slidably supported within the cabinet structure; Fig. 6 is a plan view of the loud speaker system showing the loud speaker partially removed from the cabinet structure; and Fig. 7 is a cross-sectional view of the loud speaker as represented in Fig. 6 showing the loud speaker being removed from the apparatus cabinet.

In mounting a loud speaker sound reproducer within a cabinet which houses associated radio receiving apparatus, there is a tendency for microphonic noises to be reproduced by the loud speaker due to mechanical shock and vibration which may arise in different parts of the radio receiving apparatus.
80 In sound reproducers of extreme sensitivity, there is a tendency for acoustic feed back in the circuits of the electron tubes to produce a continuous roar or hum in the loud speaker which seriously interferes with quality reception. I have developed the present construction for the removable mounting of an electromagnetic sound reproducer within a cabinet structure with means for eliminating the undesirable acoustic feed back for insuring
85 quality reproduction independently of shock or vibration which may occur in parts of the radio receiving apparatus adjacent to the loud speaker sound reproducer.

Referring to the drawings in detail reference character 1 designates a cabinet housing in which the radio receiving apparatus is mounted in different compartments. The doors 2 are shown in open position, these doors normally serving to close the front of the cabinet housing for entirely enclosing the radio receiving apparatus and loud speaker reproducer. An ornamental panel 3 is provided serving to close the compartment in the cabinet 1 which is provided for the mounting
95 of the electromagnetic sound reproducer. The panel 3 is removable from the front of the cabinet 1 to allow the insertion or removal of the loud speaker from the cabinet housing. An aperture 4 is provided in the panel 3
100 110

through which sound emanates from the loud speaker within the cabinet. The loud speaker is mounted from the laterally extending shelf member 5 by means of a pair of bracket members 6 and 7 into which the frame of the loud speaker is arranged to slide. The loud speaker frame includes a shelf-like member 8 to which the plate member 9 is connected and from which the electromagnetic sound reproducer 23 is suspended by means of the bracket member 22. The plate member 9 is centrally apertured at 10 and within this apertured portion, the peripheral edge of the cone shaped sound reproducing diaphragm 11 is free to float. A damping ring 12 is provided around the peripheral edge of the cone 11, this damping ring being connected to the rear surface of the panel 9.

The brackets 6 and 7 which provide supporting means for the cone, each consist of pressed channel members having an end portion 15 which forms an abutment or stop for the end of the shelf 8. Each channel member has an integrally connected lug portion 16 formed thereon and from the lug portion 16, a screw threaded stud member 14 extends. The brackets 6 and 7 are so positioned on the lower surface of the shelf 5 that the screw threaded stud member 14 may protrude through apertures 19 in the plate 9 when the loud speaker is moved into the cabinet housing 1. The plate 9 is provided with finger holes 20 to facilitate the insertion or removal of the loud speaker from the brackets 6 and 7. The edges of the shelf-like portion 8 are substantially covered with felt or other sound insulating material, the felt serving to acoustically insulate the loud speaker system from the radio receiving apparatus cabinet or the radio receiving apparatus which is mounted within the cabinet. It will be observed that the felt 21 entirely covers the ends of the rear edge of the shelf 8 so that direct abutment between the shelf 8 and the limiting stops 15 on the brackets is prevented. In order to further acoustically insulate the loud speaker system from the cabinet structure, I provide large felt washers 17 and 18 which fit over the screw threaded studs 14 on opposite sides of the plate member 9 and provide sound insulating abutments against which the nut 25 may operate. Bracket members 24 extend between the rear of the plate member 9 and the shelf 8 for mechanically reinforcing the loud speaker assembly.

The construction of loud speaker system herein greatly facilitates manufacture and assembly of radio receiving apparatus with built-in loud speakers. The cabinet structure in which the broadcast apparatus is housed may include a number of different compartments, one compartment serving to enclose the radio receiving apparatus while other compartments are provided for the power supply equipment and the sound re-

producer. The complete loud speaker may be tested and then moved into place for connection with the output circuit of the receiving apparatus through flexible conductor 26 with a knowledge that the combined equipment is complete and may be shipped ready for installation with minimum effort on the part of the purchaser of the equipment.

