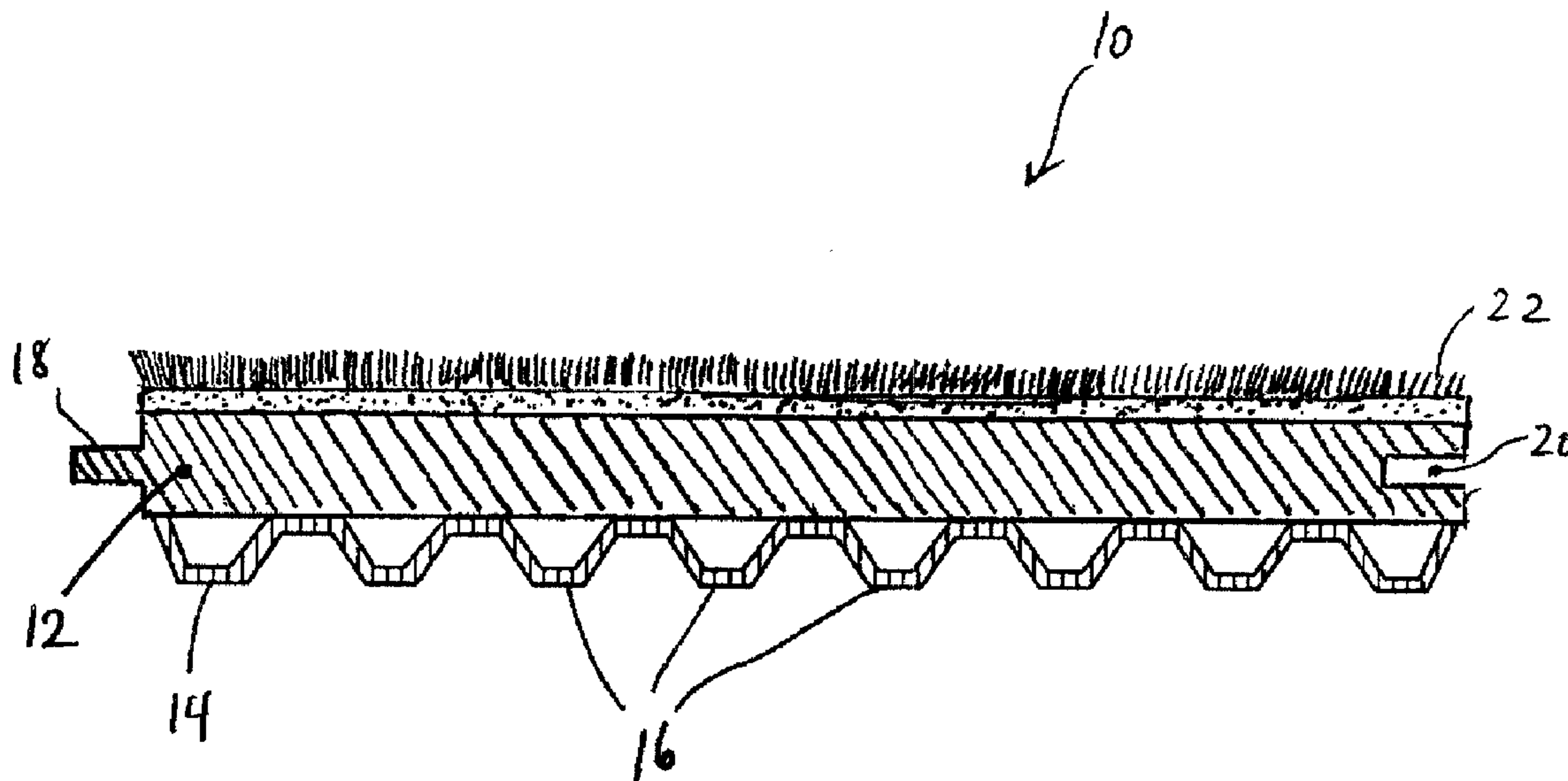




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(54) Title: FLOOR PANEL FOR FINISHED FLOORS



(57) Abrégé/Abstract:

A floor panel having a structural core and a finished surface layer disposed on a top side of the structural core. A substantially water-impervious sheet having a plurality of projections for providing an air gap between the core and a concrete foundation is affixed to a bottom side of the structural core. The finished surface may be carpet, carpet underlayment, or a finished wood or wood-like surface. The floor panel minimizes the effort required to construct a sub-floor whilst dealing with moisture problems typically encountered in installing wooden sub-floors over a concrete foundation.

**Abstract**

A floor panel having a structural core and a finished surface layer disposed on a top side of the structural core. A substantially water-impervious sheet having a plurality of projections for providing an air gap between the core and a concrete foundation is affixed to a bottom side of the structural core. The finished surface may be carpet, carpet underlayment, or a finished wood or wood-like surface. The floor panel minimizes the effort required to construct a sub-floor whilst dealing with moisture problems typically encountered in installing wooden sub-floors over a concrete foundation.

## **FLOOR PANEL FOR FINISHED FLOORS**

### **Background of Invention**

There are a number of places in a dwelling or office where moisture and/or humidity can affect the structural properties of wooden floors. One such example is the concrete foundation typical of basement floors. Not only does water have a tendency to seep into basement floors, but also the temperature difference between the cool concrete and the warm top surface of the wooden floor can cause condensation on the bottom surface of the wooden floor. This problem must be dealt with in many flooring applications.

In the prior art, floors have typically been constructed by applying a number of flooring layers, i.e., sub-floors, prior to installing the finished wood, carpet or vinyl surface. This process often requires a fair degree of manual labour to carry out. It would be beneficial if the labour requirements were minimized, especially if the floor is intended to be installed by non-professionals, as will be encountered in the "do-it-yourself" or "handyman" market. In any such application moisture and condensation problems must also be dealt with.

### **Summary of Invention**

According to one aspect of the invention a floor panel is provided which includes a structural core and a finished surface layer disposed on a top side of the structural core. A substantially water-impervious sheet is affixed to a bottom side of the structural core. The sheet has a plurality of projections for providing an air gap between the panel and a mounting surface, such as a concrete foundation. The panel also preferably includes means for interconnecting the panel to another said panel in abutting relationship.

In one embodiment, the finished surface layer is carpet. In another embodiment, the finished surface is a finished wood or wood-like surface. The structural core can be



an unfinished wooden board with finished wood or wood-like strips, planks or tiles affixed to the top side of the wooden board provide the finished surface of the panel. Alternatively, the wooden board may be omitted such that the structural core is provided by finished wood or wood-like strips, planks or tiles which provide the finished surface of the panel.

According to another aspect of the invention a floor panel is provided which includes a wooden core; a carpet underlayment layer affixed to a top side of the wooden core; and a substantially water-impervious sheet affixed to a bottom side of the structural core. The sheet includes a plurality of projections for providing an air gap between the panel and a mounting surface.

