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(71) Applicant: **REDI S.p.A.**
**Zola Predosa (Bologna) (IT)**

(72) Inventors:
- **Cioni, Moreno**
  **40033 Casalecchio di Reno (IT)**
- **Riccelli, Fabio**
  **40050 Calderino di Monte San Pietro (IT)**

(74) Representative: **Manconi, Stefano et al**
**Studio Torta S.p.A.**
**Via Viotti, 9**
**10121 Torino (IT)**

(54) **Drainage system for road surfaces**

(57) A drainage system for road surfaces is defined by a plurality of drainage plates (2), which are substantially rectangular in shape, each of which has at least one drainage channel (5) and is delimited by a lateral rim wall (10) defined by two first edges (11a, 11b) opposite to each other and by two second edges (12a, 12b) opposite to each other; each edge (11a, 11b, 12a, 12b) being provided with at least one coupling member (14) to allow each pair of mutually adjacent drainage plates (2) to be selectively connected at two relative first edges (11a, 11b), at two relative second edges (12a, 12b), and at a first edge (11a, 11b) of one of the two drainage plates (2) and at a second edge (12a, 12b) of the other drainage plate (2).

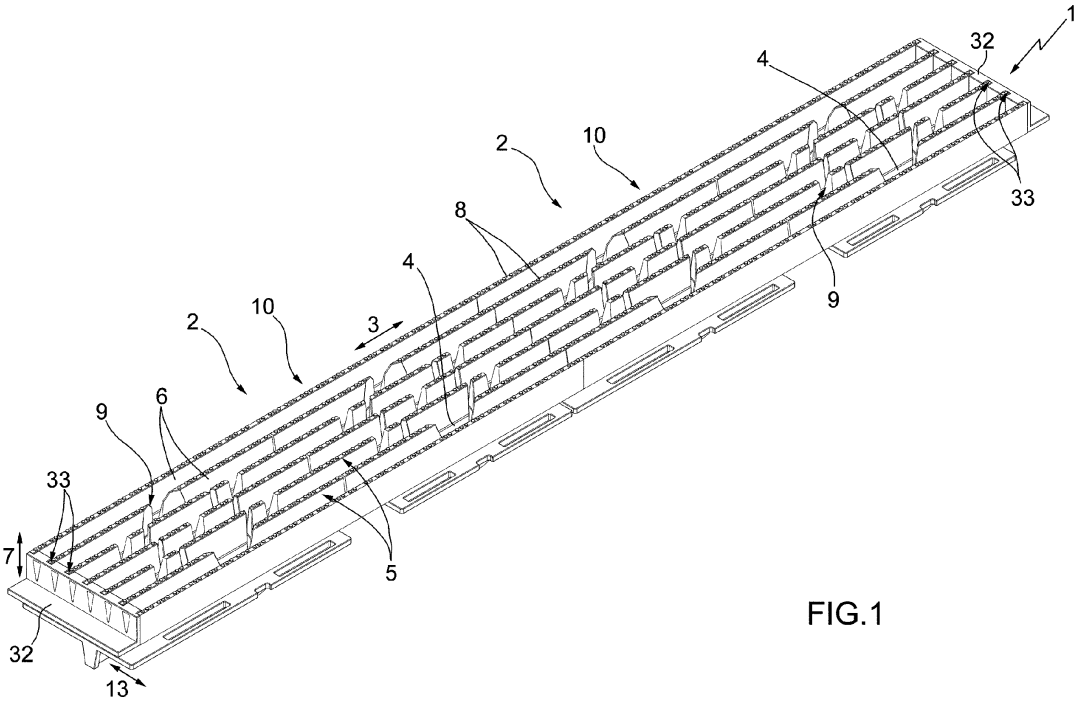


FIG.1

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## Description

**[0001]** The present invention relates to a drainage system for road surfaces.

**[0002]** In particular, the present invention relates to a drainage system for road surfaces of the type comprising a plurality of drainage plates, each of which is substantially rectangular in shape, is delimited by a bottom wall, and is provided with a plurality of drainage channels which are parallel and arranged mutually side-by-side.

**[0003]** Each drainage channel is laterally delimited by a pair of containment walls projecting from the bottom wall, and is normally aligned with a corresponding drainage channel of an adjacent drainage plate.

**[0004]** The drainage plates are distributed according to a plurality of rows mutually arranged side-by-side, each comprising a plurality of mutually aligned drainage plates.

**[0005]** The draining systems for road surfaces of the known type described above have some drawbacks mainly deriving from the fact that their installation requires alignment of the drainage plates of each row and correctly positioning each row with respect to the other rows, implies severe operative difficulties by personnel, and may consequently be rather inaccurate.

