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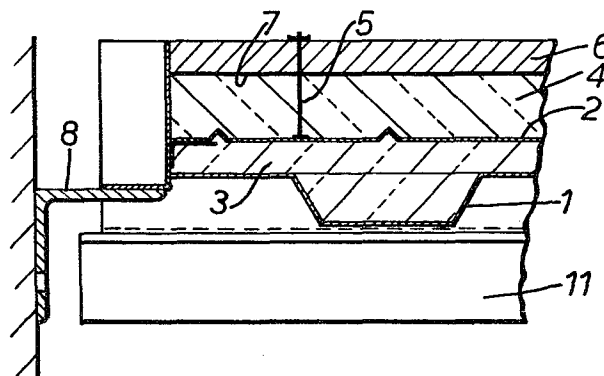
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(54)

Insulated wall panels.

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An insulated wall panel comprises a stainless steel or other sheet metal exterior 1 separated by a layer 3 of insulation material from an interior membrane 2 that carries support means, in the form of pins 5, for the insulation material. Each wall panel 1 preferably has a ribbed exterior that may be in the form of a single sheet of stainless steel. The interior membrane 2 may be a single sheet formed from mild steel, stainless steel, galvanised steel or calcium silicate board and the insulating material 3, which is preferably disposed at both sides of the interior membrane, may advantageously be ceramic wool. There are preferably two layers of insulating material to the rear of the interior membrane 2, said layers being physically separated by a sheet of aluminium foil 7. Such wall panels are particularly suitable for the walls of buildings in offshore marine situations and the support of the insulating material 3 from the interior membrane 2 by the pins 5 prevents the visible surface of the stainless steel exterior from being defaced by weld burns. The panels provide a good corrosion-resisting vapour barrier and the insulating material 3 tends to remain in its appointed position should a panel be exposed to a closely neighbouring fire.

**EP 0 090 625 A2**

1 INSULATED WALL PANELS.

 This invention relates to insulated wall panels.

 Wall panels are known which include a profiled external metal sheet that supports insulation material.

5 Conventionally, support of the insulation is provided by studs which are welded to the inside surface of the external sheeting, the actual insulation material being impaled upon the studs so as to be retained in position by washers.

10 In its broadest aspect, this invention provides a wall panel which includes a sheet metal exterior separated laterally by insulation material from an interior membrane characterised in that the membrane includes support means for the insulation material. The
15 internal membrane of the panel may include insulation support means on each of its two sides and may, for example, comprise a sheet of mild steel, stainless steel, galvanised steel or calcium silicate board. In one arrangement, the support means comprises pins
20 extending outwardly from one or both sides of the membrane. These pins may be secured to the membrane in any conventional manner such as, for example, by welding or by a positive mechanical connection. The exterior metal sheet may, for example, comprise stainless steel.

25 For a better understanding of the invention, and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:-

 Figure 1 is a side elevation of a wall panel of a
30 building, the panel being constructed in accordance with the invention,

 Figure 2 is a section taken on the line II-II in Figure 1,

 Figure 3 is a section taken on the line III-III
35 in Figure 1,

 Figure 4 is a section taken on the line IV-IV in Figure 1,

-2-

1 Figure 5 is an enlarged detail of the section illustrated in Figure 3,

5 Figure 6 is a side elevation of an alternative form of wall panel constructed in accordance with the invention,

 Figure 7 is a section taken on the line VII-VII in Figure 6,

 Figure 8 is a section taken on the line VIII-VIII in Figure 6,

10 Figure 9 is a section taken on the line IX-IX in Figure 7,

 Figure 10 is a side elevation of another form of wall panel constructed in accordance with the invention,

15 Figure 11 is a section taken on the line XI-XI in Figure 10,

 Figure 12 is a side view of the panel illustrated in Figure 10,

 Figure 13 is a section taken on the line XIII-XIII in Figure 10, and

20 Figure 14 is a section taken on the line XIV-XIV in Figure 10.

 Referring firstly to Figures 1 to 5 of the drawings, the wall panel that is illustrated therein comprises an exterior wall 1 consisting of a sheet of
25 stainless steel. Laterally spaced from the wall 1 is an internal membrane 2 comprising a sheet of, for example, mild steel, stainless steel, galvanised steel or calcium silicate board.

 The wall 1 and the membrane 2 are separated by a
30 layer of heavy duty insulation material 3 which may, for example, be ceramic wool. A similar layer of insulation material 4 is provided on the surface of the membrane 2 that is remote from the wall 1. The layers 3 and 4 are retained in their appointed positions by pins 5 that are
35 welded to the opposite sides of the membrane 2 (when the latter is metallic) so as to project perpendicularly therefrom. A further layer 6 of insulation material is

-3-

1 positioned alongside the insulation layer 4 but is
physically separated therefrom by a sheet of aluminium
foil 7.

