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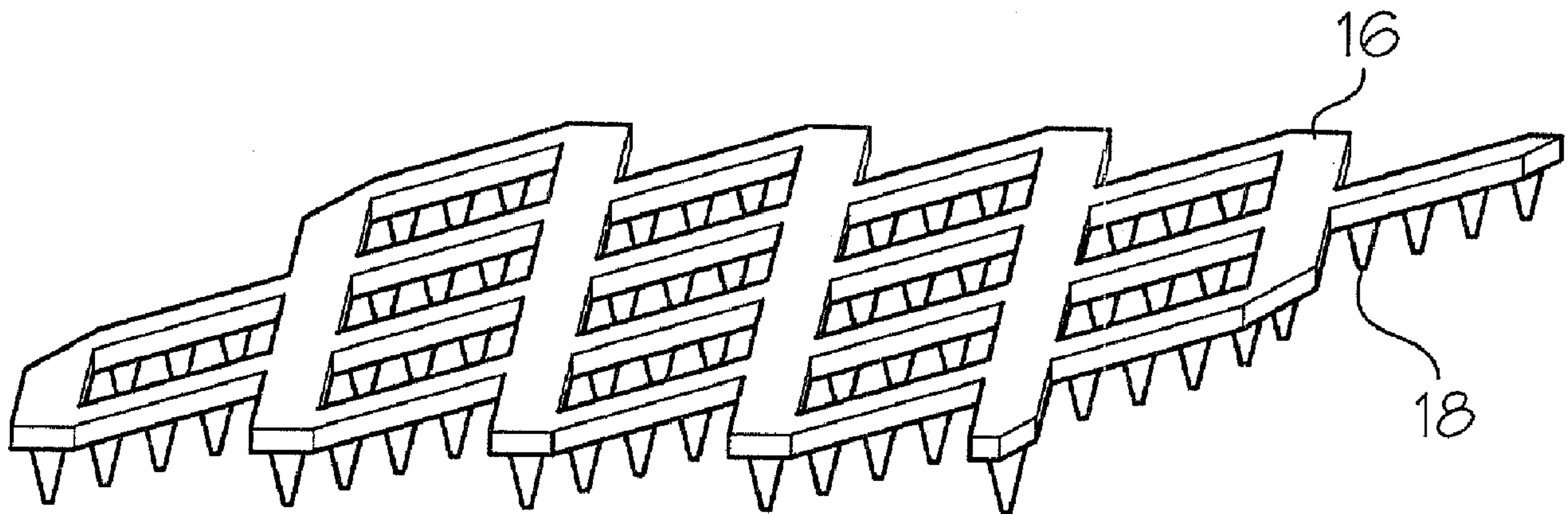
(72) Inventeur/Inventor:
THIBEAU, CLARENCE, CA

(73) Propriétaire/Owner:
THIBEAU, CLARENCE, CA

(74) Agent: G. RONALD BELL & ASSOCIATES

(54) Titre : PANNEAUX A LAME D'AIR POUR LA CONSTRUCTION DE BATIMENTS

(54) Title: AIR GAP SPACER FOR USE IN BUILDING CONSTRUCTION



(57) Abrégé/Abstract:

An air gap spacer for use in building construction which can provide adequate spacing between the exterior surface of a building under construction, and the cladding or other exterior material being placed on the outer surface of the building, whereby the air gap spacer is disposed therebetween in order to provide an adequate air space which facilitates improved ventilation and water drainage through to the internal air gap, while allowing a firm backing to which exterior siding, shingles or brick may be attached. The air gap spacer is advantageously manufactured in 4' x 8' sheets of corrugated plastic, and, as such, will not rot. Application of the air gap spacer in 4' x 8' sheets involves less installation time, and, if necessary, a utility knife can be used to easily cut the air gap spacer sheet to size to fill in smaller areas.



ABSTRACT

An air gap spacer for use in building construction which can provide adequate spacing between the exterior surface of a building under construction, and the cladding or other exterior material being placed on the outer surface of the building, whereby the air gap spacer is disposed therebetween in order to provide an adequate air space which facilitates improved ventilation and water drainage through to the internal air gap, while allowing a firm backing to which exterior siding, shingles or brick may be attached. The air gap spacer is advantageously manufactured in 4' x8' sheets of corrugated plastic, and, as such, will not rot. Application of the air gap spacer in 4' x 8' sheets involves less installation time, and, if necessary, a utility knife can be used to easily cut the air gap spacer sheet to size to fill in smaller areas.

AIR GAP SPACER FOR USE IN BUILDING CONSTRUCTION

The present invention relates to an air gap spacer which is designed to be attached to an exterior surface of a building during construction, and, more specifically, as an air gap spacer to be applied between an exterior surface of a building and the cladding or other exterior material being placed on the outer surface of the building, in order to provide a sufficient air space and facilitate improved water drainage and ventilation while allowing a firm backing to which exterior siding, shingles or brick may be attached.

In the construction industry, National Building Code requirements normally stipulate that a minimum air gap be provided between the exterior sheathing of a building being constructed and the exterior siding or brick being placed thereon. As an example, the National Building Code of Canada requires that the minimum air gap be 3/8 " or 10mm. This is because climate changes could result in the external siding, shingles or brick expanding or contracting in response to variations in temperature, which may compromise the exterior surface of the building. Siding manufacturers also generally specify that a minimum air gap be provided to ensure their product does not warp or buckle in ever changing conditions of temperature and humidity.

In the past, construction of an air space of this type was usually achieved using wood (1" x 3" or milled strips) pieces which would be attached to the wall at required spacing intervals. Utilizing such a method would create an air gap when installed horizontally, but this limits air circulation and water drainage. Further, the wooden strips can eventually rot, causing structural damage and risk of insect infestation.

DESCRIPTION OF THE PRIOR ART

There are numerous examples of prior art devices designed for use in the construction industry when it is necessary to achieve support and uniform spacing between adjacent lengths of materials, such as when applying siding or clapboard to the side of a house, or shingles to the roof of a house.

U.S. Patent No. 4,936,021 describes an adjustable support/spacer device for facilitating desired spacing between two adjacent surface members, such as siding and the exterior surface of a building under construction. The device described therein is self-clamping to the material, such as shingles or siding, being applied to the exterior

surface of the building under construction. However, utilization of such a device is time-consuming, because to achieve the desired spacing necessitates continual manual adjustment of the device, and does not adequately provide for a spacer device which efficiently provides for improved ventilation and drainage characteristics.

