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(54) Acoustic fabric.

(57) A laminated sheet of flexible acoustic material comprising a batt of fiberglass sandwiched between two outer layers of loose weave unsealed sailcloth. Elongated panels of the sheets may be attached laterally one to another to form a canopy. One side of the sheet may carry a zipper component for hanging banners from the canopy.

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FIELD OF THE INVENTION

This invention relates to flexible acoustic sheet material for use in an enclosure to absorb sound.

BACKGROUND OF THE INVENTION

United States Patent Application Serial No. 255,032 filed October 7, 1987 in the names of Wiktor Moskaliuk, Christopher M. Allen and Roderick G. Robbie entitled INTERIOR CANOPY FOR STADIUM discloses a canopy suspendible from a roofed stadium, and close-off curtains hanging from the canopy, forming an audience chamber.

Fabrics presently known for use in the canopy and curtains are acoustically relatively inefficient and/or too expensive for the purpose, and also have structural limitations. One such commercially available fabric is sold by Chemical Fabrics Corporation of Buffalo, New York, U.S.A. under the trademark FABRASORB and has a sound absorption coefficient of .55. Sound absorption coefficients are derived by dividing the sound absorption at graduated frequencies by the total surface area of a specimen in square metres. A single number rating, called the noise reduction coefficient (NRC) is the average of the sound absorption coefficients of a material for various frequencies rounded to the nearest multiple of 0.05. The higher the NRC value, the better the material performance. Besides its relatively low sound absorption coefficient FABRASORB cannot be sewn or folded and it is affected by moisture, also Chemfab is expensive to colour.

It is an object of the present invention to provide an acoustic fabric which has a relatively high acoustic rating, is relatively inexpensive to produce, and is more easily handled.

SUMMARY OF THE INVENTION

Essentially the present invention consists of an acoustic fabric comprising a central sheet or batt of fiberglass sandwiched between two sheets of loosely woven unsealed sailcloth. Preferably the fabric is quilted. The invention also resides in a canopy and/or cut off curtains made up of panels of the fabric.

BRIEF DESCRIPTION OF THE DRAWINGS

Example embodiments of the invention are shown in the accompanying drawings in which:

Figure 1 is a perspective view of a modular element of a panel comprised of the fabric of the invention;

Figure 2 is a cross-section taken along line 2-2 of Figure 1;

Figure 3 is a perspective view of a portion of a canopy showing a plurality of panels composed of the modular elements of Figure 1;

Figure 4 is a cross-section taken along line 4-4 of Figure 3;

Figure 5 is a cross-sectional view taken along line 5-5 of Figure 3;

Figure 6 is a cross-sectional view taken along line 6-6 of Figure 3;

Figure 7 is a perspective view of a storage bag, both closed and partially open, for the panels of the canopy of Figure 1; and

Figure 8 is a graph comparing the sound absorption coefficients of the fabric of the invention and Chemfab.

DESCRIPTION OF PREFERRED EMBODIMENT

The example embodiment shown in Figures 1 and 2 of the drawings consists of a composite

rectangular fabric sheet in the form of a panel 10, comprising a centre batt 12 of fiberglass lying between two outer layers 14 of loosely woven unsealed sailcloth. Panel 10 is quilted by a grid 16 of stitching to maintain layers 14 in position in abutting relationship with batt 12. Each side edge 18 of panel 10 carries spaced grommets 20.

Fiberglass batt 12 may have a density between 8 and 24 kilograms per cubic metre and a preferred batt is about one-half inch in thickness with a density of 16 kilograms per cubic metre (one pound per square foot). Outer layers 14 may be of DACRON which is a trade mark of a polyester fibre sold by Du Pont Canada Inc., preferably fire retardant using, for example, a bath or spray of ammonium polyphosphate.

A canopy 24 constructed from panels 10 is shown in Figure 3 of the drawings and consists of a plurality of panels attached together by pairs of releasable spring hooks 26. Canopy 24 is attached to a rail or bar 28 by releasable spring hooks 30.

