

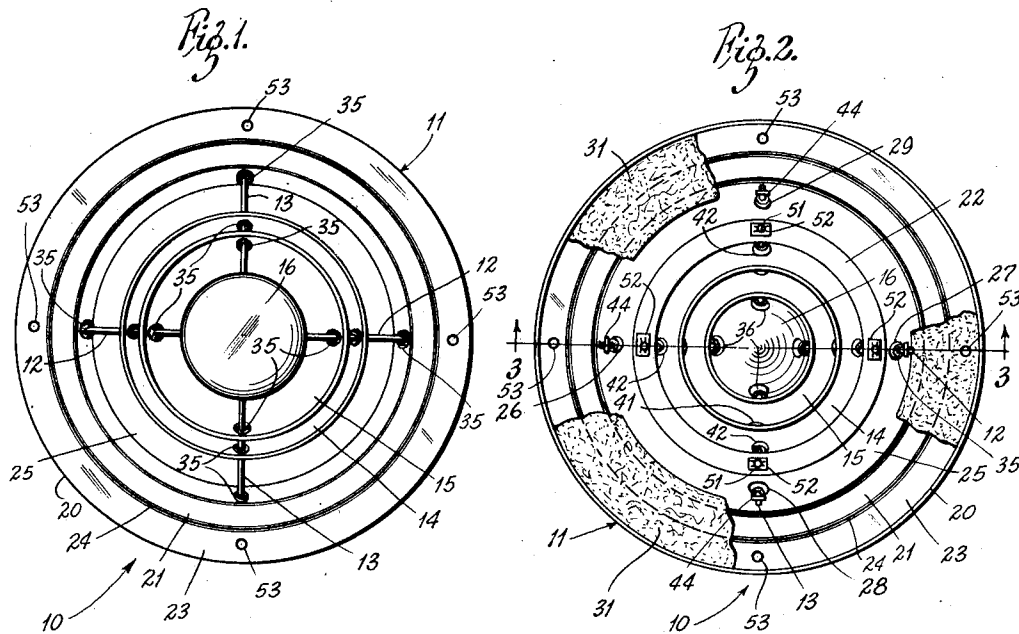
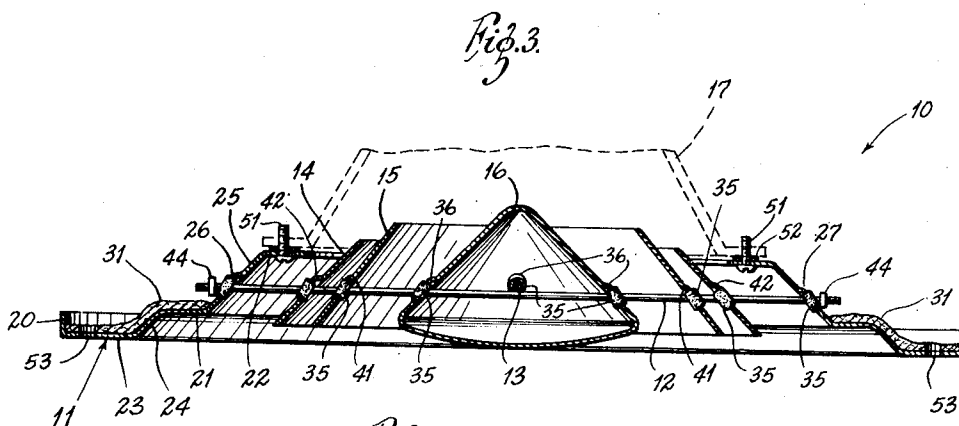
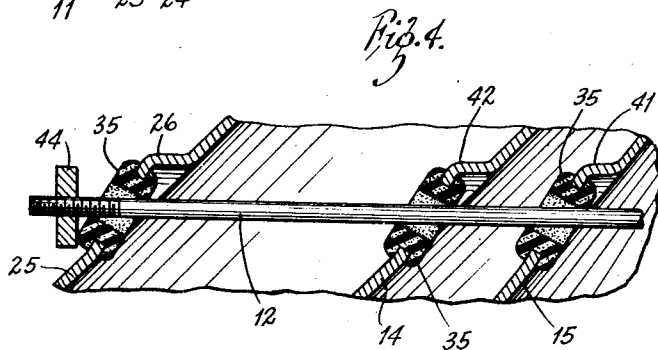
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2,819,773

HIGH FREQUENCY SPEAKER BAFFLE

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2,819,773

HIGH FREQUENCY SPEAKER BAFFLE

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11 Claims. (Cl. 181—31)

This invention relates to improvements in speaker baffles, and in particular is concerned with a non-resonant, high frequency baffle.