5 The wall 1 and the membrane 2 are supported along
their vertical edges by members 8 in the form of hot- or
cold-rolled angular sections generally of equal or
dissimilar limb length. Although the vertical support
members and horizontal support members that are shown
10 throughout the drawings are all of the construction that
has just been described, it is, in fact, preferred to
form the supporting frame of the wall panel from steel
sheet pressed into an angular-, Z- or box-section since
this folded sheet metal construction enables the frame
15 to be lighter than when the construction shown in the
drawings is employed without sacrificing any strength.
In addition, the folded sheet metal construction for the
wall panel frames is more versatile than is a
construction using rolled angular sections when panels
of non-standard dimensions are to be produced. The
20 support members 8 that are illustrated or the preferred
alternative support members that have just been
described are, in turn, carried by brackets secured to
the adjacent upright wall of the building concerned.
The wall 1 and the membrane 2 may be joined to the
25 support members 8 or to the alternative support members
by any convenient and conventional means such as, for
example, welding. The horizontal supporting frame
members that correspond to the upright members 8 or to
the alternative members that have just been described
30 are connected to the floors and ceilings of the building
by horizontal brackets 11 of angularly shaped ^{cross-}section.

A horizontally extending spacer 12 filled with
insulation material is positioned between upper and
lower sheets of the wall 1 and membrane 2.

35 The wall panel that is illustrated in Figures 6
to 9 of the drawings again comprises the exterior front
wall 1 that may be manufactured from sheets of mild

-4-

1 steel or stainless steel, said sheets having been
profiled with longitudinal ribs or troughs and being
joined together at their overlapping side edges.
Laterally spaced from the wall 1 is again the internal
5 membrane 2 that is manufactured from sheets of, for
example, mild steel, stainless steel, galvanised steel
or calcium silicate board, said sheets being formed with
projections 13 for keying purposes.

The wall 1 and the membrane 2 are separated by
10 the layer 4 of heavy duty insulation material, such as
ceramic wool. Similar layers 15 of insulation material
are provided between the surface of the membrane 2 that
is remote from the wall 1 and a back wall 16 of the
panel. The layers 15 are retained in position by pins
15 17 welded to one side of the membrane 2. The layers 15
are closely adjacent to one another but are physically
separated by a sheet of aluminium foil 18.

The front wall 1, the membrane 2 and the back
wall 16 are sustained along their vertical edges by
20 members 19. These supporting frame members 19 may again
be rolled angular sections, as illustrated, or may have
the preferred folded sheet metal construction that is
described above. In either case, the members 19 are, in
turn, supported by brackets secured to the adjacent wall
25 of the building concerned.

The walls 1 and 16 and the membrane 2 may be
joined to the supporting frame members 19 by any
convenient and conventional means such as, for example,
welding. The horizontal frame members of the wall panel
30 again have either of the two different constructions
that have been described and are connected to the floors
and ceilings of the building concerned by the previously
mentioned horizontally extending brackets 11 of
angularly shaped cross-section.

35 A horizontally extending stainless steel support
rail 22 is positioned between upper and lower sections
of the membrane 2 and the rear wall 16.

-5-

1 The wall panel that is illustrated in Figures 10
to 14 of the drawings is similar in many respects to the
panel already described with reference to Figures 5 to 9
of those drawings and the reference numerals that are
5 used in Figures 10 to 14 denote the same parts as have
already been described with reference to the former
Figures.

One advantage of the wall panels that have been
described above is that, because the insulation material
10 is supported by the membrane 2 in each case, a visible
stainless steel exterior wall surface can be employed
without detriment to its appearance as a result of weld
burn caused by studs which, conventionally, are welded
to the interior surface of the external visible wall to
15 provide support for the insulation material. Secondly,
the membrane 2 integrates, by conduction, any
temperature differences that are due to non-uniform
thickness in the insulation thus creating a
substantially uniform temperature inner layer within the
20 wall panel.

Thirdly, fire resistance integrity is maintained
because the front exterior wall 1 remains unrestrained,
the insulation material being supported by the membrane
2 so that any movement of the exterior wall due to
25 expansion caused by an adjacent fire is not transmitted
to the insulation itself whereby the latter remains in
its originally appointed position.

The membrane 2 that has been described acts as a
vapour barrier because it prevents the relatively high
30 vapour pressure inside a building interior from
propagating the migration of warm moist air through the
insulation to the relatively cold inner surface of the
exterior wall where condensation could occur with
attendant corrosion problems.

35 Although by no means exclusively suitable for
this purpose, the wall panels that have been described,
and that are illustrated in the drawings, are of
exceptional utility in off-shore marine conditions.

1 CLAIMS.

1. A wall panel which includes a sheet metal exterior (1) separated laterally by insulation material (3) from an interior membrane (2) characterised in that the membrane (2) includes support means (5) for the insulation material (3).

2. A wall panel as claimed in claim 1, characterised in that the interior membrane (2) is formed from mild steel, stainless steel, galvanised steel or calcium silicate board.

3. A wall panel as claimed in any preceding claim, characterised in that the insulation material (3) between the sheet metal exterior and the interior membrane comprises ceramic wool.

4. A wall panel as claimed in any preceding claim, characterised in that the support means for the insulation material comprises pins (5) projecting from at least one surface of said internal membrane (2).

5. A wall panel as claimed in claim 4, characterised in that the internal membrane (2) is of metallic construction having said pins (5) welded thereto.

6. A wall panel as claimed in any preceding claim, characterised in that the sheet metal exterior (1) is formed from stainless steel.