According to yet another aspect of the invention a kit is provided, comprising a plurality of floor panels and a carpet. Each floor panel has a wooden core; a carpet underlayment layer affixed to a top side of the wooden core; a substantially water-impervious sheet affixed to a bottom side of the structural core, the sheet having a plurality of projections for providing an air gap between the panel and a mounting surface; and means for interconnecting means for interconnecting the panel to another said panel in abutting relationship. The carpet may then be disposed over the floor panels when they are interconnected and installed over a mounting surface such a concrete foundation.

### **Brief Description of Drawings**

The foregoing and other aspects of the invention will become more apparent from the following description of illustrative embodiments thereof and the accompanying drawings which illustrate, by way of example, the principles of the invention. In the drawings, in which certain features are not drawn to scale for the purpose of description:

Fig. 1A is a perspective view, taken from the top, of a flooring panel according to a first embodiment having a finished surface composed of carpet;

Fig. 1B is a perspective view, taken from the bottom, of the flooring panel shown in Fig. 1A;

Fig. 1C is a cross-sectional view of the flooring panel shown in Fig. 1A;

Fig. 2 is an cross-sectional view of a series of interconnected floor panels according to a second embodiment upon which a non-sectioned layer of carpet may be overlaid;

Fig. 2A is a cross-sectional view of a variant of the panel shown in Fig. 2 further including a carpet attachment strip;

Fig. 3 is a cross-sectional view of a flooring panel according to a third embodiment having a finished wood or wood-like surface;

Fig. 4 is a cross-sectional view of a flooring panel according to a fourth embodiment having a finished wood or wood-like surface including an interconnect structure;

Fig. 5 is a cross-sectional view of a flooring panel according to a fifth embodiment having a beveled finished wood or wood-like surface;

Fig. 6 is a cross-sectional view of a flooring panel according to a sixth embodiment having a finished wood or wood-like surface without an intermediate core layer; and

Fig. 7 is a cross-sectional view of a flooring panel according to a seventh embodiment having a painted or varnished wood or wood-like surface.



### **Detailed Description of Illustrative Embodiments**

Referring to Figs. 1A-1C, a first embodiment of a flooring panel 10 is shown. The panel 10 comprises a core 12 which provides the panel with structural rigidity. This layer is preferably formed from an engineered wood product such as ½ inch, 5/8 inch or ¾ inch oriented strand board (OSB), waferboard or one of the many commercially available plywoods. Other dimensions and/or other materials may be used in the alternative for the core 12, depending on load handling or stiffness requirements.

A water-impermeable membrane 14 is fixed to the underside of the core layer 12, preferably by adhesive bonding. The membrane 14 is preferably formed from polyethylene and includes a plurality of projections such as frusto-conical cones 16 for spacing the panel 10 from the (typically concrete) foundation and enabling air to circulate underneath the panel. The cones 16 are also somewhat deformable thus providing some cushioning effects when walking over the panel. The membrane 14 protects the wood core from warping, deforming or delaminating as a result of excess humidity or moisture that may arise in basements or as a result from temperature differentials between the foundation and wooden core. As such, the air gap provided by the membrane 14 also functions as a thermal insulation barrier. The membrane is especially useful when OSB is used as the core material since it is more susceptible to damage from moisture than plywood. The membrane 14 is preferably sourced from Delta FL™ polyethylene sheets manufactured by Cosella Dorken of Beamsville, Ontario, Canada. Alternatively, a similar product (which appears to be less deformable) may be sourced from Platon™ polyethylene sheet distributed by Armtec Limited of Orangeville, Ontario, Canada. Other types of dimpled, bossed, or cleated sheets of substantially water-impervious material may be used in the still further alternative. The shape of the projections on the water-impervious sheet is not as important as the fact that the projections and the panel can withstand a reasonable load and the projections provide an air gap through which a reasonable flow of air can circulate.

In the illustrated embodiment, a sectioned piece of carpet 22 is affixed to the top surface of the core 12 by adhesive bonding, stapling, nailing, or other such fastening means as known in the carpet-laying art. Hook and loop fasteners are also contemplated. Because the preferred membrane 14 has some shock-absorbing qualities, a carpet underlayment may not be necessary. However, a shock-absorbing carpet underlayment may be disposed between the core 12 and carpet 22, if desired.

The side-walls or perimeters of the core layer 12 include one or more tongues and grooves 18,20 for interconnecting panels in abutting relationship. The carpet 22 is preferably selected with sufficiently long hairs so as to hide any seam lines or imperfections in the tongue & groove joints that may arise when the panels 10 are interconnected or that may arise as a result of the panels shifting somewhat over time.

The panel 10 preferably has a breadth of about 2 feet by 2 feet. This size enables the panels 10 to be conveniently handled and installed, especially by non-professionals. The panels may be installed as a floating floor system, i.e., without nailing or otherwise fastening them to the foundation. Because the panel 10 has a finished surface, installing a fully finished floor can be accomplished quickly. Imperfections in the surface level of the foundation can be compensated for by disposing one or more extra layers of the membrane 14 under select panels. Alternatively, because the preferred membrane 14 is somewhat deformable, select panels can be nailed or more preferably screwed into the foundation under various tensions or depths to achieve a level finished surface.

If desired, the carpet 22 may be replaced with a carpet underlayment 30 as shown in panels 25 of Fig. 2. In this case, a non-sectioned layer of carpet 32 may be disposed over the floor panels 10 to completely hide any seam lines presented by the tongue and groove joints. If desired, the panels may be fitted with one component 34 (shown in phantom) of a hook and loop fastener system (e.g., Velcro™) and the underside of the carpet layer 32 may have the other component 36 (shown in phantom) of the fastener system affixed thereto. Furthermore, certain panels may be provided with integrated



carpet attachment strips 37 as shown in the fragmentary view of Fig. 2A which have upright nails upon which the carpet 32 may be attached.

Fig. 3 shows the embodiment of another panel 40 which features the preferably wooden core 12 and the waterproof membrane 14. A finished wooden top floor or wood like surface 42, such as hardwood flooring, laminated flooring, or melamine wood flooring, is affixed to the top surface of the core 14, preferably by adhesive bonding. Because the wood flooring 42 is itself comprised of multiple strips, planks or parquet tiles 42a, 42b, ..., 42n, any seam lines that may arise between the tongue and groove joints 18,20 of the panel appear to be part of the finished wood flooring 42.

If desired, the strips, planks or parquet tiles 42a, 42n located on the periphery of the panel 40 may also have tongues and grooves 44, 46, as shown in Fig. 4. This provides a double interlocking structure for interconnecting adjacent panels.