For the purposes of illustrating my invention, I have shown an elliptically shaped sound reproducing diaphragm but my invention is equally applicable to diaphragm of various shapes and sizes, and circular constructions of cones may be employed in a manner as equally satisfactory as the elliptical shaped cone shown in the drawings.

It will also be understood that while the drawings show the loud speaker compartment as a part of a radio receiver cabinet, the loud speaker of my invention may be mounted in an independent cabinet as part of a public address system or voice reproducer used with a variety of kinds of apparatus such as a talking film system.

While I have described the preferred embodiment of my invention, I desire it to be understood that modifications and improvements may be made within the scope of the appended claims without departing from the spirit of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. In a radio cabinet a loud speaker construction comprising a shelf-like support, an electromagnetic driver depending from said shelf-like support, a sound reproducing diaphragm connected with said electromagnetic driver and a pair of brackets within said radio cabinet spaced from each other in the same plane above the normal position of said driver for slidably mounting said shelf-like support within said radio cabinet.

2. A radio cabinet comprising a laterally extending shelf member, a pair of bracket members mounted beneath said laterally extending shelf member and adjacent opposite ends thereof, a frame member arranged to be slidably mounted within said bracket members and an electromagnetic driver carried by said frame member for actuating a sound reproducing diaphragm positioned within said radio cabinet and supported by said frame member.

3. A radio cabinet structure including a loud speaker compartment, a pair of bracket members mounted from the top portion of said compartment adjacent opposite ends thereof, a shelf-like frame structure comprising a pair of independent panels, one of said panels being slidably mounted in said bracket members, an electromagnetic sound reproducer carried by one panel of said shelf-like frame structure, a sound reproducing diaphragm supported by the other panel of said

frame structure, said shelf-like frame structure being movable from a position entirely within said compartment to a position outside of said compartment for repair and adjustment of said electromagnetic sound reproducer.

4. A radio cabinet structure including a loud speaker compartment, a pair of bracket members mounted in said loud speaker compartment, a loud speaker including a shelf-like frame adapted to slidably engage said bracket members, a sounding board carried by said frame and extending at right angles thereto, a sound reproducing diaphragm carried by said sounding board, said shelf-like frame being movable from a position entirely enclosed by said cabinet structure to a position outside of said cabinet structure, and means interposed between each of said bracket members and the ends of said shelf-like frame for acoustically insulating said loud speaker from said radio cabinet structure.

5. A loud speaker cabinet comprising an acoustic chamber, an electromagnetic sound reproducer, a frame for supporting said electromagnetic sound reproducer, and means in said acoustic chamber for removably suspending the frame of said electromagnetic sound reproducer in a position within said acoustic chamber, and guide members for controlling the removal and replacement of said frame with respect to said chamber.

6. A loud speaker construction comprising an acoustic chamber, a frame structure, an electromagnetic driver carried by said frame structure, a sounding board depending from said frame structure, a sound reproducing diaphragm connected to said electromagnetic driver and carried by said sounding board, and means for removably securing said frame structure within said acoustic chamber whereby said frame structure may be positioned within said acoustic chamber or displaced to a position outside of said acoustic chamber by movement of said frame structure in a substantially horizontal plane.

7. A loud speaker including an acoustic chamber, a slidable frame structure having one side thereof removably engaging one side of said acoustic chamber, an electromagnetic driver carried by said frame structure, a sounding board extending at right angles to said frame structure, a sound reproducing diaphragm carried by said sounding board and actuated by said electromagnetic driver, said electromagnetic driver and sound reproducing diaphragm being movable from a position within said acoustic chamber to a position displaced from said acoustic chamber, and acoustic insulation material surrounding the ends of said frame structure and acoustically insulating said frame structure from said acoustic chamber.

