March 26, 1940. H. E. McDONALD 2,194,664

SOUND REPRODUCING APPARATUS

Filed Feb. 17, 1938 2 Sheets-Sheet 1

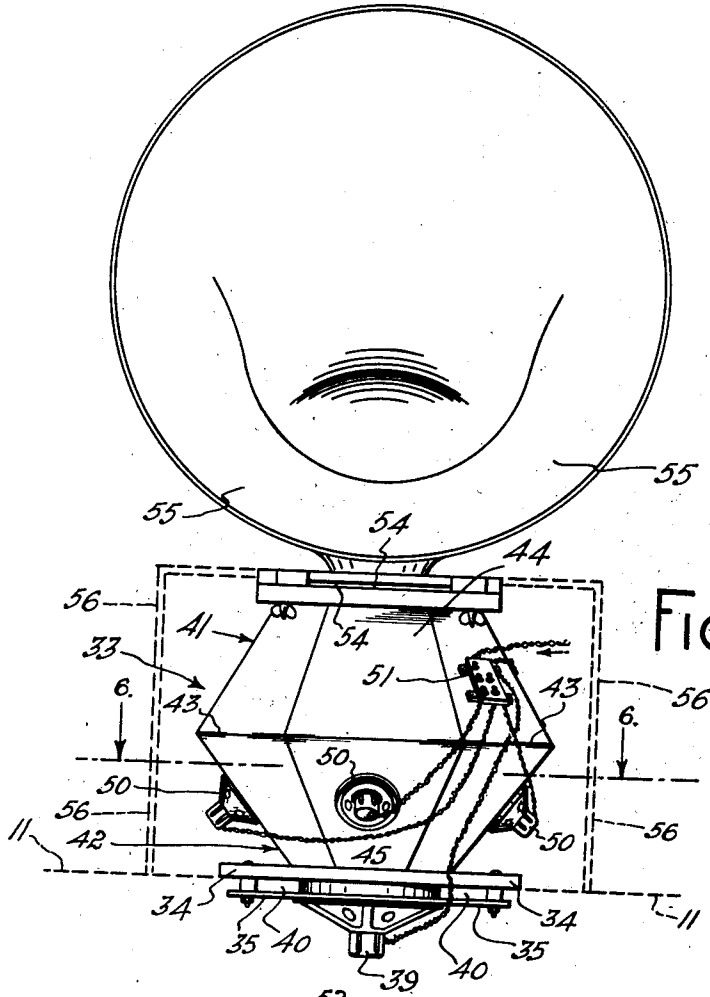



FIG. 1.

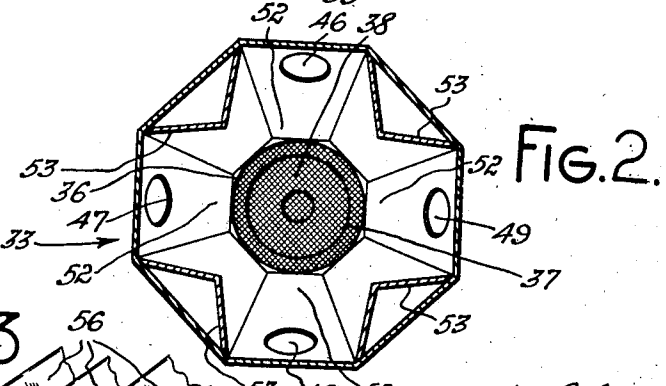
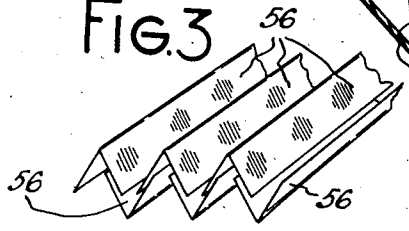



FIG. 2.

FIG. 3




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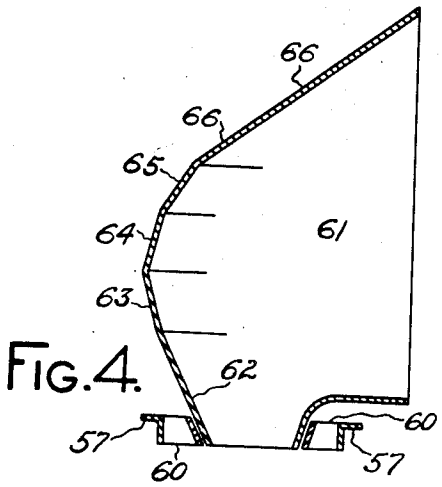



FIG. 4.

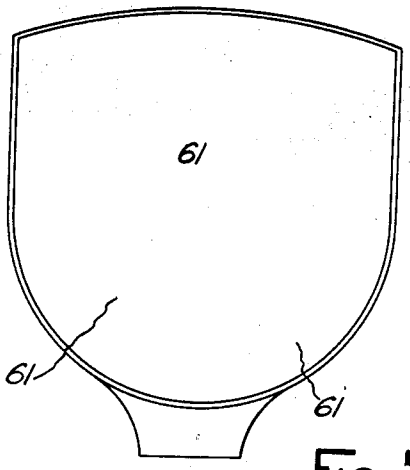



FIG. 5.