If desired, a zipper component 32 may be fixed by stitching 34 to panel 10 for the removable attachment of a banner 36 to be suspended from canopy 24, as seen in Figure 3 and more particularly in Figure 5.

A storage bag 40 of a duffle type for sheets 10 is shown in Figure 6 and consists of a bottom portion 42 and a top portion 44 which is foldable over the bottom portion and closable by a zipper 46. Attached to the ends of top portion 44 are handles 48. Bag 40 is of a size to accommodate, in stacked arrangement, the number of sheets 10 forming a panel 26.

The improved sound absorption qualities of the invention are shown in Figure 8 of the drawings which shows the absorption coefficients of the fabric of the invention for frequencies ranging from 80 Hz to 5000 Hz, compared with the sound absorption coefficient of FABRASORB (a trade mark of Chemical Fabrics Corporation used with an acoustically absorbent fabric) for the same range of frequencies. The following table 1 shows the readings used to plot the graph of Figure 8, using a banner suspended horizontally by ropes to corner grommets 22 in a reverberation chamber by a mounting designated Mounting Type H as listed in ASTM E795-83. The test was conducted in accordance with the requirements of ASTM C423-84 using a sample area of 3.19 square metres of sheet 10.5 millimetres thick. The sample used for the test comprised a fiberglass batt approximately one-half inch thick having a density of 16 kilograms per cubic metre sandwiched between two layers of Dacron (polyester fibre) unsealed sailcloth and quilted.

TABLE 1

Frequency Hz	Invention Sample Sound Absorption Coefficients	Fabrasorb Sample Sound Absorption Coefficients
80	.33	.26
100	.12	.27
125	.14	.30
160	.19	.32
200	.29	.34
250	.45	.43
315	.60	.47
400	.72	.52
500	.75	.55
630	.81	.55
800	.92	.59
1000	1.04	.60
1250	1.15	.62
1600	1.33	.66
2000	1.44	.67
2500	1.51	.67
3150	1.55	.69
4000	1.59	.73
5000	1.56	.73

The single noise reduction coefficient (NRC) of the tested sample was .90 compared with an NRC of .55 for FABRASORB.

The fabric of the invention can be produced in any width. The multiple sheets and the zippers

associated with the sheets are not essential and are shown in the example embodiment as one use of the invention.

Claims

1. A laminated panel of flexible acoustic material comprising a batt of fiberglass and two outer layers of loose weave unsealed sailcloth one contiguous with each side of the fiberglass batt.

2. A panel as claimed in claim 1 including a zipper component fixed to the sheet intermediate the edges thereof for attaching a banner thereto.

3. A panel as claimed in claim 1 in which the density of the fiberglass batt is between 8 and 24 kilograms per cubic metre.

4. A panel as claimed in claim 1 in which the sailcloth is a polyester fibre.

5. A sheet as claimed in claim 4 in which the polyester fibre is fire retardant.

6. A panel as claimed in claim 1 in which the sheet is quilted by a grid of stitching.

7. A panel as claimed in claim 1 in which the sheet carries a plurality of spaced grommets adjacent the edges thereof.

8. A panel as claimed in claim 3 in which the density of the fiberglass batt is about 16 kilograms per cubic metre.

9. A panel as claimed in claim 8 in which the sailcloth is a fire retardant polyester fibre.

10. A canopy of acoustic sheet material comprising a plurality of elongated panels attached laterally one to another, each panel comprising a batt of fiberglass and two outer layers of loose weave unsealed sailcloth one contiguous with each side of the fiberglass.

11. A canopy as claimed in claim 10 in which each panel carries a plurality of spaced grommets adjacent each edge thereof, and clip means engaging the grommets to attach the panels.

12. A canopy as claimed in claim 10 including at least one zipper component fixed to at least one of the panels intermediate the lateral edges thereof attaching a banner thereto.