Alternatively, as shown in Fig. 5, the strips, planks or parquet tiles 42a, 42n located on the periphery of the panel 40 may have beveled edges 48 to thereby simulate grout lines. The beveled edges 48 may be painted to provide a contrast relative to the surface colour of the strips, planks or parquet tiles 42a, 42b, ..., 42n.

In the further alternative, the wooden core 14 may be omitted altogether as shown in Fig. 6. In this embodiment, a plurality of the strips, planks or parquet tiles 42a, 42b, ..., 42n used in conventional wood flooring systems are interconnected and bonded to the water impervious membrane 14 to form a panel 50. The tongue and grooves 44, 46 of the strips, planks or parquet tiles 42a, 42n located on the periphery of the panel 50 are used to interconnect adjacent panels 50. In this embodiment, the strips, planks or parquet tiles have a thickness sufficient to function as the structural core of the flooring panel.

In a still further embodiment as shown in Fig. 7, a panel 60 may comprise the wooden core 12 and the water impervious membrane 14. In this case, the core 12 is painted or varnished so as to provide a finished surface.



**Those skilled in the art will understand that numerous other variations and modifications may be made to the embodiments disclosed herein without departing from the spirit of the invention.**

**Claims**

1. A floor panel, comprising:  
a structural core;  
a finished surface layer disposed on a top side of the structural core; and  
a substantially water-impervious sheet affixed to a bottom side of the structural core, the sheet having a plurality of projections for providing an air gap between the panel and a mounting surface.
2. The panel according to claim 1, including means for interconnecting the panel to another said panel in abutting relationship.
3. The panel according to claim 2, wherein the water-impervious sheet is constructed from semi-rigid polyethylene.
4. The panel according to claim 3, wherein the projections are somewhat deformable under a load.
5. The panel according to any of claim 1-4, wherein the finished surface layer is carpet.
6. The panel according to any of claims 1-4 wherein the finished surface is a finished wood or wood-like surface.
7. The panel according to any of claims 1-4, wherein the structural core is an unfinished wooden board and finished wood or wood-like strips, planks or tiles affixed to the top side of the wooden board provide said finished surface.
8. The panel according to any one of claims 1-4, wherein the structural core is provided by finished wood or wood-like strips, planks or tiles, said strips, planks or tile also providing said finished surface.

9. The panel according to claims 7 or 8, wherein said strips, planks or tiles further include means for interconnecting to corresponding strips, planks or tiles located on another of said panels.

10. A floor panel, comprising:  
a wooden core;  
a carpet underlayment layer affixed to a top side of the wooden core; and  
a substantially water-impervious sheet affixed to a bottom side of the structural core, the sheet having a plurality of projections for providing an air gap between the panel and a mounting surface.

11. The panel according to claim 10, further comprising a carpet attachment strip affixed to the top side thereof.

12. A kit, comprising:  
a plurality of floor panels, each floor panel having:  
a wooden core;  
a carpet underlayment layer affixed to a top side of the wooden core;  
a substantially water-impervious sheet affixed to a bottom side of the structural core, the sheet having a plurality of projections for providing an air gap between the panel and a mounting surface;  
and  
means for interconnecting means for interconnecting the panel to another said panel in abutting relationship; and  
a carpet for disposition over the floor panels when interconnected.



