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(71) Applicants:
- **Bramini, Sergio**
  I-20052 Monza (MI) (IT)
- **Torielli, Gianandrea**
  I-20032 Cormano (MI) (IT)
- **Riondato, Agurino**
  I-35013 Cittadella (PD) (IT)

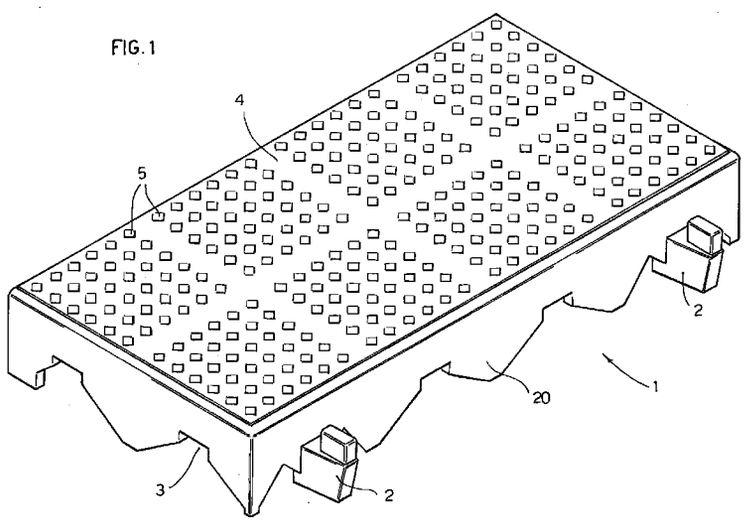
(72) Inventors:
- **Bramini, Sergio**
  I-20052 Monza (MI) (IT)
- **Torielli, Gianandrea**
  I-20032 Cormano (MI) (IT)
- **Riondato, Agurino**
  I-35013 Cittadella (PD) (IT)

(74) Representative: **Petruzziello, Aldo et al**
Dr. Ing. A. Racheli & C. s.r.l.
Viale San Michele del Carso, 4
20144 Milano (IT)

(54) Synthetic paving for quick or automatic assembly on flat roofs and indoor or outdoor surfaces including those subject to chemical attack

(57) A paving for quick or automatic assembly consisting of tiles (1) made of synthetic material joined together, for flat roofs and indoor and outdoor surfaces, even those subject to chemical attack, the tiles (1) being provided with means (2, 3) which permit the assembly thereof and holes (5) on the whole or part of the surface (4) and having their underside divided into square compartments (6), separated by ribs (7), to increase their strength and create a sound deadening effect.

FIG. 1



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Description

The present invention relates to paving for quick or automatic assembly, to be used primarily for covering flat roofs, generally intended to bear small loads, where a covering that withstands atmospheric, chemical and bacterial agents is required.

It is known that flat roofs intended to bear loads much lower than 100 kg/m^2, must, for technical and practical reasons, have the waterproof surface on view.

In this case, even with the use of self-protecting waterproofing materials (gravel tiles, laminated etc.), the roof, though having the characteristics of a terrace, can be walked on only occasionally and for work reasons.

Because of UV rays and seasonal changes in temperature together with weather factors, the majority of surfaces on view known to date tends to deteriorate with time, jeopardising the impermeability of the product.

Moreover, various traditional walk-on surfaces such as industrial flooring, pavements, unloading platforms for materials and chemical products or foodstuffs, are subject to chemical or bacterial attack, because they normally consist of concrete or tar mix surfaces.

Besides the above disadvantages, the paving currently in use also has the disadvantage of not providing any acoustic protection.

EP-A-0441728 proposes a prefabricated plastic tile intended for covering roofs or terraces, which has the drawback of horizontal mortising, besides the fact that it does not form a finished paving.

WO-92/20885 proposes a plastic tile with a perforated upper surface, the holes of which are not provided for drainage purposes but to accommodate coloured pegs that can form writing or graphic signs. The system for closing these holes does not allow perfect waterproofing, therefore the above tile cannot be used to create paving that withstands chemical agents either.

The present invention proposes to overcome the above drawbacks by providing a new type of paving for automatic or quick assembly that stands up to impact, chemical or bacterial attack, low or high temperatures and weather.

