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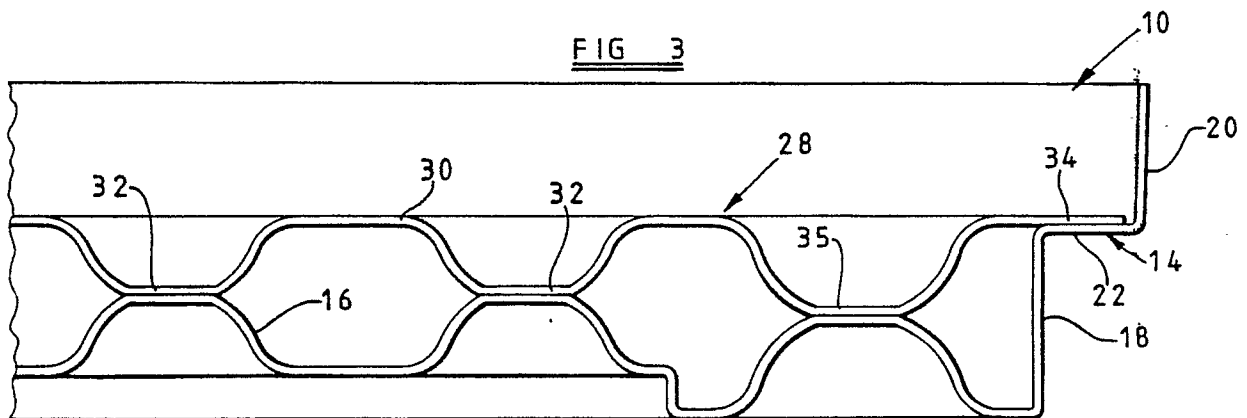
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(54) **Load bearing panel and panel structure.**

(57) A lightweight rigid floor panel comprises a tray (10) having a generally planar base (12) and up-standing side walls (14). The base (12) has a plurality of dome-like projections (16) extending above the base, the uppermost surfaces of which are slightly flattened. An insert (28) has a generally planar surface (30) also optionally provided with a plurality of dome-like depressions (32) which extend below the

surface (30) and contact the projections (16) of the base. The panel structure formed from the tray (10) and insert (28) secured together, for example by welding, is formed into a load bearing panel by the addition of settable, for example cementitious material, in the space above the insert and defined between the insert (28) and the side walls (14).

FIG 3



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## LOAD BEARING PANEL AND PANEL STRUCTURE

The present invention relates to load bearing panels.

Lightweight and rigid floor panels are normally made by providing a flat upper sheet forming the floor surface with a stiffening web secured to the underside of the upper sheet. However, it is difficult to produce a lightweight floor panel of sufficient rigidity to resist bending under heavy loads.

The present invention seeks to provide an improved floor panel.

Accordingly, the present invention provides a load-bearing floor panel having a generally planar base and upstanding side walls, said base having formed therein a plurality of dome-like projections extending upwardly from said base; and an insert abutting said side walls and uppermost surfaces of said dome-like projections, the space above said insert and defined between said insert and the side walls of said tray being filled with a settable material.

The insert may be generally planar and may have a plurality of dome-like depressions extending downwardly from its general plane.

Preferably said settable material is a cementitious material.

The invention also provides a panel structure comprising a generally planar base and upstanding side walls, said base having formed therein a plurality of dome-like projections extending upwardly from said base; and an insert abutting said side walls and uppermost surfaces of same dome-like projections.

Two embodiments of the present invention are further described hereinafter, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a plan view of a tray of a first embodiment of load-bearing floor panel according to the present invention;

Figure 2 is a section through the tray of Figure 1;

Figure 3 is a section through a portion of an assembled load-bearing floor panel including the tray of Figures 1 and 2;

Figure 4 is a plan view of a tray of a second embodiment of load-bearing floor panel according to the present invention;

Figure 5 is a perspective view of part of an insert for the tray of Figure 4;

Figure 6 is a section through the tray of Figure 4; and

Figure 7 is a section through a portion of an assembled load-bearing floor panel including the tray of Figures 4 to 6.