**[0006]** It is an object of the present invention to provide a drainage system for road surfaces which is free from the above-described drawbacks and which is simple and cost-effective to implement.

**[0007]** According to the present invention, there is provided a drainage system for road surfaces as disclosed in the appended claims.

**[0008]** The present invention will now be described with reference to the accompanying drawings, which show a non-limitative embodiment thereof, in which:

figure 1 is a diagrammatic perspective view, with parts removed for clarity, of a preferred embodiment of the drainage system of the present invention;

figures 2 and 3 are two diagrammatic perspective views of a detail of the drainage system in figure 1;

figure 4 is a diagrammatic plan view of the detail in figures 2 and 3;

figure 5 is a diagrammatic perspective view of the detail in figures 2, and 4 shown in a different operating condition; and

figure 6 is a diagrammatic perspective view, with parts removed for clarity, of a variant of the draining system in figure 1.

**[0009]** With reference to figure 1, numeral 1 indicates as a whole a drainage system for road surfaces comprising a plurality of drainage plates 2 made of plastic material.

**[0010]** As shown in figures 2, 3 and 4, each plate 2 is substantially rectangular in shape, extends in a direction 3, is delimited by a bottom wall 4 and has a plurality of drainage channels 5 arranged side-by-side and parallel to direction 3 itself.

**[0011]** Each channel 5 is laterally delimited by two containment walls 6, which project from the wall 4 in a direction 7 which is substantially transverse to direction 3, extend parallel to direction 3, and are delimited by respective upper non-slip surfaces 8.

**[0012]** The channels 5 are connected to each other by means of a plurality of openings 9 obtained through the central walls 6.

**[0013]** Each plate 2 has a lateral rim wall 10 comprising two longitudinal edges 11 which are parallel to each other and to the direction 3 and two transverse edges 12 which are parallel to each other and to a direction 13 orthogonal to directions 3 and 7.

**[0014]** Each edge 11, 12 has respective coupling means 14 shaped to connect the plate 2 selectively to at least one adjacent plate 2 at two respective edges 11 (figure 6), at two respective edges 12 (figure 1), and at an edge 11 of a plate 2 and at an edge 12 of the other plate 2 (figure 6).

**[0015]** In the case in point, one of the edges 11 (hereinafter indicated by reference numeral 11a) has a plurality of teeth 15 (four teeth 15 aligned along one another in direction 3 in the case in point) projecting downwards from the wall 4 and the other edge 11 (hereinafter indicated by reference numeral 11b) has a plurality of recesses 16, which are equal in number to the number of the teeth 15, each of which is adapted to receive and retain a respective tooth 15.

**[0016]** Two recesses 16 are obtained through a coupling plaque 17 extending under the wall 4 and along part of the edge 11b, while the remaining two recesses 16 are obtained through a further coupling plaque 18, which is substantially L-shaped, and extends under the wall 4, along part of the edge 11b, and along one of the edges 12.

**[0017]** In the case in point, one of the edges 12 (hereinafter indicated by reference numeral 12a) has at least one tooth 19 (three teeth 19 aligned to one another in direction 13, in the case in point) projecting downwards from the wall 4 and the other edge 12 (hereinafter indicated by reference numeral 12b) has at least one recess 20 obtained through the plaque 18 to receive and retain the tooth 19 itself.

**[0018]** Since the teeth 15, 19 project downwards from the wall 4 and the plaques 17, 18 are obtained under the wall 4, the coupling between the two adjacent plates 2 guarantees the coplanarity between the respective walls 4.

**[0019]** Each tooth 15 of at least part of the teeth 15 has a hole 21, which is obtained through the tooth 15 in direction 13, and is adapted to be engaged by an anchoring tie rod (not shown) of the plate 2 to the road surface.

**[0020]** Furthermore, in the case in point, each plate 2 has two circular chases 22 (figure 4), each of which is obtained on the wall 4, extends through the walls 6, has a given radial width, and is provided with two radial apertures 23 which project radially outwards from the respective chase 22 and are diametrically opposite to each

other.

**[0021]** With reference to figure 5, the chases 22 are selectively milled at their inner diameter by the personnel installing the drainage system 1 to make corresponding openings 24.

**[0022]** Each opening 24 is partially closed by a respective circular lid 25, which has a diameter equal to the outer diameter of the respective chase 22, rests on the chase 22, and is fixed to the plate 2 by means of a pair of fastening screws 26 suited to be screwed into the apertures 23.

**[0023]** The lid 25 is delimited by a bottom wall 27 provided with at least an opening 28 for the outflow of the water, and has a plurality of containment baffles 29 projecting from the wall 27 itself.