5 Other types of prior art devices describe installing siding panels onto a support structure. U.S. Patent No. 3,236,932 describes elongated metal strips which are used for applying metallic siding panels to a building structure without the use of nails or other fasteners penetrating the siding panels. Thus, no holes are formed into the siding panels. Each of the elongated metal strips has a central box portion with side flanges
10 containing holes. The metal strips are fastened with nails or screws along the flanges to the support wall. The strips also have vertically spaced clips for engaging the upper and lower edges of the siding panels.

Another example of this type of prior art device is described in U.S. Patent No. 4,047,349, which teaches a sheet material attaching device for securing siding panels
15 to a building. The attaching device is a longitudinal strip constructed from bendable sheet metal or plastic with support tabs which are integrally stamped-out segments of the strip. Preformed slots in the siding panel are engaged with the bendable support tabs which are then bent to secure the siding panel to the sheet material attaching device. However these types of devices do not provide for an air gap spacer meant to
20 provide spacing between the exterior surface of a building under construction, and the materials being placed on the outer surface of the building, in order to provide an air space and facilitate water drainage to the internal air gap, while allowing a firm backing to which exterior siding, shingles or brick may be attached.

Accordingly, there is a need in the construction industry to provide a durable air
25 gap spacer which requires less installation time to install and which facilitates improved air circulation and water drainage capabilities. The present invention satisfies this need and provides these benefits.

SUMMARY OF THE INVENTION

An object of the present invention is to provide an air gap spacer having
30 improved ventilation and drainage characteristics, as well as increased durability, and which is easily installed.

Another object of the present invention is to provide an air gap spacer which can provide a firmer and more even backing over a wider area than conventional construction methods, with respect to the exterior shingles, siding or brick being applied thereon, over the exterior of the building.

5 An air gap spacer for providing spacing between wall surfaces and cladding material, the air gap spacer comprising:

 a planar surface comprising a plurality of interconnected matter surface areas and a plurality of apertures between the matter surface areas; and

 a plurality of spaced un-apertured protrusions of substantially uniform height
10 depending from only one side of said matter surface areas, the apices of at least some of said protrusions forming a protrusion plane;

 whereby, when the spacer is in place between the wall surfaces and the cladding material, liquid and air may pass between the protrusions to facilitate air circulation in, and liquid drainage from the spacing between the wall surfaces and the cladding
15 material.

 An air gap spacer for providing spacing between wall surfaces and cladding material, the air gap spacer comprising:

 a planar surface comprising a plurality of interconnected matter surface areas and a plurality of apertures between the matter surface areas wherein said planar
20 surface comprises greater aperture surface areas than matter surface areas; and

 a plurality of spaced un-apertured protrusions of substantially uniform height depending from said matter surface areas, the apices of at least some of said protrusions forming a protrusion plane;

 whereby, when the spacer is in place between the wall surfaces and the cladding
25 material, liquid and air may pass between the protrusions to facilitate air circulation in, and liquid drainage from the spacing between the wall surfaces and the cladding material.

 An air gap spacer for providing spacing between wall surfaces and cladding material, the air gap spacer comprising:

30 a planar surface comprising a plurality of interconnected matter surface areas and a plurality of apertures between the matter surface areas; and

a plurality of spaced protrusions of substantially uniform height protruding from only a first side of said matter surface areas, each of the protrusions having a base of a first width and an apex of a second width that is less than the first width, the apexes of at least some of said protrusions forming a protrusion plane, a second side of the matter surface areas opposite the first side of the matter surface areas having portions opposite the protrusions' bases that are un-apertured;

whereby, when the spacer is in place between the wall surfaces and the cladding material, liquid and air may pass between the protrusions, to facilitate air circulation in, and liquid drainage from, the spacing between the wall surfaces and the cladding material.

A method for providing spacing between wall surfaces and cladding material, the method comprising the steps of:
providing an air gap spacer comprising:

a planar surface comprising a plurality of interconnected matter surface areas and a plurality of apertures between the matter surface areas; and

a plurality of spaced un-apertured protrusions of substantially uniform height depending from only one side of said matter surface areas, the apices of at least some of said protrusions forming a protrusion plane; and

placing the air gap spacer between the wall surfaces and the cladding material; whereby liquid and air may pass through channels formed between the protrusions, to facilitate air circulation in, and liquid drainage from, the spacing between the wall surfaces and the cladding material.

The air gap spacer of the present invention is advantageously formed with ventilation and drainage apertures or internal passages or openings therein so as to facilitate improved air circulation and water drainage. The ventilation and drainage apertures can, for example, be in the form of a depression or groove which is formed on an underside of the air gap spacer, particularly at the intersection of a pair of spacer members. If, for example, moisture or condensation water accumulates between the construction sheathing material and the exterior cladding layer, the apertures or

internally formed passages or openings of the air gap spacer of the present invention permit the moisture or rain water to run along the air gap spacer, and away from the construction sheathing material, e.g. plywood or chipboard, and the exterior cladding layer, which may be e.g. aluminum or vinyl siding, shingles, brick, stone or stucco. The
5 apertures or internally formed passages or openings then allow for water to pool thereon and drain within and out from below the air gap barrier formed therebetween.

The internally formed passages of the air gap spacer will normally comprise vertically oriented passages, but it is conceivable that the internally formed passages can also be formed in a diagonal orientation, or that some passages may be formed in
10 a horizontal, or somewhat horizontal, orientation.

Preferably, the air gap spacer of the present invention is manufactured as 4' x 8' sheets of a corrugated recyclable plastic material, such as CoroplastTM, and is preferably 3/8" (10mm) thick, though it is possible to have different thicknesses of, for instance, from 10mm-20mm, and is designed to be attached to the cladding on an
15 exterior wall of a building during construction. As it is preferably made of plastic, the product will not rot and saves on lumber. The manufacturing of the air gap spacer in 4' x 8' sheets also means less installation time is required to install and provide such an air gap, as compared to conventional construction methods, and facilitates improved air circulation and water drainage capabilities. The air gap spacer is normally to be
20 installed in a vertically oriented manner, but it is conceivable that it can also be applied in a somewhat horizontal orientation.