7. A wall panel as claimed in any preceding claim, characterised in that the sheet metal exterior (1) is of ribbed/troughed formation.

8. A wall panel as claimed in any preceding claim, characterised in that the panel has a substantially surrounding supporting frame formed wholly or principally from hot- or cold- rolled angular sections (8).

9. A wall panel as claimed in any one of claims 1 to 7, characterised in that the panel has a substantially surrounding frame formed wholly or principally from folded sheet metal.

-7-

1 10. A wall panel as claimed in claim 9,
characterised in that the sheet metal of said frame is
press-folded to give it an angular-, Z- or box-shaped
section.

5 11. A wall panel as claimed in any preceding
claim, characterised in that two adjoining layers (4, 6)
of the insulation material are provided at the side of
said interior membrane (2) which is remote from the
sheet metal exterior (1), said two layers (4, 6) being
10 physically separated from one another by a metallic foil
layer (7).

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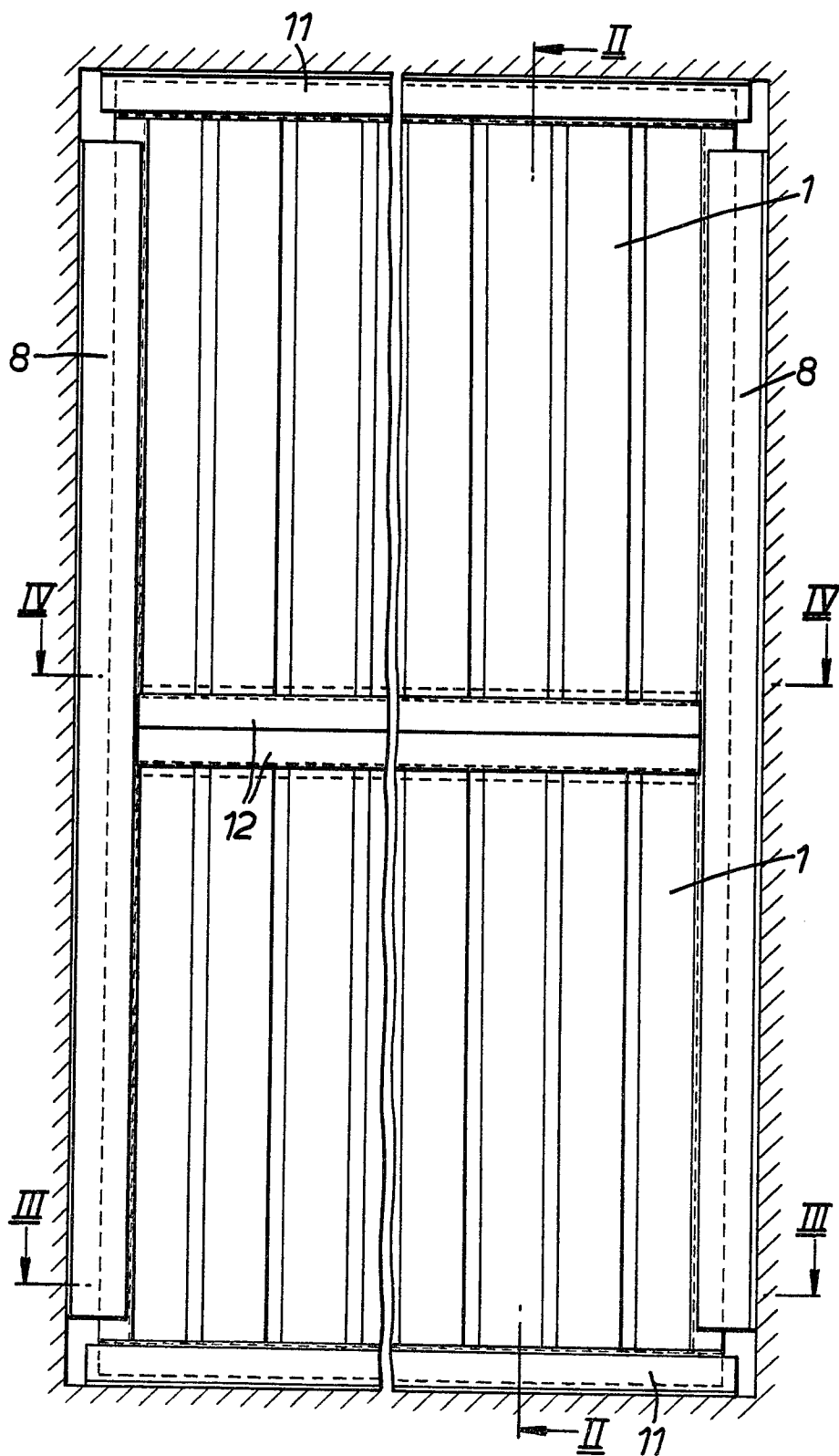


FIG. 1.