**[0024]** Following the assembly of the lid 25 on the plate 2, the wall 27 is coplanar with the wall 4 and baffle 29 is coplanar with a respective wall 6.

**[0025]** Additionally or alternatively to the openings 28 of the lids 25, the wall 4 of each plate 2 has portions of different thickness to allow personnel installing the drainage system 1 to mill the thinner portions and make corresponding openings (not shown) for the outflow of the water.

**[0026]** The outflow openings 28 obtained in the lids 25 and/or the openings (not shown) obtained through the wall 4 are associated to respective discharge ducts (not shown) of the water.

**[0027]** The discharge ducts extend under the plate 2, either perpendicularly or parallel to the wall 4, and are fixed to the plate 2 by means of a plurality of fixing screws (not shown), which can be screwed into corresponding holes 30 obtained under the wall 4 or fitted by interference with respective coupling collars 31 projecting downwards from the wall 4 itself.

**[0028]** Since each edge 11a, 11, 12a, 12b is provided with own coupling means 14, the plates 2 could be selectively connected to each other at the edge 11a of one plate 2 and at the edge 11b of the other plate 2 (figure 6), at the edge 12a of one plate 2 and at the edge 12b of the other plate 2 (figure 1), at the edge 11a, 11b of a plate 2 and at the edge 12a, 12b of the other plate 2 (figure 6) conferring maximum flexibility to the drainage system 1 and guaranteeing a correct positioning of each plate 2.

**[0029]** The free ends of the channels 5 of each plate 2 are longitudinally closed by a plug 32 (figure 1), which is mounted transversely to the direction 3, is substantially L-shaped, and is provided with a plurality of seats 33 which can be coupled by fitting with the free ends of the respective walls 6. The cap 32 may be possibly glued to the plate 2.

## Claims

1. A drainage system for road surfaces comprising a plurality of drainage plates (2), each of which has the shape of a quadrilateral, is delimited by a bottom wall (4), and is provided with at least one pair of containment walls (6) projecting from the bottom wall (4) so as to define at least one drainage channel (5); each drainage plate (2) having, furthermore, a lateral rim wall (10) comprising two first edges (11a, 11b), which are parallel to one another and to a first direction (3), and two second edges (12a, 12b), which are parallel to one another and to a second direction (13), which is transverse to the first direction (3) itself; and **characterized in that** each one of said first and second edges (11a, 11b, 12a, 12b) of each drainage plate (2) is provided with respective coupling means (14) to connect the drainage plate (2) to at least one adjacent drainage plate (2); the coupling means (14) being shaped so as to allow each pair of adjacent drainage plates (2) to be selectively connected in correspondence to two relative first edges (11a, 11b), in correspondence to two relative second edges (12a, 12b), and in correspondence to a first edge (11a, 11b) of one of the two drainage plates (2) and to a second edge (12a, 12b) of the other drainage plate (2).

2. A drainage system according to claim 1, wherein the two first edges (11a, 11b) of each drainage plate (2) have, one, at least one first tooth (15) and, the other, at least one first recess (16) and the two second edges (12a, 12b) of each drainage plate (2) have, one, at least one second tooth (19) and, the other, at least one second recess (20); each one of said first and second recesses (16, 20) of each drainage plate (2) being shaped so as to selectively receive and hold said first and second teeth (15, 19) of the adjacent drainage plate (2).

3. A drainage system according to claim 2, wherein each drainage plate (2) has at least one coupling plaque (17, 18) obtained under the relative bottom wall (4); the relative first and second recesses (16, 20) being obtained through said coupling plaque (17, 18).

4. A drainage system according to claim 3, wherein said first and second recesses (16, 20) of each drainage plate (2) are obtained through the relative coupling plaque (17, 18) in a third direction (7), which is substantially orthogonal to said first and second directions (3, 13), and extend outside of the bottom wall (4).

5. A drainage system according to claim 3 or 4, wherein each one of said first and second teeth (15, 19) projects from the relative bottom wall (4), so as to allow the relative bottom wall (4) to lay on the coupling plaque (17, 18) of the adjacent drainage plate (2) and to be coplanar to the bottom wall (4) of the adjacent drainage plate (2).

6. A drainage system according to claim 4 or 5, wherein each one of said first and second teeth (15, 19) projects from the relative bottom wall (4) parallel to said third direction (7).

7. A drainage system according to any of the claims from 2 to 6, wherein at least one first tooth (15) of each drainage plate (2) has a first opening (21), which is suited to be engaged by an anchoring tie rod of the drainage system to the road surface.

