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(54) **Tile, particularly for providing roofings**

(57) A tile (1), particularly for providing roofings, constituted by a substantially flat plate (2) that has an approximately square or rectangular plan shape, comprising, proximate to a first side (3) and a second side (4) thereof, which are not contiguous, first means for pivoting between two plates (2) in a laterally adjacent and partially overlapping condition and, proximate to a third side (5) and a fourth side (6) thereof, which are not contiguous, second means for pivoting between two plates (2) arranged so that one is in front of the other and so that they are partially superimposed.

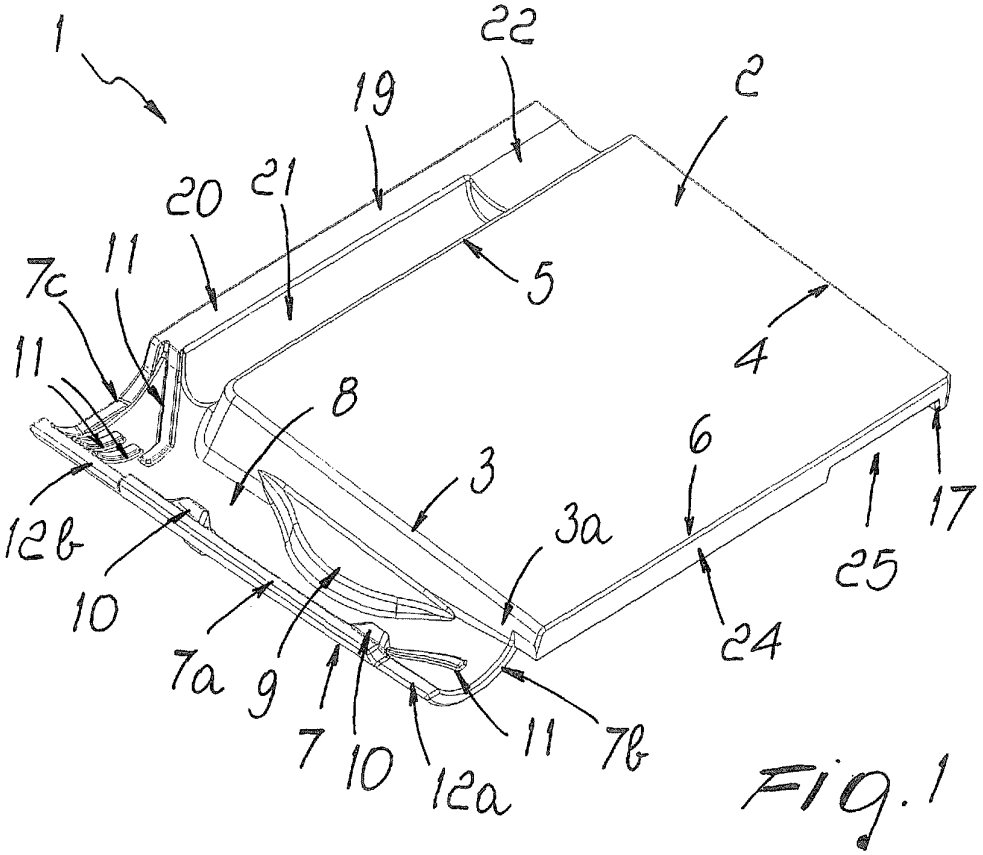

Fig. 1

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Description

[0001] The present invention relates to a tile particularly for providing roofings.

[0002] Tiles that have a substantially rectangular plan shape and an approximately sinusoidal transverse cross-section, constituted by a convex portion that is contiguous to a concave portion, are currently used to provide roofings.

[0003] Such tiles are made of rigid materials, such as clay hardened by firing or plastic or metal.

[0004] Grooves are formed on the upper surface of such known types of tile, proximate to their rear perimetric edge directed toward the ridge of the roof during use, and are approximately parallel to each other and to such rear perimetric edge; a tooth protrudes from the lower face surface of the tiles, proximate to their front perimetric edge directed during use toward the gutter line of the roof and is shaped so that it can be accommodated within the grooves of a further tile.

[0005] Such known types of tile are arranged mutually side-by-side, with the convex region of one tile partially superimposed and rested on the concave region of the adjacent tile, so as to constitute a plurality of rows that are approximately parallel to each other and to the ridge of the roof; the tiles of one row rest on the tiles of the row arranged in front of it, arranging the teeth that protrude from the tiles of the rear row within the seats of the tiles of the forward row.

[0006] However, these known types of tile have a drawback: they do not lend themselves to the provision of roofs that have a curved profile, since they are rigid and cannot follow the curvature of the roof once they are mutually connected to each other; in this case, the tooth of the rear tiles would escape from the seat of the front tiles, thus interrupting the continuity of the roofing; it is in fact not possible to provide very deep seat and very tall teeth, since this would cause the total space occupation and cost of such tiles to become excessive.

[0007] Further, these known types of tile would form, for the roof, a wavy upper surface, which cannot meet particular aesthetic and/or architectural requirements, which provide for roofs whose upper surface is substantially planar.

[0008] Flat tiles are also known which are constituted by a flat plate, which has an approximately rectangular plan shape and on the upper surface of which, proximate to its rear perimetric edge (which during use is directed toward the ridge of the roof) and to one of its two lateral perimetric edges, there are approximately rectilinear seats, which are arranged substantially parallel to each other and to the contiguous perimetric edge of the plate.

[0009] Appropriately provided rectilinear protrusions protrude approximately at right angles from the lower surface of the plate, proximate to its front perimetric edge (which during use is directed away from the ridge of the roof) and proximate to its lateral perimetric edge that is not affected by such seats; such protrusions have such a shape and arrangement that they can be positioned in the underlying seats of a further tile, on which the one being considered is partially superimposed to the rear or laterally.

