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has an effect to economically and efficiently prevent the temperature of the roof from becoming high due to shining down of direct sunlight on the upper surface of the roof.



Description

TECHNICAL FIELD

5 **[0001]** The present invention relates to roofs, and more specifically relates to roofs that prevent members forming the roofs from becoming high temperature by direct sunlight to thereby eliminate the influence on indoors.

BACKGROUND ART

10 **[0002]** As this kind of prevention means on the conventional roofs, there are some means for ventilating a space of attics to thereby cut the influence from the roofs. Additionally, there are some means for prevent rise of the temperature from the roofs by forming the roofs themselves into a heat insulation structure.

Patent Document 1: Japanese Patent Application Laid-open No.2003-184216 A

15 Patent Document 2: Japanese Patent Application Laid-open No.2003-80772 A

DISCLOSURE OF THE INVENTION

PROBLEM TO BE SOLVED BY THE INVENTION

20 **[0003]** The effect that is brought about by the above-mentioned conventional methods, such as ventilating the space of attics and forming the roofs into the heat insulation structure, can be relatively expected. However, these methods require plenty of cost, and in addition to that, applying these methods to, for example, factories, warehouses, garages or the like is not ready due to their structures, and the temperature of metal roofs using low profile standing seam metal
25 roofing and roof decks in particular become considerably high by direct sunlight to thereby influence on indoors.

[0004] For that reason, the present invention is intended to protect the roofs themselves from direct sunlight by a simple configuration, and also prevent the roofs from becoming high temperature by positively cooling them.

MEANS FOR SOLVING PROBLEM

30 **[0005]** A roof of the present invention is characterized in that a planar base material in which gaps penetrated through back and front sides are formed is arranged on a roof surface with a clearance between the roof and itself.

[0006] The present invention according to claim 2 is characterized in that the planar base material in which the gaps penetrated through the back and front sides are provided has a net structure.

35 **[0007]** The present invention according to claim 3 is characterized in that the planar base material in which the gaps penetrated through the back and front sides are provided is a sheet or a board material having bores scattered therein.

[0008] The present invention according to claim 4 is characterized in that the planar base material in which the gaps penetrated through the back and front sides are provided is arranged on the roof surface with a concave-convex streak formed in a certain direction to form a ventilation flue in a space between the concave streak and the planar base material.

40 **[0009]** The present invention according to claim 5 is the roof with the concave-convex streak formed in the certain direction, and characterized in that the ventilation flue is formed in the space between the concave streak and the sheet or the board material, and that the bores are provided in the sheet part or the board material part on this ventilation flue.

[0010] The present invention according to claim 6 is characterized in that the planar base material is arranged from the inside except an end thereof in a direction of the concave-convex streak of the roof.

45 **[0011]** The present invention according to claim 7 is characterized in that the planar base material has a heat insulation efficiency.

EFFECT OF THE INVENTION

50 **[0012]** Since the roof according to claim 1 of the present invention has a structure that the planar base material in which the gaps penetrated through the back and front sides are formed is arranged on the roof surface with the clearance between the roof and itself, the roof structure has an effect to prevent the temperature of the roof from becoming high due to shining down of direct sunlight on the upper surface of the roof, and makes air exist in the space formed between the roof and the planar base material, and can also be expected to have an aeration effect and an air cooling effect by
55 air going in and out also from the gaps where air penetrates through the back and front sides, and further, has an effect to control the loose of the planar base material and discharge the rain water collected on the planar base material from the gaps which penetrate the back and front sides.

Such effects are not brought about artificially or mechanically, but brought about using natural winds, so that it also has

an economical effect which does not require a running cost.

[0013] The present invention according to claim 2 is characterized in that the planar base material in which the gaps penetrated through the back and front sides are provided has a net structure, and the present invention according to claim 3 is characterized in that the planar base material in which the gaps penetrated through the back and front sides are provided is the sheet or the board material having bores scattered therein, wherein the material has an effect the ability of being used for the planar base material as they are without giving special processing or the like, and thus the aeration effect, the loose control effect, and the rain water discharge effect from the nets or bores are exerted.

[0014] According to the present invention of claim 4, since the roof has the roof surface with a concave-convex streak formed in a certain direction, the planar base material is arranged thereon, and the ventilation flue is formed in the space between the concave streak and the planar base material, the arranged planar base material itself has the effect to prevent direct sunlight or the like from shining down on the roof surface, while the wind can easily pass through the inside of the ventilation flue, so that air passes through inside of the flue to prevent the roof from heating and the air cooling effect can also be obtained for cooling the inside of the flue by air circulation.

[0015] In addition, since the planar base material on the ventilation flue has the gaps penetrated through the back and front sides, air goes in and out freely also from the gaps penetrated through the back and front sides, so that the air circulation function is promoted to enhance the aeration effect and the air cooling effect, and the loose of the planar base material is further prevented, thus also providing an effect of promoting drainage of the rain water collected on the planar base material.

Such effects are not brought about artificially or mechanically, but brought about naturally and also has an economical effect which does not require a running cost.

[0016] According to the present invention of claim 5, when the planar base material is the sheet or the board material, if the bores are provided in the sheet part or the board material part on the ventilation flue formed in the space between the concave streak and the sheet or the board material, the aeration effect, the loose control effect, and the rain water discharge effect is fully exerted.

[0017] Since the roof in which concave-convex streak is formed is composed of metal roof decks in many cases, is likely to become high temperature by direct sunlight, it receives benefits by the present invention.