Referring to Figures 1 to 3 of the drawings, a

form of load-bearing panel according to the present invention has a tray 10 having a generally planar base 12 and upstanding side walls 14. Each side wall 14 has two vertically displaced upright portions 18, 20 which are interconnected by a generally horizontal portion 22, the upper portion 2u of each side wall being positioned outwardly of the lower portion 18.

The base has a central portion 24 which is recessed inwardly of the tray 10 relative to a peripheral region 26. The base is provided with a plurality of dome-like projections 16 which extend above the base. The uppermost surfaces of the projections 16 are slightly flattened and, in the central portion 24 of the base, lie in a common plane and a preselected distance below the horizontal wall portion 22 of the side walls 14.

The uppermost surfaces of the projections 16 in the peripheral region 26 of the base are also slightly flattened and lie in a different common plane which is below that of the uppermost surfaces of the projections 16 in the central portion of the base. The uppermost surfaces of the projection 16 in the peripheral region also, therefore, lie a preselected distance below the horizontal wall portion 22, below the uppermost surfaces of the projections in the central portion.

As can be seen from the plan view of the tray 10 (Figure 1) the projections are arranged in a preselected pattern, although other patterns may be chosen.

Figure 3 shows a portion of an insert 28 which has a generally planar surface 30 provided with a plurality of dome-like depressions 32 which extend below the surface 30. These depressions 32 lie in a pattern similar to that of the projections 16 of the base. The lowermost surfaces of the depressions 32 are slightly flattened and lie in a common plane. The insert is generally rectangular (or square) in shape to match the tray 10 and has a generally horizontally projected peripheral flange 34.

The dimensions of the insert are such that when it is located in the tray 10 the lowermost surfaces of the depressions 32 rest on the uppermost surfaces of the projections 16 with the peripheral flange 34 resting on the side wall as can be seen from Figure 3. Deeper depressions 35 are provided in a peripheral region overlying the region 26 of the base. The flattened uppermost surfaces of the projections 16 provide good supporting contact with the insert.

The tray and insert are secured together at selected positions, preferably by mechanical means such as spot welding.

When the insert and tray have been assembled

together, the space above the insert and defined between the insert 28 and the side walls 20 of the tray 10, is filled with a material which sets or is cured into a rigid form. The material is preferably a cementitious material.

The settable material is keyed into the depressions 32 and 35 and affords a smooth top surface to the panel.

Where a less rigid load-bearing panel is required, the embodiment of Figures 4 to 7 may be utilized. Referring to the drawings the same reference numerals have been used for similar parts where appropriate. Figure 5 shows an insert 36 which has a generally planar surface 37 provided with two upstanding flanges 38 along each side edge. The insert is generally rectangular in shape to match the tray 10, shown in Figure 4.

The insert 36 is also provided with depending flanges 39 along each side edge and at each corner, each depending flange being provided with a foot portion 40 in a plane parallel with the general plane of the surface of the insert. The flanges 39 are recessed from the edges of the insert 36.

The dimensions of the insert 36 are such that when it is located in the tray 10 it is supported by each foot portion 40 with the upstanding flanges 38 contacting the side walls 14 and the surface 37 contacting the uppermost surfaces of the projections 16 as can be seen from Figure 7. The flattened uppermost surfaces of the projections 16 lie in a common plane and provide good supporting contact with the insert.

As can be seen from Figures 6 and 7 the peripheral edge region 41 of the base 12 of the tray is recessed below the general surface plane of the base to provide locating contact for each foot portion 40. The tray and insert are secured together preferably by spot welding at the positions indicated by X in Figure 7.

When the insert and tray have been assembled together, the spaces 42, 43 above the insert 36 and along the edge regions between the walls 14 and flanges 39 are filled with a settable material.

The projections 16 (and depressions 32 where provided) give the panel structure considerable rigidity and flexural strength. The use of an insert 28 permits a reduction in the quantity of settable material needed to form a floor panel and, where depressions 32 are provided, keying of the settable material is excellent.

insert abutting said side walls and uppermost surfaces of said dome-like projections, the space above said insert and defined between said insert and the side walls of said tray being filled with a settable material.