[0010] These known types of tile are arranged so as to cover the slopes of a roof, arranging them laterally adjacent to each other so as to constitute a plurality of horizontal rows, in which each row is partially covered by the row arranged behind it.

[0011] However, these known types of tile have drawbacks: due to their flat shape, they are in fact unable to drain large amounts of water toward the gutter and therefore can be used only to provide roofs whose slope is steep enough to nonetheless drain the water from them.

[0012] Further, since these known types of tile are substantially flat, between such tiles and the underlying slope there is no space adapted to allow ventilation and therefore such tiles are not suitable for providing ventilated roofs.

[0013] Moreover, to ensure better water draining, the tiles of one row must be staggered with respect to the tiles of the contiguous rows, and this can affect negatively the overall aesthetics of the resulting roof; this further entails that the two tiles arranged at the end of approximately half of the rows must be narrower than the other tiles, with a consequent increase in production, storage and transport costs.

[0014] Further, these known types of flat tile cannot be used to provide roofs that have a curved profile, since in order to follow the curvature of the roof, two contiguous tiles, being substantially flat, would have to rotate with respect to each other through a very large angle, with the risk that such tiles might separate, interrupting the continuity of the roofing.

[0015] The aim of the present invention is to solve the above-mentioned problems, eliminating the drawbacks of the cited background art, by providing a tile that allows to obtain roofs whose upper surface is substantially flat, even with slopes of limited inclination, at the same time ensuring effective water draining.

[0016] Within this aim, an object of the invention is to provide a tile that allows to obtain a ventilated roof whose upper surface is substantially flat.

[0017] Another object of the invention is to provide a tile that allows to also cover roofs having a curved profile, ensuring that the continuity of the roofing is maintained.

[0018] Another object of the invention is to maintain low production, storage, transport and laying costs.

[0019] Another object is to provide a tile that is structurally simple and has low production costs.

[0020] This aim and these and other objects, which will become better apparent hereinafter, are achieved by a tile, particularly for providing roofings, constituted by a substantially flat plate that has an approximately square or rectangular plan shape, characterized in that said plate comprises, proximate to a first side and a second side thereof, which are not contiguous, first means for pivoting between two of said plates in a laterally adjacent and

partially overlapping condition and, proximate to a third side and a fourth side thereof, which are not contiguous, second means for pivoting between two of said plates arranged so that one is in front of the other and so that they are partially superimposed.

[0021] Further characteristics and advantages of the invention will become better apparent from the following detailed description of a particular but not exclusive embodiment thereof, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figures 1 and 2 are first and second top perspective views of a tile according to the invention;
Figures 3 and 4 are first and second bottom perspective views of the tile according to the invention;
Figures 5 and 6 are respectively a front view and a rear view of the tile according to the invention;
Figures 7 and 8 are first and second side views of the tile according to the invention;
Figure 9 is a perspective view of four tiles according to the invention, connected to each other in the condition of maximum mutual distance;
Figure 10 is a perspective view of four tiles according to the invention, connected to each other in the condition of minimum mutual distance;
Figure 11 is a sectional view, taken along the line XI-XI of Figure 10;
Figure 12 is a sectional view, taken along the line XII-XII of Figure 9;
Figure 13 is a sectional view, taken along the line XIII-XIII of Figure 10;
Figure 14 is a sectional view, taken along the line XIV-XIV of Figure 9;
Figures 15 is a sectional view, taken along the line XIV-XIV of

[0022] Figure 9, of two tiles according to the invention, mutually connected and inclined with respect to each other;

[0023] Figures 16 is a sectional view, taken along the line XII-XII of Figure 9, of two tiles according to the invention, mutually connected and inclined with respect to each other.

[0024] In the exemplary embodiments that follow, individual characteristics, given in relation to specific examples, may actually be interchanged with other different characteristics that exist in other exemplary embodiments.

[0025] Moreover, it is noted that anything found to be already known during the patenting process is understood not to be claimed and to be the subject of a disclaimer.

[0026] With reference to the figures, the reference numeral 1 designates a tile, constituted by a plate 2, which has an approximately square or rectangular plan shape and is substantially flat and is preferably but not necessarily made of fired clay.

[0027] Proximate to at least one first side 3 and one second side 4 of the plate 2, which are mutually not contiguous and parallel, there are first means for pivoting between two plates 2 arranged mutually adjacent and partially superimposed; in the embodiment shown in the accompanying figures, the first and second sides 3, 4 are arranged, during use, approximately at right angles to the ridge and the gutter line of the slope of the roof, not shown in the accompanying figures, to which the tile 1 is applied.

[0028] Advantageously, proximate to a third side 5 and a fourth side 6 of the plate 2, which are not mutually contiguous, there are second means for pivoting between two plates 2 arranged so that one lies in front of the other and the tiles are partially superimposed; in the embodiment shown in the accompanying figures, the third and fourth sides 5, 6 are arranged during use approximately parallel to the ridge and to the gutter line of the slope of the roof to which the tile 1 is applied, with the third side 5 directed toward the ridge and the fourth side 6 directed toward the gutter line.

[0029] In the embodiment shown in the accompanying figures, the first pivoting means comprise advantageously a first tab 7, which protrudes from the first side 3 of the plate 2 and has an approximately rectangular or isosceles-trapezoid plan shape and, in transverse cross-section, an arc-like and preferably substantially semicircular configuration, so as to form a concave surface 8 that during use is directed away from the slope of the roof, not shown in the accompanying figures.

[0030] The first tab 7 further has, in a side view, approximately the shape of a right-angled trapezoid, with the shorter parallel side arranged proximate to the fourth side 6 of the plate 2.

[0031] The first tab 7 thus forms, at its concave surface 8, a duct for draining water.