The paving according to the invention consists of prefabricated plastic tiles (high and medium density linear polyethylene, low density polyethylene, polypropylene, polystyrene, polyvinyl chloride, polytetrafluorethylene, nylon, recycled refuse plastic conglomerates, synthetic resins, etc.), it being possible to lay said tiles directly on the waterproof surface, with automatic fastenings (side couplings), able to give the paving resistance to translational movements due to sliding friction (treading) and to the effects of wind which could make the roof "float".

The surface of the tiles is suitably perforated to permit the rainwater to run off to the inside, allowing the entire roof surface above the drains to be covered, eliminating the leaf protective grids and providing more space to take the water.

Thanks to the structure of the product, which consists of plastic with heat-insulating properties, and to the air space beneath, the tiles, if laid dry directly on the waterproof surface or on the heat-insulating layer, actively contribute to insulation of the roof, protecting the underlying layer from seasonal changes in temperature and chemical assault by sulphur dioxide and UV rays, thus reducing ageing.

Another advantageous characteristic is that of allowing the room beneath to be soundproofed, by absorption of noise through the holes above and dispersion related to the internal structure.

The paving according to the invention also permits construction of the "reversed roof", a building method of German origin in which: the waterproof layer, which also serves as a barrier against steam, is laid directly on the slab, the insulating panel, consisting of waterproof material, on top of this and the paving constructed with prefabricated cement squares or loose gravel (15-30 mm) as the final layer.

In this case also, as in the case of flat roofs with waterproofing on sight, it would not be possible, unless in the presence of a weight-bearing structure designed to bear the loads relative to the paving (cast in situ, squares or gravel), to construct the "upside down roof".

With the paving according to the invention, it is possible to lay the tiles (40x40 cm, 20x40 cm, 30x40 cm or other measurements technically compatible with the laying surface) directly on the insulating panel increasing its heat insulation coefficient without weighing on the structure.

The same tiles, without through holes so that they have a continuous waterproof surface, laid with setting mortar or buried in concrete or tar mix (asphalt) with the joints sealed with silicone or, in the event of definite chemical attack, with epoxy resin, make it possible to cover surfaces that may undergo erosion or partial solution following the attack of chemical products, oils, grease or foodstuffs, for example unloading platforms for chemical food products, storage areas for products or industrial refuse etc.

The roofing or paving tiles according to the invention, particularly the 20x40 type, can easily be laid on the ground, also to create paths and hard standing in gardens, open-air spaces, pitches for campsites, sports facilities, etc.

The upper holes allow grass to grow through in cultivated areas, fixing the product more firmly to the ground and thus creating a partially green area that can be walked on and is non-slip.

Further characteristics of the invention will be made clearer by the detailed description that follows, referring to a purely exemplary and therefore non-limiting embodiment, illustrated in the attached drawings in which:

- Figure 1 is a perspective view of a tile according to the invention;
- Figure 2 is a top view of the tile in Figure 1;

- Figures 2A and 2B are sections taken along the lines A-A and B-B in Figure 2;
- Figure 3 shows a cutaway cross section of an example of the paving according to the invention in use.

With reference to these figures, a tile 1 has protrusions 2 suitable for engaging in special seats 3 so as to create a simple joint with adjacent tiles. These protrusions 2 can be situated on any side of the tile, preferably on two adjoining sides.

The surface 4 of the tile is provided with holes 5.

Figure 2 shows a tile 1, rectangular in shape, having protrusions 2 on two of its four sides. From the sections in Figures 2A and 2B it can be seen that the underside of the tile 1 is divided into compartments 6, preferably all the same and square in shape, separated from each other by reinforcing ribs 7. Said compartments 6 also serve to absorb the sound waves coming from the outside.

In the example of use in Figure 3, a paving 12, composed of tiles 1 assembled by means of the protrusions 2 and the seats 3, is laid on top of a layer 13 composed of heat insulating, waterproof panels 8, generally consisting of high density foamed polystyrene. This layer 13 in turn rests on a waterproof surface 9, also constituting a barrier against steam; said waterproof surface 9 completely covers a cement load-bearing slab 10. Lastly, flashing 11 covers the edge 14 of the roof

The whole forms the so-called "upside down roof", characterised in that it has the waterproof layer directly in contact with the slab.

In the event that the tile 1 is to be used to pave flower beds or gardens, it is laid in the same way and protrusions 20 on the side edges of the tile can be made to protrude in a point so that they stick into the ground.