2. A panel according to claim 1 wherein the insert is generally planar.

3. A panel according to claim 1 or claim 2 wherein the insert has a plurality of dome-like depressions extending downwardly from its general plane.

4. A panel according to and preceding claim wherein the settable material is a cementitious material.

5. A panel structure comprising a generally planar base and upstanding side walls, said base having formed therein a plurality of dome-like projections extending upwardly from said base; and an insert abutting said side walls and uppermost surfaces of said dome-like projections.

6. A panel structure according to claim 5 wherein the insert is generally planar.

7. A panel structure according to claim 5 or claim 6 wherein the insert has a plurality of dome-like projections extending downwardly from its general plane.

## Claims

1. A load bearing floor panel having a generally planar base and upstanding side walls, said base having formed therein a plurality of dome-like projections extending upwardly from said base; and an

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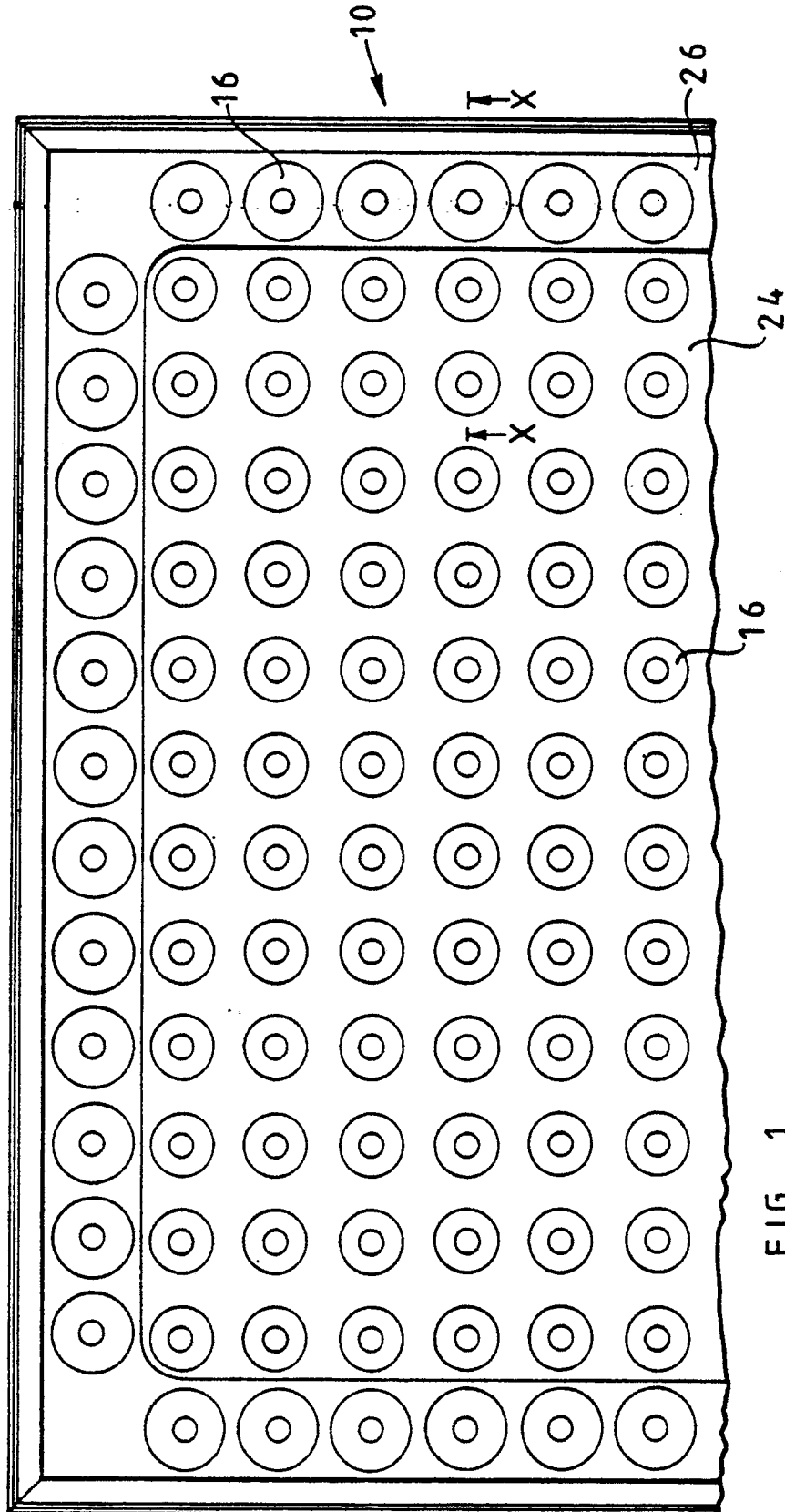