If needed, a utility knife can quickly cut the air spacer sheet to size to fill smaller areas, as required, and to allow for window and door openings, eliminating "boxing in" the opening.

25 Preferably, the design of the air gap spacer in 4' x 8' sheets is in the form of a diamond pattern, effectively creating a lattice-like structure. Normally, utilizing such a diamond pattern configuration for the air gap spacer normally results in each 'diamond' in the sheet of plastic material having 4" x 6" dimensions. Since the minimum surface of shingles exposed to the elements is 4", this design provides a firmer and more even
30 backing over a wider area than conventional construction methods, with respect to the exterior shingles, siding or brick being applied thereon, over the exterior of the building. However, it is conceivable that each 'diamond' in each diamond pattern within the sheet

of plastic material may have 4" x 8" dimensions, though in such an embodiment, it may be preferable to have an additional bridging portion stretching from side to side across the center of each individual diamond pattern, so as to provide additional stability and strength to the air gap spacer. It is also conceivable that the interconnected spacer
5 elements can be manufactured in square, hexagonal and rectangular configurations, rather than strictly a diamond pattern. It is further conceivable that the air gap spacer of the present invention could be collapsible for storage purposes, wherein the framework of interconnecting spacer members comprising the air gap spacer can be folded upon itself.

10 The 4" x 6", or 4" x 8", dimensions for the diamond pattern result in 4 "diamonds" with a total horizontal width of 16", thereby facilitating nailing or screwing to the underlying studs of a sheathed wall. Similarly, two 8" wide "diamonds" also result in a 16" width.

The air gap spacer can be secured to the exterior wall of the building being
15 constructed, and the siding, shingles or brick positioned on the exterior surface of the building by way of securing means such as nails, screws or the like. As the spacer is made of plastic material, the securing means can be driven straight through the spacer to secure the spacer to the adjacent material, or, in an embodiment of the present invention, the air gap spacer can be formed having a plurality of mounting holes therein,
20 so as to facilitate the securing means being placed therethrough.

Prior to siding, brick or shingle installation, a strip of insect screen, eg: 12 " wide, is advantageously attached to the bottom of the sheathing, and then lapped over the bottom of the air gap spacer, so as to restrict bugs and insects from entering and nesting within the air barrier located between the exterior wall of the building being
25 constructed, and the siding, shingles or brick to be positioned later on the exterior surface of the building. Alternatively, the bottom of the air gap spacer can be manufactured with a strip of screen attached thereto.

As described above, the present invention provides for an easily and rapidly installed air gap spacer that provides for improved ventilation and drainage
30 characteristics, and that can provide a more firm and even backing over a wider area than conventional construction techniques, with respect to the exterior shingles, siding or brick being applied thereon, over the exterior of the building.

The protrusions advantageously depend from the apertured planar surface at least approximately perpendicularly and may be disposed equidistantly over the planar surface of grouped or in concentrated areas thereof. The protrusions may be all alike, terminating to form the protrusion plane. The protrusion plane is preferably at least substantially parallel to the apertured plane. The apertured surface may comprise aperture surface areas and matter surface area of similar magnitudes and the apertured surface may comprise greater aperture surface areas than matter surface areas. The apertures of the apertured surface may be of a repeating pattern over parts of or at least substantially the entire spacer. The protrusions may be are of a repeating pattern over parts of or at least substantially the entire surface of the spacer. The apertures may be of at least the following shapes: diamond, circular, square, rectangular, oval and quadrilateral. The protrusions may be of at least the following shapes: pyramidal, flat topped pyramidal, conical, flat topped conical, rectangular based pyramid, cuboid and rectangular block. The spacer may be made by at least one of: injection moulding, pouring moulding, extrusion or stamping.

According to another aspect of the present invention there is provided an air gap spacer comprising: an apertured sheet material of at least substantially uniform thickness, the sheet material being adapted for placement between an outer wall surface of a building under construction and an exterior cladding material so as to provide an air gap therebetween, wherein the spacer material includes passages therein, so as to permit air circulation and liquid drainage among the apertures. The sheet material may be of a lattice structure forming diamond shaped apertures, the passages running through the lattice structure. The passages may be disposed at intersections formed by the spacer material. The air gap spacer may be adapted to be secured to the surface of the building being constructed by way of securing means selected from the group consisting of tacks, nails and screws. The air gap spacer may comprise a plurality of mounting holes therein, whereby securing means may be placed therethrough for attaching the spacer to the surface of the building being constructed.

The exterior cladding material may be one of: siding, shingles, brick and clapboard or another suitable material. The spacer may be made of a material selected from the group consisting of plastic, metal, aluminum, and pressed wood particle product or other suitable material.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of the present invention will be further described with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view of an uncut 4' x 8' sheet of the air gap spacer
5 provided in accordance with the present invention;

FIG. 2 is a side elevational view of an air gap spacer according to an embodiment of the present invention, which illustrates drainage holes formed on a surface of the air gap spacer;

FIG. 3 is a top elevational view of the air gap spacer illustrated in FIG. 2, which
10 illustrates an air gap spacer system according to another embodiment of the present invention, wherein the air gap spacer is provided with nail mounting holes, whereby the air gap spacer can be attached to an adjacent material; and

FIG. 4 is a side elevational view of an air gap spacer according to another embodiment of the present invention, wherein the air gap spacer provides for a plurality
15 of drainage and ventilation openings which are formed therein.

FIGS. 5 a,b,c are depictions of the shape of one surface of the air gap spacer according to certain embodiments of the present invention.

FIGS. 6 a,b,c are depictions of the shape of the protrusions of the air gap spacer according to certain embodiments of the present invention.

20 FIG. 7 is a perspective view of an example of an embodiment according to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Illustrated in FIG. 1 is a large uncut 4' x 8' sheet of the air gap spacer 1 of the present invention. In this embodiment, the uncut sheet utilizes a diamond pattern
25 configuration 2.

Figure 2 illustrates one embodiment of the present invention, whereby the air gap spacer of the present invention is formed with an indentation 3 on an underside thereon, so as to facilitate water drainage away from the exterior wall of the building and the siding, shingles or brick positioned on the exterior surface of the building, and to
30 facilitate improved air circulation. The air gap spacer is formed of a corrugated plastic material 4, and the diamond pattern of the uncut sheet results in open areas 5 being formed within the uncut sheet. The open areas 5 within the uncut sheet reduces the

total weight of the air gap spacer 1, making the air gap spacer easier to secure to adjacent surfaces, and permits improved water drainage and air circulation.