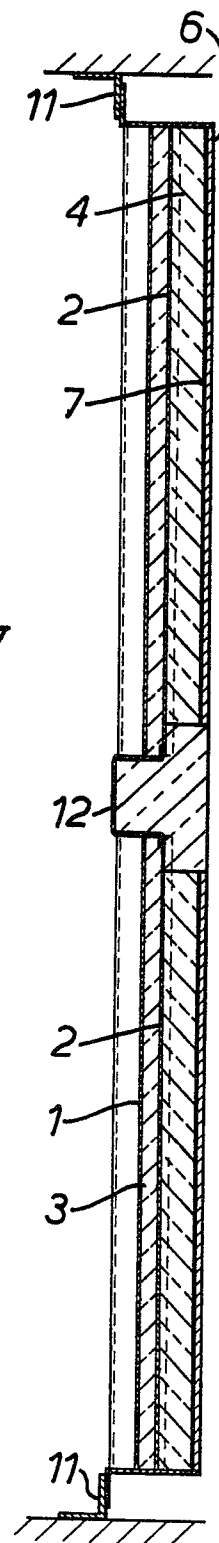
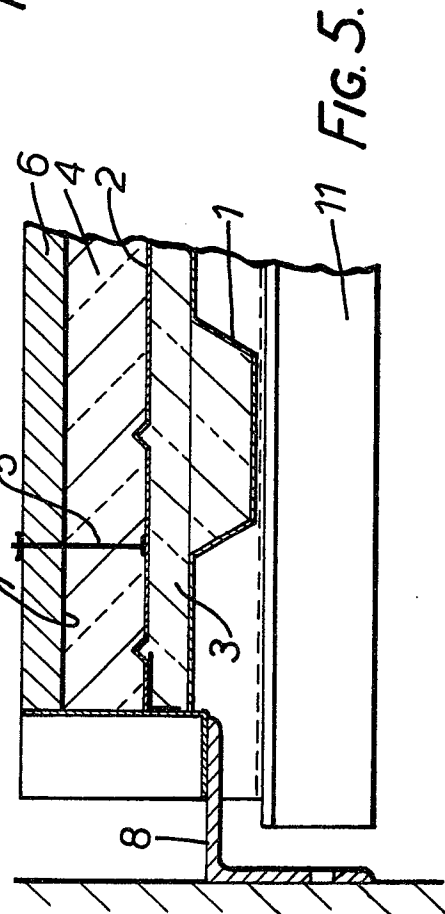
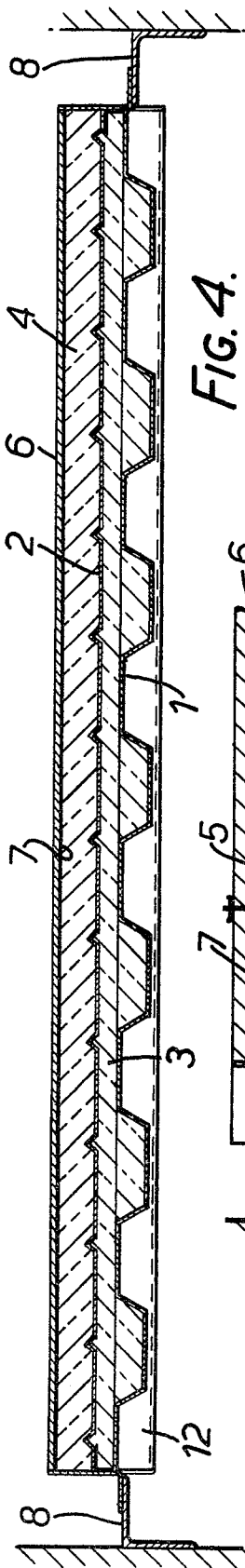
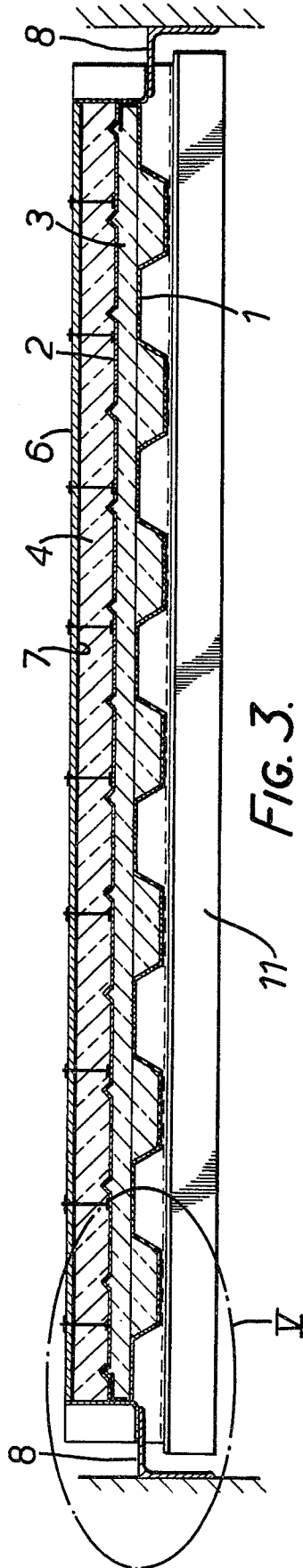


FIG. 2.