FIG 1

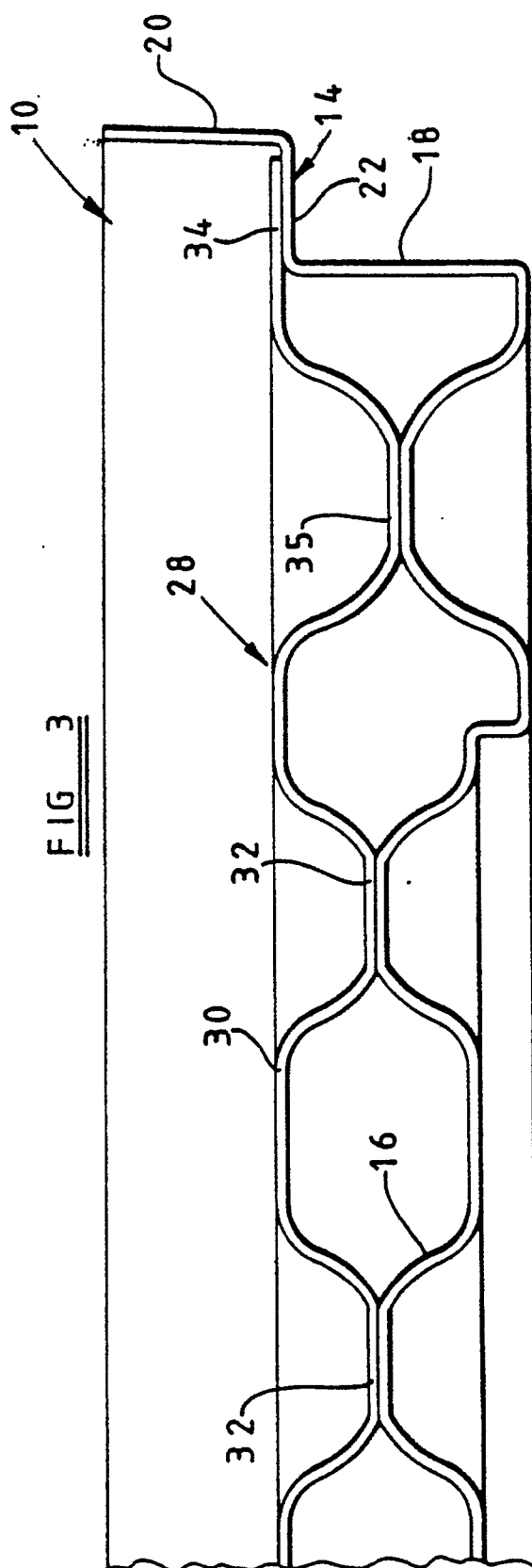