Referring to Figure 3, this figure illustrates the embodiment of the present invention introduced in Figure 2, wherein the air gap spacer is provided with nail
5 mounting holes 7, whereby the air gap spacer can be secured to the exterior of a building.

Referring to Figure 4, there is illustrated another embodiment of the present invention, whereby the air gap spacer is formed of a corrugated plastic material having a first surface 9 which overlies, and is spaced in parallel relationship to, a second
10 surface 11. Spacer elements 13 are positioned along the length of the air gap spacer, these being positioned at spaced intervals between the first 9 and second surfaces 11, whereby the spacer elements 13 are perpendicularly positioned in relation to the first 9 and second 11 surfaces. The spacer elements 13 create a plurality of openings 15 within the air gap spacer of the present invention, to provide for drainage and
15 ventilation.

Figures 5a, b and c, 6a, b and c and 7 illustrate certain embodiments of the present invention. The air gap spacers shown are partial planes, as seen in Figures 5a, b and c. Protrusions extend from the planar surface, as seen in Figures 6a, b and c. In this way, the amount of material used can be reduced and adequate air and liquid
20 flow is achieved. In operation, the profiled surface is affixed to a building wall by tacking, adhesive or the like leaving the apertured planar surface for application of the siding, shingles, brick or the like.

In Figures 5a, b and c the material is indicated with reference numeral 16 and the spaces in between by reference numeral 17. Although diamond, circle and square
25 shapes are illustrated, many shapes could be used. In Figures 6a, b and c, the protrusions (18) are indicated with reference numeral 18. Although tapered square, conical and elongated triangular shapes are illustrated, many other shapes could be used. In Figure 7, a perspective view of the protrusions (18) is illustrated. Sample dimensions are as follows: thickness of spacer 12mm (height of the protrusions 11mm),
30 width of the base of a protrusion 5mm, width of the apex of a protrusion 2mm, distance between two adjacent protrusions at their base 5mm. Dimensions should be

determined to achieve acceptable physical properties. Manufacturing methods may include pouring, extrusion or injection molding and stamping.

The spacers may be of various sizes, for instance (in feet) 4x8, 4x4, 4x2, 2x2. The flat surface holes may be of various sizes, for instance (in inches) 6, 4, 2. The
5 protrusions are preferably not less than 10mm apart. The thickness of the spacer is preferably at least 10mm.

The foregoing are exemplary embodiments of the present invention and a person skilled in the art would appreciate that modifications to these embodiments may be made without departing from the scope and spirit of the invention.

THE EMBODIMENTS OF THE PRESENT INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. An air gap spacer for providing spacing between wall surfaces and cladding material, the air gap spacer comprising:
 - a planar surface comprising a plurality of interconnected matter surface areas and a plurality of apertures between the matter surface areas; and
 - a plurality of spaced un-apertured protrusions of substantially uniform height depending from one side of said matter surface areas, the apices of at least some of said protrusions forming a protrusion plane;whereby, when the spacer is in place between the wall surfaces and the cladding material, liquid and air may pass between the protrusions to facilitate air circulation in, and liquid drainage from the spacing between the wall surfaces and the cladding material.
2. An air gap spacer according to claim 1, wherein a thickness of the planar surface and a ratio of the matter surface areas to the aperture surface areas are chosen so as to inhibit the trapping of water and moisture in spaces defined by the matter surface areas when the air gap spacer is mounted in operative relationship.
3. An air gap spacer according to claim 1 or 2, wherein said protrusions depend from said planar surface at least in approximately perpendicular disposition.
4. An air gap spacer according to claim 1 to 3, wherein at least some of said protrusions are of like dimensions, terminating to form said protrusion plane.
5. An air gap spacer according to any one of claims 1 to 4, wherein said protrusion plane is at least substantially parallel to said planar surface.
6. An air gap spacer according to any one of claims 1 to 5, wherein the apertures of the apertured surface are of a repeating pattern over at least substantially the entire spacer.

7. An air gap spacer according to any one of claims 1 to 6, wherein said protrusions are of a repeating pattern over at least substantially the entire surface of the spacer.
8. An air gap spacer according to any one of claims 1 to 7, wherein the apertures are selected from a shape from the group including: diamond, circular, square, rectangular, oval and quadrilateral.
9. An air gap spacer according to any one of claims 1 to 8, wherein said protrusions are selected from a shape from the group including: pyramidal, flat topped pyramidal, conical, flat topped conical, rectangular based pyramid, and rectangular block.
10. An air gap spacer according to any one of claims 1 to 7, wherein said protrusions are provided in the shape of a cuboid.
11. An air gap spacer for providing spacing between wall surfaces and cladding material, the air gap spacer comprising:
 - a planar surface comprising a plurality of interconnected matter surface areas and a plurality of apertures between the matter surface areas wherein said planar surface comprises greater aperture surface areas than matter surface areas; and
 - a plurality of spaced un-apertured protrusions of substantially uniform height depending from said matter surface areas, the apices of at least some of said protrusions forming a protrusion plane;whereby, when the spacer is in place between the wall surfaces and the cladding material, liquid and air may pass between the protrusions to facilitate air circulation in and liquid drainage from the spacing between the wall surfaces and the cladding material.
12. An air gap spacer for providing spacing between wall surfaces and cladding material, the air gap spacer comprising:
 - a planar surface comprising a plurality of interconnected matter surface areas and a plurality of apertures between the matter surface areas; and

a plurality of spaced protrusions of substantially uniform height protruding from a first side of said matter surface areas, each of the protrusions having a base of a first width and an apex of a second width that is less than the first width, the apexes of at least some of said protrusions forming a protrusion plane, a second side of the matter surface areas opposite the first side of the matter surface areas having portions opposite the protrusions' bases that are un-apertured;

whereby, when the spacer is in place between the wall surfaces and the cladding material, liquid and air may pass between the protrusions, to facilitate air circulation in, and liquid drainage from, the spacing between the wall surfaces and the cladding material.

13. An air gap space according to claim 12, wherein a thickness of the planar surfaces and a ratio of the matter surface areas to the aperture areas are of sizes so as to inhibit the trapping of water and moisture in spaces defined by the matter surface areas when the air gap spacer is in operative relationship.