According to the present invention of claim 6, if the planar base material is arranged from the inside except the end thereof in the direction of concave-convex streak of the roof, air certainly enter the formed ventilation flue from the end of the roof, thus further enhancing the air cooling effect in the concave streak part.

[0018] Further, according to the present invention of claim 7, if the roof is formed of the planar base material with heat insulation efficiency, shading and heat insulation function of direct sunlight or the like are enhanced, thus increasing the effect of preventing the temperature of the roof from becoming high.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

FIG. 1 is a plan view showing one embodiment of the present invention;

FIG.2 is a principal part sectional view of FIG.1;

FIG.3 is a principal part sectional view of FIG. 1;

FIG.4 is a plan view showing another embodiment of the present invention of FIG.1;

FIG.5 is a principal part sectional view of FIG.4;

FIG. 6 is a principal part sectional view of FIG.4;

FIG.7 is a plan view showing another embodiment of the present invention; and

FIG.8 is a plan view showing another embodiment of the present invention.

EXPLANATIONS OF LETTERS OR NUMERALS

[0020]

- 1: Roof
- 2: Planar base material
- 3: Metal roofing board
- 4: Cap
- 5: Snow stopper
- 6: Angle
- 7: Attachment hole
- 8: Clearance

- 9: Gap
- 10: Roof deck
- 11: Concave streak
- 12: Convex streak
- 13: Bolt and nut
- 14: Ventilation flue
- 15: Interval
- 16: End

BEST MODE FOR CARRYING OUT THE INVENTION

[0021] The present invention could protect roofs themselves from direct sunlight with a simple configuration, and also could prevent the roofs from becoming high temperature by positively cooling them.

Embodiment-1

[0022] Embodiments of the present invention will be described based on the drawings. FIG. 1 is a plan view of a roof showing one embodiment of the present invention, and FIGs.2 and 3 are principal part sectional views thereof, wherein it is configured that the planar base material 2 is arranged on a roof 1. It is effective to cover about 70 to 90% of the roof 1 with the planar base material 2.

The roof 1 in the drawings is a low profile standing seam metal roofing roof of a flat roof, being removably attached with a bolt and nut 13 using an angle 6 of a snow stopper 5 which is attached to a cap 4 of a knot of a metal roofing board 3, and attachment holes 7 of a planar base material 2, and the planar base material 2 is arranged on the roof 1 while loosing from the surface of the roof 1 and providing a clearance 8 (about 50-90 mm) therebetween. The attachment

holes 7 are disposed to the peripheral edge portion of the planar base material 2 at a predetermined pitch.

[0023] The planar base material 2 is a thin board-like material or a sheet-like material, the material of which may be any kind of materials, such as wood, resin, metal, or cloth, and gaps 9 penetrated through a back and front sides are formed therein.

The gaps 9 which penetrate through the back and front sides may be formed linearly or geometrically to be scattered regularly or arbitrarily. In a case that the gaps 9 are through holes, an opening rate of the overall through holes to the planar base material 2 is set to about 3 to 8 % and preferably 4 to 6 %.

[0024] As a net structure, a textile net or a knitted net, such as a resin net, a synthetic fiber net, a mesh cloth, a screen mesh, a bolting cloth, a wire net, or a net punched holes uniformly or the like, are provided with the gaps 9, so that they can be used for the planar base material 2 as they are.

Further, a tape-like material of thin width is woven or knitted to form the gaps 9, or a configuration arranging a stick material or a string material within a frame in the shape of barred lattice can also provide the streaky gaps 9, so that they can be used for the planar base material 2 as they are.

[0025] As the sheet, a material which has tensile strength, such as various textile cloth, a vinyl cloth, a rubber material is desirable, and a material called a shade sheet variously processed, such as light-proof, heat resistance, waterproofing, or a cold gauze may be used. For example, the thickness of the sheet is about 0.2-2.0 mm, preferably 0.4-0.8 mm.

As the board material, although a single board of the various materials and a plyboard can be used without any limitations, a board as thin as possible is preferable. For example, the thickness of the board material is about 2.0-20.0 mm.

In addition, a corrugated board such as polystyrene or the like, a thin board made of resin with a heat insulation function, or a single board and a plyboard with a heat insulating layer on the surface are also desirable.

Moreover, a shape and a size of the through holes 9 formed in the sheet or the board material may adopt arbitrary one, and scattering of the through holes is designed appropriately based on a relation between an increase in roof temperature by sunlight passing therethrough and a ventilation circulation. For example, the diameter of the through holes 9 is about 80-150 mm (preferably 100-120 mm) in a case of circular holes (refer to FIG.4).

[0026] Since the roof 1 is blocked by the planar base material 2 without sunlight hitting directly, the temperature rise of the roof 1 itself can be prevented, even when the net planar base material is used, it has a block function of sunlight. Subsequently, since the space of the clearance 8 is formed between the roof 1 and the planar base material 2, and the planar base material 2 is provided with the gaps 9 and 9 · · · , air goes in and out and circulates from the ends and the gaps 9 of the planar base material 2 of the roof 1, so that the air in the space of the clearance 8 is aerated to thereby prevent the temperature in the space from becoming high, and the air cooling function of the roof 1 itself is also performed, and the loose of the planar base material 2 by the wind or the like can also be prevented.

Embodiment-2

[0027] FIG.4 is a plan view of a roof showing another embodiment of the present invention, and FIGs.5 and 6 are principal part sectional views thereof, wherein it is configured that the planar base material 2 is arranged on the roof 1. The roof 1 is a flat roof which is gently inclined in a direction from the top to the bottom and is formed of a roof deck 10 in the drawing, and concave streaks (valley parts) 11 and convex streaks (mountain parts) 12 of the roof deck 10 are also arranged in the top to bottom direction along with an inclination in the drawing.