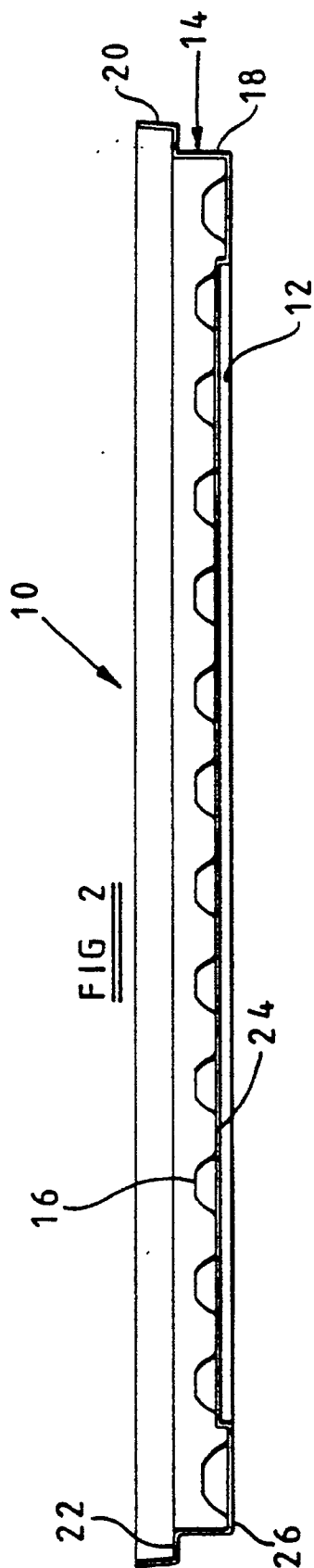
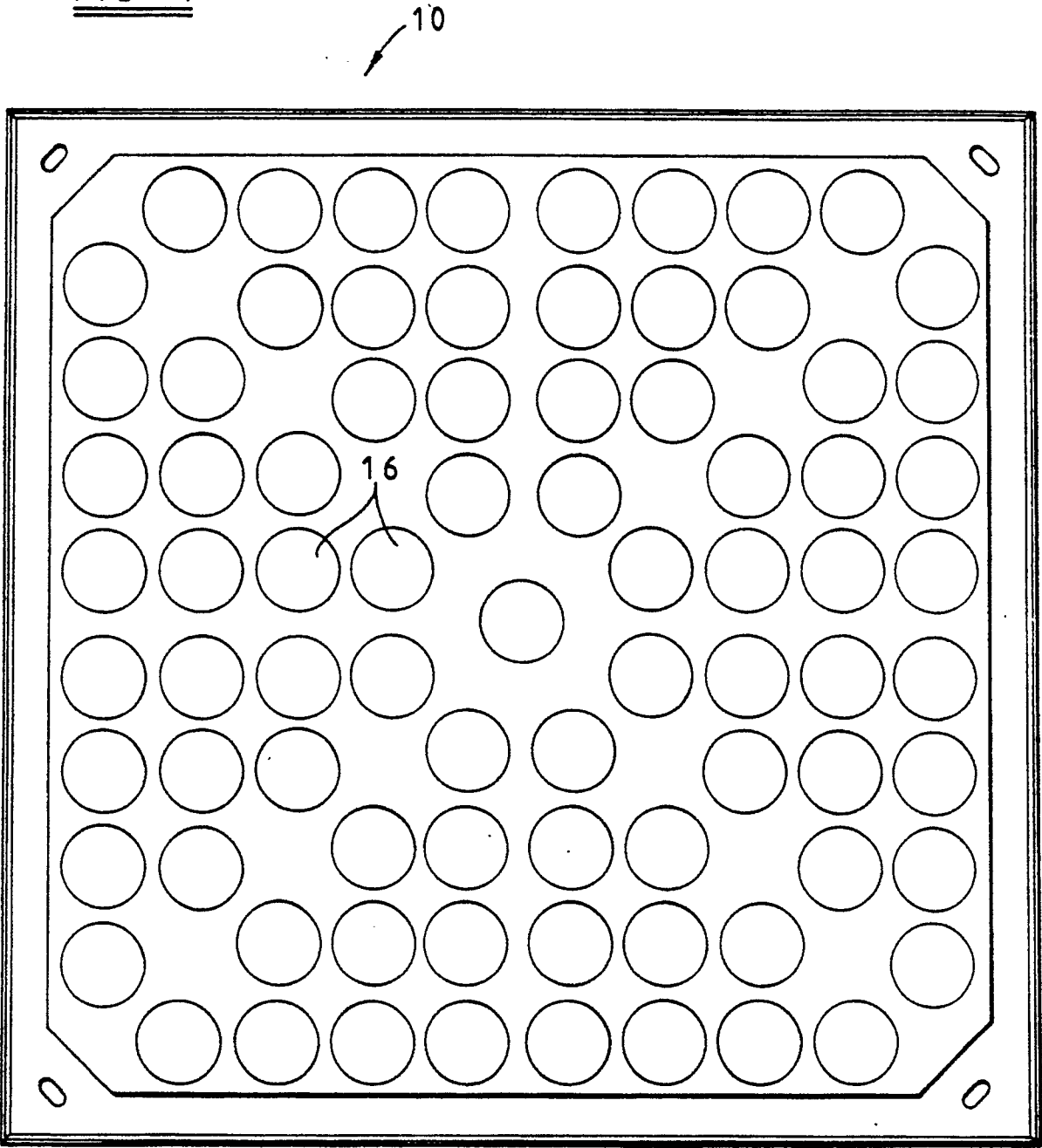