Fig. 1A

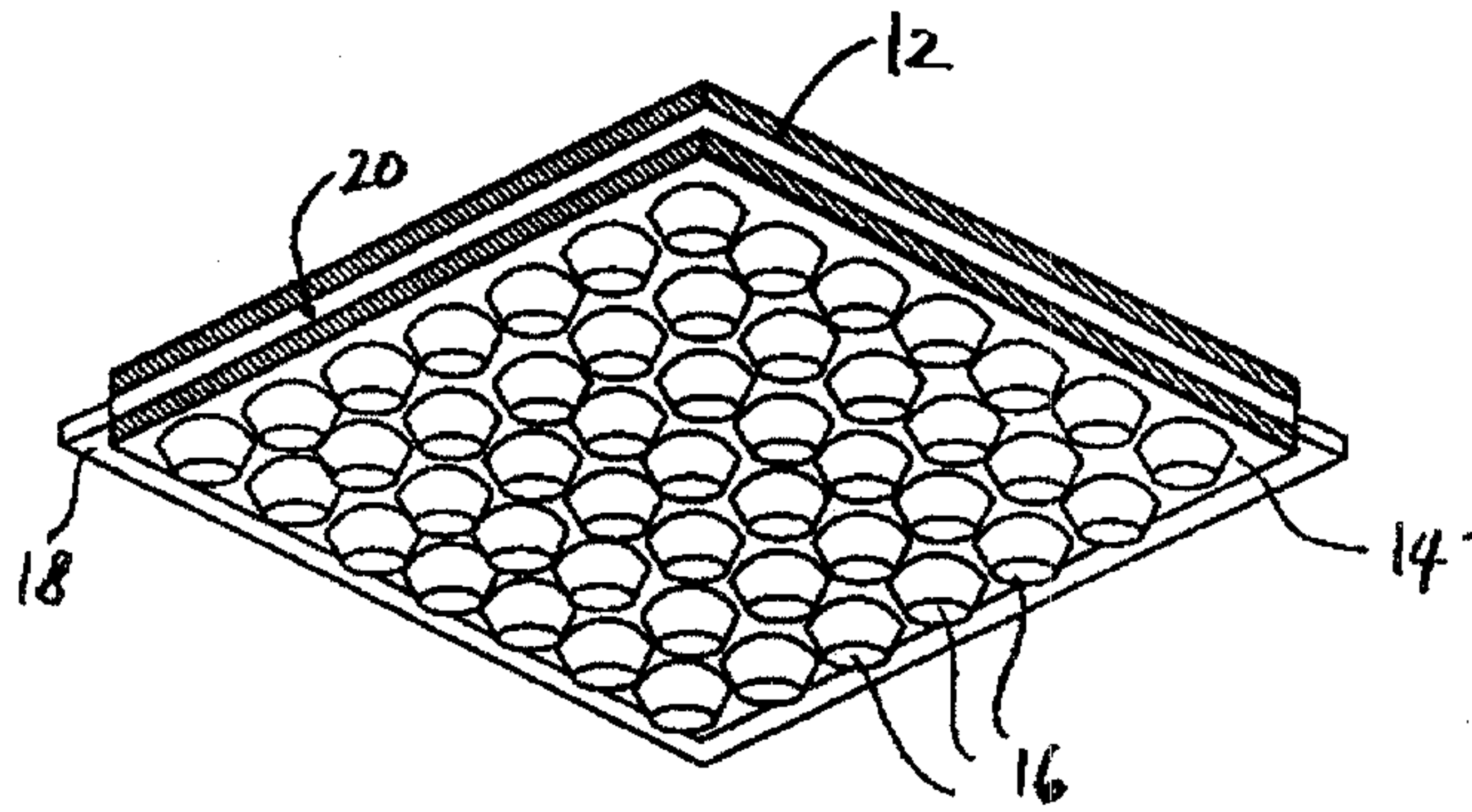
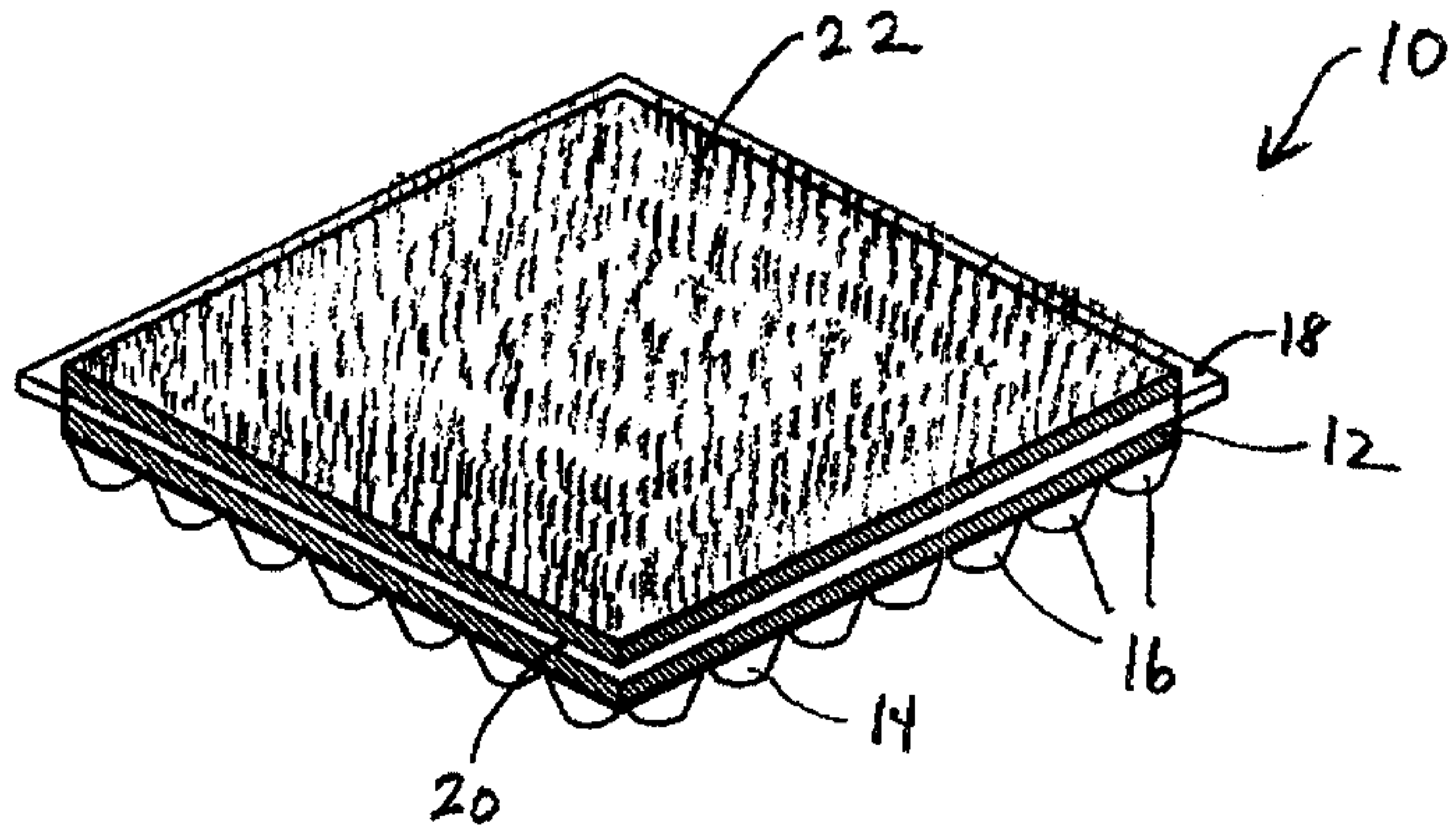
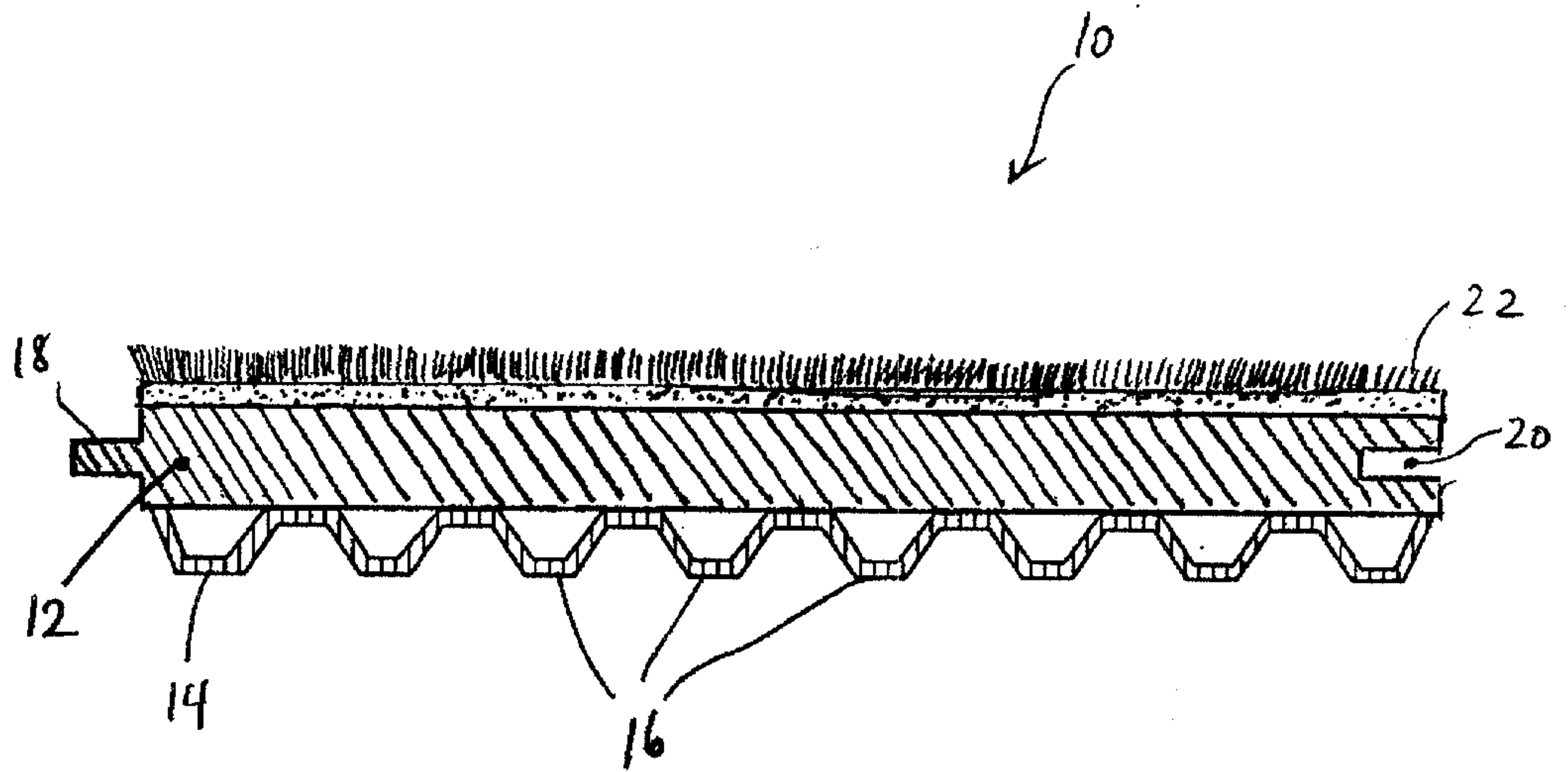