14. A method for providing spacing between wall surfaces and cladding material, the method comprising the steps of:

providing an air gap spacer comprising:

a planar surface comprising a plurality of interconnected matter surface areas and a plurality of apertures between the matter surface areas; and

a plurality of spaced un-apertured protrusions of substantially uniform height depending from only one side of said matter surface areas, the apices of at least some of said protrusions forming a protrusion plane; and

placing the air gap spacer between the wall surfaces and the cladding material; whereby liquid and air may pass through channels formed between the protrusions, to facilitate air circulation in, and liquid drainage from, the spacing between the wall surfaces and the cladding material.

15. A method according to claim 14, wherein a thickness of the planar surface and the ratio of the matter surface areas to the aperture surface areas are chosen so as to

inhibit the trapping of water and moisture in spaces defined by the matter surface areas when the air gap spacer is mounted in operative relationship.

16. A method according to claim 14 or 15, wherein said protrusions depend from said planar surface at least approximately perpendicularly.

17. A method according to any one of claims 14 to 16, wherein at least some of said protrusions are of like dimensions, terminating to form said protrusion plane.

18. A method according to any one of claims 14 to 17, wherein said protrusion plane is at least substantially parallel to said planar surface.

19. A method according to any one of claims 14 to 18, wherein the apertures of the apertured surface are of a repeating pattern over at least substantially the entire spacer.

20. A method according to any one of claims 14 to 19, wherein said protrusions are of a repeating pattern over at least substantially the entire surface of the spacer.

21. A method according to any one of claims 14 to 20, wherein the shape of the apertures are selected from the group including: diamond, circular, square, rectangular, oval and quadrilateral.

22. A method according to any one of claims 14 to 21, wherein the shape of said protrusions are selected from the group including: pyramidal, flat topped pyramidal, conical, flat topped conical, rectangular based pyramid, and cuboid.

