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[54] **ACOUSTICAL TESTING APPARATUS**

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[73] Assignee: **Eckel Industries, Inc.**, Cambridge, Mass.

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[21] Appl. No.: **469,299**

[52] **U.S. Cl.** ..... **181/33 GE**
[51] **Int. Cl.** **E04b 1/84**
[58] **Field of Search** ..... 181/33 GD, 33 GE, 33 K; 73/552; 343/18 A; 179/107 R, 175

[56] **References Cited**
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Assistant Examiner—John F. Gonzales
Attorney, Agent, or Firm—Harold E. Cole

[57] **ABSTRACT**

Testing apparatus for hearing aids and the like has an outer cabinet enclosed by a top, bottom and sides within which is a horn-shaped anechoic inner chamber that encloses the component to be tested, which chamber is formed of sound absorbing panels, having a smooth interior surface, and which increase in thickness from the top towards the bottom. Said chamber has a bottom and a well is formed below the bottom that communicates with the chamber and is of greater width at the point of communication. A cover for said chamber is lined with wedge-shaped sound absorbing panels that extend from the top downwardly.

7 Claims, 6 Drawing Figures

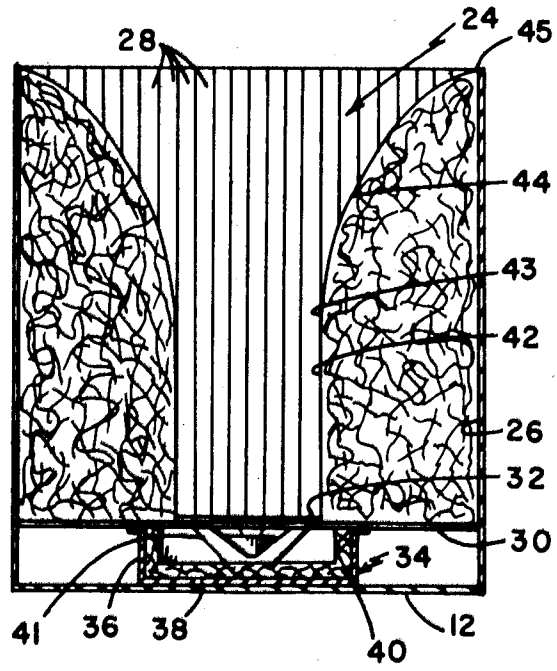


FIG 1

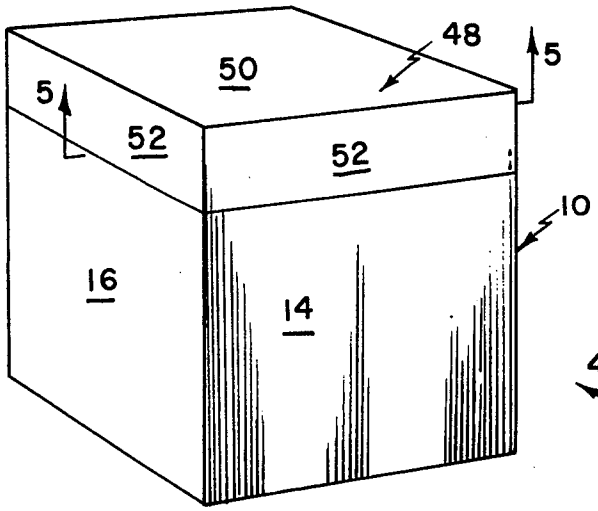
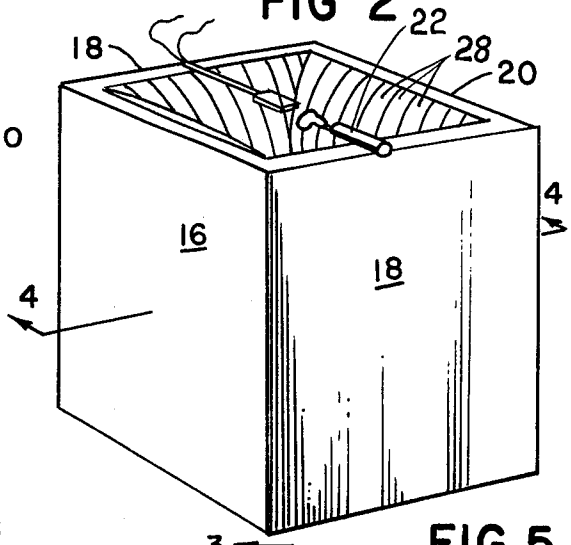