The present invention is an improvement on my patent for Loud Speaker Mounting, No. 2,563,948, issued August 14, 1951. The baffle of this invention has extremely faithful reproducing characteristics for the higher audio frequencies when the baffle is used in loud speaker systems and the like. The baffle is especially well adapted for use as a recessed ceiling baffle in buildings and the like, and is characterized by an undercoating on the baffle frame which prevents resonance and eliminates undesirable vibrations.

By means of this invention, the speaker baffle can be used with a standard speaker cone to distribute the desired sound at different angles from the axis of the speaker with extremely high faithfulness in the higher as well as the lower frequencies at different directions from the axis. The entire baffle structure is made as a unit that can be conveniently shipped and installed in a simple and expedient manner. When used in a ceiling, or other supporting structure, the baffle serves in an improved manner and is strong, rigid and relatively inexpensive.

Therefore, it is a principal object of this invention to provide a ceiling speaker baffle which has characteristics of faithfully reproducing high frequencies at different directions from the axis of the speaker through the provision of baffle rings, without metallic resonance.

Still another object of this invention is to provide a speaker baffle having a central diffuser with a plurality of spaced rings which disperse the sound waves from the speaker to obtain a high frequency reproduction.

Yet another object of this invention is to provide a speaker baffle having a central diffuser and a plurality of spaced rings set at different angles from one another at an increasing pitch towards the center of the baffle to provide for a most effective sound reproduction.

Still a further object of this invention is to provide a speaker baffle in which undesirable resonance and vibrations are reduced by a sponge-like undercoating on the baffle supporting structure.

Yet another object of this invention is to provide a speaker baffle having a diffuser and a plurality of spaced dispersion rings in which there are supporting rods through these elements which are held out of contact therewith by vibration reducing grommets of a resilient nature for the reduction of resonance and vibration.

Still another object of this invention is to provide a speaker baffle apparatus having high frequency characteristics with reduced resonance and vibration which is rugged and simple to construct and install.

Further objects of this invention will appear in the detailed description which follows and will be further apparent to those skilled in the art.

A preferred embodiment of the invention is shown in the accompanying drawings for the purpose of illustrating

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tion. It is to be understood that the invention is not limited thereto, and that these drawings are for the purpose of example only. In the drawings:

Figure 1 is a view in front elevation of the speaker baffle;

Figure 2 is a view in rear elevation of the speaker baffle with the undercoating partially removed;

Figure 3 is a view in cross section of the baffle taken on the line 3—3 of Figure 2; and

Figure 4 is a view taken similarly to Figure 3 on an enlarged scale showing a fragmentary portion of the baffle and the means for connecting the dispersing rings.

The speaker baffle is generally indicated at 10 in Figures 1, 2 and 3, and has as its main supporting element a frame 11. Supporting rods 12 and 13 connect dispersing rings 14 and 15 to the central diffuser cone 16. A speaker 17 is indicated in dotted lines as being fastened to the frame.

The frame 11 is of a generally rim-like configuration and is constructed of spun aluminum which has desirable characteristics for corrosion prevention and negligible vibration. As best shown in Figure 3, the frame 11 has an exterior flange 20 and interior ledges 21 and 22 offset at levels rearwardly from the outside annular surface 23. The ledges 21 and 22 are defined by shoulders 24 and 25. Bosses 26, 27, 28 and 29 are stamped into the shoulder 25 to provide for the insertion of rods 12 and 13.

An undercoating 31 is provided on the interior of the annular surface 23, the shoulder 24 and the ledge 21. This undercoating provides for the substantial elimination of any vibration and resonance in the speaker baffle, and acts to absorb any forces that might be transmitted to the frame or sound waves from the speaker. The undercoating is of a more or less sponge-like nature but is relatively hard, although it will bear an impression when a hard object is inserted against it. Such an undercoating may be conventionally made of fibers, tar and oil, which act as a metallic deadener when applied to the frame.