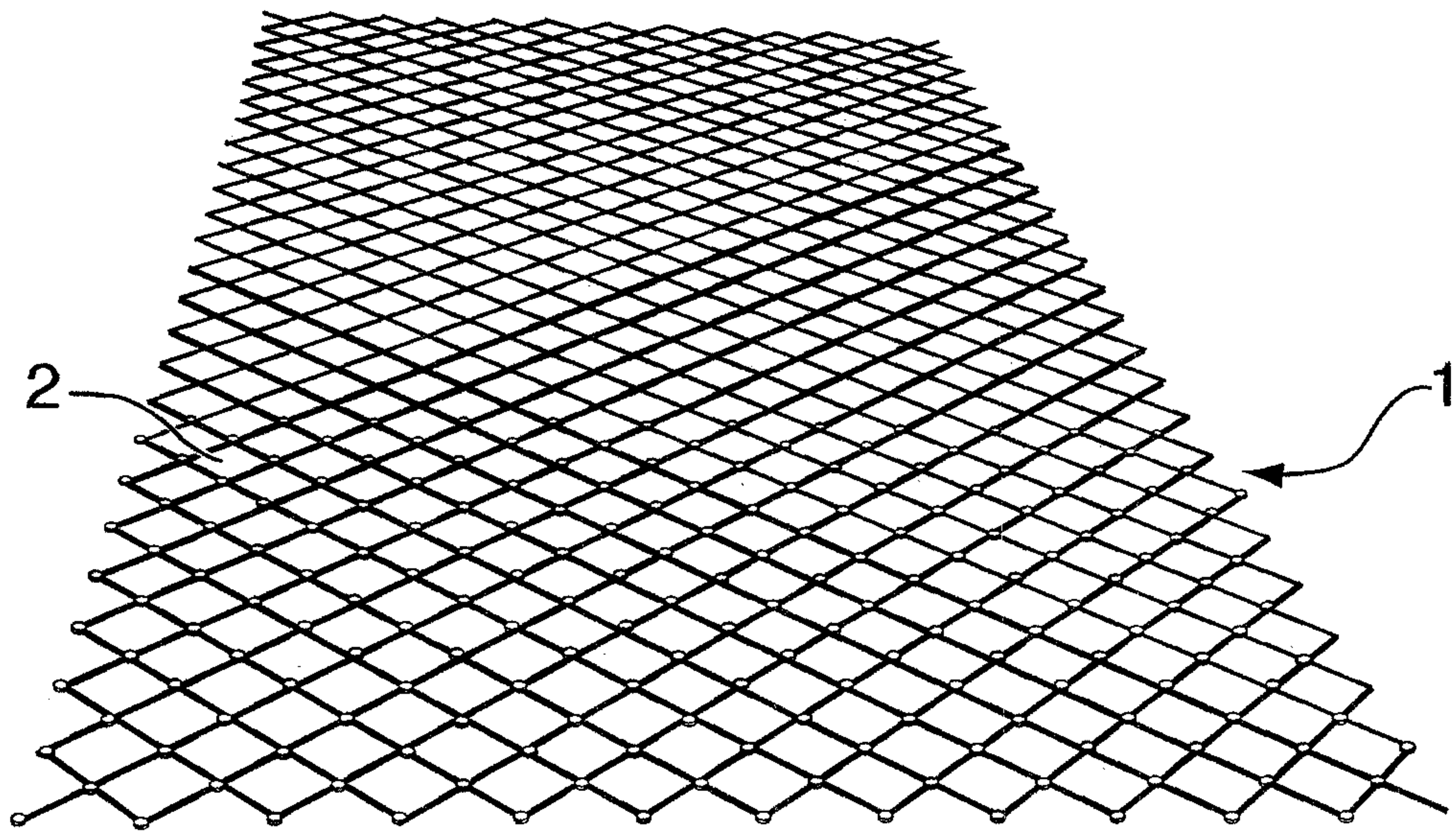


FIG. 1

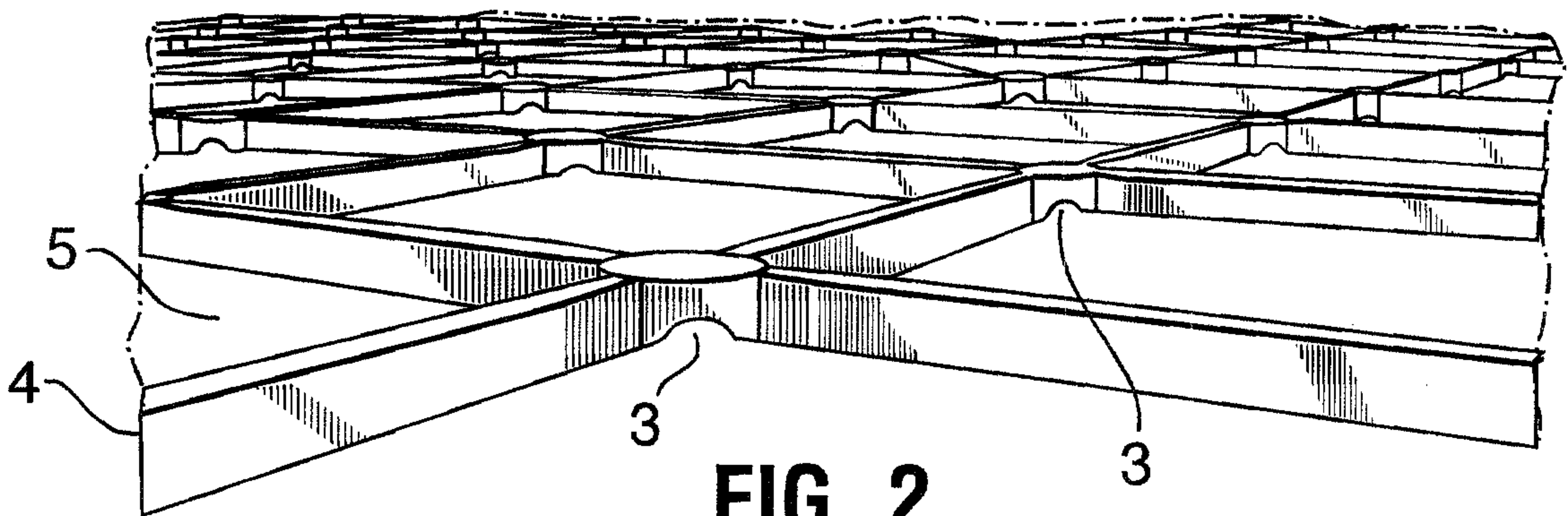


FIG. 2