The roof 1 may have concave-convex streaks formed thereon, so that means and configurations for forming the streak are not limited to a kind of roof deck, and a kind of roof is not considered, either.

[0028] The planar base material is in removable fixed and arranged with the bolts and nuts 13 provided in a circumferential end of the roof 1 corresponding to the attachment holes 7 and 7 · · · provided in the circumference.

Moreover, the gaps 9 and 9 · · · exist in the planar base material 2 on a ventilation flue 14 formed of the concave streak 11 of the roof 1 and the arranged planar base material 2.

Hence, since air in the ventilation flue 14 goes in and out and circulates from the end and gaps of the concave streak of the planar base material 2, the air in the ventilation flue 14 is ventilated to be able to prevent the temperature from becoming high, and the air cooling function of the concave streak 11 of the roof 1 which forms the ventilation flue 14 or the planar base material 2 is also performed, and the loose of the planar base material 2 by the wind or the like can be also prevented.

Embodiment-3

[0029] FIG.7 is a plan view showing another embodiment, wherein a plurality of the planar base materials 2 and 2 · · · are mutually arranged on a plane-like roof 1 with an interval 15, and air can go in and out and circulate from the portion with the interval 15 to the ventilation flues 14. For example, the interval 15 is about 10-500 mm.

Embodiment-4

[0030] FIG.8 is a plan view showing another embodiment, wherein the planar base material 2 is arranged from the inside except the end 16 in the direction of the concave-convex streaks 11, 12 of the roof 1, so that air can easily go into the ventilation flues 14 from the end 16 which the planar base material 2 is not arranged thereon.

[0031] The above description shows one embodiment of the present invention, and the mere design change from which the same effect can be obtained and the modifications by means of common practice are included in the embodiments of the present invention.

INDUSTRIAL APPLICABILITY

[0032] When the roofs themselves are protected from direct sunlight and also prevented from becoming high temperature by positively cooling them, the present invention can be used in areas where they are achieved not artificially or mechanically but using natural winds or the like, and reduction in running cost is required.

Claims

1. A roof, wherein a planar base material in which gaps penetrated through back and front sides are formed is arranged on a roof surface with a clearance between the roof and itself.
2. The roof according to claim 1, wherein the planar base material in which the gaps penetrated through the back and front sides are provided has a net structure.
3. The roof according to claim 1, wherein the planar base material in which the gaps penetrated through the back front sides are provided is a sheet or a board material having bores scattered therein.
4. The roof according to claim 2, wherein a concave-convex streak is formed in a certain direction and a ventilation flue is formed in a space between the concave streak and the planar base material.
5. The roof according to claim 3, wherein the concave-convex streak is formed in the certain direction, the ventilation flue is formed in the space between the concave streak and the sheet or the board material, and the bores are provided in the sheet part or the board material part on this ventilation flue.

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6. The roof according to claim 5, wherein the planar base material is arranged from an inside except an end thereof in a direction of the concave-convex streak of the roof.
7. The roof according to claim 1, wherein the planar base material has heat insulation efficiency.

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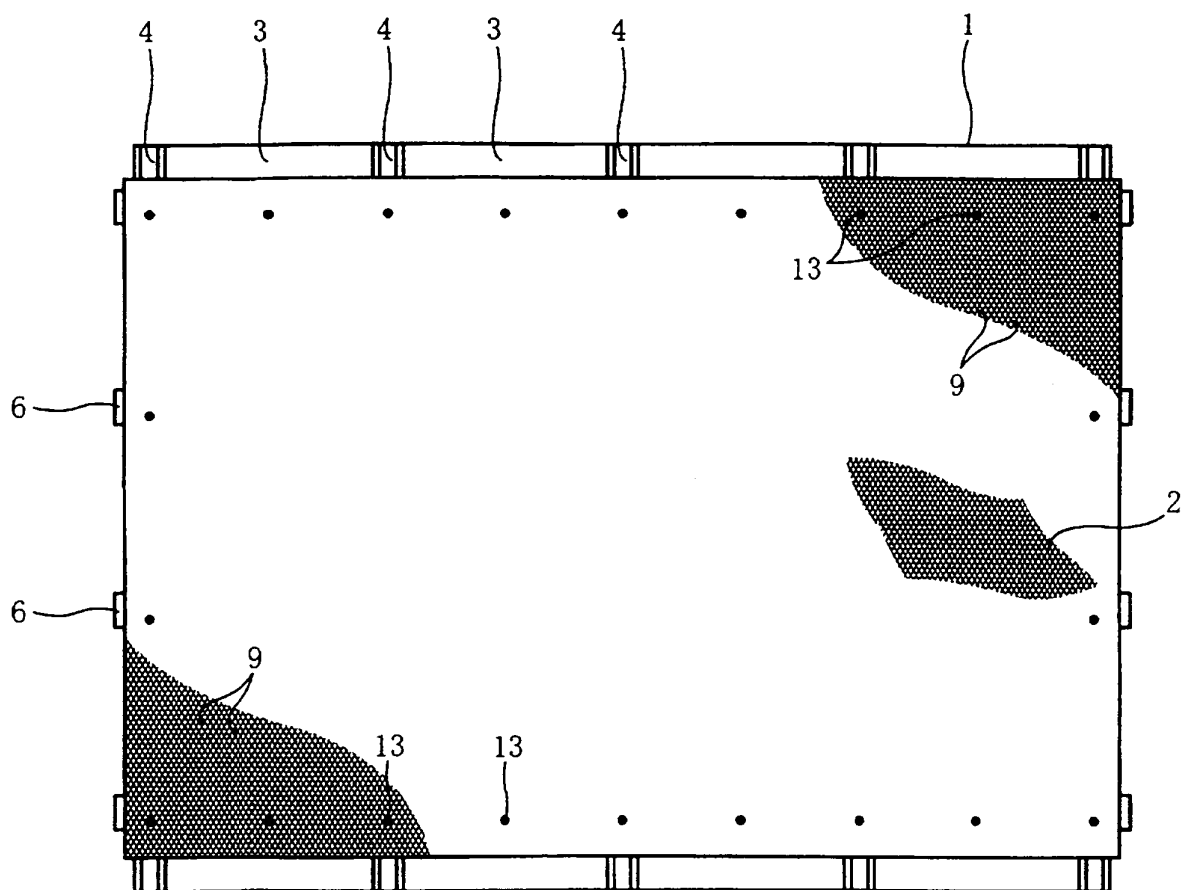