Fig. 1B

Fig. 1C



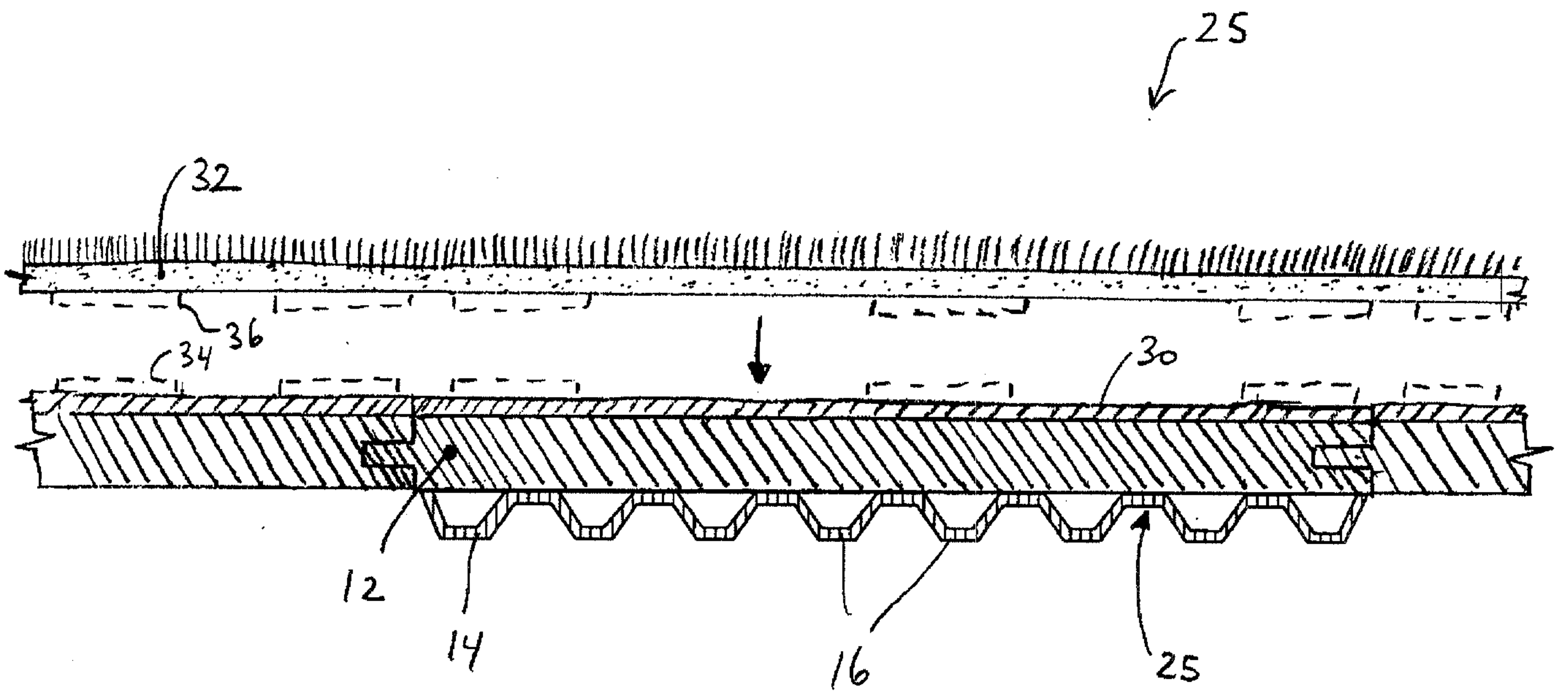


Fig. 2

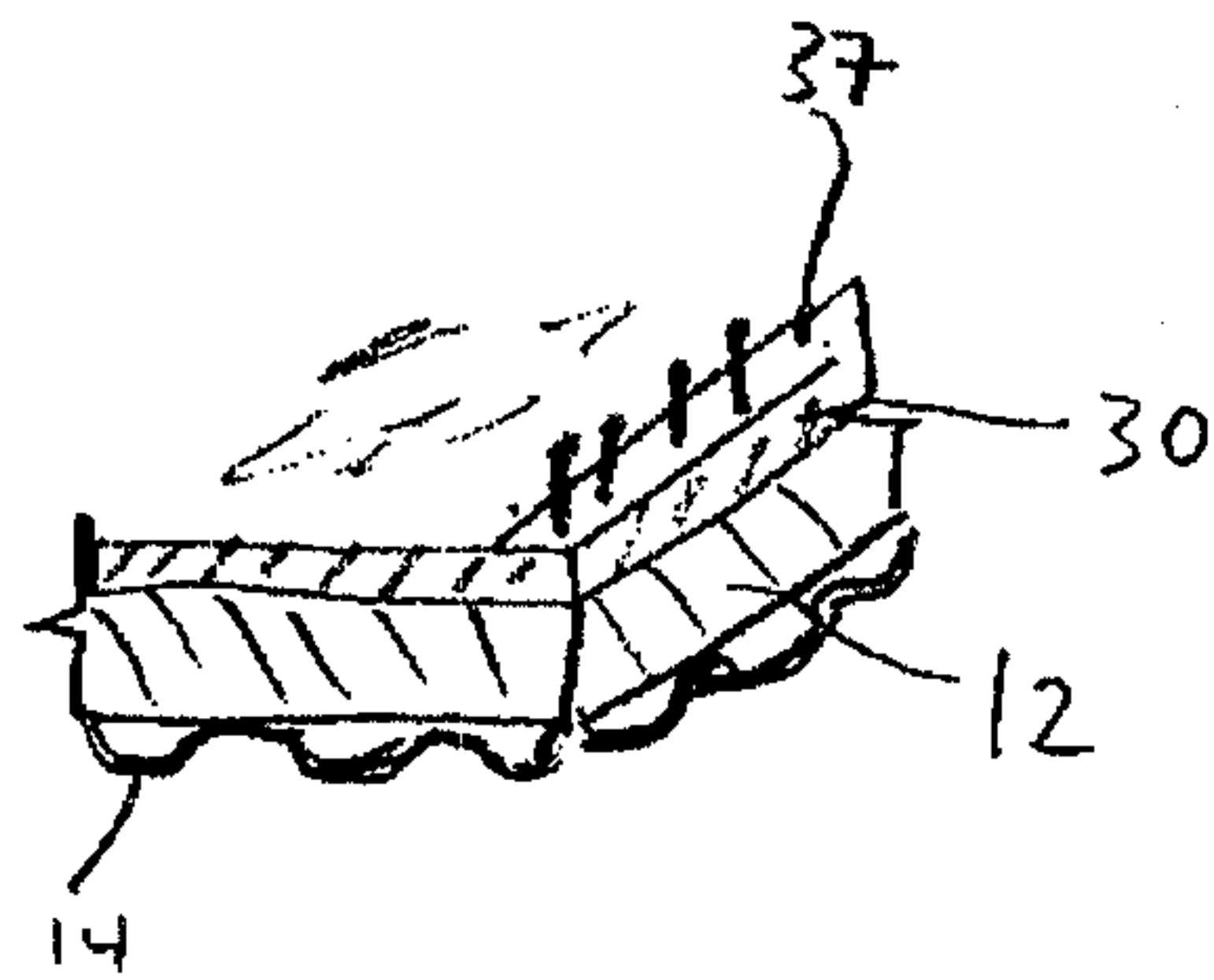