8. A drainage system according to any of the previous claims, wherein each drainage plate (2) has a plurality of drainage channels (5), which are each delimited by two respective containment walls (6) that are parallel to one another; each containment wall (6) of at least part of the containment walls (6) having at least one second opening (9), which is suited to connect two adjacent drainage channels (5).

9. A drainage system according to any of the previous claims, wherein the bottom wall (4) of each drainage plate (2) comprises at least two portions having respective thickness that are different from one another.

10. A drainage system according to claim 9, wherein each drainage plate (2) has at least one third opening for the outflow of the liquid, which can be obtained through the bottom wall (4) in correspondence to the portion with the smaller thickness.

11. A drainage system according to any of the previous claims, wherein each drainage plate (2) has at least one circular chase (22), which is obtained on the bottom wall (4), extends through the containment walls (6) and presents a given radial width.

12. A drainage system according to claim 11 and comprising, furthermore, a lid (25) to close a fourth opening (24), which is obtained by making a hole in the drainage plate (2) in correspondence to the inner diameter of the circular chase (22); the lid (25) having a diameter that is equal to the outer diameter of the circular chase (22), a plurality of containment baffles (29), which are each coplanar to a relative containment wall (6), and at least one fifth opening (28) for the outflow of the liquid.

13. A drainage system according to claim 12 and comprising, furthermore, fixing means (26) to fix the lid (25) to the drainage plate (2).

14. A drainage system according to claim 10 or 12 and comprising, furthermore, a first and/or a second discharge duct, which can be selectively connected to the drainage plate (2) under the bottom wall (4) in correspondence to the third opening or to the fifth opening (28), and extend perpendicular and, respectively, parallel to the bottom wall (4) itself.

15. A drainage system according to any of the previous claims, wherein each containment wall (6) is delimited by an upper non-slip surface (8).

16. A drainage system according to any of the previous claims and comprising, furthermore, a closing plug (32) to longitudinally close a free end of the drainage channels (5) of a drainage plate (2).