Lastly, in the event that the tiles 1 must withstand chemical attack, their upper surface 4 is completely closed and provision is made for the joints to be sealed after laying.

Claims

1. A paving tile for quick or automatic assembly on flat roofs and indoor and outdoor surfaces, made of plastic and having reciprocal coupling means (2, 3) that allow it to be joined to adjacent tiles, further having underneath compartments (6) defined by ribs (7).

2. A paving tile according to claim 1, characterized in that it has holes (5) on all or part of its surface (4).

3. A tile according to claim 2, characterised in that said holes (5) are grouped into squares coinciding with said underneath compartments (6), which are also square.

4. A tile according to claim 1, 2 or 3, characterised in that pointed protrusions (20) are provided on the underside around the outer edge.

5. A tile according to claim 1, characterised in that said surface (4) is completely closed and waterproof.

6. Paving for quick or automatic assembly on flat roofs and indoor and outdoor surfaces, consisting of tiles according to any one of claims 1 to 5.

7. Paving according to claim 6, particularly for flat roofs, characterised in that it is laid on a layer (13) consisting of heat insulating, waterproof panels (8), in turn resting on a waterproof surface (9), covering a concrete slab (10).

8. Paving according to claim 6, particularly of the type that withstands chemical attack, characterised in that it uses tiles with a closed surface (4) and provision is made for the joints between adjacent tiles to be sealed after assembly.