[0032] Advantageously, an outer longitudinal perimetric edge 7a of the first tab 7 that is directed away from the first side 3 of the plate 2 lies on a plane that is approximately parallel to, and lower than, the plane of arrangement of the plate 2, at a distance from the latter, therefore in the direction of the underlying slope of the roof, that is approximately equal to the thickness of the plate 2.

[0033] Advantageously, the first tab 7 protrudes to the rear of the first plate 2, beyond the third side 5 thereof.

[0034] At a central region of a surface 3a for blending the concave surface 8 and the first side 3 of the plate 2, at least one first protrusion 9 protrudes transversely to the concave surface 8 and is preferably but not necessarily approximately semicircular in its plan shape and affects only partially the width of the first tab 7.

[0035] The first protrusion 9 is inclined so as to form an acute angle in the direction of the fourth side 6.

[0036] One or more first teeth 10 protrude from the concave surface 8 of the first tab 7 proximate to its longitudinal perimetric edge 7a and are directed toward the first side 3 to affect partially the width of the first tab 7, without affecting the portion in which the first protrusion

9 is present.

[0037] Advantageously, first projections 11 protrude from the concave surface 8 of the first tab 7, proximate to the longitudinal perimetric edge 7a, are adapted to facilitate the draining of the water thereon, and are preferably inclined with respect to the longitudinal perimetric edge 7a, so as to form an acute angle with the edge 7a in the direction of the third side 5.

[0038] Advantageously but not necessarily, on the longitudinal perimetric edge 7a of the first tab 7 there are, starting from a front transverse end 7b and a rear transverse end 7c of the first tab 7, two recesses, respectively designated by the reference numerals 12a and 12b.

[0039] At least one second tooth 14 and at least one third tooth 15 protrude from a convex surface 13 of the first tab 7, proximate to its rear transverse end 7c; the second tooth 14 is arranged on a central longitudinal axis of the first tab 7 and the third tooth 15 is arranged on an axis that is parallel and slightly offset axially in the direction of the longitudinal perimetric edge 7a; the second and third teeth 14, 15 constitute means for resting the tile 1 on the slope of the roof.

[0040] Such resting means further comprise a second protrusion 16, which in a side view preferably has an arc-like profile and protrudes approximately at right angles and longitudinally from a lower surface 2a of the plate 2, in a region that is adjacent to the second side 4.

[0041] Advantageously, such first pivoting means comprise a second tab 17, which protrudes approximately at right angles from the lower surface 2a of the plate 2, at the edge of the second side 4 thereof, preferably along the entire length of said second side 4.

[0042] Conveniently, one or more fourth teeth 18 protrude from a second tab 17 to affect also the lower surface 2a of the plate 2 in the direction of the first tab 7.

[0043] As shown for example in Figures 11 and 12, the second tab 17 can be positioned, during use, within one first tab 7 of a further tile 1, and can perform a transverse translational motion with respect to the first tab 7, in order to adjust the distance between the two mutually laterally adjacent tiles 1.

[0044] As shown in Figures 11 and 12, the translational motion of the second tab 17 within the first tab 7 is delimited by two stroke limit positions defined respectively by the abutment of the second tab 17 against the edge of the plate 2 at the blending surface 3a between the concave surface 8 and the first side 3 of the plate 2 and by the abutment of the fourth teeth 18 against the first teeth 10 of the first tab 7.

[0045] Advantageously, the second pivoting means comprise a third tab 19, which protrudes from the third side 5 of the plate 2 and has an approximately rectangular plan shape, which is blended transversely to the first tab 7 proximate to the rear transverse end 7c thereof.

[0046] Advantageously, the third tab 19 lies on a plane of arrangement that is approximately parallel to, and lower than, the plane of arrangement of the plate 2, at a distance from the latter, therefore in the direction of the underlying slope of the roof, that is approximately equal to the thickness of the plate 2.

[0047] Conveniently, the third tab 19 comprises a first portion 20, which is contiguous to the first tab 7 and in which there is, approximately starting from the third side 5 of the plate 2 and along part of its length, a channel 21, which is open upward and preferably has, in a transverse cross-section, a substantially semicircular shape and ends at one end at the concave surface 8 of the first tab 7, so as to convey therein any water that might accumulate thereat; advantageously, the channel 21 is arranged along a longitudinal axis that is inclined with respect to the plane of arrangement of the plate 2, so as to facilitate the draining of water from the channel 21 to the first tab 7.

[0048] Advantageously, the third tab 19 comprises a second portion 22, whose upper surface is approximately flat or slightly arc-like, and is arranged on the opposite side with respect to the first tab 7.

[0049] Advantageously, a third protrusion 23 that constitutes such resting means of the tile 1 protrudes, approximately at right angles and transversely to the plate 2, from the surface of the third tab 19 that is directed toward the lower surface 2a of the plate 2.

[0050] Such second pivoting means further comprise a fourth tab 24, which protrudes approximately at right angles from the fourth side 6 of the plate 2 toward the underlying slope of the roof, approximately starting from the first side 3 of the plate 2, and affects the fourth side 6 along a length that is approximately equal to the length of the first portion 20 of the third tab 19; a seat 25 is formed between the fourth tab 24 and the second tab 17, and the second portion 22 of the third tab 19 of an additional tile 1 arranged in front and below is arranged at the seat 25.

[0051] As shown for example in Figures 13 and 14, the fourth tab 24 can be positioned, during use, within the channel 21 formed in the first portion 20 of the third tab 19 of an additional tile 1, and can perform a translational motion transversely to the channel 21 in order to obtain the chosen distance between the two tiles 1; as shown in Figures 13 and 14, the translational motion of the fourth tab 24 within the channel 21 is delimited by two stroke limit positions defined by the abutment of the fourth tab 24 against the lateral surface of the channel 21.