3/8

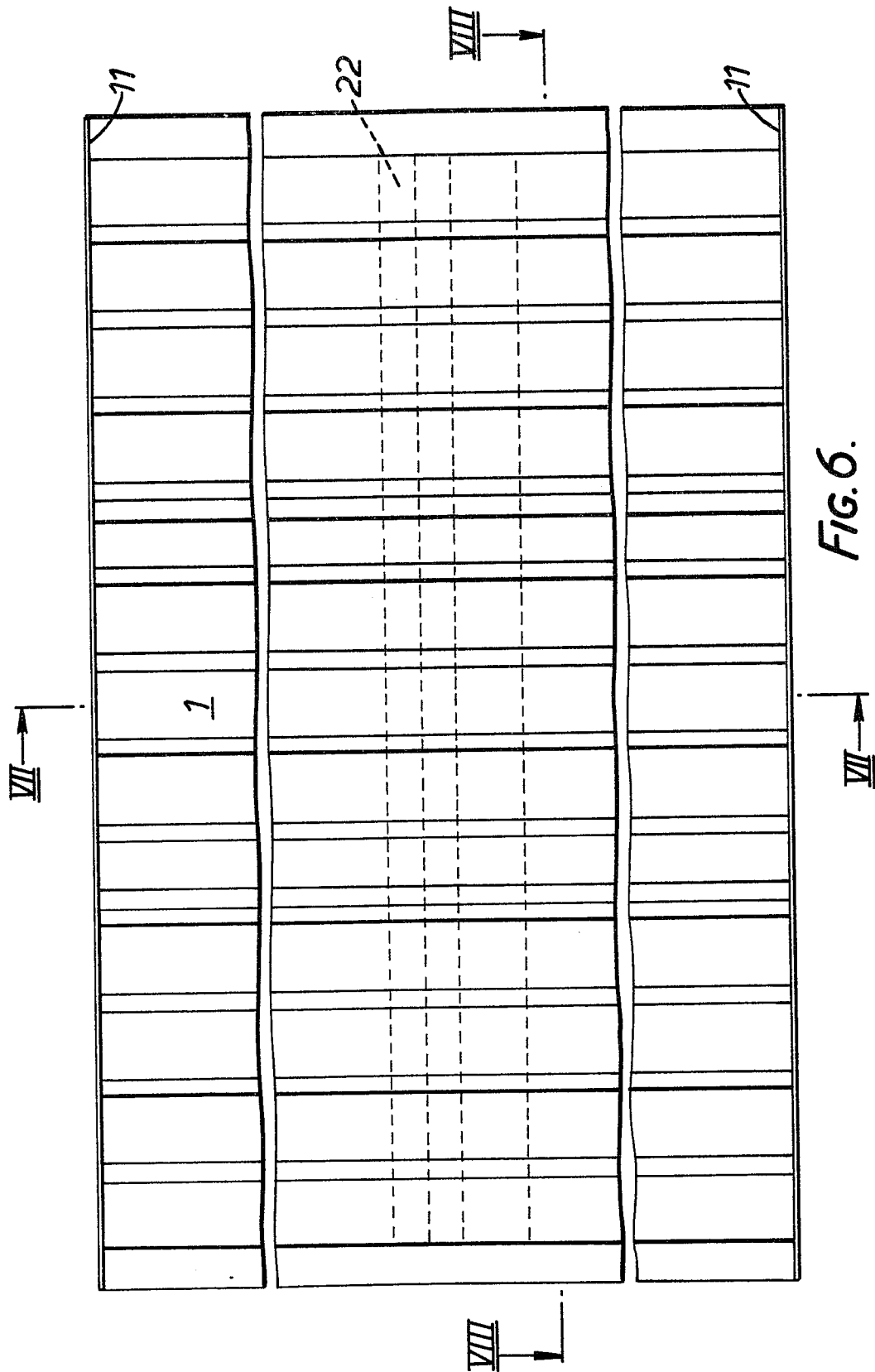


FIG. 6.

