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ABSTRACT

An acoustic panel for sound attenuation employs a septumized cellular core sandwiched between a backsheet and a linear acoustic facesheet. The linear
5 acoustic facesheet employs a linear material layer that impedes acoustic waves entering the core substantially linearly over a wide range of frequencies and sound of pressure levels.

ACOUSTIC PANEL

BACKGROUND INFORMATION

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1. Field:

The present disclosure generally relates to acoustic treatments for controlling sound and noise, and deals more particularly with an acoustic panel fused for sound attenuation.

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2. Background:

High bypass type aircraft engines produce noise due to the high airflows through inlets, rotating stages and exhaust nozzles of the engines. In order to reduce noise and satisfy noise regulations governing commercial aircraft, high bypass engines may incorporate acoustic panels in various parts of the engine, such as in the inlets of engine nacelles. These acoustic panels, sometimes referred to as acoustic treatments or acoustic liners, may comprise a septumized honeycomb core sandwiched between a perforated inner skin and a non-perforated outer skin. The placement of septums in the cells of the honeycomb core form cavities that act as Helmholtz resonators which attenuate the sound/noise caused by high speed airflow into the inlets of the engine nacelles. Sound entering the cells of the core is dampened by the septum and reflected by the outer skin to partially cancel the incoming sound over a range of frequencies.

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In some acoustic panels, only a septum in the core is used to dampen incoming acoustic waves, but the use of only a septum may limit the ability of the core materials to attenuate acoustic waves over a wide range of frequencies. Moreover acoustic cores that employ individual septums in core cells are time-consuming and expensive to fabricate. In other known acoustic panels, a layer of acoustic material is placed on one side of the inner skin which acts as an impedance to reduce the amplitude of acoustic waves entering the core, however the layer of acoustic material may provide acoustic wave attenuation over only a relatively narrow range of frequencies.

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combined in yet other embodiments in which further details can be seen with reference to the following description and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

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The novel features believed characteristic of the illustrative embodiments are set forth in the appended claims. The illustrative embodiments, however, as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment of the present disclosure when read in conjunction with the accompanying drawings, wherein:

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FIG. 1 is a cross-sectional view of one exemplary embodiment of an acoustic panel;

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FIG. 2 is a cross-sectional view of another exemplary embodiment of an acoustic panel;

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FIG. 3 is a cross-sectional view of a further exemplary embodiment of an acoustic panel;

FIG. 4 is a plan view of a portion of a linear acoustic facesheet forming part of the embodiment of the acoustic panel shown in FIG. 3.

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FIG. 5 is a sectional view taken along the line 5-5 in FIG 4.

FIG. 6 is a plan view of a portion of an alternate embodiment of the linear acoustic facesheet.

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FIG. 7 is a cross-sectional view of a portion of the linear acoustic facesheet shown in FIG. 6.

FIG. 8 is a perspective view of an aircraft engine, portions broken away in section to show internal components of the engine.

The description of the different illustrative embodiments has been presented for purposes of illustration and description, and is not intended to be exhaustive or limited to the embodiments in the form disclosed. Many
5 modifications and variations will be apparent to those of ordinary skill in the art. Further, different illustrative embodiments may provide different advantages as compared to other illustrative embodiments. The embodiment or embodiments selected are chosen and described in order to best explain the principles of the embodiments, the practical application, and to enable
10 others of ordinary skill in the art to understand the disclosure for various embodiments with various modifications as are suited to the particular use contemplated.

21. The method of claim 19 wherein producing the acoustically transparent outer facesheet layer includes:

laying up a plurality of plies of composite material, including laying down strips of fiber reinforced resin tape having differing fiber orientations and spacing the strips of fiber reinforced resin tape apart from each other.

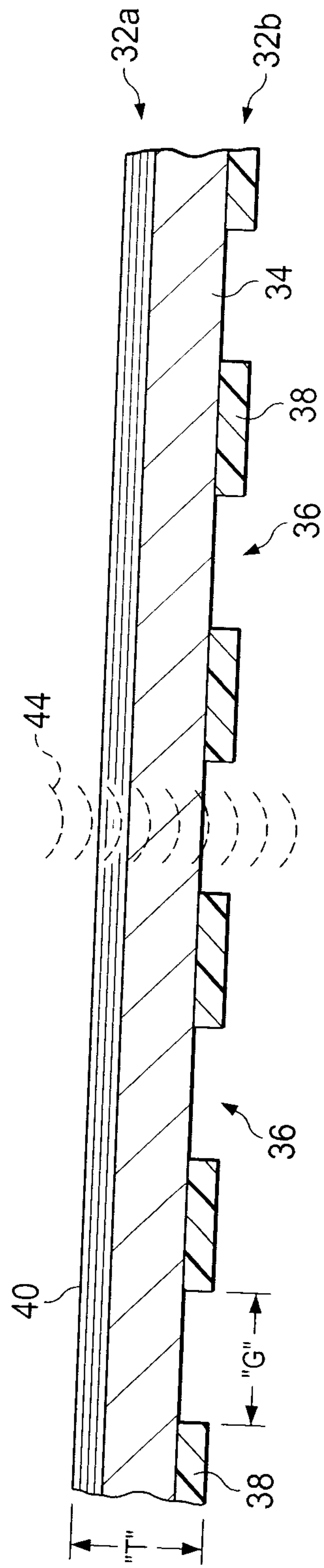


FIG. 5