[0052] Use of the invention is therefore as follows: with reference to the accompanying figures, by arranging proximate to the gutter line of the slope of a roof, not shown in the figures, a plurality of mutually laterally adjacent tiles 1, with the second tab 17 of each tile 1 arranged within the first tab 7 of the tile 1 that is laterally adjacent thereto, it is possible to obtain a first row of tiles 1 approximately parallel to the gutter line.

[0053] It is further possible to associate to the rear with such first row a second row of tiles 1, arranged so that the fourth tab 24 of the tiles 1 of the second row is positioned within the channel 21 provided in the tiles 1 of the first row.

[0054] By proceeding in a similar manner, it is possible

to cover the slope of the roof completely with a plurality of tiles 1.

[0055] Since, as shown in Figure 10, the plate 2 of each tile 1 covers the first tab 7 of the plate that is contiguous to its second side 4 and the third tab 19 of the plate that is contiguous to its third side 5, the upper surface of the roof that is obtained is substantially planar, since it is formed substantially by the plates 2, all of which are approximately coplanar and are laterally mutually adjacent at a chosen mutual distance.

[0056] Draining of rainwater is in any case ensured by the presence of the channel 21 and of the first tab 7.

[0057] Further, the presence of the first tab 7 and of the resting means in the tiles 1 forms, between the tiles 1 and the underlying slope of the roof, a chamber, not shown in the accompanying figures, which is sufficient to allow ventilation of the roof.

[0058] It has thus been shown that the invention has achieved the proposed aim and objects, a tile having been devised which allows to provide roofs with a substantially planar upper surface while ensuring optimum draining of rainwater even with roofs having a limited inclination.

[0059] Further, the presence of an air chamber formed between the tiles and the underlying slope of the roof ensures adequate ventilation of the roof.

[0060] Further, the presence of the first and second pivoting means allows to use the tile according to the invention also to provide curved roofs, since said first and second pivoting means allow to maintain the connection between two contiguous tiles even in case of a large rotation of one tile with respect to the other.

[0061] Moreover, by way of the possibility to modify even by a substantial extent the mutual distance of two tiles, both in a direction that is parallel to the ridge of the roof and in a direction that is perpendicular thereto, it is possible to achieve the covering of roofs having a chosen shape and configuration without having to use tiles of different width, thus reducing costs for production, transport and storage with respect to the background art.

[0062] Further, the production costs of the tile according to the invention remain low, since it is provided only by means of components that are easy to manufacture and/or assemble.

[0063] The invention is of course susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0064] The materials used, as well as the dimensions that constitute the individual components of the invention, may of course be more pertinent according to specific requirements.

[0065] The various means for performing certain different functions need not certainly coexist only in the illustrated embodiment but can be present per se in many embodiments, including ones that are not illustrated.

[0066] The characteristics indicated as advantageous, convenient or the like may also be omitted or be replaced with equivalents.

[0067] The disclosures in Italian Patent Application No. VE2007A000068 from which this application claims priority are incorporated herein by reference.

[0068] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A tile, particularly for providing roofings, constituted by a substantially flat plate that has an approximately square or rectangular plan shape, **characterized in that** said plate comprises, proximate to a first side and a second side thereof, which are not contiguous, first means for pivoting between two of said plates in a laterally adjacent and partially overlapping condition and, proximate to a third side and a fourth side thereof, which are not contiguous, second means for pivoting between two of said plates arranged so that one is in front of the other and so that they are partially superimposed.

2. The tile according to claim 1, **characterized in that** said first pivoting means comprise a first tab, which protrudes from said first side of said plate and has an approximately rectangular or isosceles trapezoid plan shape and, in a transverse cross-section, an open polygonal shape or an arc-like configuration, that forms a concave surface directed, during use, away from the slope of a roof, said first tab having, in a side view, an approximately right-angled trapezoid configuration, in which the shorter parallel side is arranged proximate to said fourth side of said plate, said first tab forming, at said concave surface, a duct for draining water.

3. The tile according to claim 2, **characterized in that** said first tab has a substantially semicircular transverse cross-section.

4. The tile according to claim 1 and 2 or 3, **characterized in that** the outer longitudinal perimetric edge of said first tab, which is directed away from said first side of said plate, lies on a plane that is approximately parallel to, and lower than, the plane of arrangement of said plate, at a distance from the latter, in the direction of said underlying slope, that is approximately equal to the thickness of said plate.

5. The tile according to claim 4, **characterized in that** said first tab protrudes to the rear of said first plate, beyond said third side thereof.

6. The tile according to claim 5, **characterized in that** at least one first protrusion protrudes transversely to said concave surface at a central region of a surface for blending between said concave surface and said first side of said plate, said protrusion having an arc-like plan shape, affecting only partially the width of said first tab, and being inclined so as to form an acute angle in the direction of said fourth side.

7. The tile according to claim 6, **characterized in that** said first protrusion has, in plan view, an approximately semicircular or inverted-Ω shape.

8. The tile according to one or more of the preceding claims, **characterized in that** one or more first teeth protrude from said concave surface of said first tab, proximate to said longitudinal perimetric edge, and are directed toward said first side so as to affect partially the width of said first tab without affecting the portion in which said first protrusion is provided.

9. The tile according to claim 8, **characterized in that** first protrusions protrude from said concave surface of said first tab, proximate to said perimetric longitudinal edge, are adapted to facilitate the draining of water on said concave surface, and are inclined with respect to said longitudinal perimetric edge so as to form an acute angle therewith in the direction of said third side.

10. The tile according to one or more of the preceding claims, **characterized in that** two recesses are provided on said longitudinal perimetric edge of said first tab, starting from the front and rear transverse ends of said first tab.

11. The tile according to one or more of the preceding claims, **characterized in that** it comprises means for resting said tile on said slope of said roof, said resting means being constituted by at least one second tooth and at least one third tooth, which protrude from said convex surface of said first tab, proximate to said rear transverse end thereof, and are arranged respectively on a central longitudinal axis of said first tab and on an axis that is parallel and slightly axially offset in the direction of said longitudinal perimetric edge.