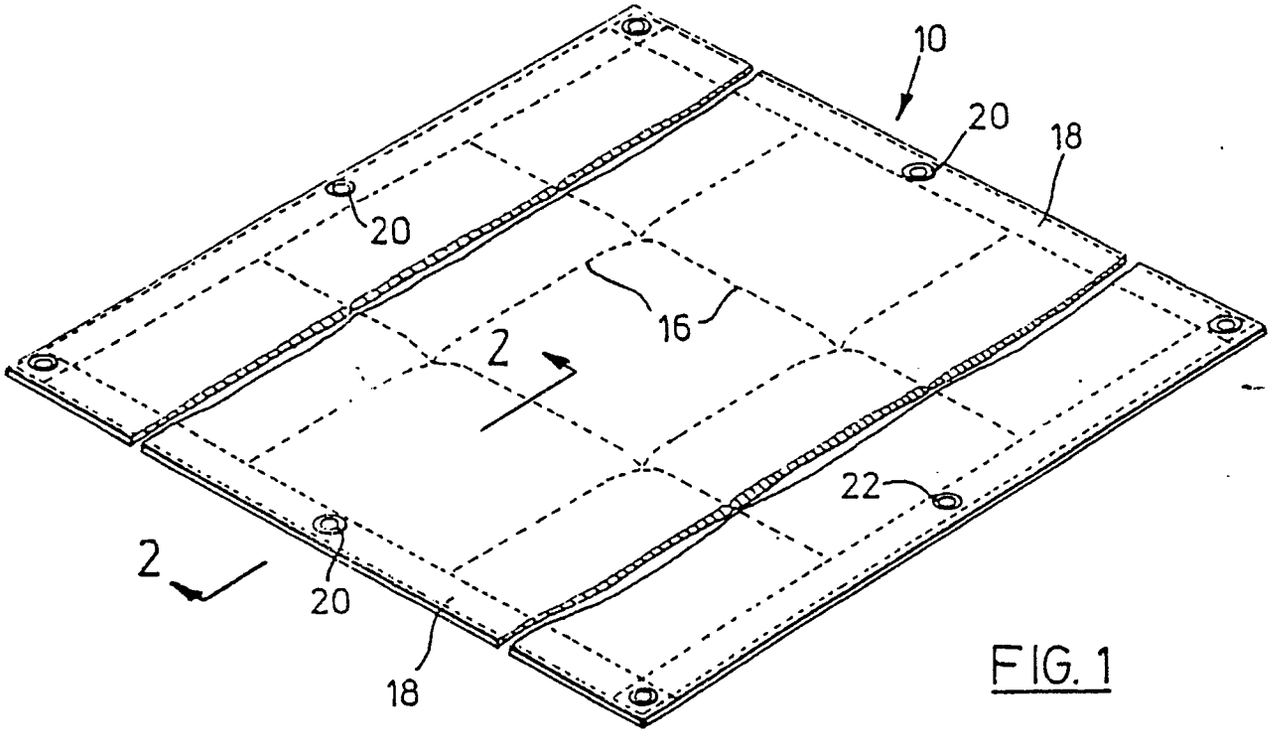

FIG. 1

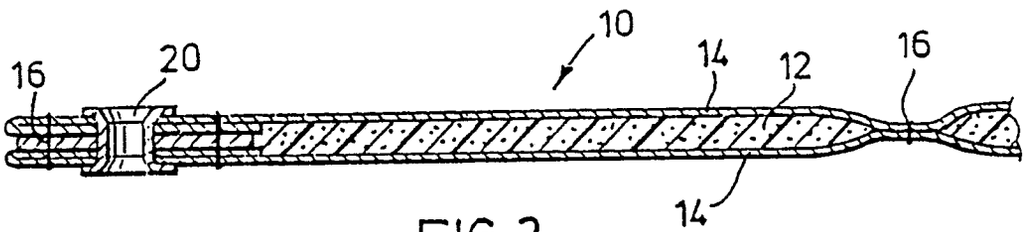

FIG. 2