4/8

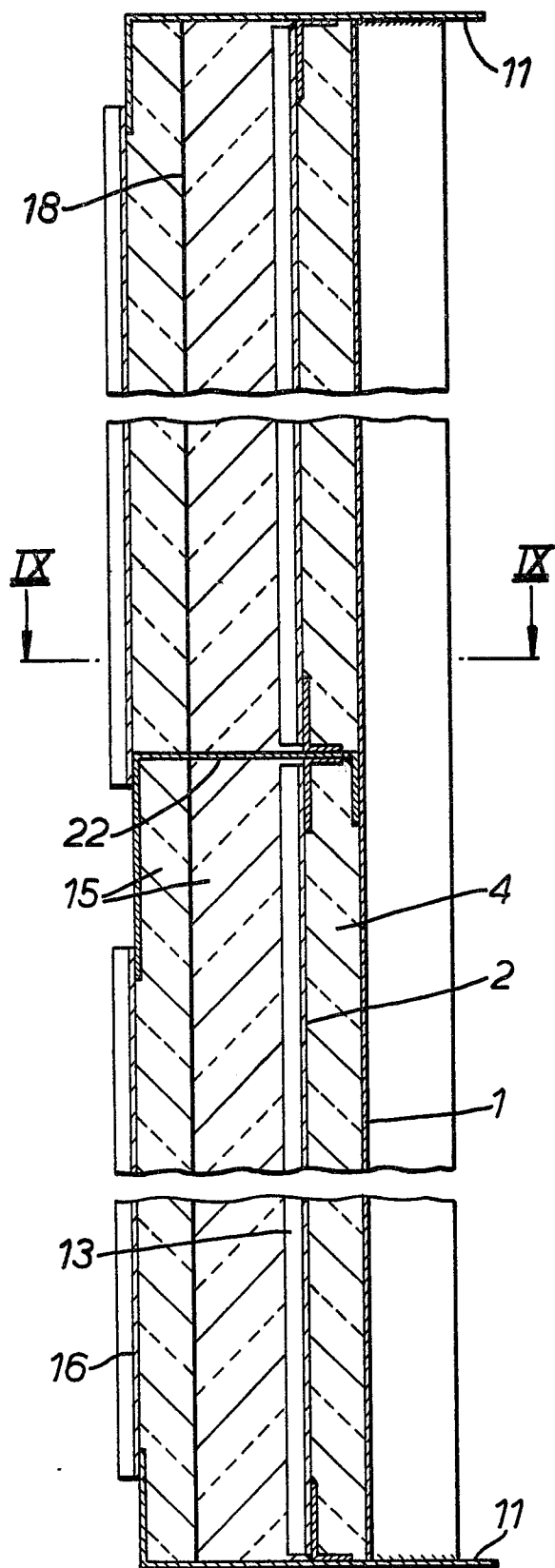


FIG. 7.

5/8

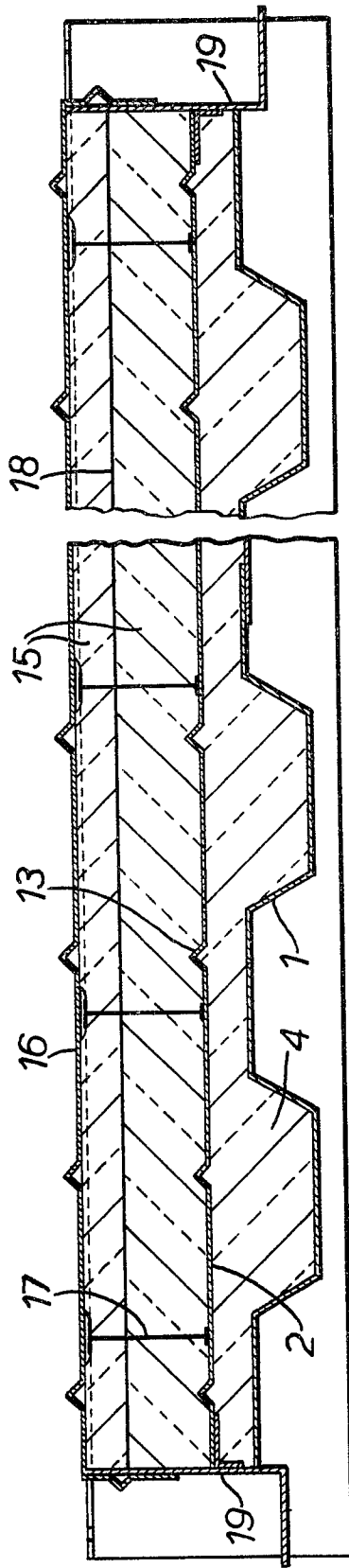


FIG. 8.