FIG 4



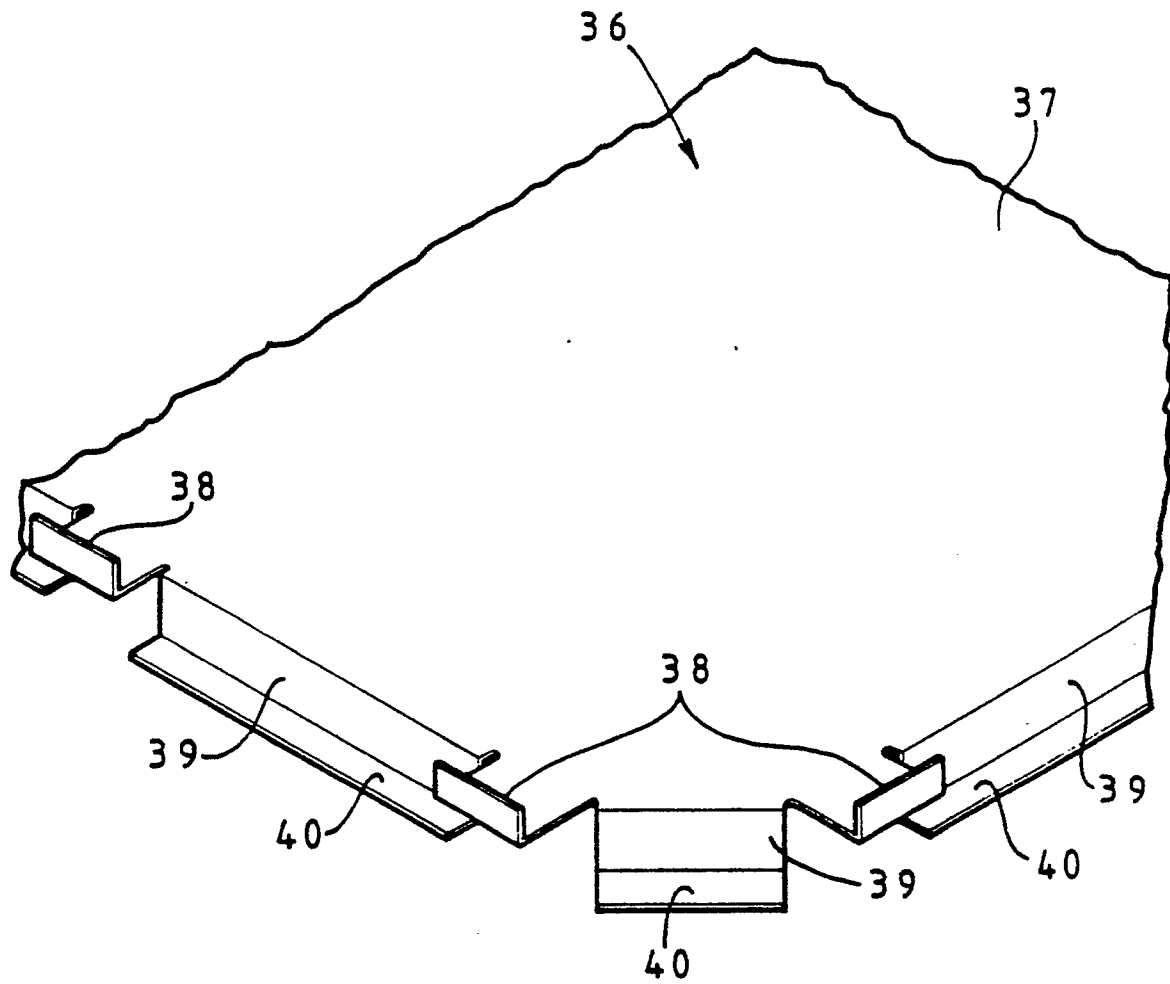
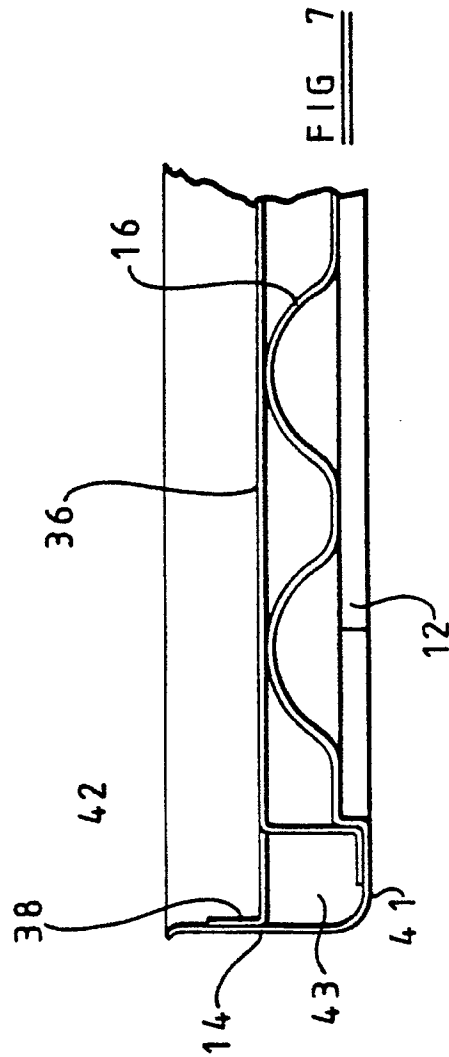
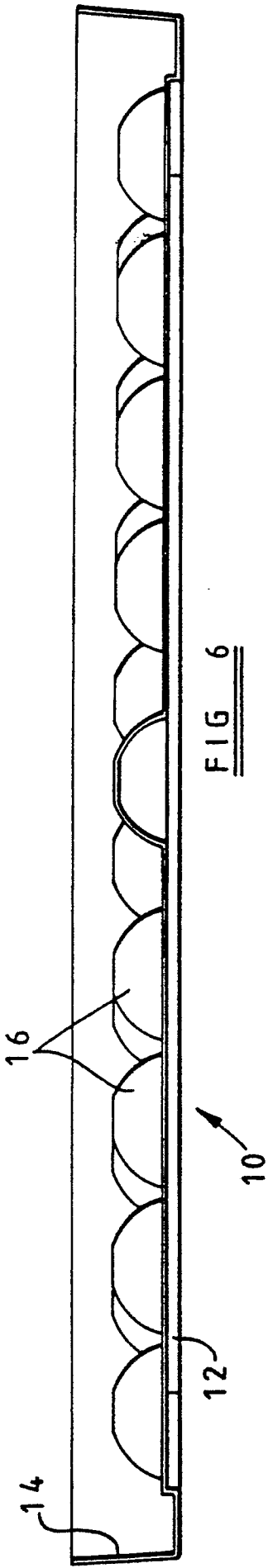


FIG 5







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# EUROPEAN SEARCH REPORT

Application Number

EP 90 30 7173

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	FR-A-1 081 794 (FIAT) * Whole document * ---	1-4	E 04 C 2/32 E 04 F 15/024
Y	GB-A- 128 716 (MADISON) * Figures 3,4,7; page 2, lines 21-38 * ---	1-4	
X	US-A-4 203 268 (GLADDEN, Jr. et al.) * Figures 4,5,10,15,20,21 * -----	5-7	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E 04 C E 04 F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 10-09-1990	Examiner MYSLIWETZ W.P.
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document			