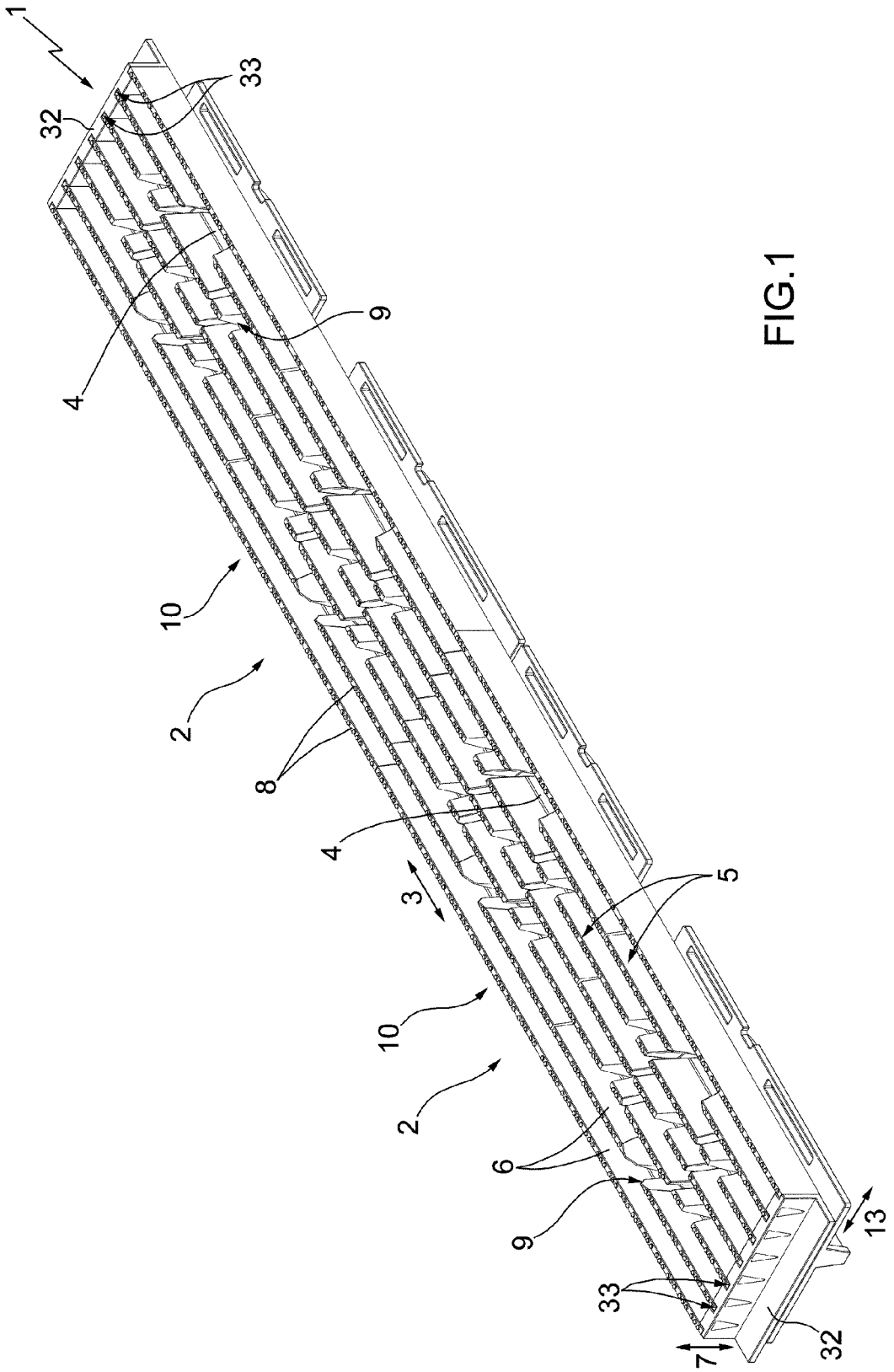


FIG.1

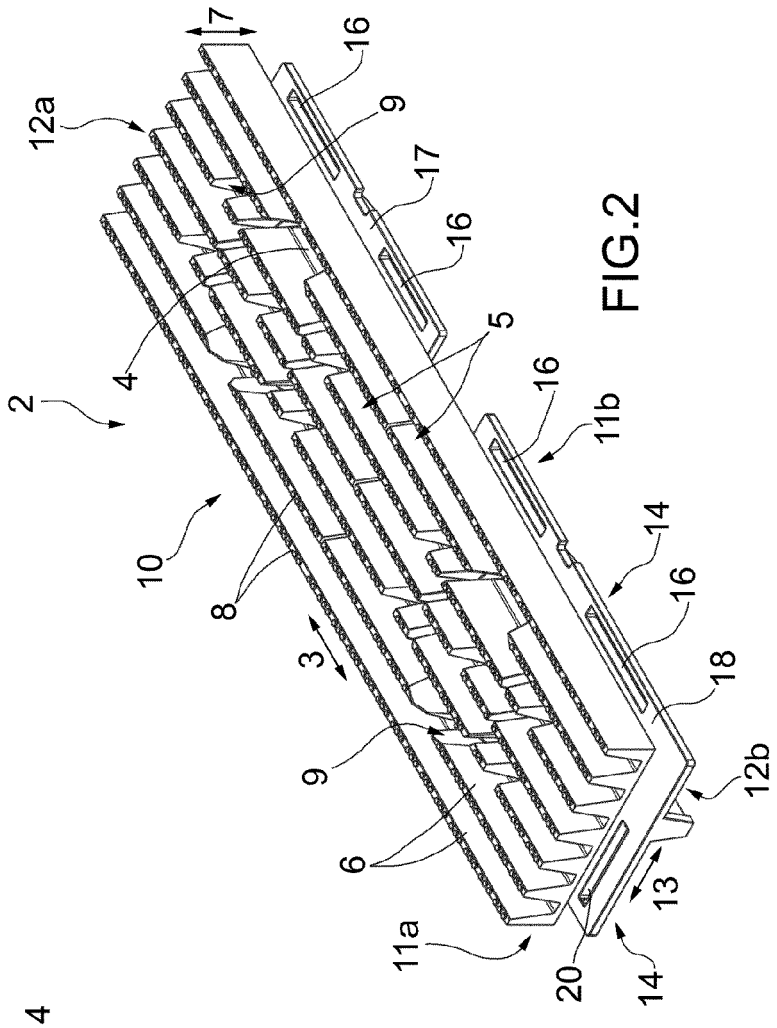
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FIG.2