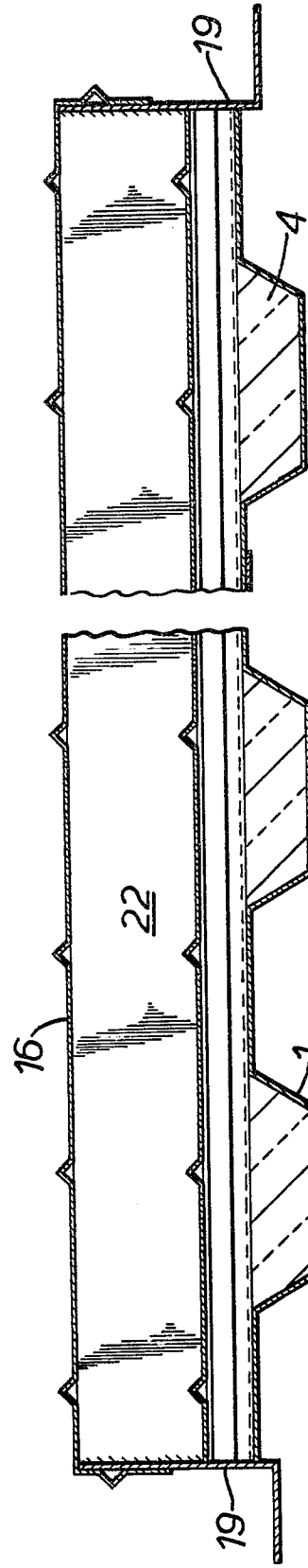
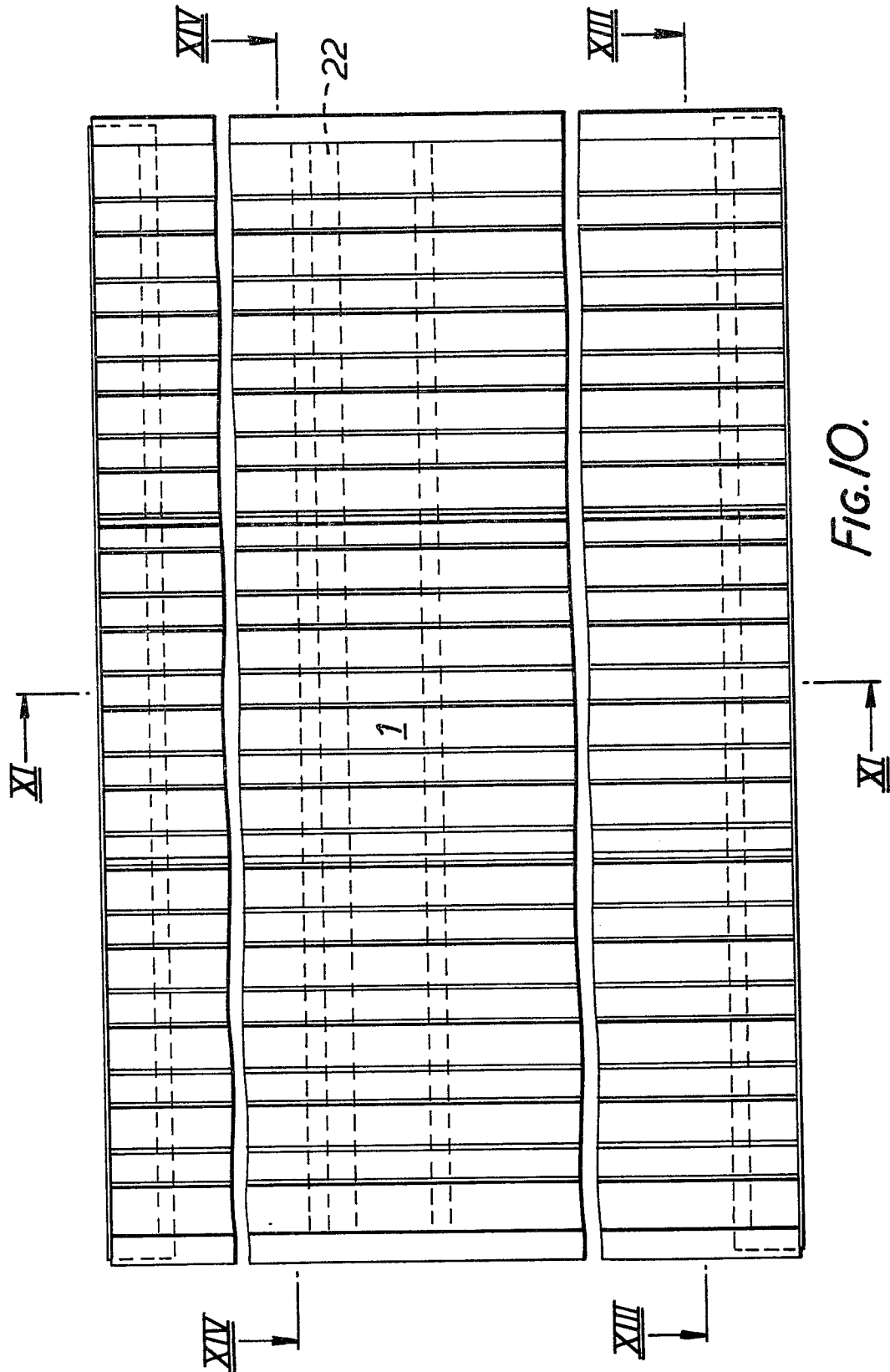


FIG. 9.

6/8



7/8

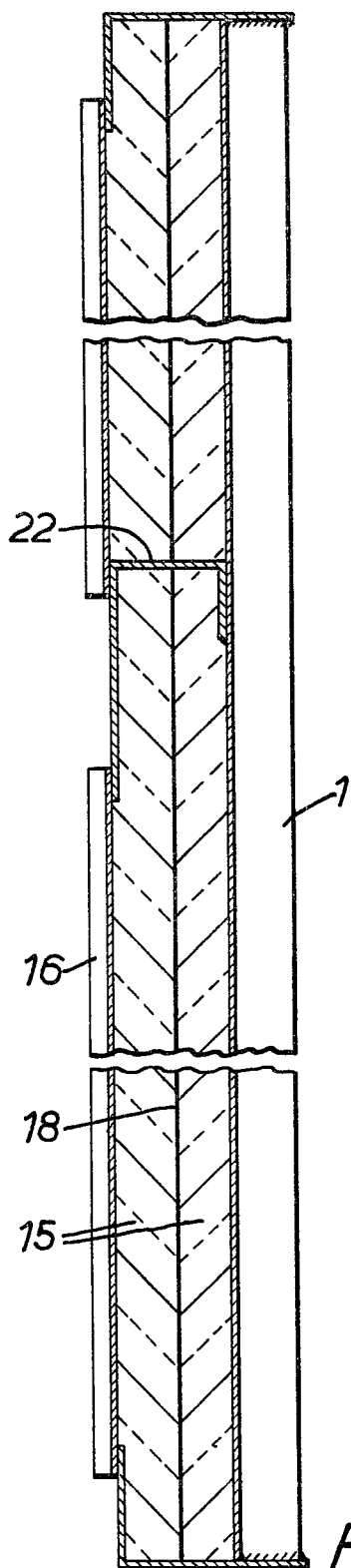


FIG. 11.

