United States Patent [19]

Ouvrier

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[54] **SPEAKER SYSTEM**

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[52] **U.S. Cl.** ..... **179/1 E,** 181/31 B

[51] **Int. Cl.** **H04r 1/28**

[58] **Field of Search** ..... 179/1 E; 181/31 B

[56] **References Cited**

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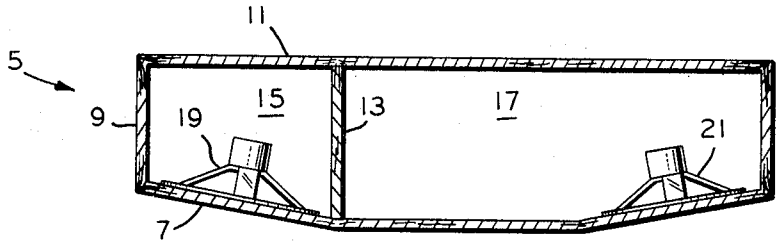
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[57] **ABSTRACT**

A high fidelity sound reproduction system includes an air-sealed cabinet with an interior divider providing first and second air-sealed compartments with a loudspeaker affixed in air-sealed relationship to each compartment and the loudspeakers electrically connected in parallel for receiving the same signals whereby bass response is enhanced.

3 Claims, 2 Drawing Figures



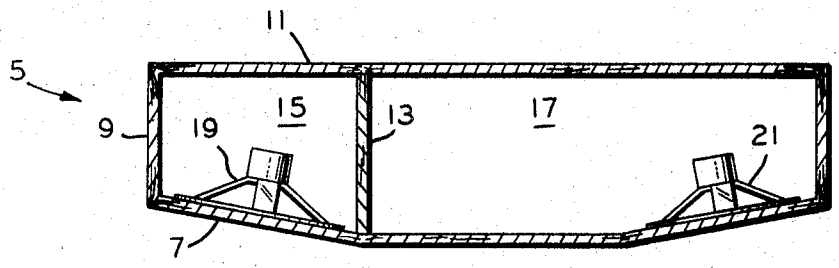

11
5
9
19
15
13
17
21
7

Fig. 1

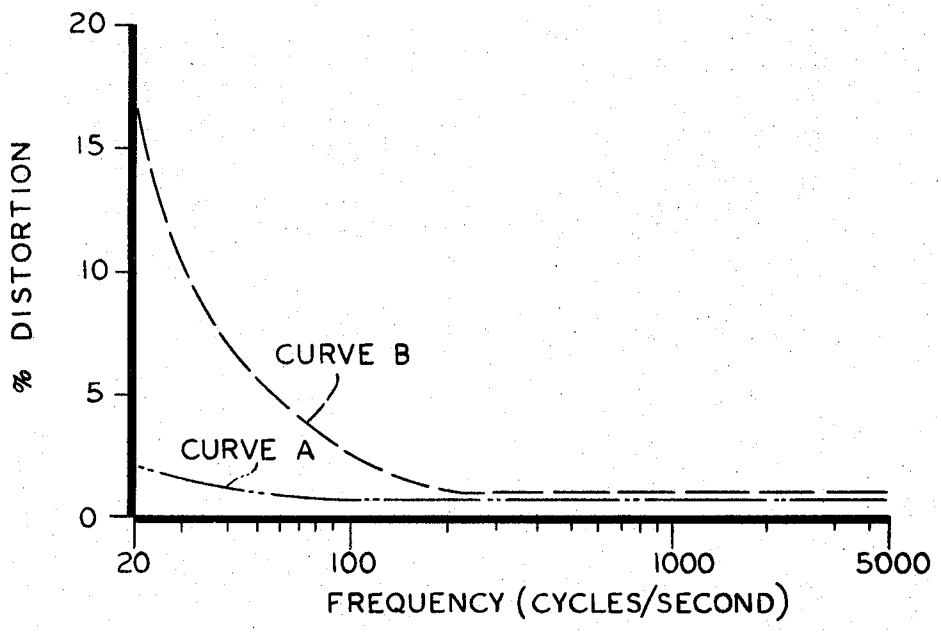

20
15
10
5
0
% DISTORTION
CURVE B
CURVE A
20
100
1000
5000
FREQUENCY (CYCLES/SECOND)

Fig. 2

SPEAKER SYSTEM

BACKGROUND OF THE INVENTION

In high fidelity sound reproduction systems, a problem exists in obtaining sufficient bass energy to provide the desired realistic effect. One attempt to provide sufficient bass energy includes the utilization of two or more woofer-type loudspeakers. Moreover, in stereo and multiple-channel systems each signal channel is equiped with a loudspeaker system which includes the above-mentioned plurality of woofer-type loudspeakers.

Although such systems do provide a tremendous amount of bass energy, it has been found that the bass sound reproduction is not fundamental and deep. On the contrary, it has been found that such systems tend to provide a highly distorted bass response which either has an undesirably low resonance or an undesirably high resonance or "boom."

Further, the known large speaker systems employing multiple loudspeakers to obtain a large amount of bass energy also have speaker enclosures with a large internal volume. Unfortunately, the large internal volume of the enclosure has a resonance which is too low and fails to reproduce a good deep bass sound. Moreover, the air volume behind the loudspeaker is excessive and consequently, the loudspeaker is not properly air-loaded to the rear of the speaker cone. Thus, the speaker cone tends to flap in a haphazard manner and produces undesired distortion.