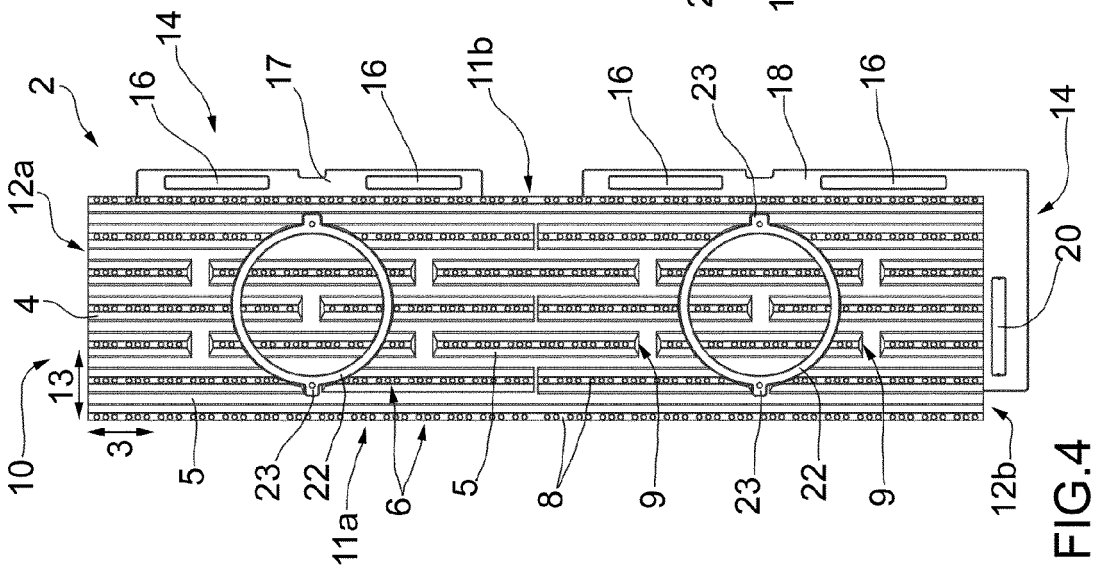
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FIG.4