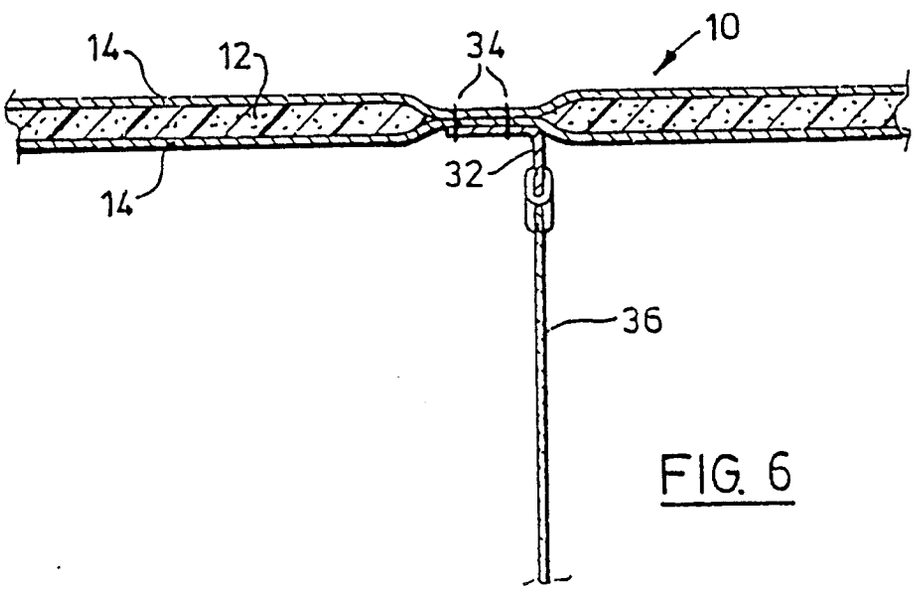

FIG. 6

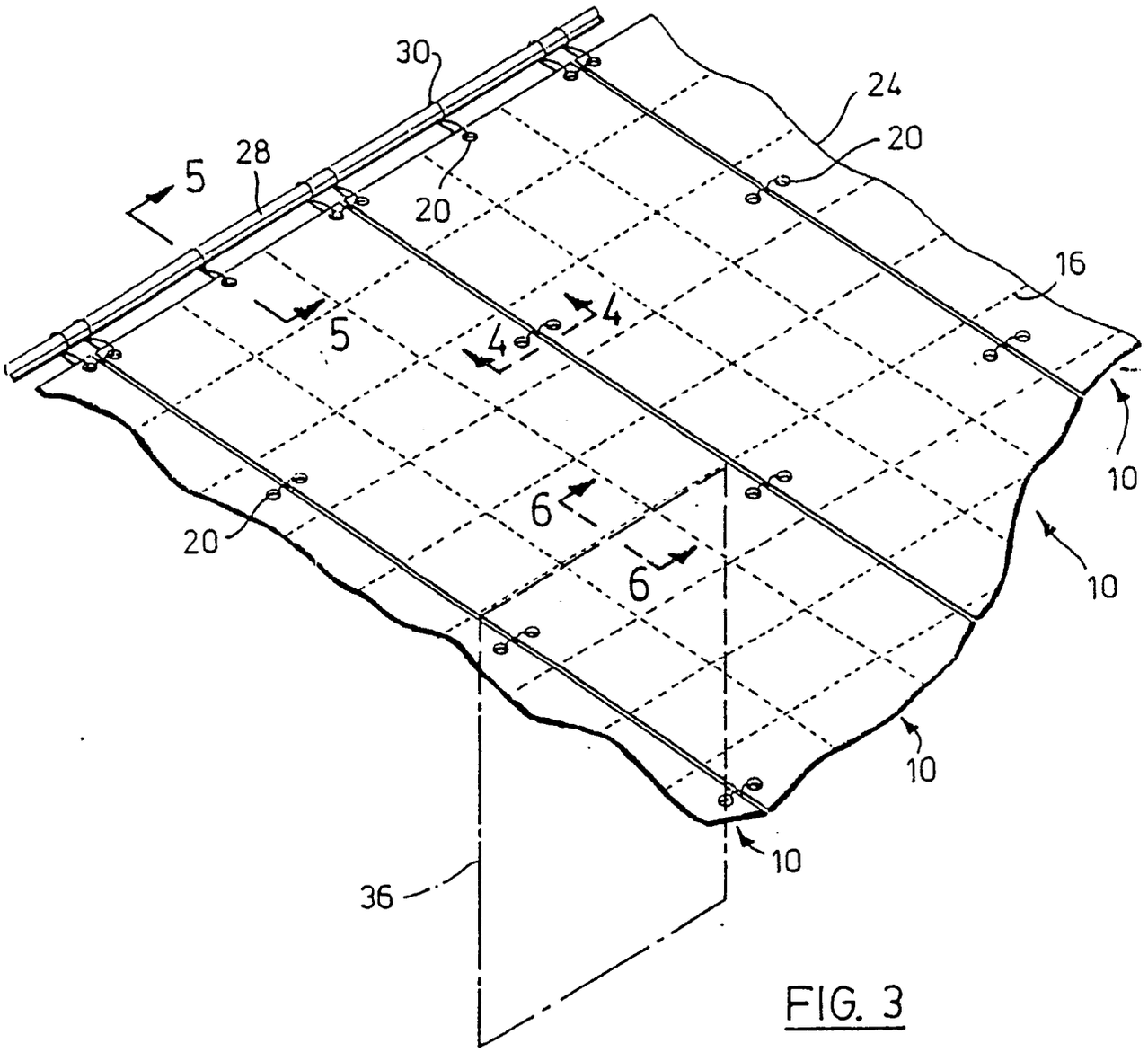

FIG. 3