FIG.1

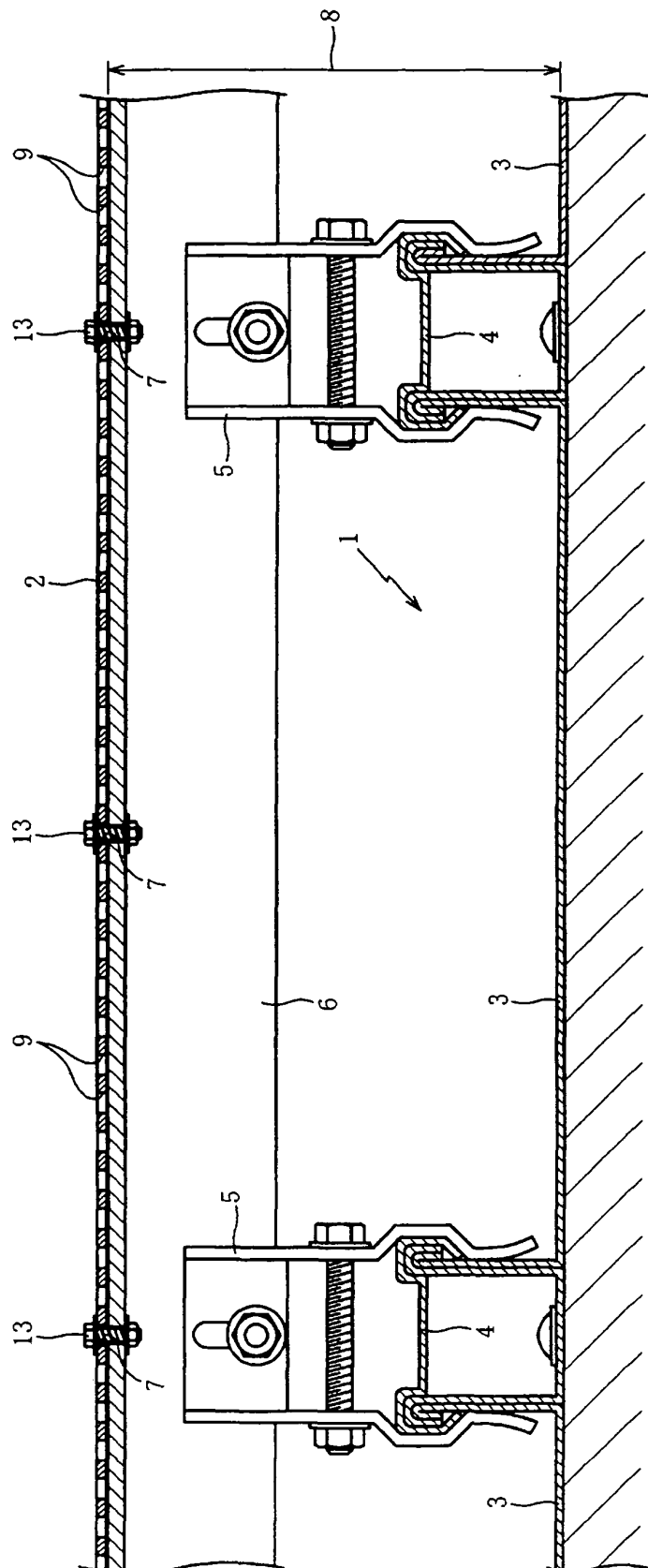


FIG. 2

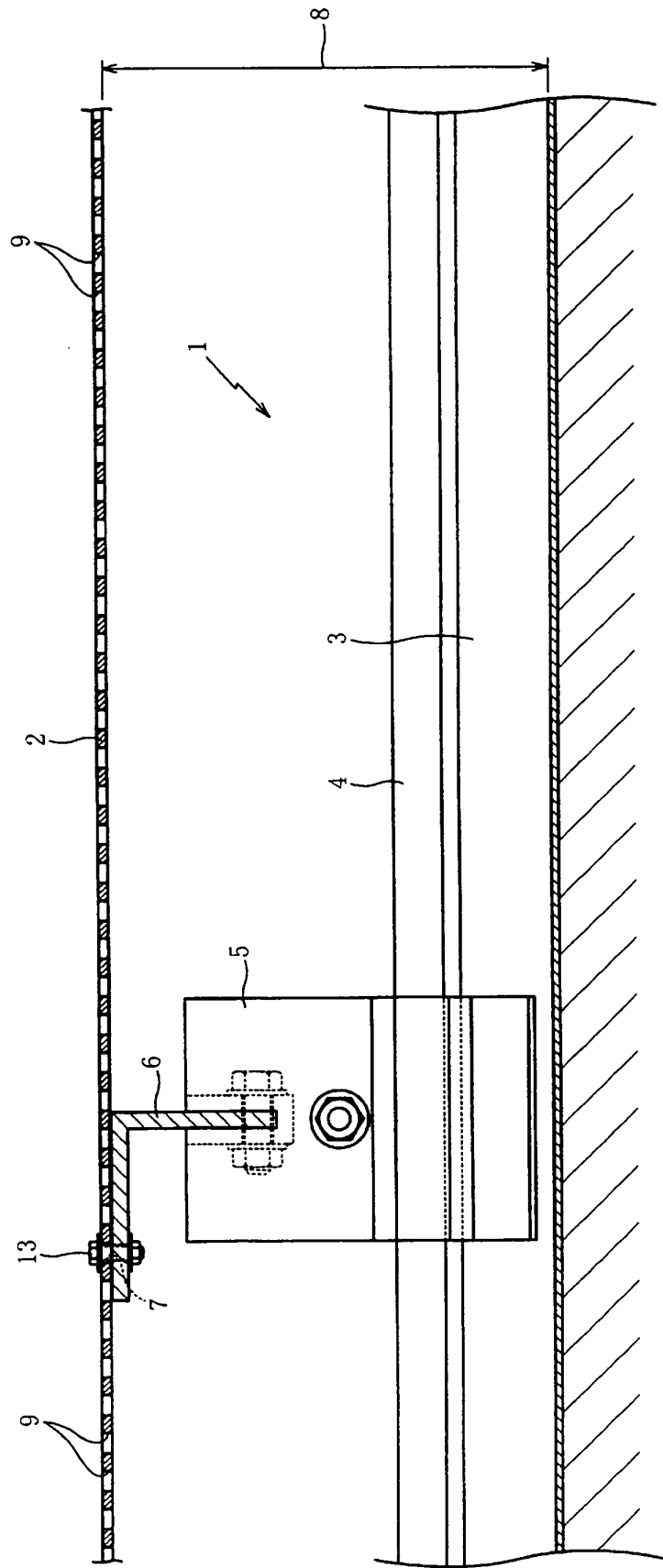


FIG.3

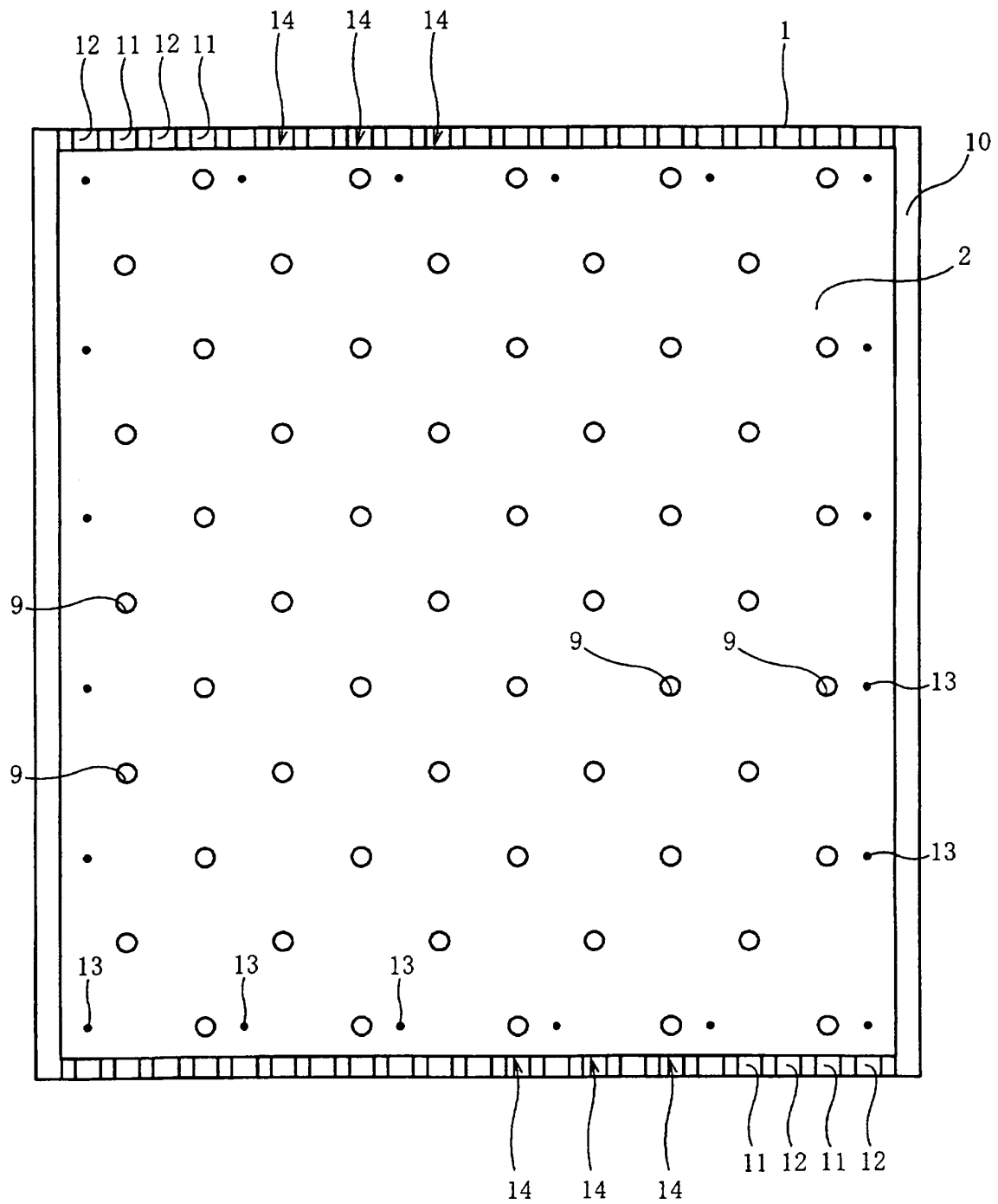


FIG. 4

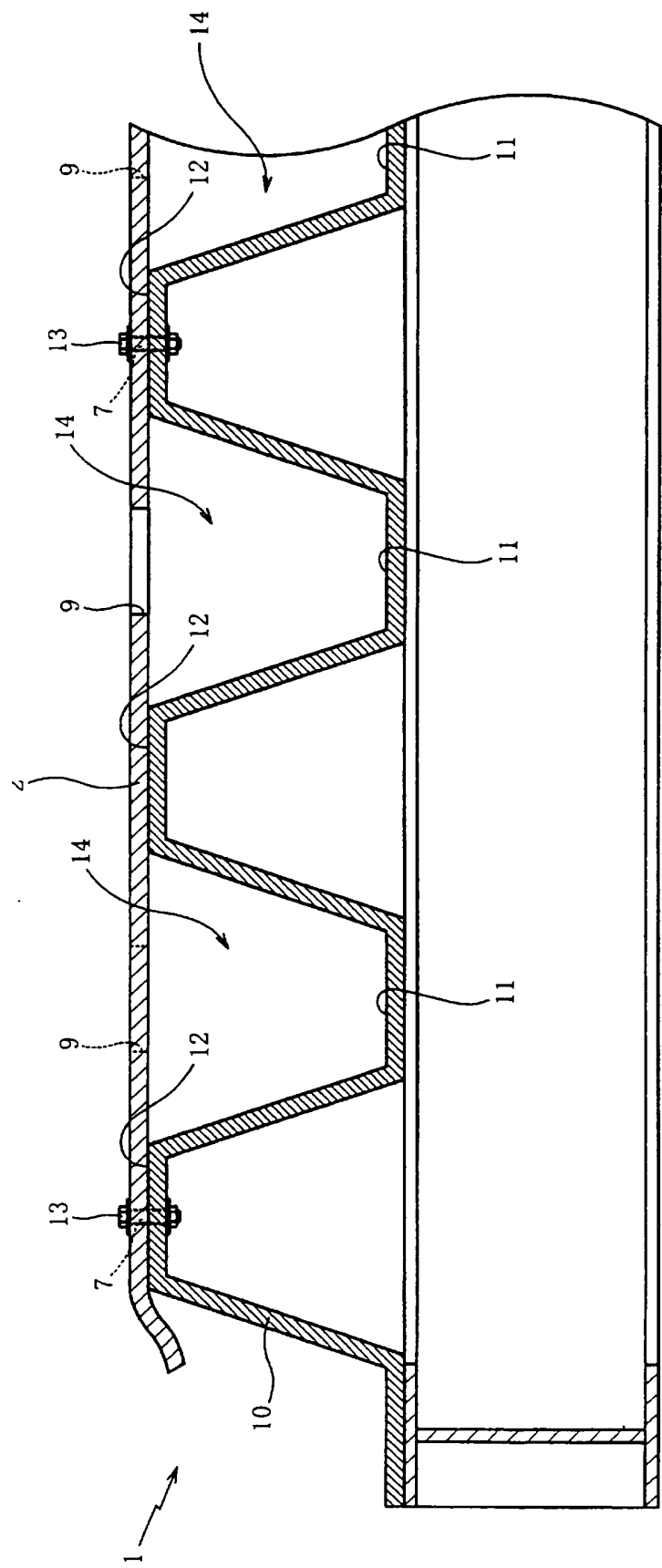


FIG.5

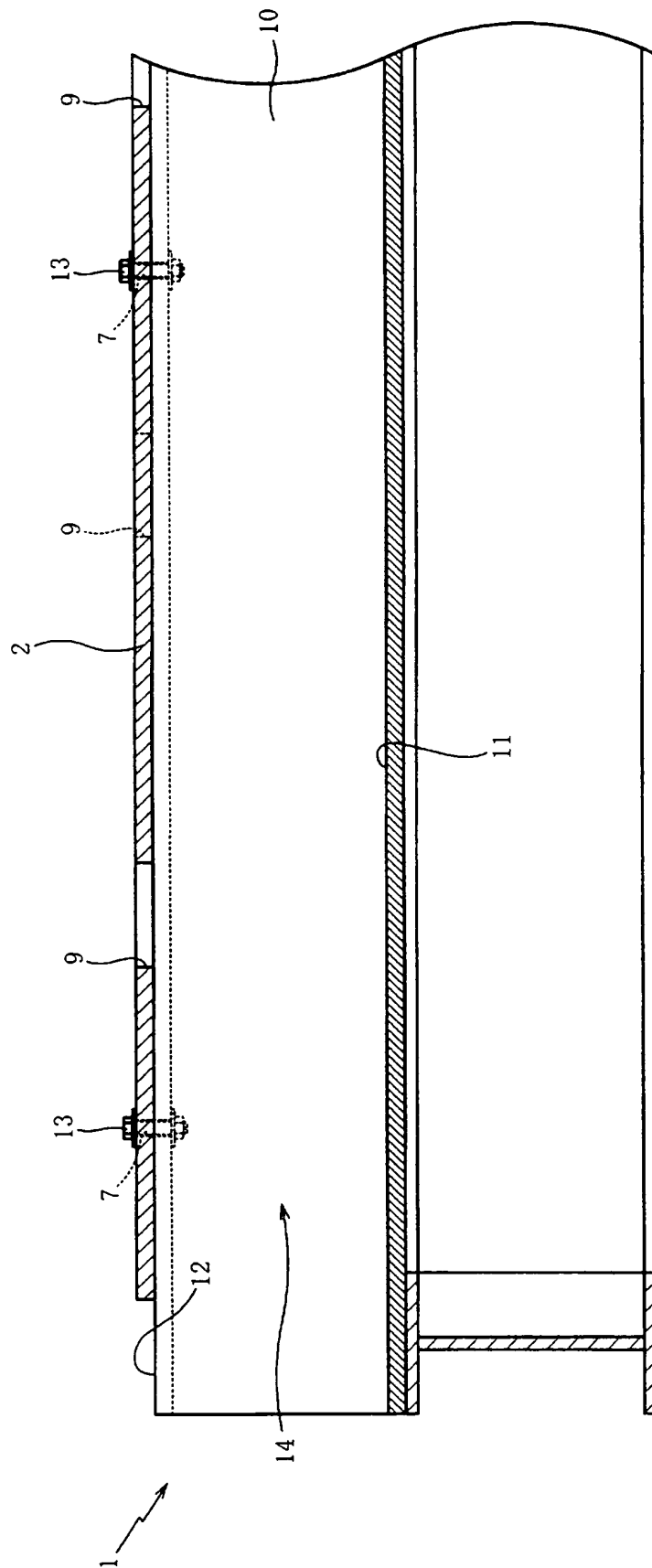


FIG. 6

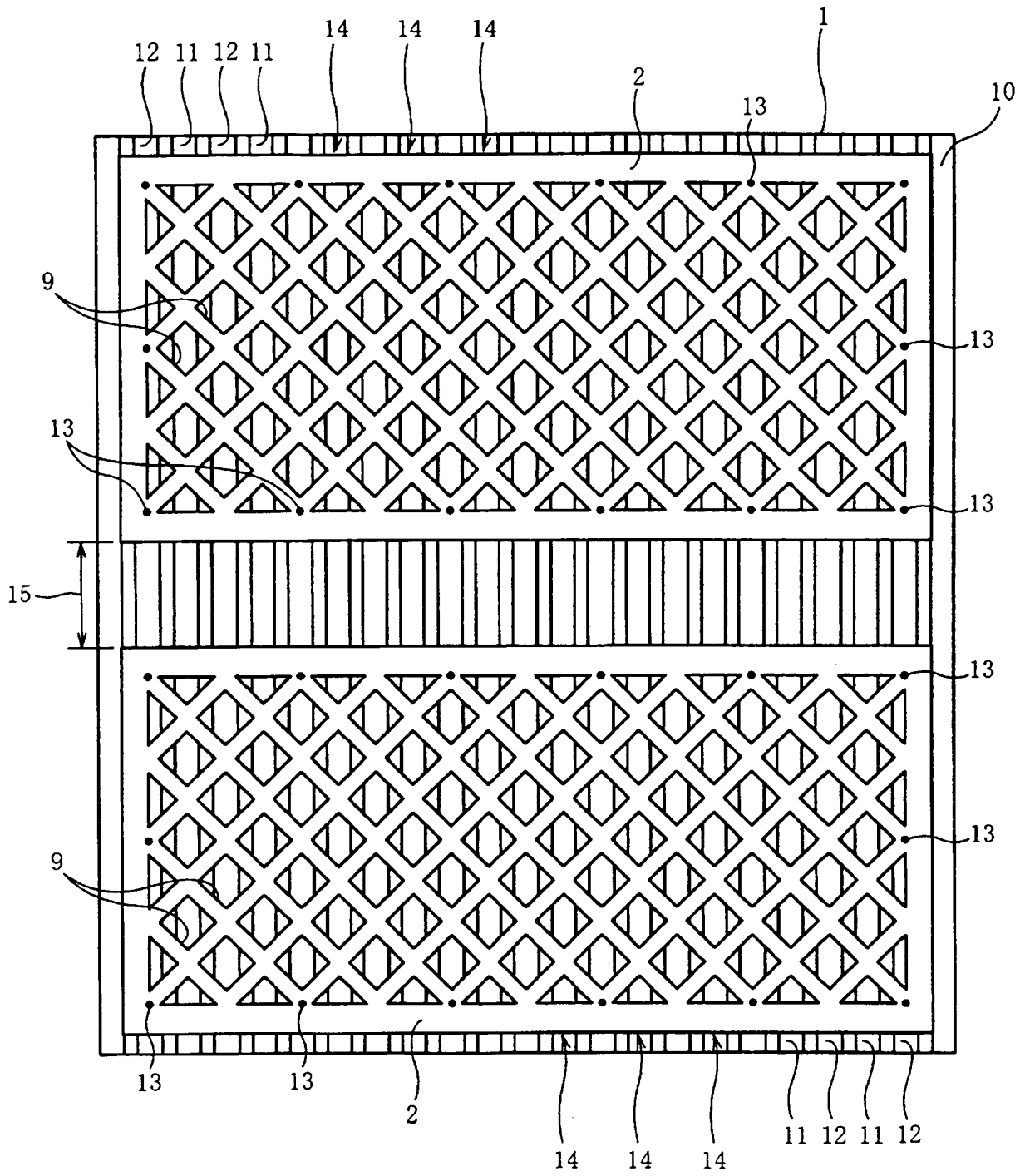


FIG. 7

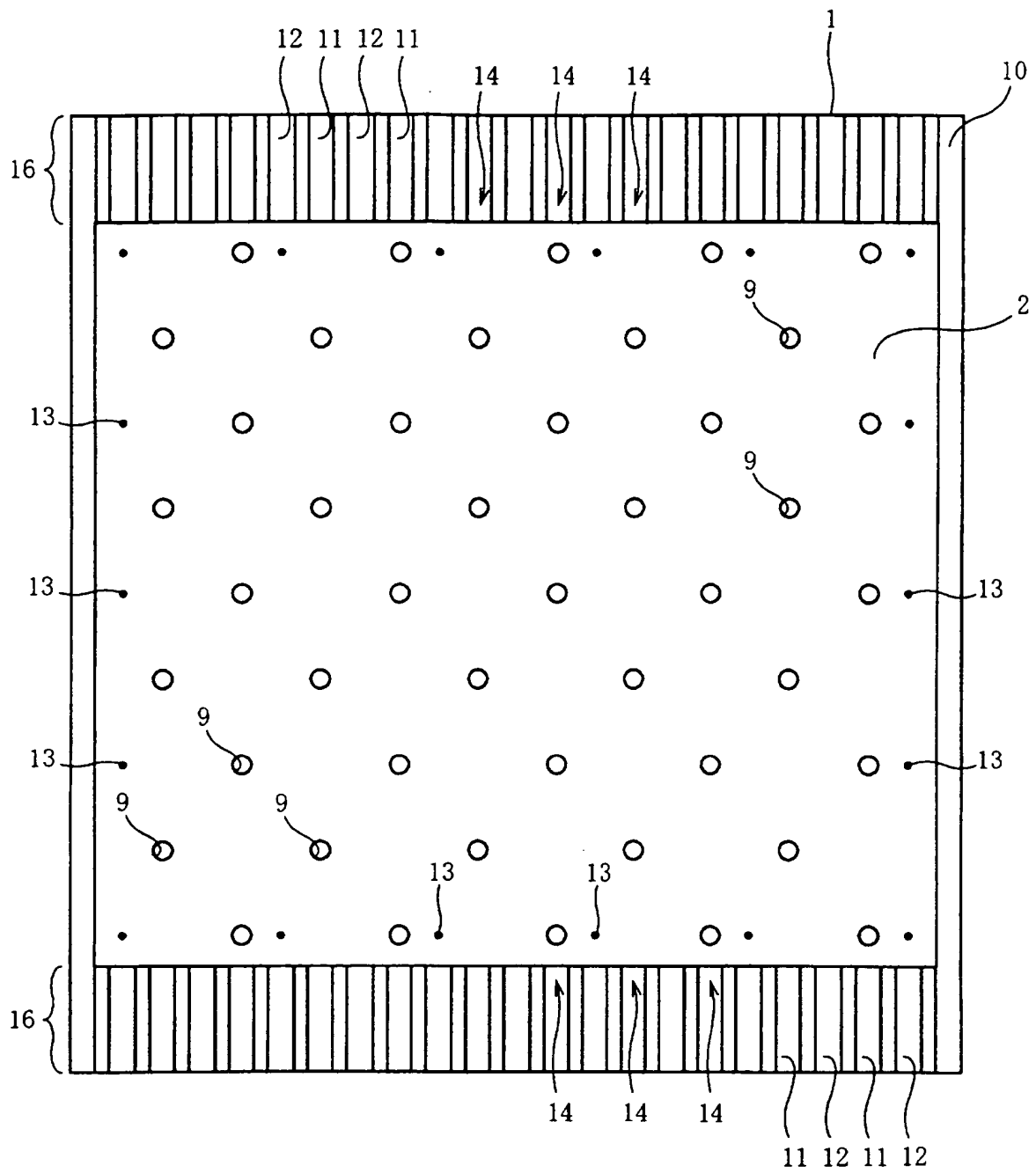


FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2006/317733