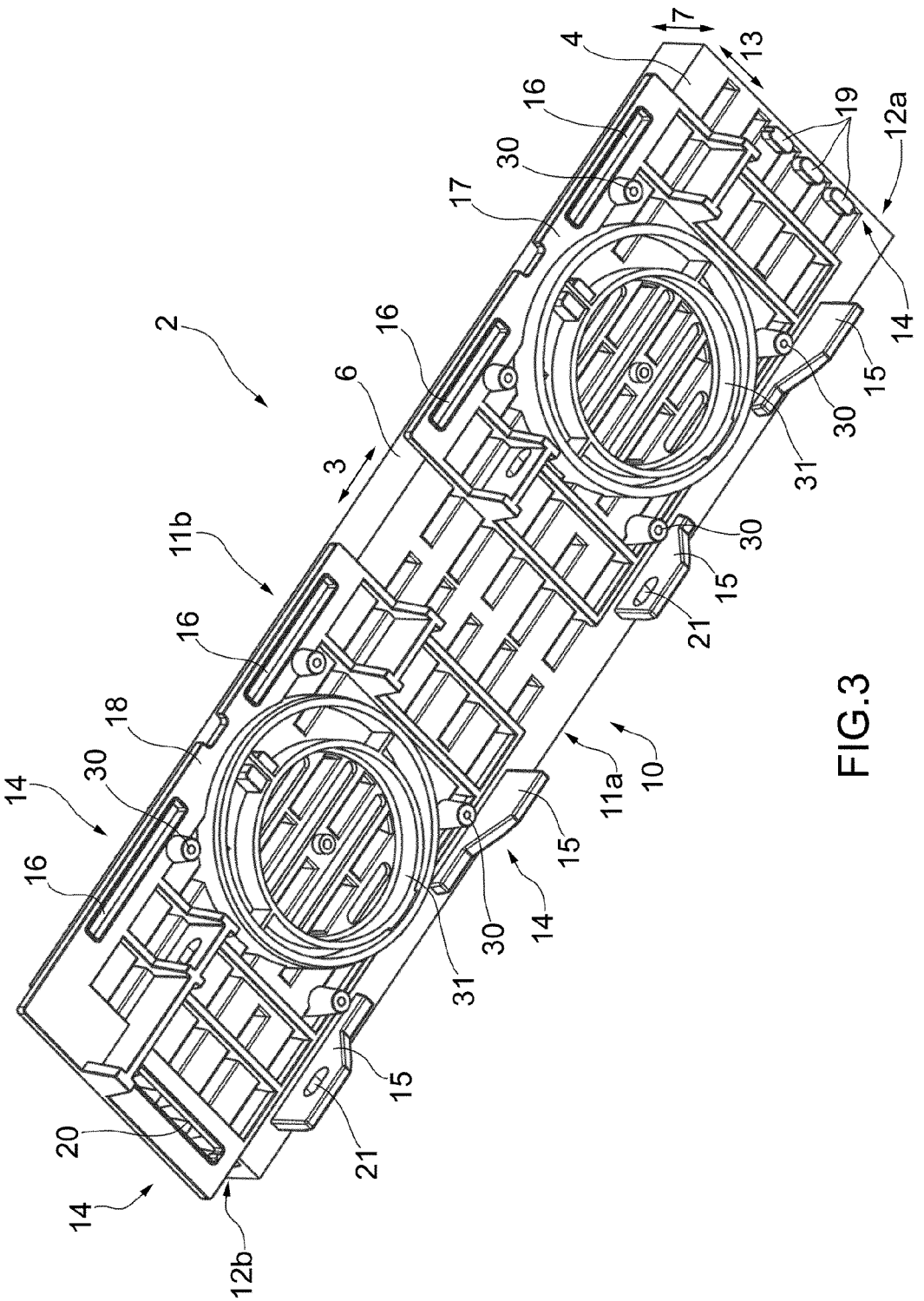


FIG.3

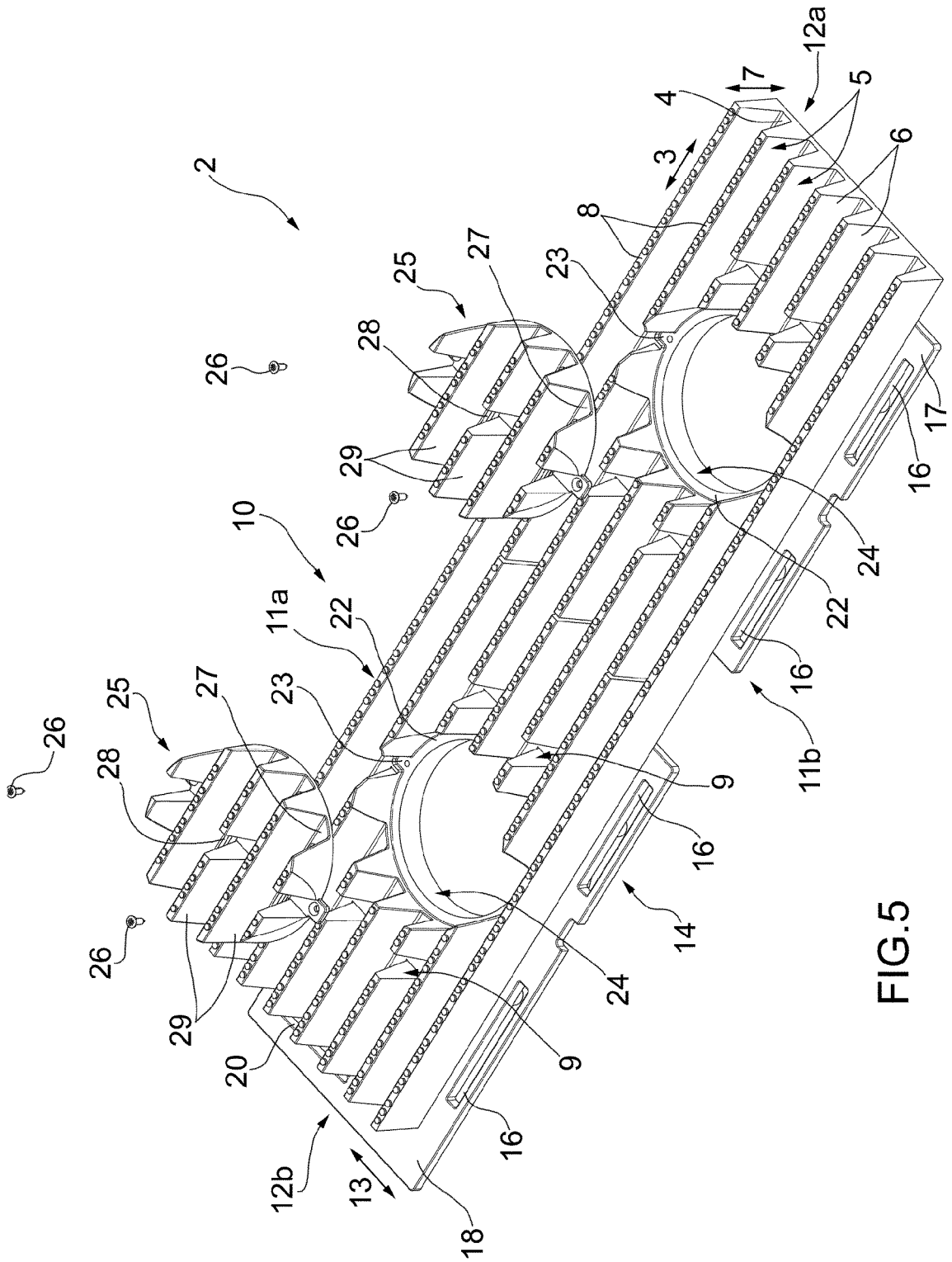
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FIG.5