The diffuser 16 is of the same type as that disclosed in my Patent No. 2,563,948, but is supported by the two rods 12 and 13 which pass entirely through it and which are fastened at their ends on the frame 11. The rods 12 and 13 are supported by rubber or soft plastic grommets 35 which are fastened in bosses 36 stamped in the diffuser shell. This provides a convenient manner of support for the grommets which enclose the rods and prevent any metallic contact with the diffuser, thereby preventing vibration and resonance.

The interior ring 15, as best shown in Figure 3, is of a generally frusto-conical configuration. It is supported upon the rods 12 and 13 by bosses 41 stamped in its periphery. These bosses have their circular edges supported within the flanges of the grommets 35. It will be noted that the pitch of the boss is more nearly vertical than that of the ring surface, which provides for a tighter and better support for the grommet and the rod which pass through the interior thereof. It will also be noted that the bottom of the ring 15 is substantially flush with the bottom of the diffuser 16, while the top is just slightly below the apex of the diffuser. Also, the pitch of the ring 15 is slightly greater than the side walls of the diffuser in order to provide for better dispersion of the sound waves and enhance the reproduction of the high frequency along the axis of the speaker.

The exterior ring 14 is shown in Figure 3 as being spaced from the ring 15 a lesser distance than the spacing between the ring 15 and the wall of the diffuser 16. Also, the pitch of the ring 14 is less than the pitch of the ring 15 so as to provide for effective lateral dispersion of

the sound waves away from the axis without interference from the ring 15. The ring 14 is also provided with a plurality of bosses 42 to support the grommets 35 in the same manner as described for the ring 15. The bottom of the ring 14 is flush with the bottom of the ring 15, but the top is foreshortened with respect to the top of the ring 15. This provides for a greater access of entry of the sound waves at the periphery of the speaker through the space between the rings 14 and 15 and between the speaker 17 and ring 14.

Assembly and operation

The speaker baffle 10 with the above described components is easily assembled. The frame 11 with its undercoating is easily connected to the rings 14 and 15 and to the diffuser 16 inserting one of the rods 12 or 13 through the bosses 26 in the frame, the bosses 42 in the exterior ring 14, the bosses 41 in the interior ring 15, and the bosses 36 through the diffuser and the opposing bosses on the opposite sides. The grommets 35 in these bosses provide for a snug and secure fastening, after which the rod is secured to the frame by fastening nuts 44 to the threaded ends. The remaining rod is then likewise inserted through the frame, the exterior ring 14, the interior ring 15 and the diffuser 16. This completes the assembly of the baffle.

The speaker cone shown in dotted lines at 17 in Figure 3 may be easily secured to the ledge 22 by bolts 51. The bolts 51 may be assembled with the speaker baffle previously and held in place by Tinnerman nuts 52, if desired. This presents a baffle unit which is complete and ready for operation when the conventional securing of the speaker cone and the electrical attachments are made. The annular surface 23 can then be secured to a wall or the ceiling or other support by fastening bolts or screws through openings 53, as will be readily understood.

The speaker baffle of this invention has been found to have a very efficient frequency response in the range of 60 to 10,000 cycles. Further, the high frequency response has been found to be very effective up to angles of 60° from the axis of the speaker. This faithfulness of reproduction of the frequencies in the audio range, and particularly the high frequencies in a high faithfulness of reproduction, is extremely advantageous as the sound reproduced may be correctly heard within the zone of from zero to 60° from the speaker axis. The arrangement of the rings 14 and 15 has been found to disperse the sound in a highly efficient manner without trapping of the loud speaker and without any bouncing or reflection of sound waves which would be highly undesirable.

The provision of the speaker baffle with its rings and undercoating makes available a unit which has long lasting qualities from the construction of spun aluminum and which has negligible vibration and resonance. Further, because of the integral relationship of the baffle unit, a speaker can be easily attached and the entire unit can be supported to a ceiling in an extremely simple installation.