12. The tile according to claim 11, **characterized in that** said resting means comprise a second protrusion, which preferably has an arc-like profile in a side view and protrudes approximately at right angles and longitudinally from the lower surface of said plate, in a region that is adjacent to said second side.

13. The tile according to one or more of the preceding claims, **characterized in that** said first pivoting means comprise a second tab, which protrudes approximately at right angles from said lower surface of said plate, at the edge of said second side thereof, preferably along the entire length of said second side.

14. The tile according to claim 13, **characterized in that** one or more fourth teeth protrude from said second tab so as to affect also said lower surface of said plate in the direction of said first tab.

15. The tile according to claim 14, **characterized in that** said second tab can be positioned within said first tab of a further tile, and can perform a transverse translational motion with respect to said first tab to adjust the distance between said two laterally mutually adjacent tiles, the translational motion of said second tab within said first tab being delimited by two stroke limit positions defined respectively by the abutment of said second tab against said blending surface between said concave surface and said first side of said plate, and by the abutment of said fourth teeth against said first teeth of said first tab.

16. The tile according to claim 15, **characterized in that** said second pivoting means comprise a third tab, which protrudes from said third side of said plate and has an approximately rectangular plan shape, which is blended transversely to said first tab proximate to said rear transverse end thereof.

17. The tile according to claim 16, **characterized in that** said third tab lies on a plan of arrangement that is approximately parallel to, and lower than, said plane of arrangement of said plate, at a distance from the latter, in the direction of said underlying slope, that is approximately equal to the thickness of said plate.

18. The tile according to claim 17, **characterized in that** said third tab comprises a first portion that is contiguous to said first tab and in which there is, approximately starting from said third side and along part of its length, a channel that is open upward and has, in a transverse cross-section, an open polygonal configuration, or an arc-like configuration, which leads at one end at said concave surface of said first tab, so as to convey therein any water that might accumulate thereat, said channel being arranged along a longitudinal axis that is inclined with respect to said plane of arrangement of said plate, in order to facilitate the draining of water from said channel to said first tab, said channel having a substantially semicircular transverse cross-section.

19. The tile according to claim 18, **characterized in that** said third tab comprises a second portion that has an approximately planar or slightly arc-like upper surface and is arranged on the opposite side with respect to said first tab, a third protrusion protruding

from the surface of said third tab that is directed toward said lower surface of said plate, approximately at right angles and transversely to said plate, and constitutes said resting means of said tile.

20. The tile according to one or more of the preceding claims, **characterized in that** said second pivoting means comprise a fourth tab that protrudes approximately at right angles from said fourth side of said plate toward said underlying slope, approximately starting from said first side, and affects said fourth side over a length that is approximately equal to the length of said first portion of said third tab, between said fourth tab and said second tab there being a seat at which said second portion of said third tab of a further tile arranged in front and below is arranged, said fourth tab being arranged within said channel of an additional tile and being able to perform a translational motion transversely to said channel in order to achieve the chosen distance between said two tiles, the translational motion of said fourth tab within said channel being delimited by two stroke limit positions defined by the abutment of said fourth tab against the lateral surface of said channel.

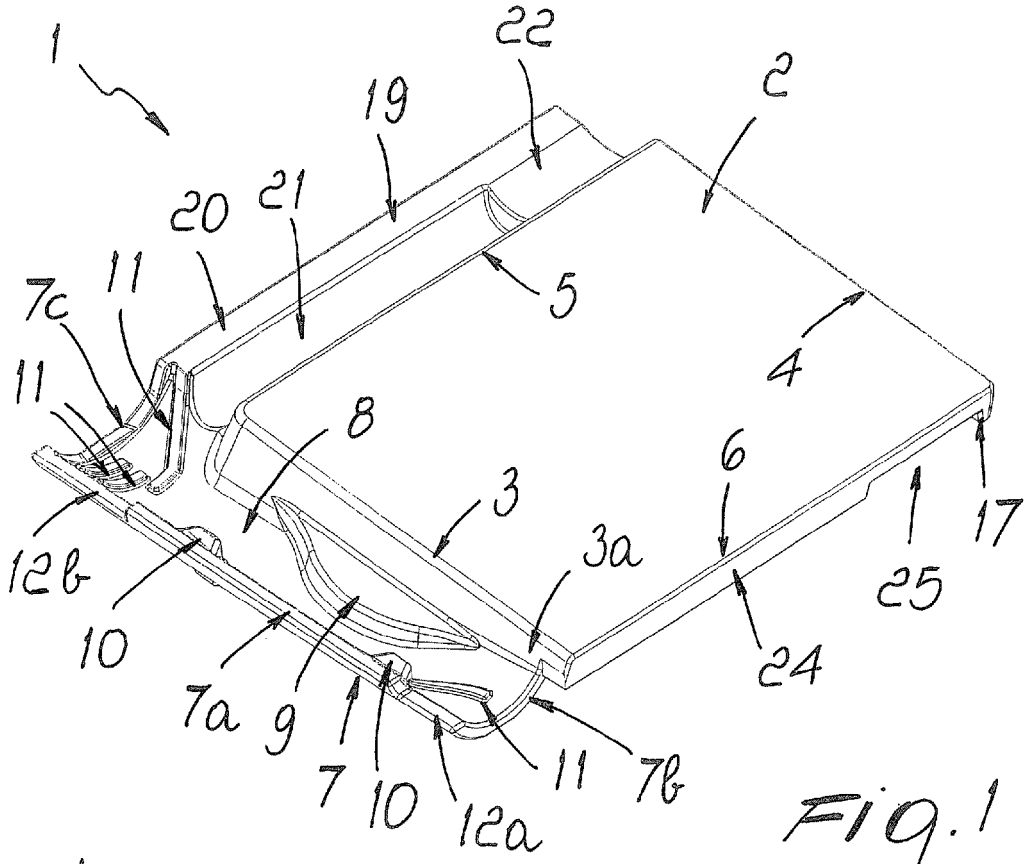
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Fig. 1