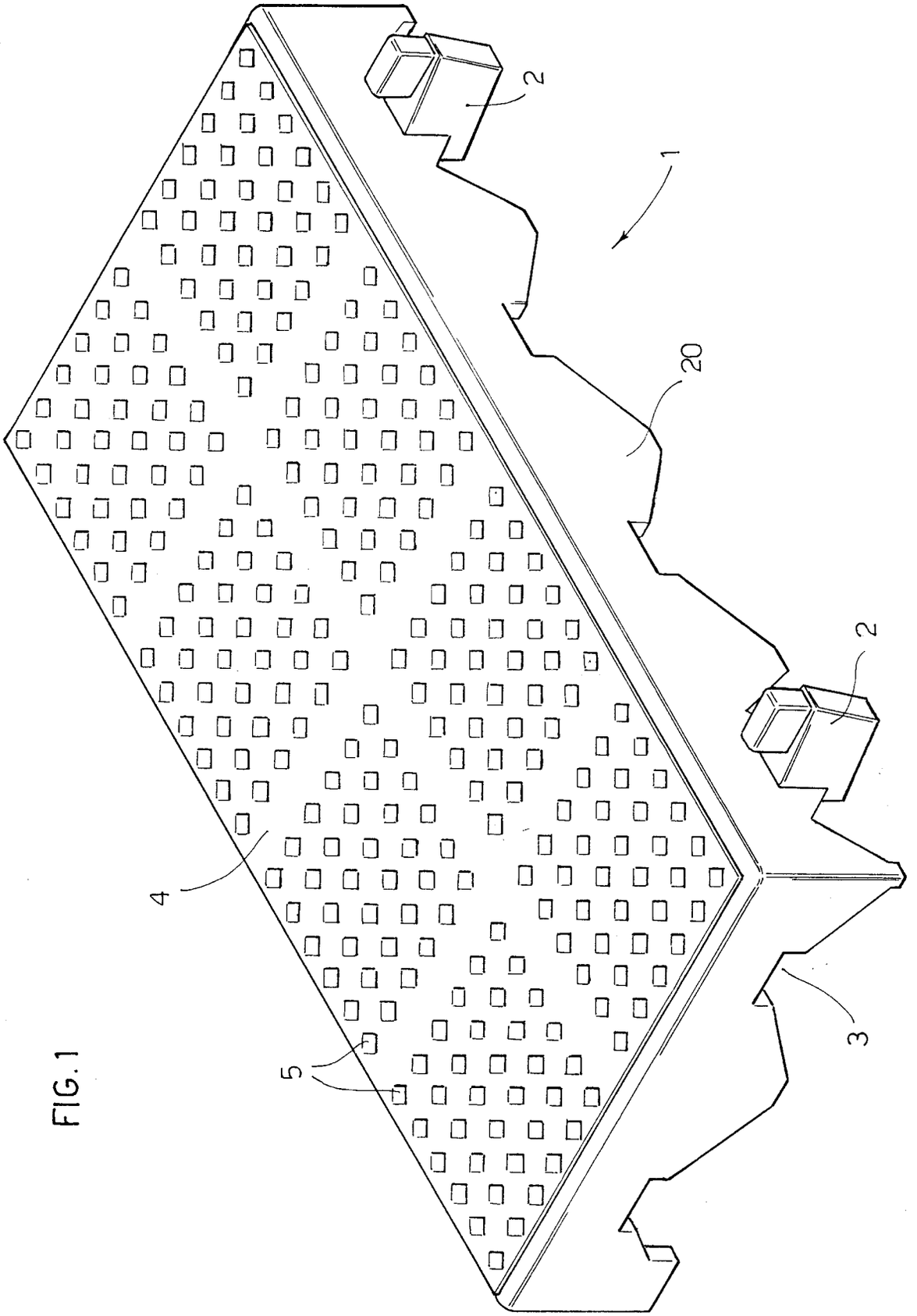

FIG. 1

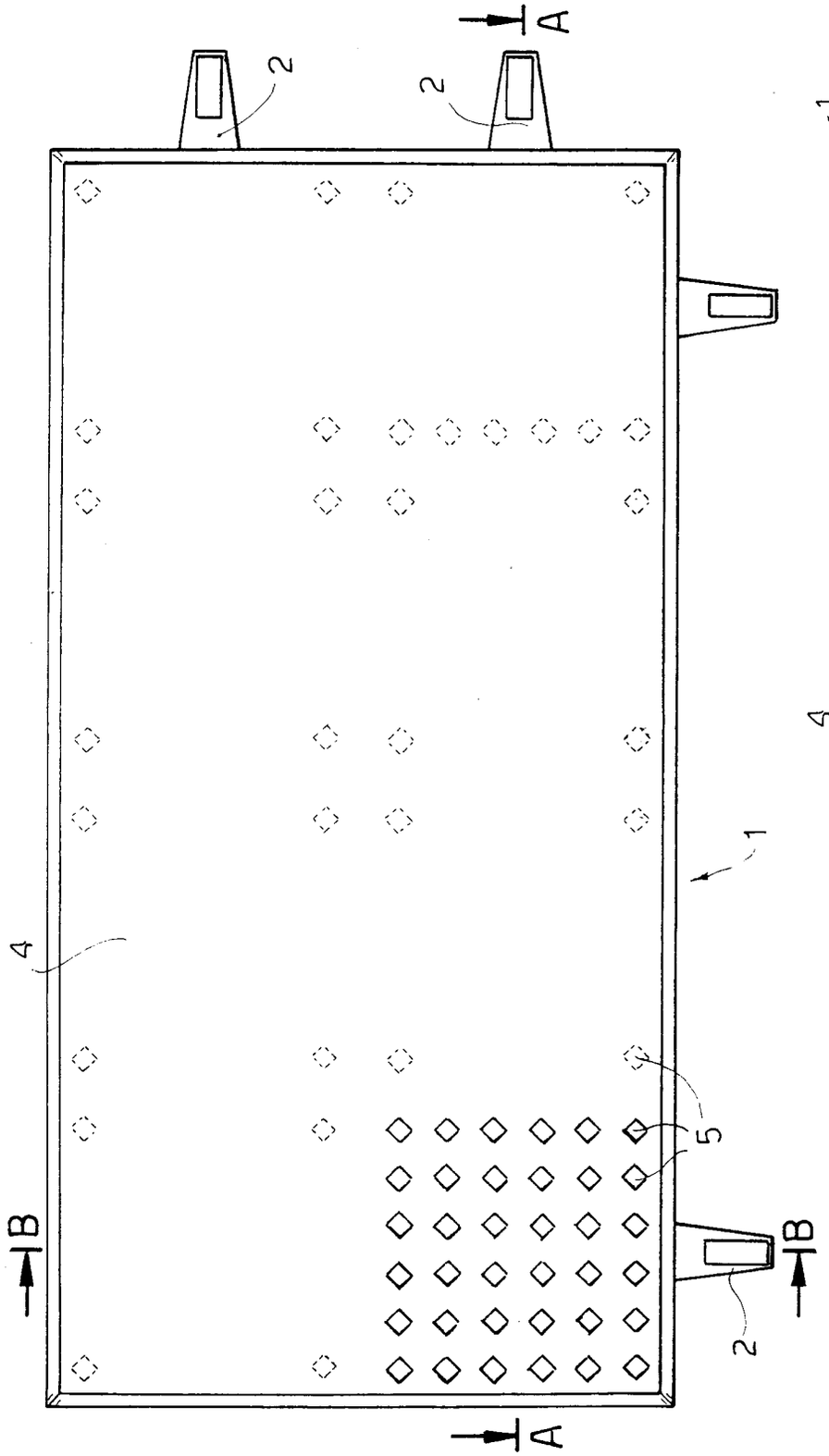

FIG. 2

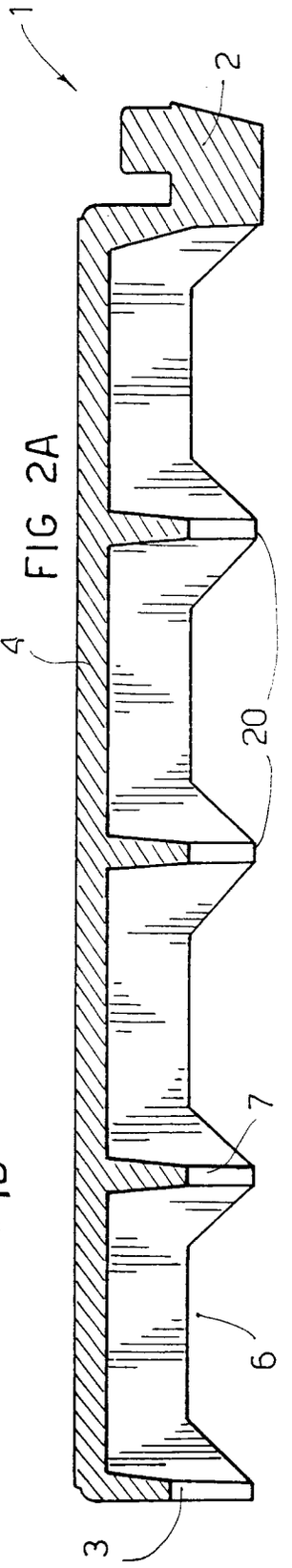

FIG 2A

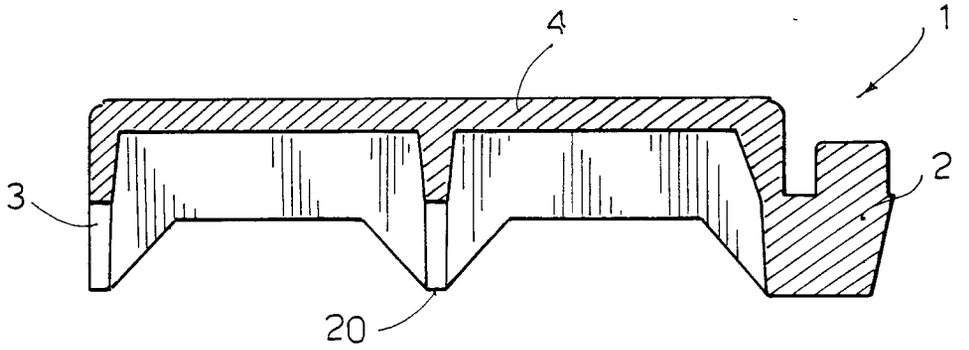

FIG. 2B

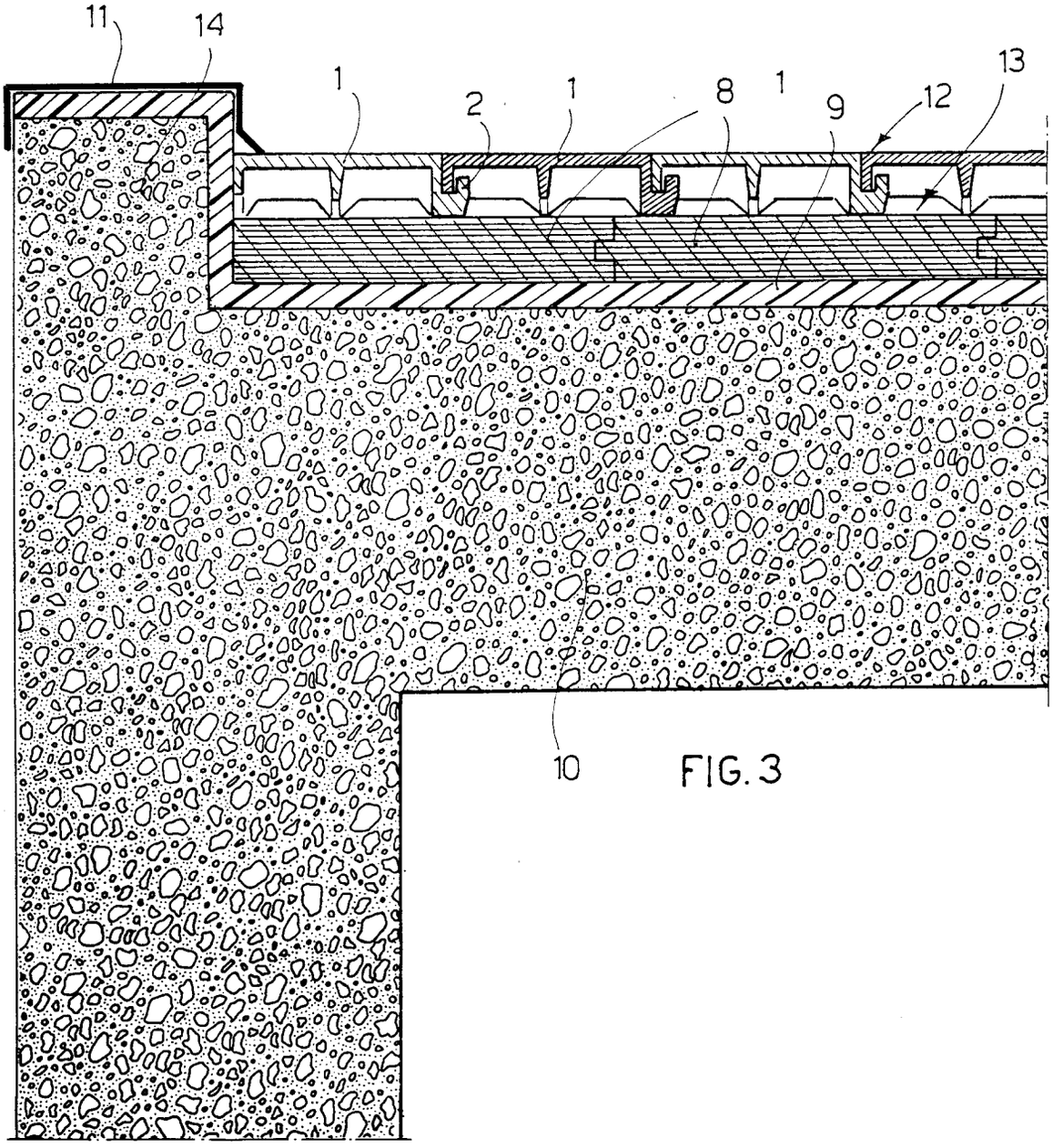

FIG. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 95 11 8795

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.6)
X	BE-A-750 281 (F. SCHEERLINCK & CO. SPRL) * page 2, line 1 - line 22 * * page 4, line 27 - page 9, line 31; figures 1-12 *	1,2,6	E04F15/10 E01C5/20 E04D11/00
Y		3,4,7	

X	DE-A-39 23 656 (DR. SPIESS KUNSTSTOFF-RECYCLING GMBH & CO) * column 1, line 1 - line 6 * * column 2, line 35 - column 3, line 14; figures 1-6 *	1,6	
Y		5	

D,X	EP-A-0 441 728 (SOPREMA S.A.) * column 1, line 1 - line 6 * * column 1, line 51 - column 2, line 1 * * column 3, line 14 - column 4, line 32; figures 1-4 *	1	
A		5,6	

Y	DE-U-86 26 073 (OTTO) * page 1, line 1 - page 3, line 8; figures 1,2 *	3	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
A		1,2,6	E04F E01C E04D

Y	GB-A-2 260 345 (MASON ET AL) * page 4, line 27 - page 6, line 30; figures 1-3 *	4	

Y	GB-A-762 581 (ROBBINS) * page 2, line 58 - line 78 * * page 3, line 16 - page 4, line 54; figures 1-6 *	5	
A		1,6	

Y	EP-A-0 239 042 (SAAR-GUMMIWERK GMBH) * column 2, line 32 - column 3, line 53; figure *	7	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	18 March 1996	Ayiter, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
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