OBJECTS AND SUMMARY OF THE INVENTION

An object of the present invention is to provide an enhanced sound reproduction system. Another object of the invention is to provide an improved loudspeaker system for sound reproduction apparatus. Still another object of the invention is to provide an improved loudspeaker system having multiple air-sealed compartments each having a loudspeaker affixed in air-sealed relationship thereto.

These and other and further objects, advantages and capabilities are achieved in one aspect of the invention by a loudspeaker system having an air-sealed cabinet with at least two air-sealed compartments and a loudspeaker affixed in air-sealed relationship to each compartment. The loudspeakers are electrically coupled in parallel or in series to a single signal source.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a plan view of a loudspeaker system utilizing the present invention; and

FIG. **2** is a graphic comparison of the loudspeaker system of FIG. **1** and a commonly employed loudspeaker system.

PREFERRED EMBODIMENT OF THE INVENTION

For a better understanding of the present invention, together with other and further objects, advantages and capabilities thereof, reference is made to the following disclosure and appended claims in connection with the accompanying drawings.

In the drawings, FIG. **1** illustrates an air-sealed cabinet or enclosure **5** having front, back, and side members **7, 9,** and **11** respectively. Top and bottom members, not shown, are affixed in air-sealed relationship to the above-mentioned front, back and side members **7, 9,** and **11.** Moreover, a divider member **13** is disposed within the enclosure **5** to provide two air-sealed compartments **15** and **17** of unequal volume.

Bass loudspeakers **19** and **21** are each affixed to the front member **7** of one of the compartments **15** and **17.** Also, the loudspeakers **19** and **21** are parallel or series connected electrically to a single source of signals. Thus, a single sound signal source is utilized to drive both of the loudspeakers **19** and **21.** Moreover, each one of the compartments **15** and **17** includes the usual high and mid-range loudspeakers (not shown) affixed to the front member in a manner well known in the art.

The air-sealed compartments **15** and **17** each have an internal volume of about 4000 cubic inches with loudspeakers **19** and **21** having a diameter of about 12 inches. Thus, the air-sealed compartments **15** and **17** each have a volume in the range of about 3000–5000 cubic inches and a resonance in the range of about 30–40 Hz.

Preferably, the air-sealed compartments **15** and **17** are of an unequal volume with a first compartment **15** having a resonance of about 30 Hz and the second compartment **17** having a resonance of about 40 Hz. Thus, the overall resonance when parallel coupled loudspeakers **19** and **21** are employed will span a rather broad band of between 30 and 40 Hz.

Additionally, FIG. **2** illustrates a percent distortion-frequency chart comparing loudspeaker systems utilizing dual bass loudspeakers in a single large enclosure and dual bass loudspeakers each affixed to an individual smaller enclosure as previously described. As can readily be seen, the dual loudspeakers affixed to the individual air-sealed compartments have a distortion (Curve A) in the 20 to 100 Hz range which is roughly one-third the distortion (Curve B) of the same dual loudspeakers affixed to a single air-sealed enclosure.

Thus, there has been provided a unique loudspeaker system utilizing dual bass loudspeakers each affixed to individual compartments of an air-sealed enclosure. The system not only provides an improved bass response unattainable in any other known structure but also exhibits a distortion level greatly reduced when compared with other known loudspeaker systems.

Moreover, the reduced air volume or rear air-loading of each of the loudspeakers in the individual compartments greatly inhibits undesired flopping of the loudspeakers and undesired distortion normally occurring in a large single enclosure.

While there has been shown and described what is at present considered the preferred embodiment of the invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention as defined by the appended claims.

What is claimed is:

1. In a high fidelity sound reproduction system, a single channel loudspeaker system comprising:

an air-sealed cabinet forming an air-sealed enclosure;

divider means disposed within said air-sealed enclosure and affixed to provide first and second air-sealed compartments, said first and second compartments having unequal volumes and each having a resonance in the range of between 30 and 40 Hz.; and

loudspeaker means including a pair of similar loudspeakers electrically coupled in parallel with each loudspeaker disposed within and affixed to one of said first and second compartments.

2. The loudspeaker system of claim 1 wherein each one of said pair of loudspeakers has a nominal diameter of about 12 inches and said first and second compartments have a resonance of about 30 and 40 Hz respectively.

3. In a multiple-channel high fidelity stereophonic sound reproduction system, a single channel loudspeaker system comprising:

an air-sealed cabinet;

divider means disposed within said cabinet to provide

a plurality of air-sealed compartments having unequal volumes with a resonant frequency of each in the range of about 30–40 Hz.; and

a plurality of loudspeakers each being a base speaker having a nominal diameter of about 12 inches, parallel coupled electrically with one of said loudspeakers disposed within and affixed in air-sealed relationship to each of said plurality of compartments.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,845,246 Dated October 29, 1974

Inventor(s) John Michael Ouvrier

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Col. 4, line 4 - delete "base" and insert -- "bass" --.

Signed and sealed this 29th day of April 1975.

(SEAL)
Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents
and Trademarks

PO-1050
(5/69)

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