Various changes and modifications may be made in the baffle and supporting structure, as will be apparent to those skilled in the art. Such changes and modifications within the teaching of this invention are intended to be within the scope of the claims appended hereto.

What is claimed is:

1. A loud speaker baffle for use with a loud speaker cone, said baffle having a centrally located imperforate diffusing cone and annular sound wave dispersing means surrounding said diffusing cone and spaced therefrom, said dispersing means comprising at least one ring element having a frusto-conical configuration.

2. A loud speaker baffle for use with a loud speaker cone, said baffle having a centrally located imperforate diffusing cone and annular sound wave dispersing means surrounding said diffusing cone and spaced therefrom, said

annular dispersing means comprising a plurality of concentrically spaced ring elements having a frusto-conical configuration.

3. A loud speaker baffle having a frame comprised of a flat rim integrally connected to internal inwardly extending shoulders, a centrally located diffusing cone, sound wave dispersing means surrounding said diffusing cone, and means for supporting said cone and dispersing means to said frame, said support means including elements cooperating with vibration reducing members attached to said diffusing cone, the frame shoulders and the dispersing means.

4. A loud speaker baffle having a frame comprised of a flat rim integrally connected to internal inwardly extending shoulders, a centrally located diffusing cone, sound wave dispersing means surrounding said diffusing cone, means for supporting said cone and dispersing means to the shoulders of said frame, and means covering one side of said frame for reducing vibration, said last named means including a coating having vibration deadening qualities.

5. A loud speaker baffle having a frame comprised of a flat rim integrally connected to internal inwardly extending shoulders, a centrally located diffusing cone, sound wave dispersing means surrounding said diffusing cone, means for supporting said cone and dispersing means to said frame, said support means including elements cooperating with vibration reducing members attached to said diffusing cone, the shoulders and the dispersing means, and means covering one side of said frame for reducing vibration, said last named means including a coating having vibration deadening qualities.

6. A loud speaker baffle having a frame, a centrally located imperforate diffusing cone, sound wave dispersing means surrounding said diffusing cone, said dispersing means comprising a plurality of frusto-conical ring elements spaced from one another and the diffusing cone and the frame concentrically from the axis of said diffusing cone.

7. A loud speaker baffle having a frame, a centrally located diffusing cone, sound wave dispersing means surrounding said diffusing cone, said dispersing means comprising a plurality of frusto-conical ring elements spaced from one another and the diffusing cone and the frame concentrically from the axis of said diffusing cone, said ring elements having a decreasing pitch from the ring adjacent the diffusing cone and outwardly therefrom.

8. A loud speaker baffle having a frame, a centrally located diffusing cone, sound wave dispersing means surrounding said diffusing cone, said dispersing means comprising a plurality of frusto-conical ring elements spaced from one another and the diffusing cone and the frame concentrically from the axis of said diffusing cone, the spacing between the interior ring element adjacent the cone, and said cone being greater than the spacing between said interior ring and the next ring.

9. A loud speaker baffle having a frame, a centrally located diffusing cone, sound wave dispersing means surrounding said diffusing cone, said dispersing means comprising a plurality of frusto-conical ring elements spaced from one another and the diffusing cone and the frame concentrically from the axis of said diffusing cone, said ring elements having their bases substantially flush with the base of said cone and having their tops progressively lower in a direction radially away from said cone.

10. A loud speaker baffle having a frame, a centrally located diffusing cone, sound wave dispersing means surrounding said diffusing cone, said dispersing means comprising first and second frusto-conical ring elements spaced from one another and the diffusing cone and the frame concentrically from the axis of said diffusing cone, said first ring being adjacent the cone and spaced a distance greater than the spacing between said first and second rings.

11. A loud speaker baffle having a frame, a centrally

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located diffusing cone, sound wave dispersing means surrounding said diffusing cone, said dispersing means comprising first and second frusto-conical ring elements spaced from one another and the diffusing cone and the frame concentrically from the axis of said diffusing cone, said first ring being adjacent the cone and spaced a distance greater than the spacing between said first and second rings, said ring elements having their bases substantially flush with the base of said cone and having their tops progressively lower in a direction radially away from

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said cone, and said first ring further having a greater pitch than said second ring.

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