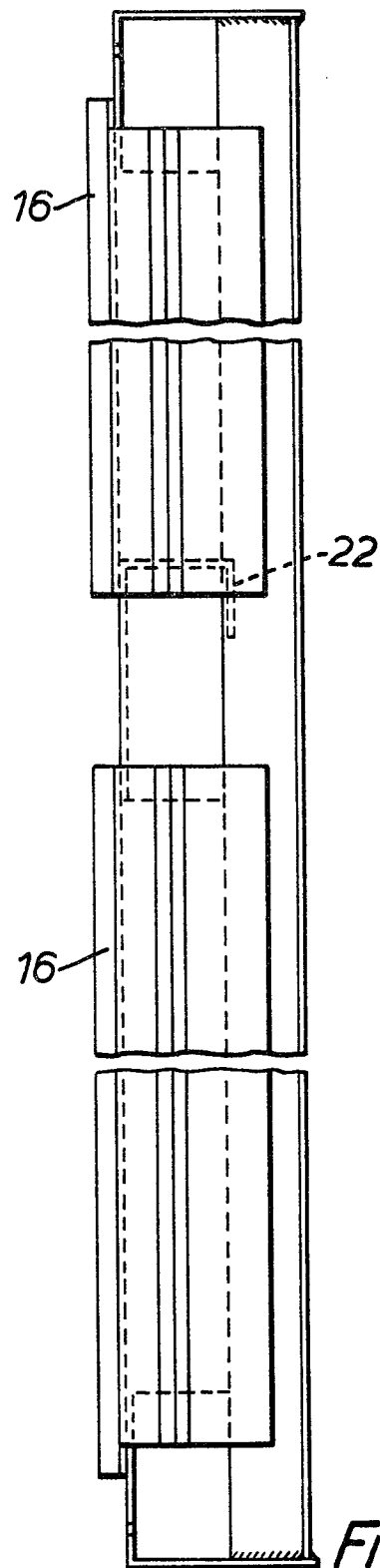


FIG. 12.

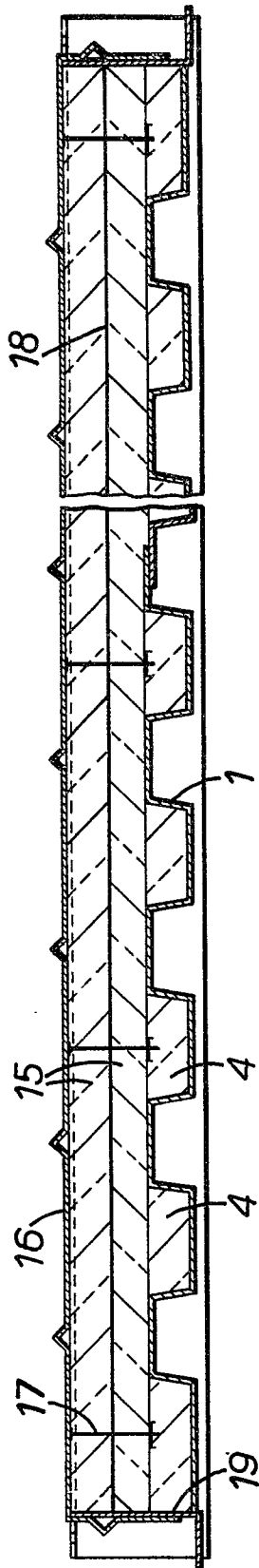


FIG. 13.

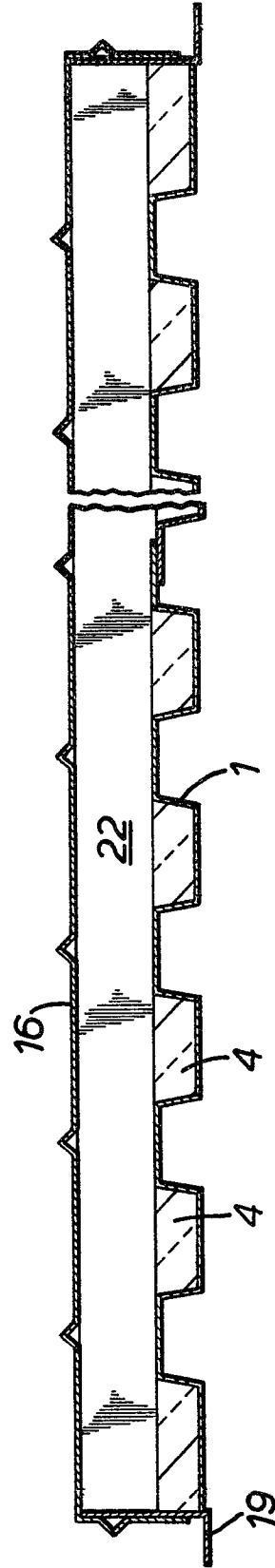


FIG. 14.