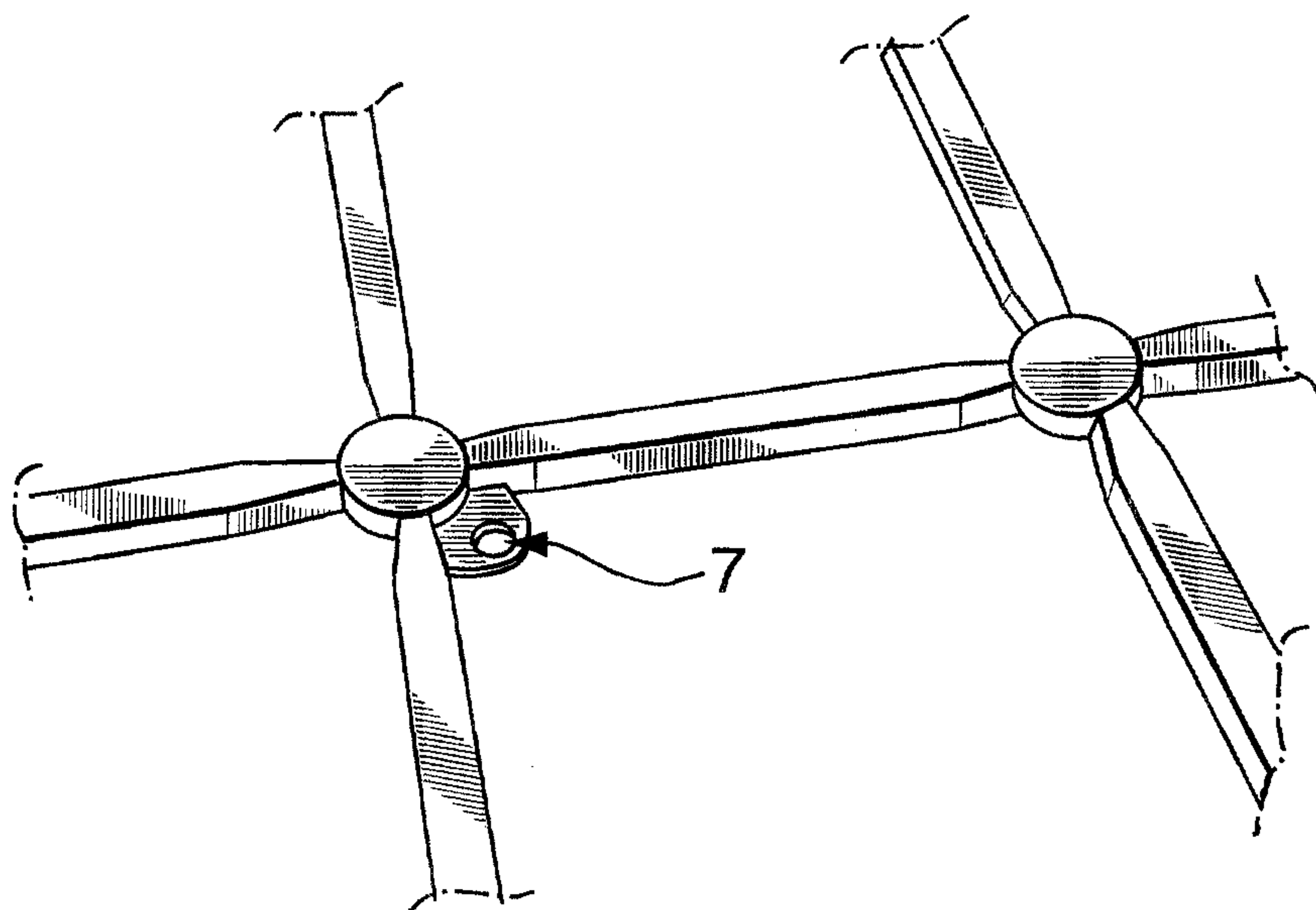


FIG. 3

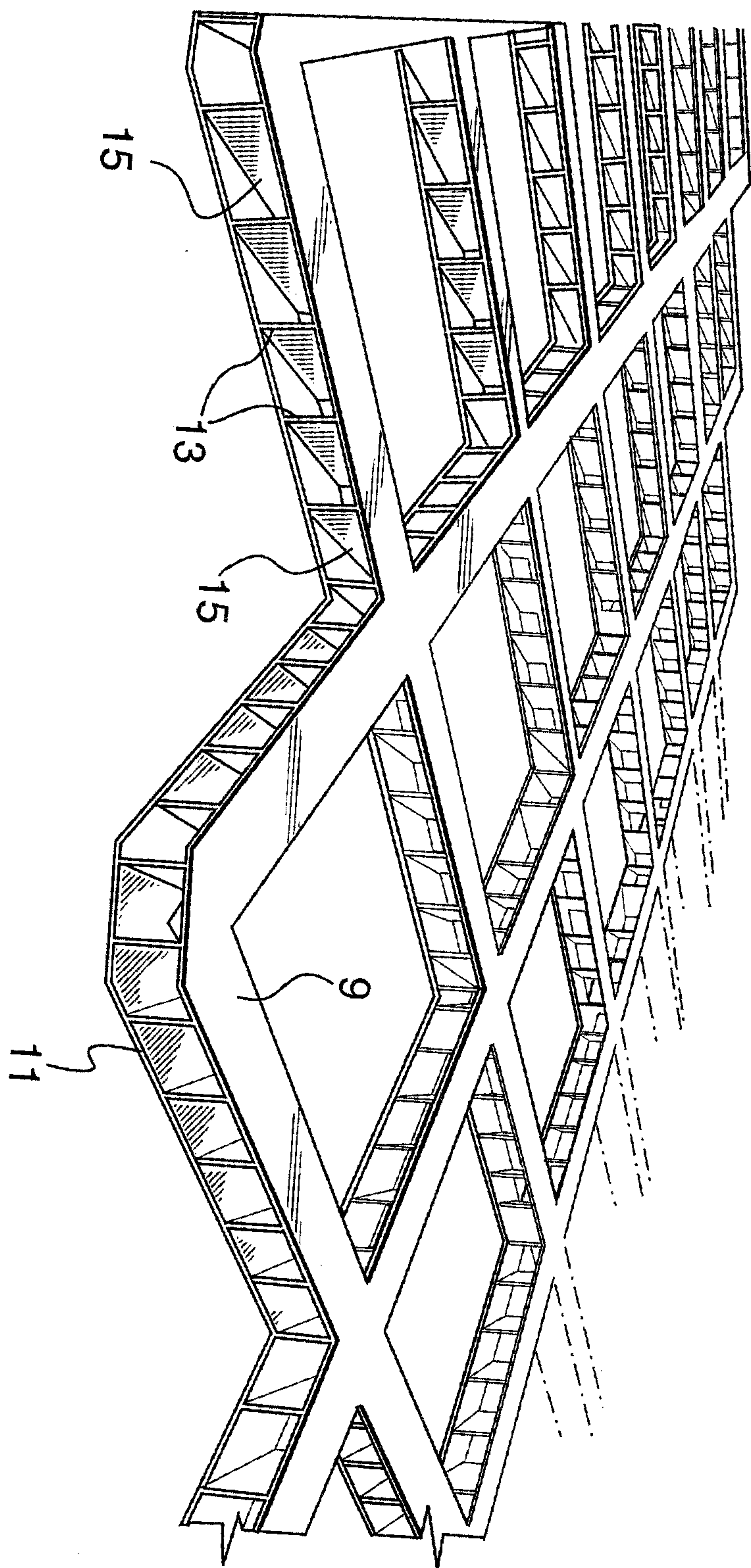


FIG. 4

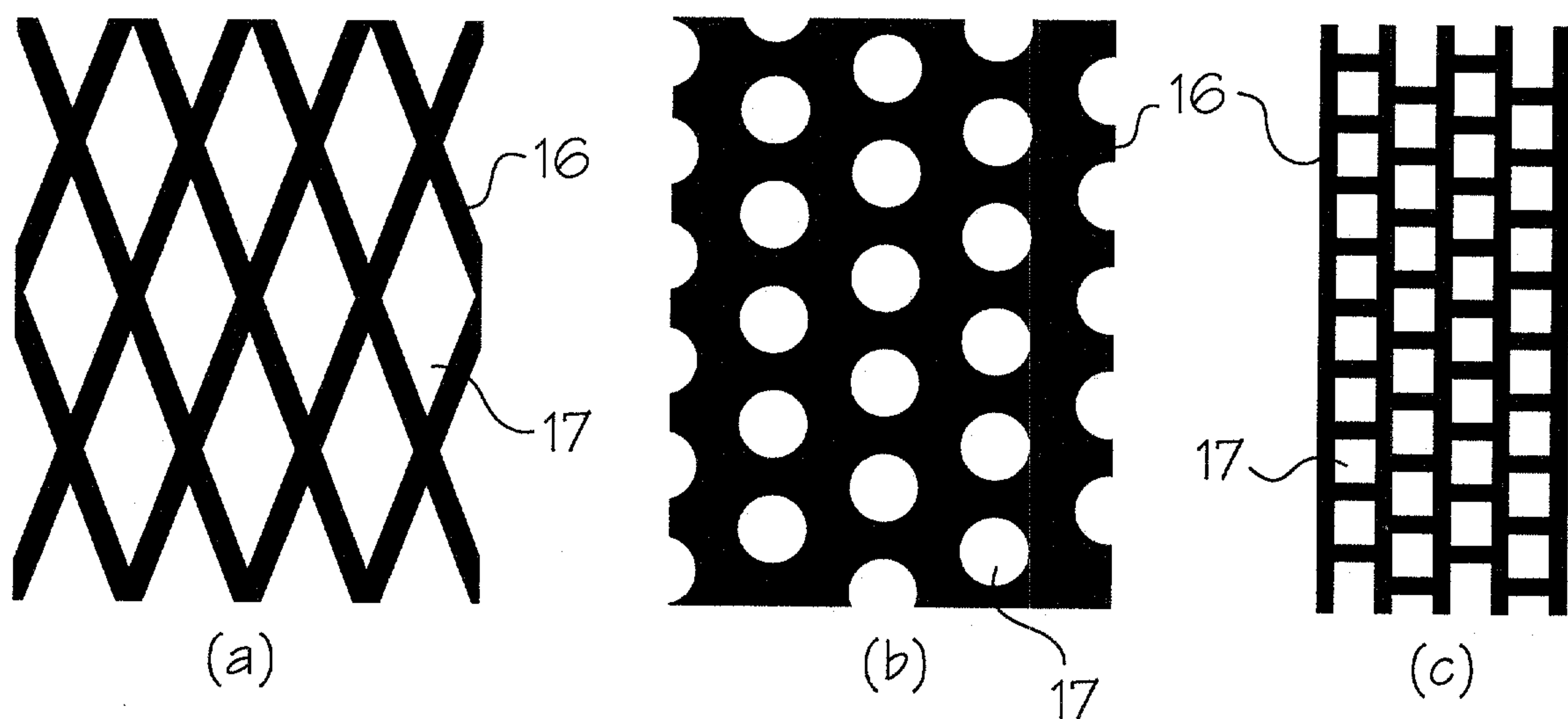