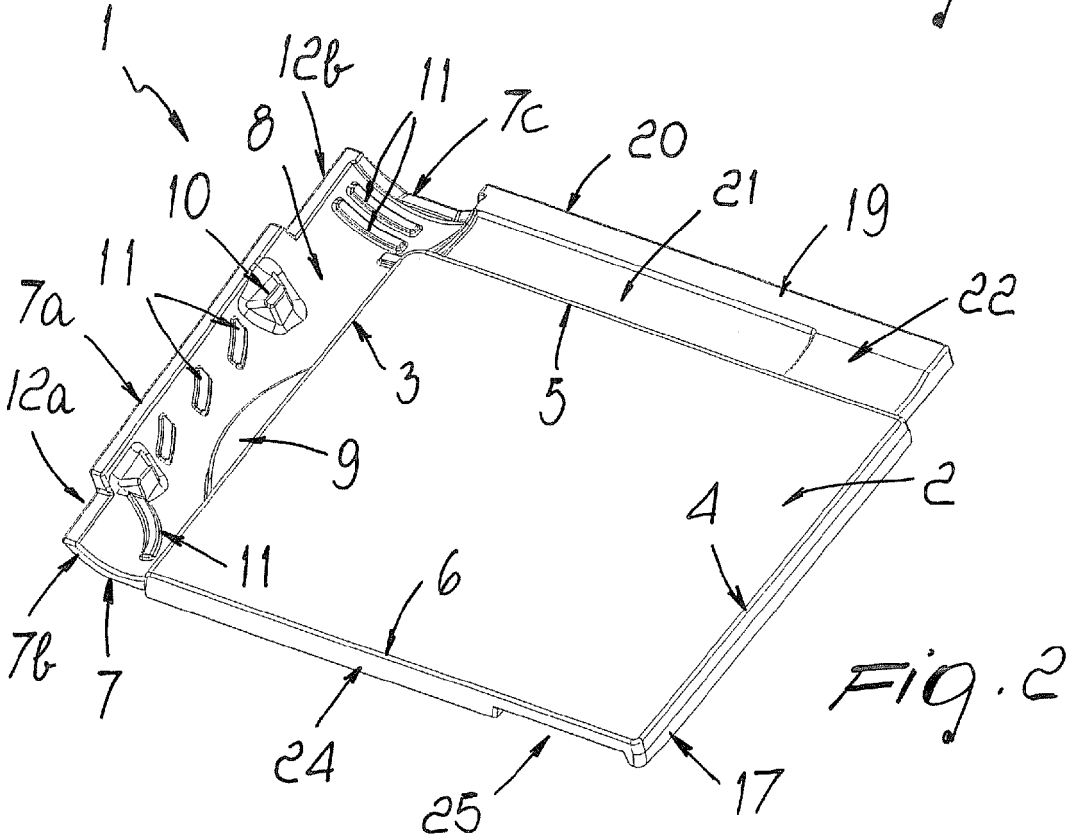
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Fig. 2

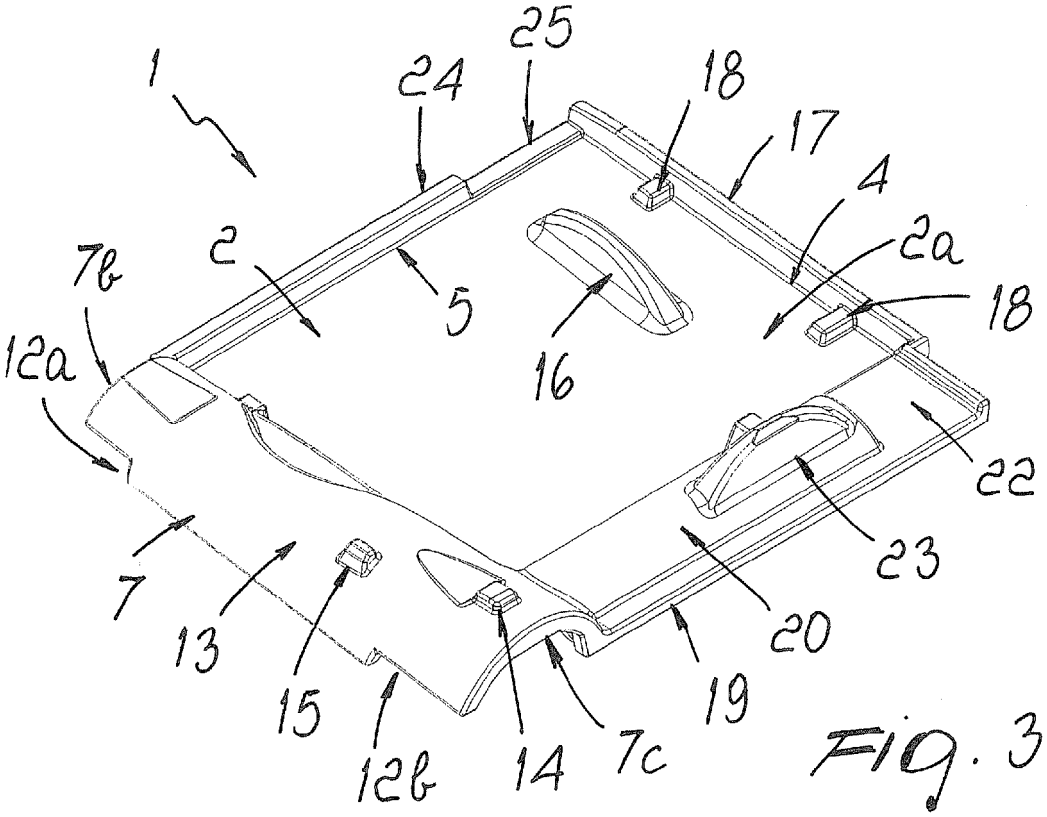
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FIG. 3