Fig. 2A



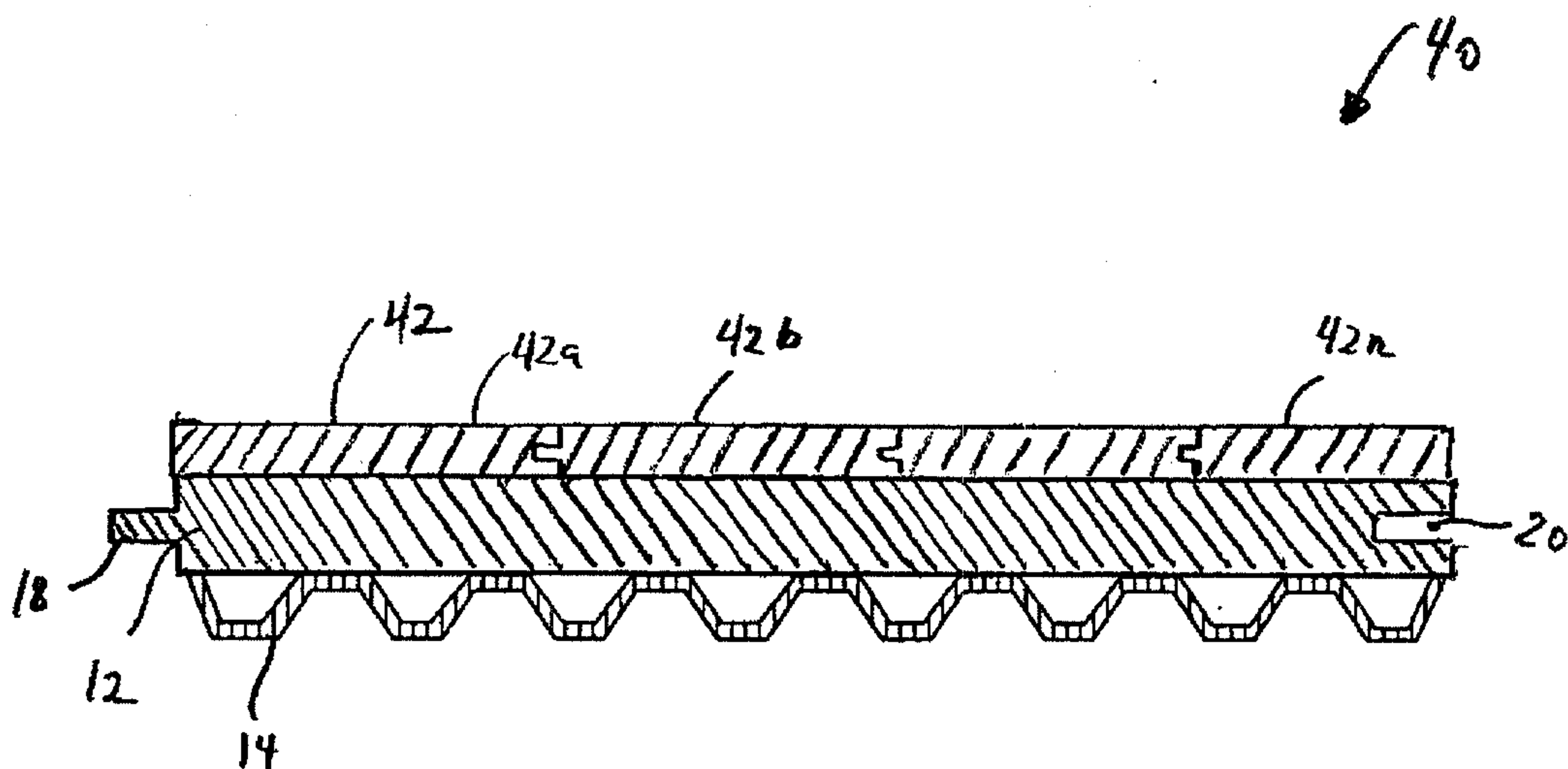


Fig. 3

