

April 14, 1959

L. BONN  
INFINITE BAFFLE COMPRISING A SPHERICAL  
SHELL OF FOAMED PLASTIC  
Filed July 25, 1955

2,881,850

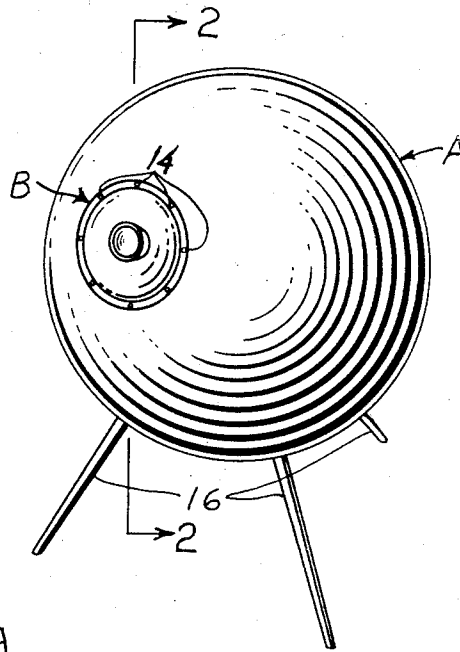


FIG. 1

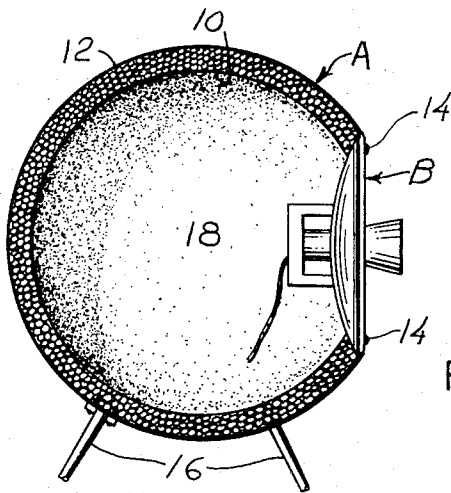


FIG. 2

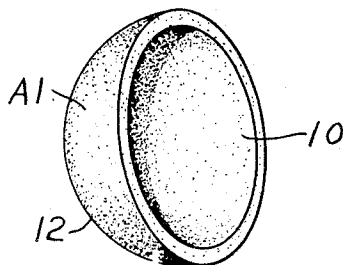


FIG. 3

INVENTOR.

LEONARD BONN

BY

*Harry Langsam*  
ATTORNEY

1

2,881,850

## INFINITE BAFFLE COMPRISING A SPHERICAL SHELL OF FOAMED PLASTIC

Leonard Bonn, Philadelphia, Pa.

Application July 25, 1955, Serial No. 524,055

1 Claim. (Cl. 181—31)

My invention relates to an acoustic device, and more particularly relates to an acoustic housing for a loudspeaker.

Heretofore, loudspeakers have been mounted upon various types of sounding boards in order to provide a resonant quality to the tone produced by the speaker. These sounding boards have been made of wood and also of plastic, and many shapes and veneers have been employed in order to match the vibrant characteristics of the particular size loudspeaker. However, it is well recognized that intricate baffling arrangements involving considerable cabinet work are necessary to impart to a loudspeaker high fidelity and high efficiency characteristics.

It, therefore, is an object of my invention to provide an acoustic housing device for a loudspeaker which will impart high fidelity characteristics at higher levels of efficiency.

Another object of my invention is to provide a portable acoustic housing device for a loudspeaker which will afford high quality transduction of electrical energy to acoustical energy in a wide variety of mounting positions and with a wide range of loudspeaker sizes.

Another object of my invention is to provide an attractive and simple acoustic device which is molded of light weight plastic and requires no independent sounding board.

Other objects of my invention are to provide an improved device of the character described, that is easily and economically produced, which is sturdy in construction, and which is highly effective in operation.

With the above and related objects in view, my invention consists in the details of construction and combination of parts, as will be more fully understood from the following description when read in conjunction with the accompanying drawing, in which:

Fig. 1 is a perspective view of an acoustic device embodying my invention.