FIG 2



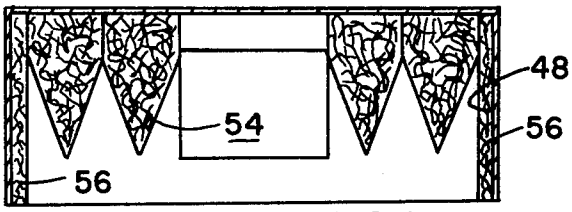


FIG 3

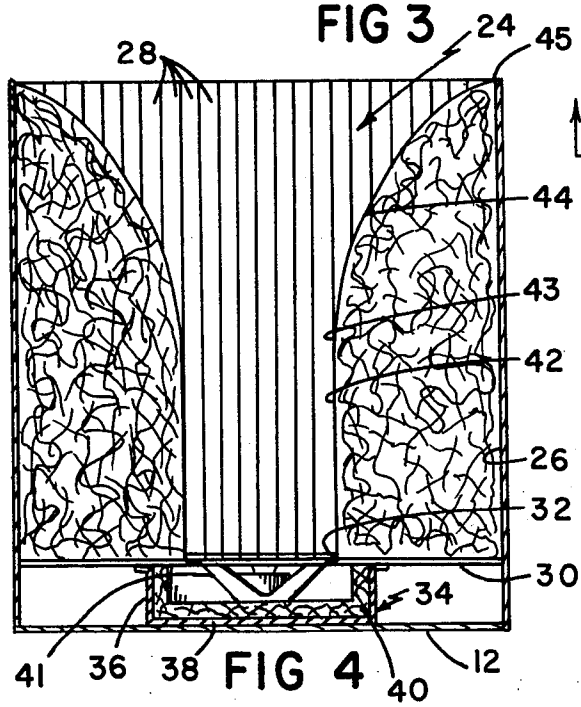


FIG 4

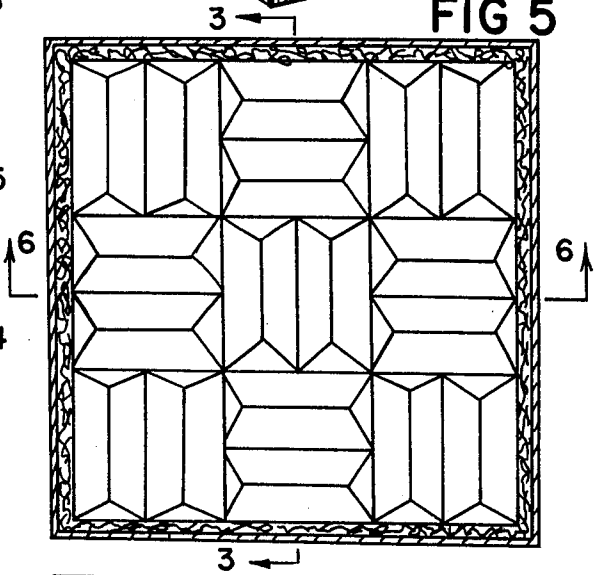


FIG 5

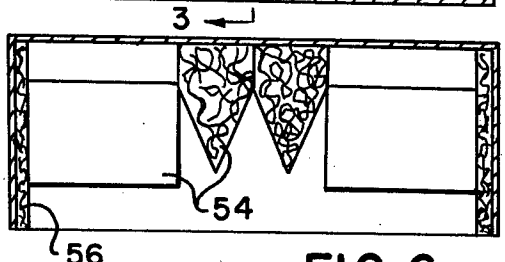


FIG 6

ACOUSTICAL TESTING APPARATUS

The principal object of my invention is to provide an improved anechoic zone in said chamber by an assembly of panels to accurately measure the response characteristics of hearing aids, small microphones and the like, said zone communicating with a well below said chamber.

Another object is to economize in material by forming the chamber with panels at the sides that present a smooth, even internal surface, thus avoiding the expense entailed by using wedge-shaped or other irregularly-shaped pieces.