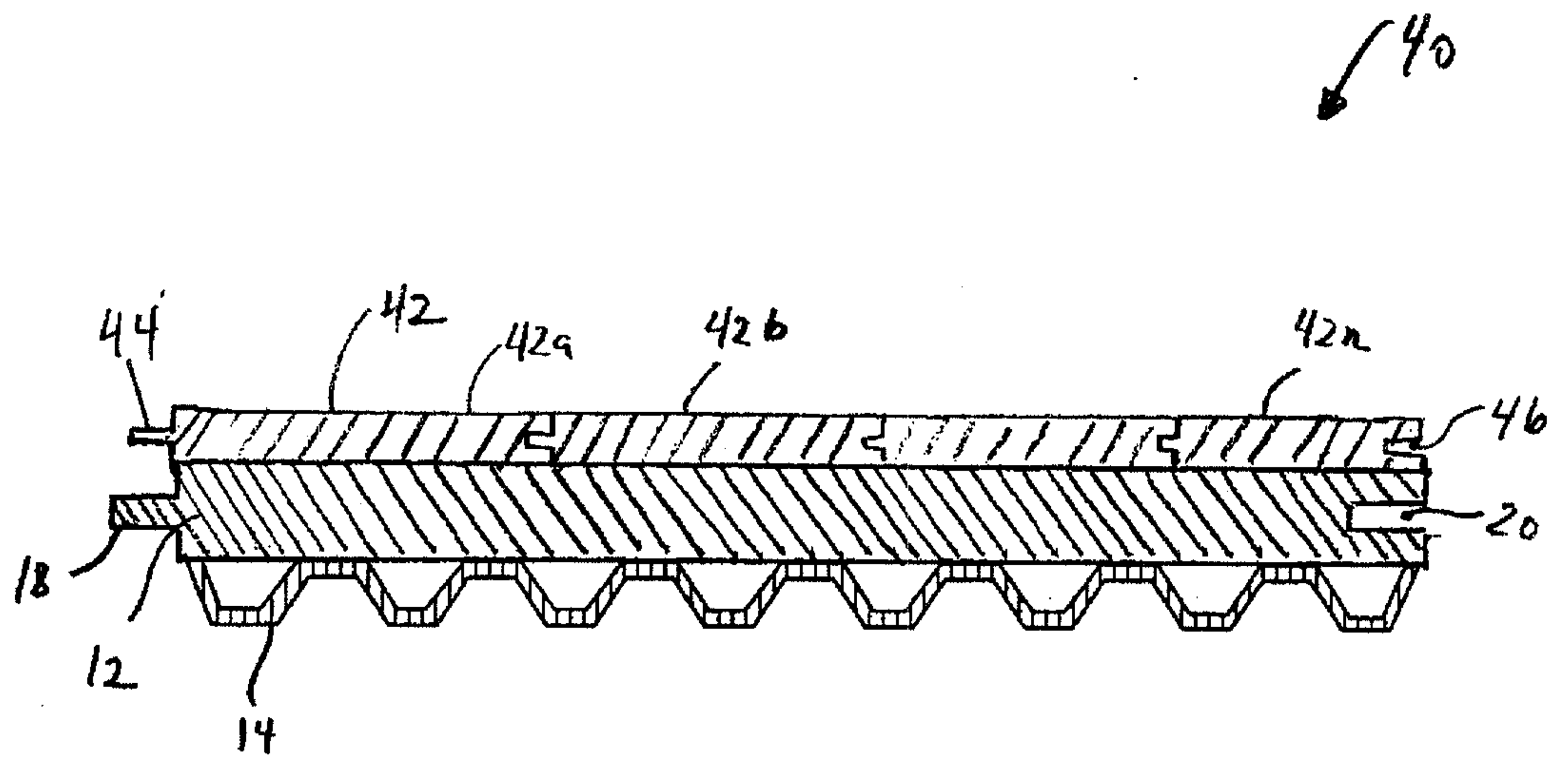


Fig. 4

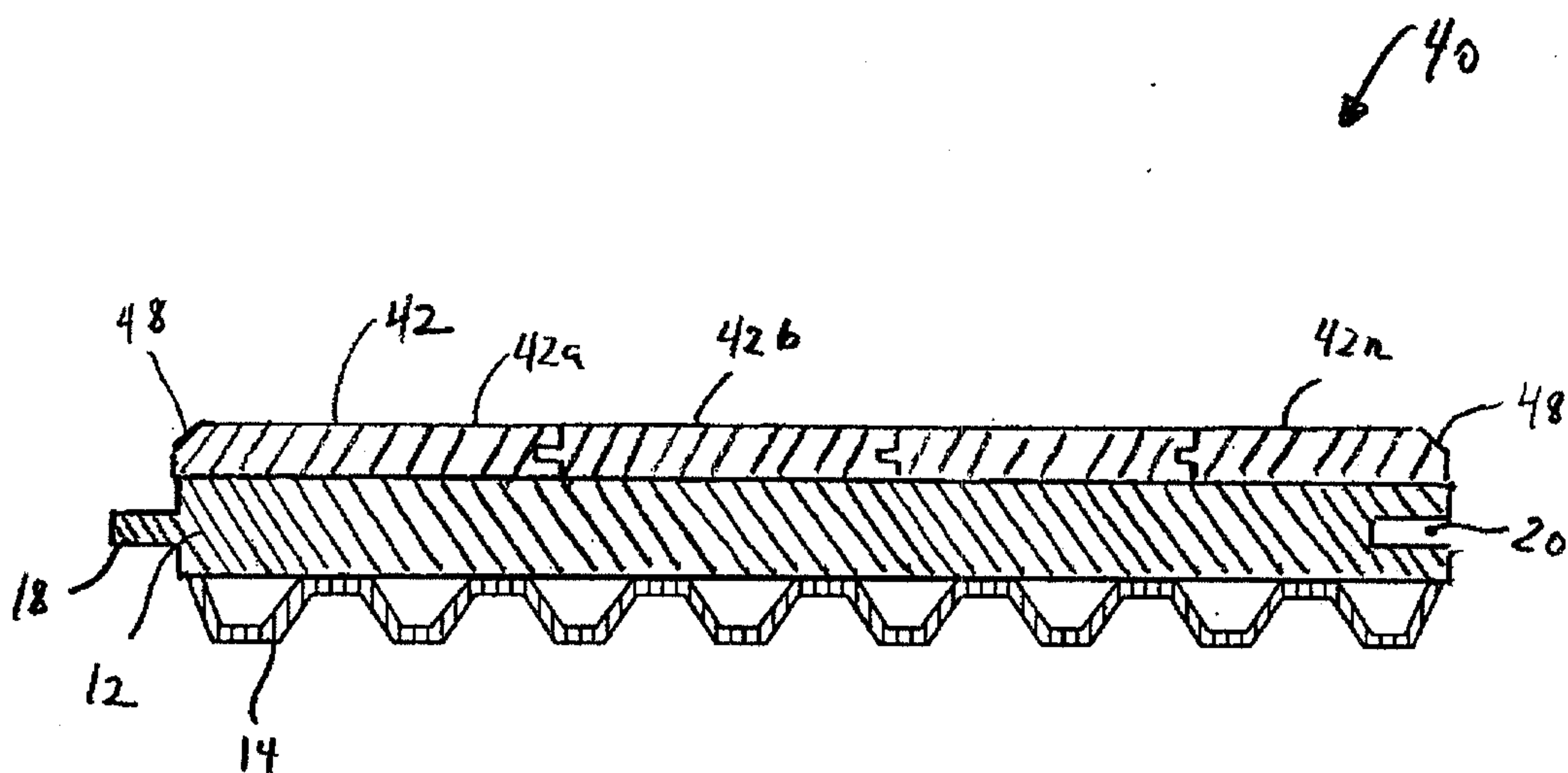


Fig. 5