Fig. 2 is a sectional view taken along lines 2—2 of Fig. 1.

Fig. 3 is a perspective view of a molded hemispherical shell before bonding to form the acoustic housing.

Referring now in greater detail to the drawing, in which similar reference characters refer to similar parts, I show an acoustic housing, generally designated as A, and a loudspeaker, generally designated as B.

The acoustic housing A, shown in Fig. 1, comprises a pair of hemispherical shells A1 which have been connected so as to define a hollow sphere having a chamber 18. Although the embodiment in the drawing is spherical in shape, the surface characteristics may be ellipsoidal or multi-faceted.

Each shell A1 is fabricated of foam plastic such as an isocyanate plastic or expandable polystyrene beads molded in a cavity in the presence of suitable reactive agents to form a discrete, closed cell, foamed structure having a smooth surfaced inner skin 10 and outer skin 12. The density of the molded shell ranges from 4 to 6 pounds per cubic foot.

The acoustic housing A is cored to form an opening adapted to receive the loudspeaker unit. The loudspeaker B is a conventional electro-magnetic coil or permanent

2

magnet type speaker and is mounted flush or recessed within the outer surface 12 by a plurality of mounting screws 14 over the opening in the housing A. The speaker may be mounted upon a rigid ring or supporting frame which, in turn, is mounted directly upon the shell of the acoustic housing. The housing for the loudspeaker should be directly coupled with the shell of the sphere and in rigid contact therewith to be most favorably effective for producing true loudspeaker reproductions of signals.

While any diameter speaker commensurate with the diameter of the housing A may be used, the larger the ratio of the housing to speaker diameter, the better is the result. It has been found that a speaker of approximately eight inch diameter attached to an acoustic housing eighteen inches in diameter produces exceptional fidelity with a good quality amplifying system.

In Figs. 1 and 2, I show the acoustic device A mounted upon a plurality of legs 16. However, the housing A may be suspended from the ceiling by guy wires or be laid directly upon the floor.

It is to be noted that the structure of the acoustic shell is a plurality of non-communicating hollow cells. The smooth interior skin 10 reflects sound from the rear of the speaker into the center of the hollow interior chamber 18 while the discrete closed cellular structure of the shell absorbs any audible sounds which otherwise would pass through the shell itself. The enclosed air space in the chamber 18 acts as a damping medium and effectively cancels sound waves created within the chamber by the loudspeaker, thereby nullifying any harmonic disturbances reflected toward the back of the speaker. My theory of operation is that sound is generated from the front and the back of the loud speaker, but 180° out of phase. The function of the soundboard, which in this case is the sphere, is to isolate and cancel this rear emanating sound which otherwise would escape and cancel out the front emanating sound. Since any interior sound is damped, the sound emitted exteriorly by the speaker is the true reproduction of electrical impulses imposed upon the speaker.

Although my invention has been described in considerable detail, such description is intended as being illustrative rather than limiting, since the invention may be variously embodied, and the scope of the invention is to be determined as claimed.

I claim as my invention:

In combination with a loudspeaker, an acoustic device comprising a molded, foamed plastic spherical shell, said shell being of a closed multi-cellular structure and having a smooth inner skin and a smooth outer skin, and means to mount the loudspeaker directly and rigidly to said shell within a complementary aperture therein, said shell defining an infinite baffle whereby a high fidelity enclosure will result to yield a flattened frequency response curve for sound emanating from the loudspeaker.

## References Cited in the file of this patent

## UNITED STATES PATENTS

2,138,717 Volk ----- Nov. 29, 1938

## FOREIGN PATENTS

510,707 Great Britain ----- Aug. 4, 1939  
653,263 Great Britain ----- May 9, 1951

## OTHER REFERENCES

Publication, "Audio Eng'g," page 25, March 1948. (Copy in Library.)  
Publication, Radio Electronics, August 1952, page 41. (Copy in Library.)  
Publication, Modern Plastics, September 1956, pages 122, 123. (Copy in Library.)