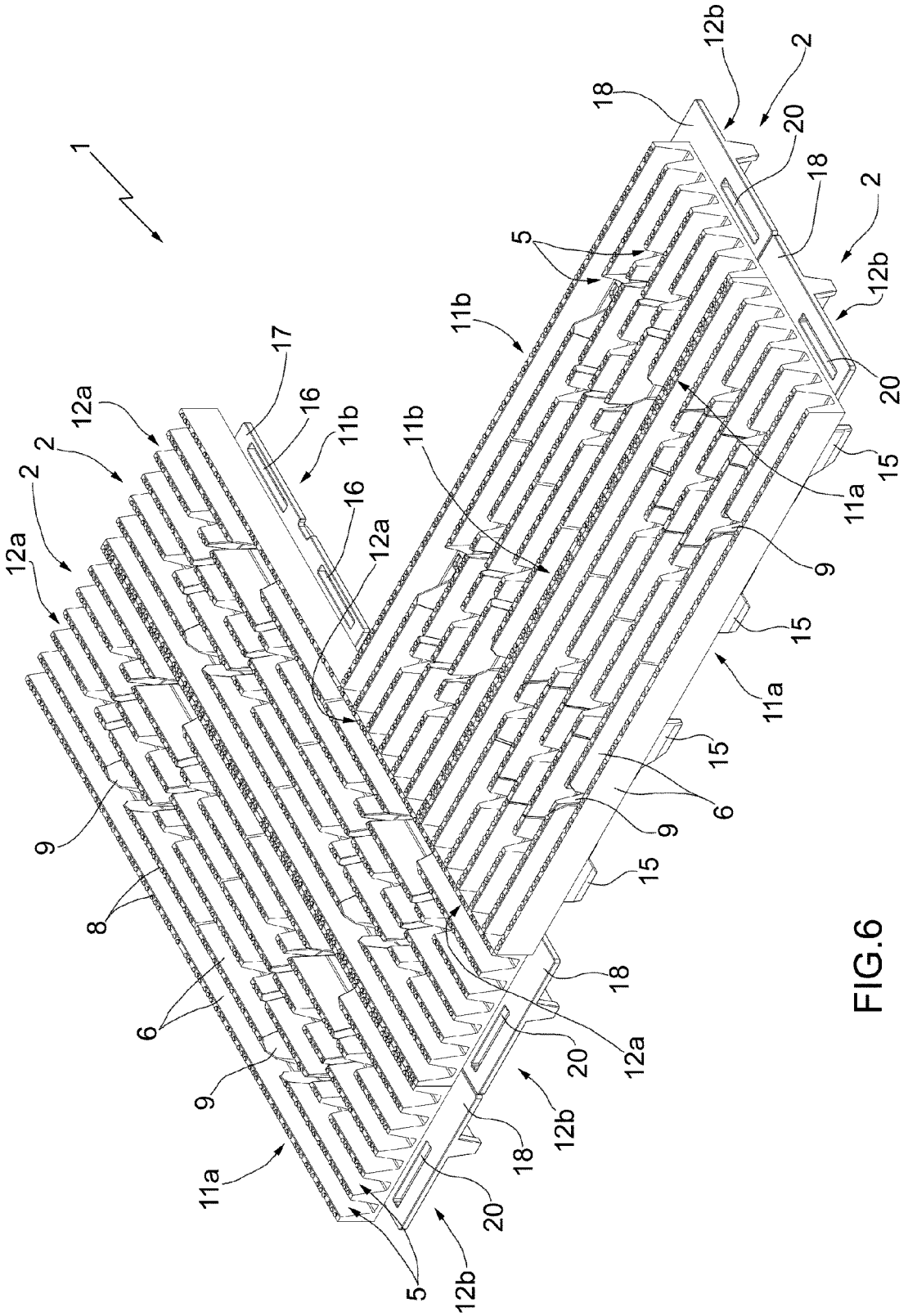


FIG.6

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# EUROPEAN SEARCH REPORT

Application Number
EP 14 16 8377

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
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| Y | US 2007/223993 A1 (PETERSON PAUL W JR [US] ET AL) 27 September 2007 (2007-09-27) * paragraphs [0001], [0004], [0041] - [0043] * * figure 1 * | 1-10,15, 16 | |
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| TECHNICAL FIELDS SEARCHED (IPC) |
|---|
| E01C<br>E03F |

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
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| Munich | 25 September 2014 | Kremsler, Stefan |

CATEGORY OF CITED DOCUMENTS

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25-09-2014

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