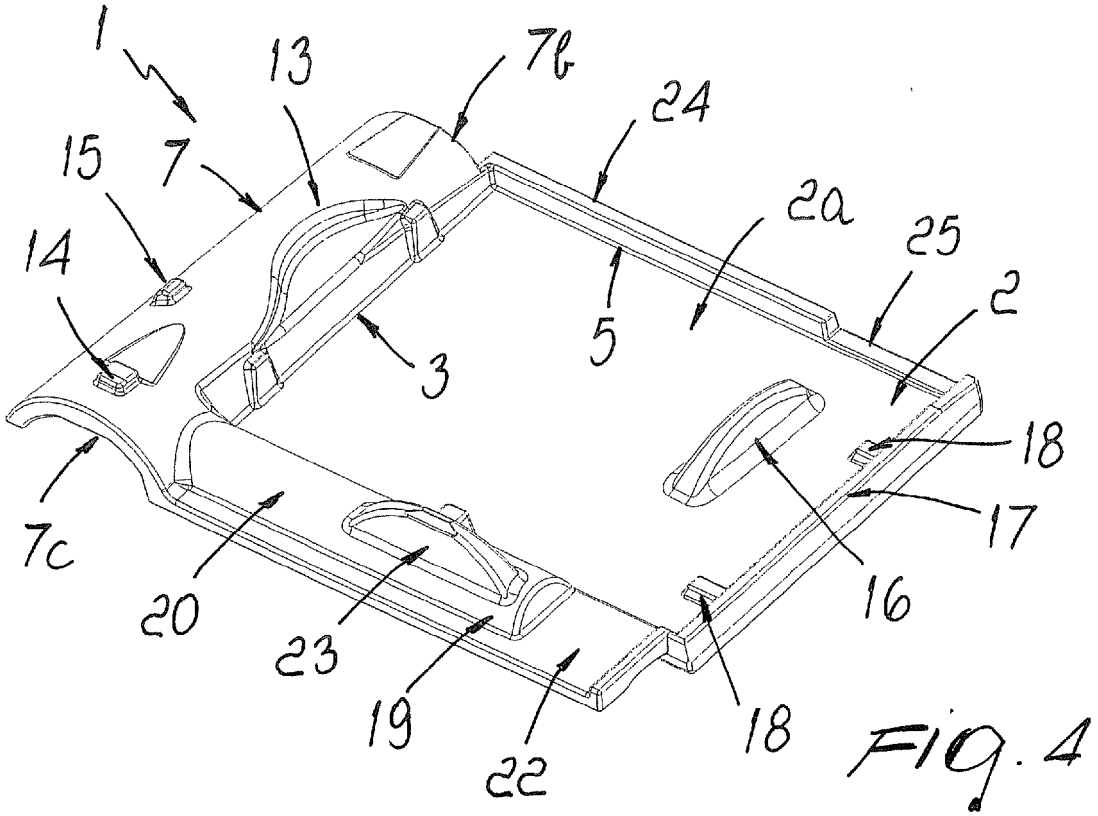
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FIG. 4

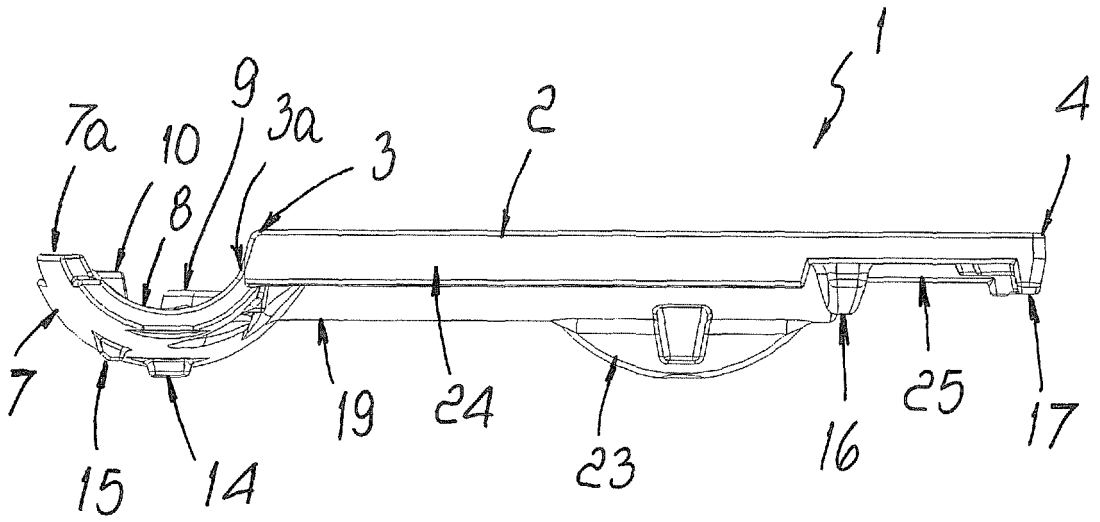
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Fig. 5