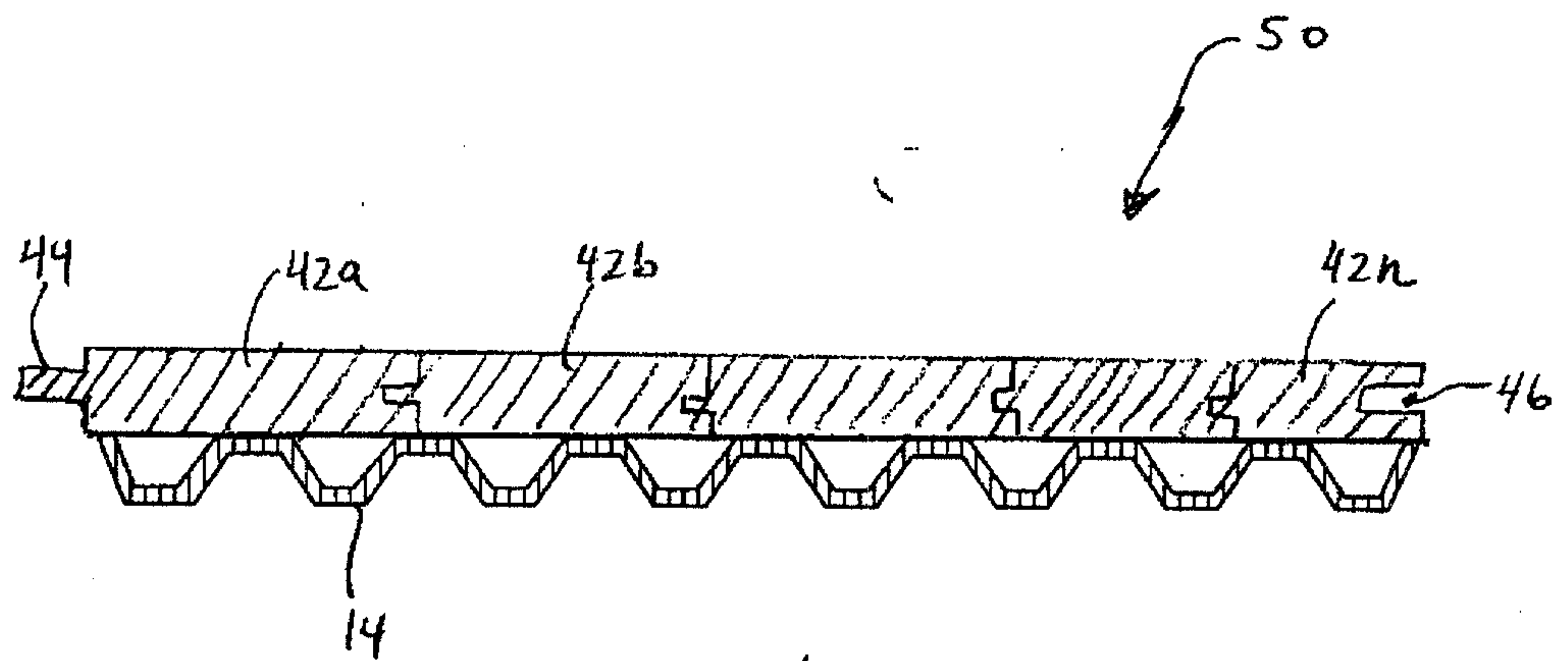


Fig. 6

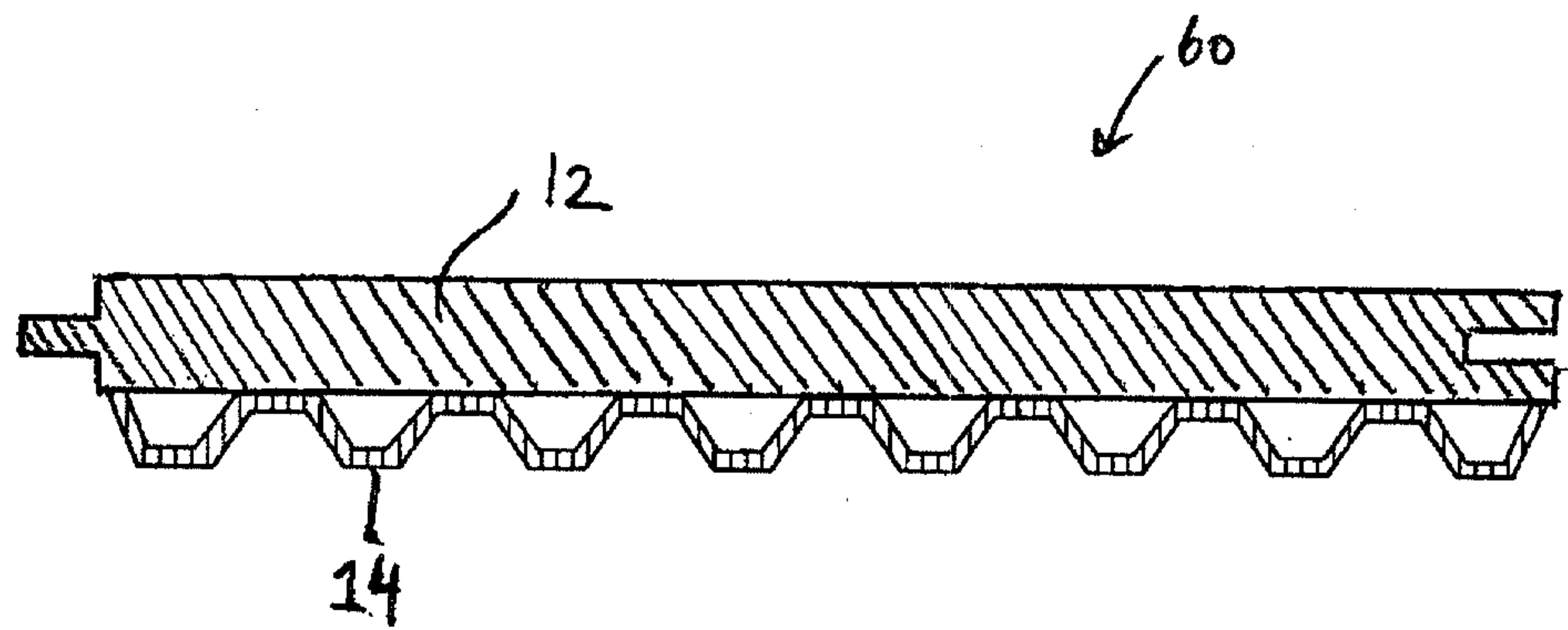


Fig. 7