A. CLASSIFICATION OF SUBJECT MATTER

E04B1/74(2006.01)i, E04D13/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

E04B1/74, E04D13/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2006
Kokai Jitsuyo Shinan Koho	1971-2006	Toroku Jitsuyo Shinan Koho	1994-2006

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 119117/1979 (Laid-open No. 36806/1981) (Asahi Glass Co., Ltd.), 08 April, 1981 (08.04.81), Page 5, line 1 to page 8, line 3; Fig. 1 (Family: none)	1, 3, 7
Y		2, 4-6
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 18316/1983 (Laid-open No. 124232/1984) (Morinobu KATSUREN), 21 August, 1984 (21.08.84), Page 3, lines 10 to 19; Fig. 1 (Family: none)	2, 4-6



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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"&" document member of the same patent family

Date of the actual completion of the international search
03 October, 2006 (03.10.06)Date of mailing of the international search report
10 October, 2006 (10.10.06)Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2006/317733

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2003-147918 A (Masami TANAKA), 21 May, 2003 (21.05.03), Par. Nos. [0010] to [0015]; Fig. 2 (Family: none)	4 - 6
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 149893/1975 (Laid-open No. 62620/1977) (Shigekazu TAJIMA), 09 May, 1977 (09.05.77), Page 4, lines 5 to 12; Fig. 4 (Family: none)	6

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REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 2003184216 A [0002]
- JP 2003080772 A [0002]