The foregoing and other objects which will appear as the nature of the invention is better understood, may be accomplished by a construction, combination and arrangement of parts such as is disclosed by the drawing. The nature of the invention is such as to render it susceptible to various changes and modifications, and therefore I am not to be limited to the construction disclosed by the drawing, nor to the particular parts described in the specification; but am entitled to all such changes therefrom as fall within the scope of my invention.

In the drawing:

FIG. 1 is a perspective view of my testing apparatus with a cover thereon.

FIG. 2 is a perspective view of said testing apparatus with the cover removed.

FIG. 3 is a sectional view taken on the line 3—3 of FIG. 5.

FIG. 4 is a sectional view taken on the line 4—4 of FIG. 2.

FIG. 5 is a sectional view taken on the line 5—5 of FIG. 1.

FIG. 6 is a sectional view taken on the line 6—6 of FIG. 5.

As illustrated, my acoustical testing apparatus has an outer housing or cabinet **10** having a bottom plate **12** from which side or wall means extend upwardly, there being four sides **14, 16, 18** and **20** shown. A hearing aid **22,** for instance, may be supported by two of said sides, as shown in said FIG. **2.**

Within said outer housing **10** is a sound absorbing anechoic chamber **24** having side means shown as a wall **26** formed of panels **28** laid together side-by-side, which panels may be made of fiberglass or other sound absorbing material. A bottom **30** supports said wall **26** and it has an intermediate opening **32.** A well **34,** having side means or a wall **36,** extends downwardly from said bottom **30** and it has a bottom **38** connected to said sides. Said well **34** is lined with sound absorbing material **40,** and it communicates with said chamber opening **32,** being of greater area thereof, being rectangular and its four sides each preferably is wider than the latter opening as shown in said FIG. **4.** A loud speaker **41** is received in said well **34,** resting on said bottom **38.** Said panels **28** extend from the chamber bottom **30** straight upwardly as at **42** to an intermediate portion of said chamber as at **43** and then flare outwardly and upwardly as at **44,** gradually reducing in thickness, until they terminate at the upper portion of said outer housing **10** as at **45.** These panels **28** may be a few inches

wide, such as 4 inches, and they present a continuous even or smooth inner surface throughout the chamber wall.

A cover **48** for said chamber has a top **50** from which four sides **52** depend downwardly. It is lined by well-known insulating members **54** which are wedge-shaped and extend downwardly from said top in well-known alternating positions such as shown in said FIGS. **3** and **5.** Said cover sides **52** are lined with insulating material **56** which extend from the inner surfaces thereof completely around said cover.

In use my apparatus is operably associated in the usual way with well-known equipment to measure and evaluate a component to be tested. Said component and a loud speaker are placed in said chamber and well respectively. The loud speaker would be connected to a well-known external oscillator and amplifier and hearing aid attached to a microphone by means of a coupler. The microphone is connected to a sound meter and analyzer by which the gain and frequency response can be measured.

What I claim is:

1. Acoustical testing apparatus comprising an outer housing, a sound absorbing chamber within said outer housing having a bottom and a horn-shaped, anechoic chamber extending upwardly from said bottom and formed of panels in side-by-side relationship and flaring outwardly towards the top, said panels having a smooth, interior surface and varying in thickness, the lowest portions thereof being thicker than the portions forming the top of said chamber.

2. Acoustical testing apparatus as set forth in claim **1,** portions of said panels extending from said lowest portions straight upwardly and portions extending upwardly from the latter flaring outwardly and terminating at a point adjacent the top and side of said housing.

3. Acoustical testing apparatus as set forth in claim **1,** said chamber bottom having an opening spaced inwardly from the outer side extremity thereof, and a well member extending lower than said opening having an interior space extending downwardly from said bottom and communicating with said chamber opening, said well member having side means extending downwardly from said chamber bottom and a bottom connected to and extending from and between said latter side means.

4. Acoustical testing apparatus as set forth in claim **3,** said well member and its interior space extending laterally beyond said chamber opening.

5. Acoustical testing apparatus as set forth in claim **3,** and sound absorbing material extending inwardly of and in contact with said well member side means and bottom.

6. Acoustical testing apparatus as set forth in claim **3,** said housing having a bottom plate below said well bottom and communicating with said well interior space.

7. Acoustical testing apparatus as set forth in claim **1,** and a cover for said housing having wedge-shaped, insulating members extending downwardly from said cover and being spaced from the lower extremity thereof upwardly.

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