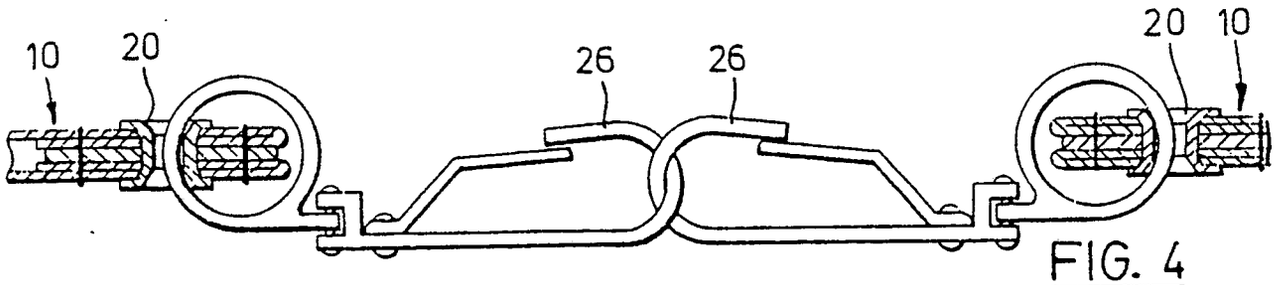

FIG. 4

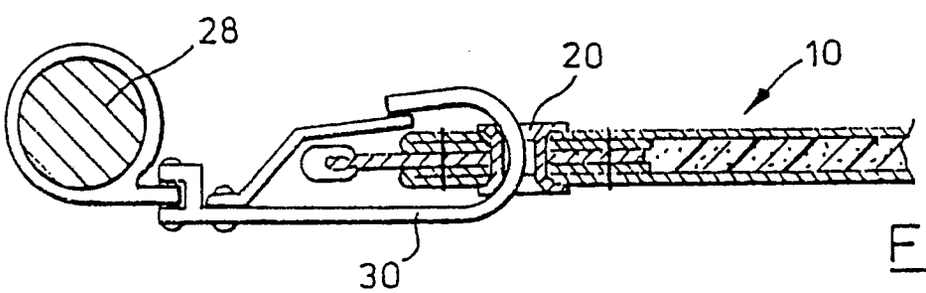

FIG. 5