FIG. 5

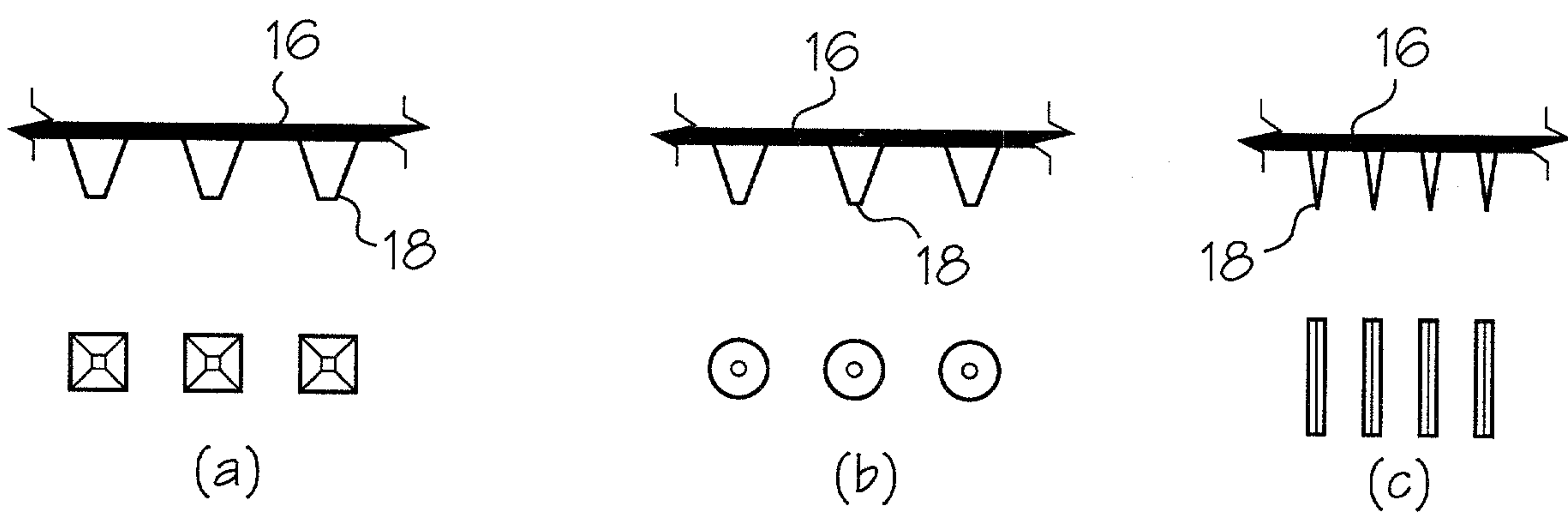


FIG. 6

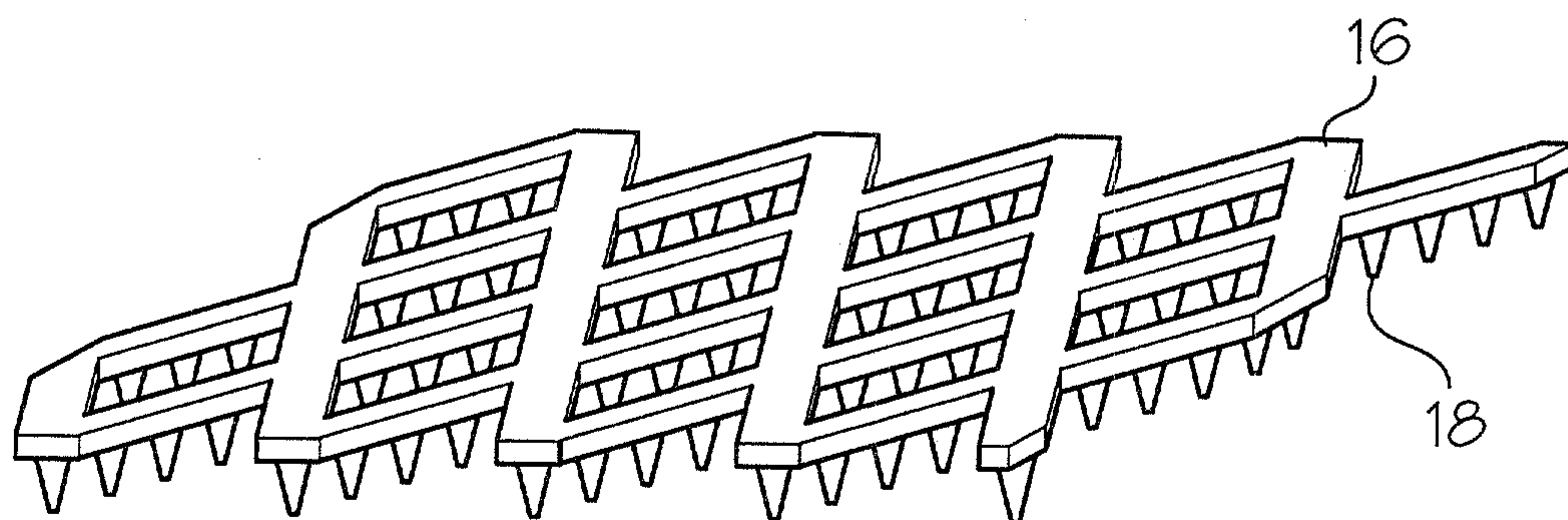


FIG. 7