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# UNITED STATES PATENT OFFICE

2,194,664

## SOUND REPRODUCING APPARATUS

Henry Edwin McDonald, Milsons Point, near Sydney, New South Wales, Australia

Application February 17, 1938, Serial No. 191,072
In Australia February 18, 1937

1 Claim. (Cl. 181—31)

This invention has particular reference to improvements in apparatus for reproducing musical sounds and is applicable to thermionic amplifiers of radio receiving apparatus.

An object of the present invention is to provide a reproducer whereby the quality of the sound produced is clear and correct with respect to tone.

The reproducer which is the subject matter of the invention consists of a plurality of dynamic speakers of different capacities and characteristics operated in a known manner from a thermionic amplifier and disposed in a common sound chamber whose cross section increases from its base towards its centre or mid-height and then reduces in cross section towards its upper or outlet end thereof.

This sound chamber is positioned within the cabinet of the apparatus with spaced relation in regard to one of the dynamic speakers.

In this regard the base of the sound chamber has an opening which coincides with an opening formed in a baffle board disposed in spaced relation to the base, said baffle board being disposed above the diaphragm of the lower of the dynamic speakers. The base of the sound chamber consists of a board which is of greater area than the baffle board and acts as a second baffle board.

The sound chamber of the dynamic speaker assembly containing the plurality of dynamic speakers is so formed that the sound therefrom is projected upwardly to the trumpet or horn shaped baffle. The chamber is preferably polygonal in shape at the centre and may consist of two tapered members one of which is inverted. The chamber itself is fitted internally with V-shaped fillers between the respective speakers to form sound directors and internal baffles.

In order that the invention may be more readily understood reference will now be made to the accompanying drawings, wherein—

Figure 1 is an elevational view of the dynamic speaker assembly.

Figure 2 is a sectional plan view of the sound chamber on the line 6—6 of Figure 1 showing the internal structure.

Figure 3 is a detail view of portion of the absorber casing which is disposed around the sound chamber of the speaker assembly seen in broken lines in Figure 1.

Figure 4 is a sectional elevation showing the large trumpet.

Figure 5 is an end elevation of the trumpet.

The dynamic speaker assembly 33 is disposed adjacent the sound reproducing apparatus and includes a plurality of tone compartments wherein treble and medium and bass tones are produced by respective speakers as will be explained later.

The dynamic speaker assembly 33, Figure 1, is mounted upon a base 34 which acts as a baffle board and has a baffle board 35 suspended therefrom.

The base or baffle 34 and the baffle board 35 are provided with openings 36 and 37 respectively, said openings being concentric. The opening 36 in the base 34 being of larger diameter than the opening 37 in the baffle board 35. The opening 37 in the baffle board 35 is covered with gauze 38 and has the bass dynamic speaker 39 disposed thereunder as seen in Figure 1.

An air gap 40 is provided between the base or baffle 34 and the baffle board 35.

The sound chamber being the internal portion of the dynamic speaker assembly 33, is disposed above the base 34 and is preferably of polygonal shape at the centre, being formed preferably of two hollow tapered members 41—42 united at their base 43, the respective narrowed portions forming the top 44 and the bottom 45 respectively of the chamber.

As illustrated the sound chamber is octagonal at the centre line 43 and has eight faces above and an equal number below the centre line 43. Four of the lower faces are provided with orifices 46, 47, 48 and 49 over which dynamic speakers 50 for use with varying frequencies are secured, with the object of producing combined sounds of desired degrees, which harmonize with the sound produced by the dynamic speaker 39 suspended to the baffle board 35.

The respective dynamic speakers 50 and 39 are controlled from a switch panel 51 which is disposed outside the casing.

The sound chamber is divided into a plurality of tone spaces 52 by fillers 53 which act not only as sound directors but also prevent clashing and humming caused by dead air in unfilled spaces.

A space or air gap 54 is left between the base of the horn 55 and the top of the sound chamber space. The space or air gap acts with the air cushion formed by air pressure produced by the sharply slanting roof in a "give and take" movement of the air cushion, thus accentuating loud or modifying soft sounds from double forte to pianissimo.

A housing is provided to surround the dynamic speaker assembly 33 as shown in broken

lines in Figure 1 and this is composed of zig-zag absorbing material **56** spaced apart as seen in Figure 3. This material **56** acts as an external absorbing lining for the dynamic speaker assembly **33**.

The trumpet or horn shaped baffle **55** shown in Fig. 1 may take the form shown generally at **61** in Figs. 4 and 5. These horn shaped baffles may be supported above the sound chamber by means of a member **57** having an arm **60** carrying a ring engaging the lower end of the trumpet. The trumpet or horn shaped baffle illustrated in Figs. 4 and 5 has a plurality of sound reflecting surfaces **62**, **63**, **64**, **65** and **66**.

I claim:

Sound reproducing apparatus comprising, a hollow casing of polygonal shape in a central transverse section and tapering inwardly towards each end to provide a sound chamber, a baffle board engaging one end of the casing and supporting said casing, a second baffle board secured to the first baffle board and spaced therefrom, a horn-shaped baffle mounted on the other end of the casing communicating with the sound chamber, said horn-shaped baffle having a plurality of sound reflecting faces, each baffle board having an opening therein, a dynamic speaker mounted on the second baffle board adjacent the opening therein, said casing having orifices therein, and dynamic speakers mounted on the casing adjacent said orifices.

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