8. A loud speaker comprising an acoustic

chamber, a frame structure slidably mounted within said acoustic chamber, said frame structure including a shelf-like laterally extending member and a vertical plate member extending substantially at right angles to said shelf-like member, an electromagnetic driver depending from said shelf-like member, a sound reproducing diaphragm actuated by said electromagnetic driver, said diaphragm having its peripheral edge terminating in the plane of said vertical plate member, said vertical plate member substantially closing the front of said acoustic chamber when said frame structure is moved to a position within said acoustic chamber from the front thereof.

9. A loud speaker comprising an acoustic chamber, a frame structure including slidable member having a sounding board extending substantially at right angles thereto, sound insulating material substantially covering opposite edges of said slidable member, a pair of brackets carried by one side of said acoustic chamber, said brackets being arranged to slidably engage the opposite edges of said slidable member, an electromagnetic driver depending from said slidable member, a sound reproducing diaphragm actuated by said electromagnetic driver and having its peripheral edge terminating in the plane of said sounding board below said slidable member, said sounding board serving to substantially enclose the front of said acoustic chamber when said frame structure is moved to a position within said acoustic chamber from the front thereof.

10. A loud speaker comprising an acoustic chamber, a frame structure including a pair of flat members disposed substantially at right angles to each other, one of said flat members providing a depending support for an electromagnetic driver, a sound reproducing diaphragm connected with said electromagnetic driver and having its peripheral edge terminating in the plane of the other of said flat members, means carried by said acoustic chamber for slidably mounting said frame structure therein for movement in a horizontal plane, and sound proof material enveloping the edges of one of said flat members for acoustically insulating said frame structure from said acoustic chamber throughout the range of movement of said frame structure in a horizontal plane.

11. A loud speaker comprising an acoustic chamber, a pair of bracket members carried by one side of said acoustic chamber, stud members extending from each of said bracket members, a frame structure including portions extending substantially at right angles to each other, an electromagnetic driver depending from one of said portions, a sound reproducing diaphragm connected with said electromagnetic driver and having its peripheral edge terminating in the plane of the

other of said portions of said frame structure, the first mentioned portion of said frame structure being slidable from a position displaced from said bracket members to a position within said cabinet structure where said stud members project through the last mentioned portion of said frame structure for securing said frame structure in a position on said stud members enclosed by said acoustic chamber.

12. A loud speaker comprising an acoustic chamber, a pair of bracket members carried by one side of said acoustic chamber, stud members extending from each of said bracket members, a frame structure including portions extending substantially at right angles to each other, an electromagnetic driver depending from one of said portions, a sound reproducing diaphragm connected with said electromagnetic driver and having its peripheral edge terminating in the plane of the other of said portions of said frame structure, said last mentioned portion being shaped to substantially close the front of said acoustic chamber, and the first mentioned portion of said frame structure being slidable in said bracket members to a position displaced from said acoustic chamber to a position within said acoustic chamber where said stud mem-

bers project through said frame structure for securing said frame structure in position with respect to said chamber.

13. A loud speaker comprising an acoustic chamber, bracket members carried by one side of said acoustic chamber, screw threaded stud members extending from said bracket members, a frame structure having portions extending at right angles with respect to each other, an electromagnetic driver suspended from one of said portions and having a sound reproducing diaphragm connected thereto, with the peripheral edge of said diaphragm terminating in the plane of another portion of said frame structure, the edges of the first mentioned portion of said frame structure being provided with sound insulating pads for slidably engaging said bracket members when said loud speaker is moved to a position within said acoustic chamber with said studs projecting through a portion of said frame structure, pads of acoustically insulated material disposed between said studs and said frame structure and nuts engaging said studs for locking said frame structure in position on said studs within said acoustic chamber.

In testimony whereof I affix my signature.

WILLIAM H. GERNS.