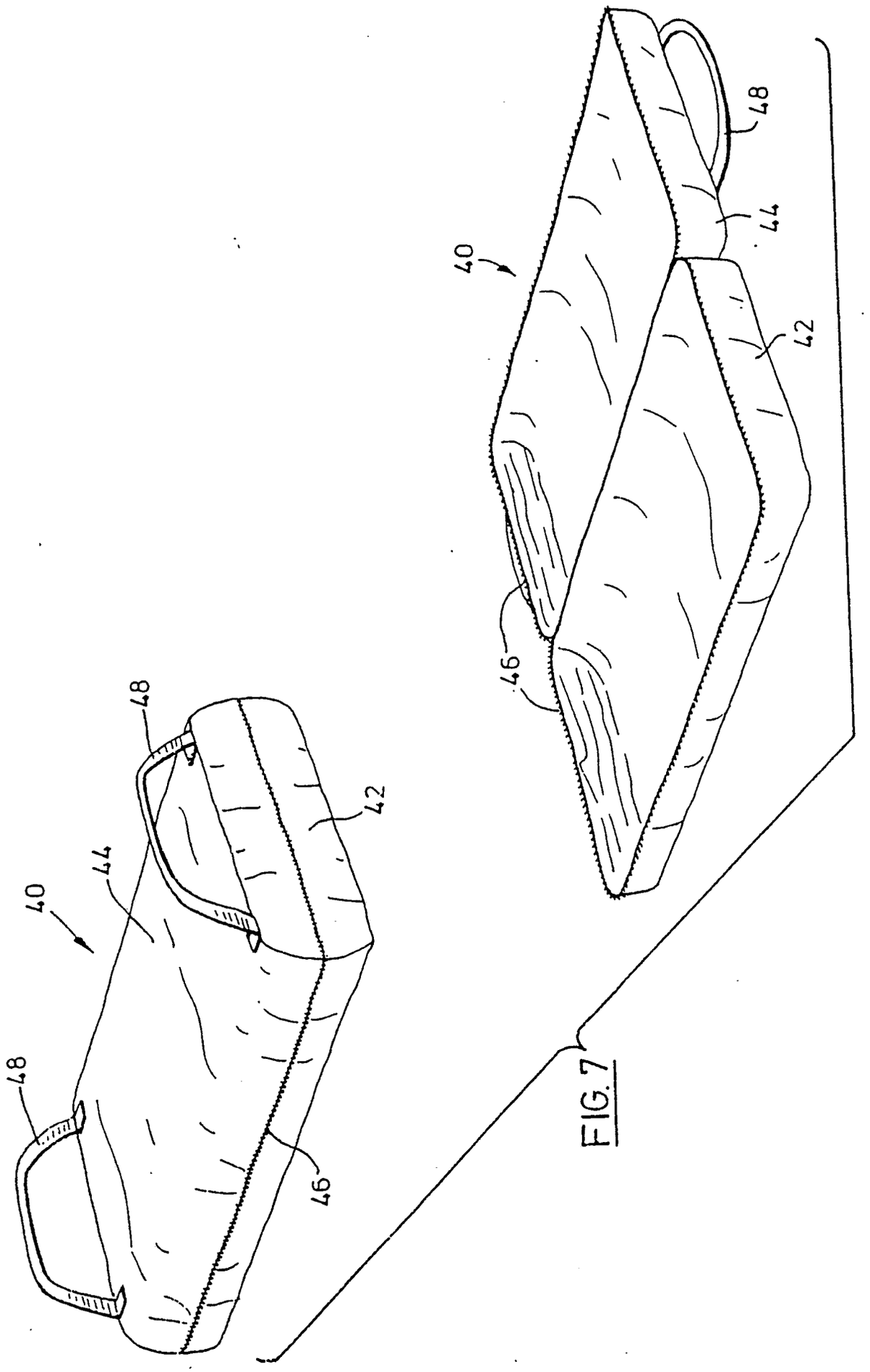

FIG. 7

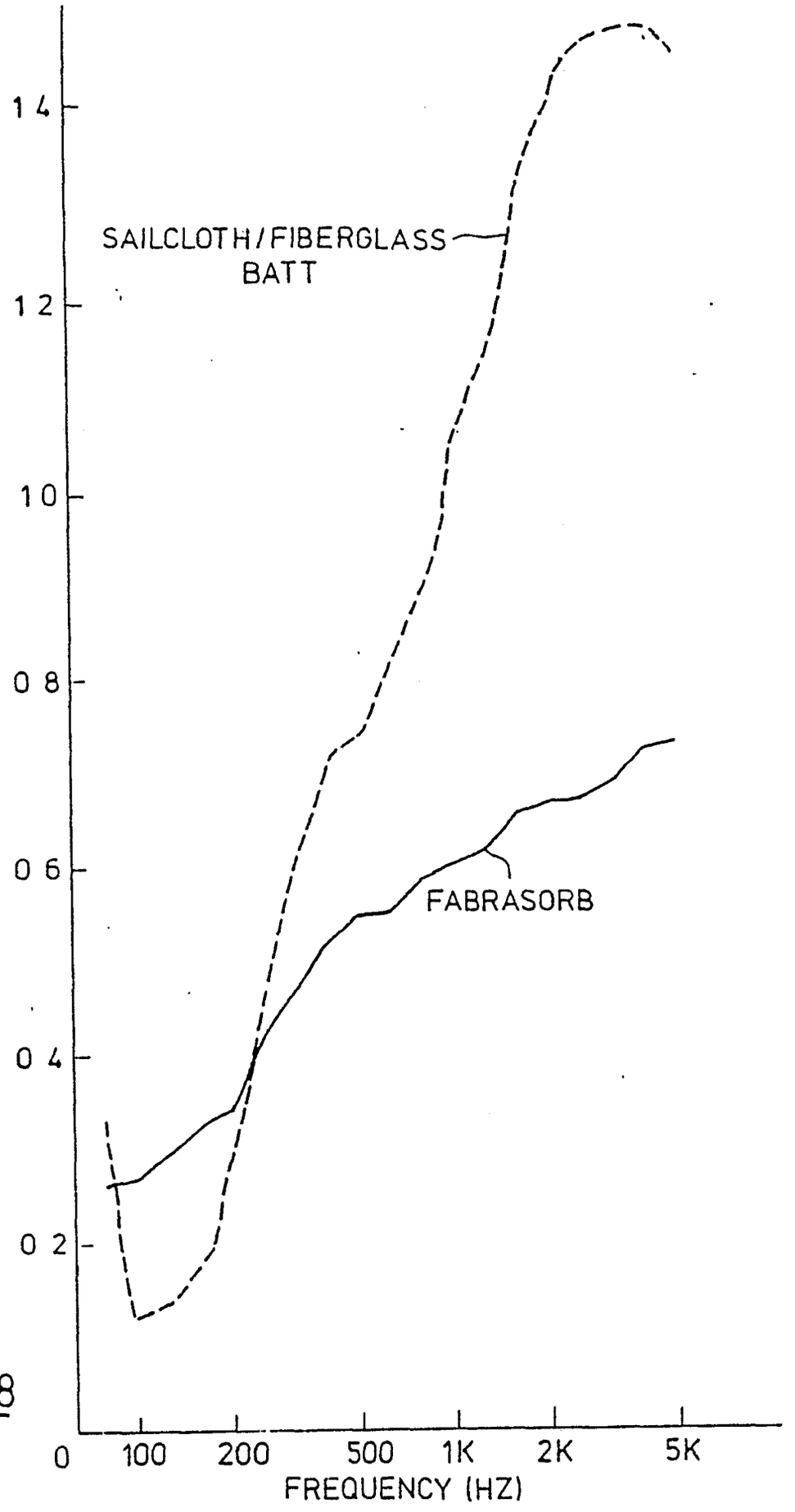
1 4
1 2
1 0
0 8
0 6
0 4
0 2
0
SAILCLOTH/FIBERGLASS BATT
FABRASORB
100
200
500
1K
2K
5K
FREQUENCY (HZ)

FIG.8