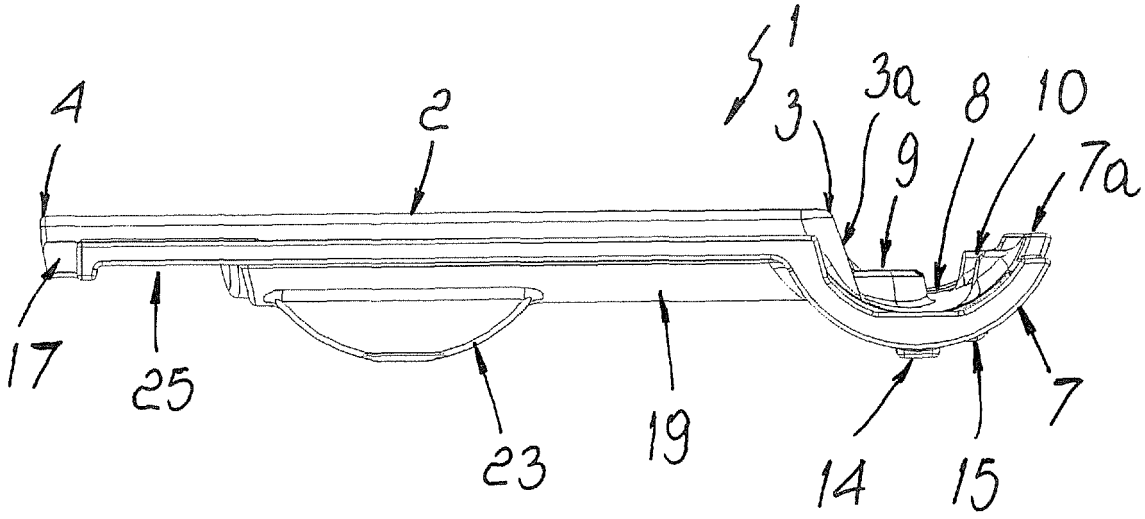
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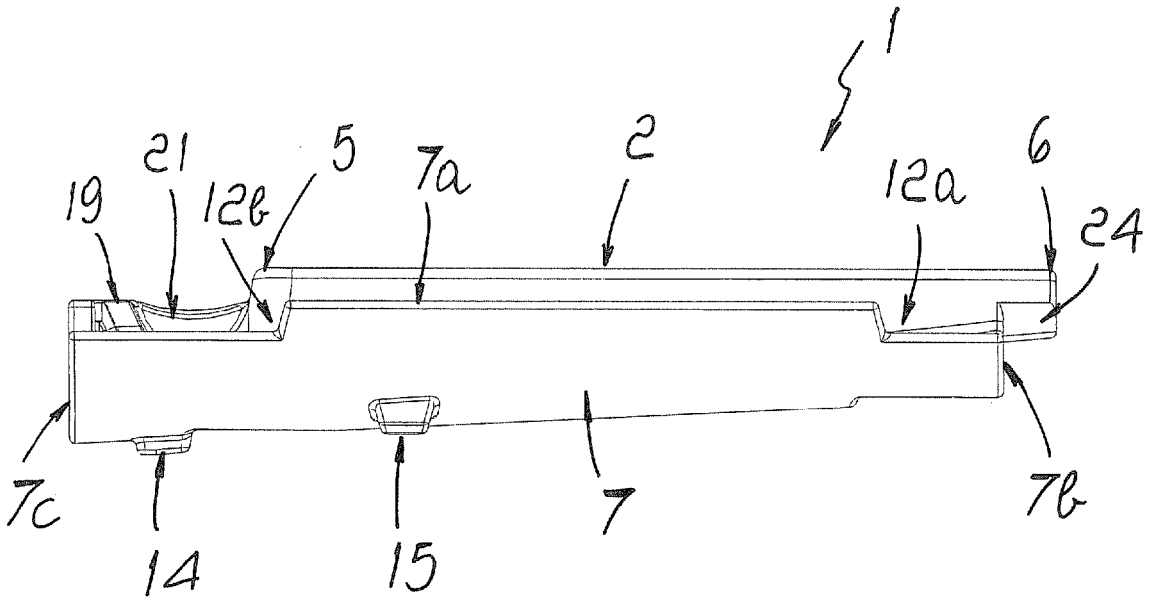
Fig. 6



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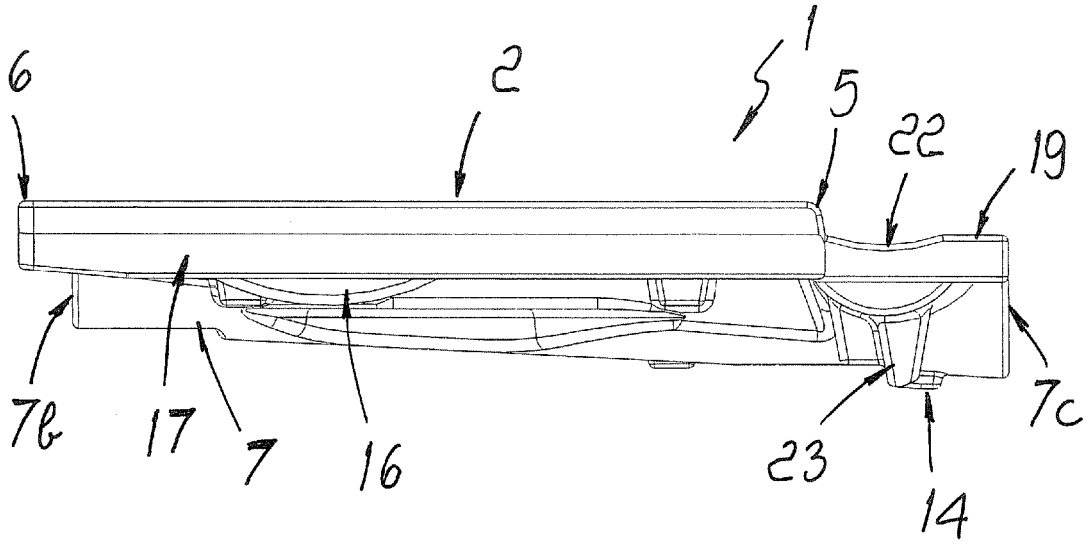

Fig. 8

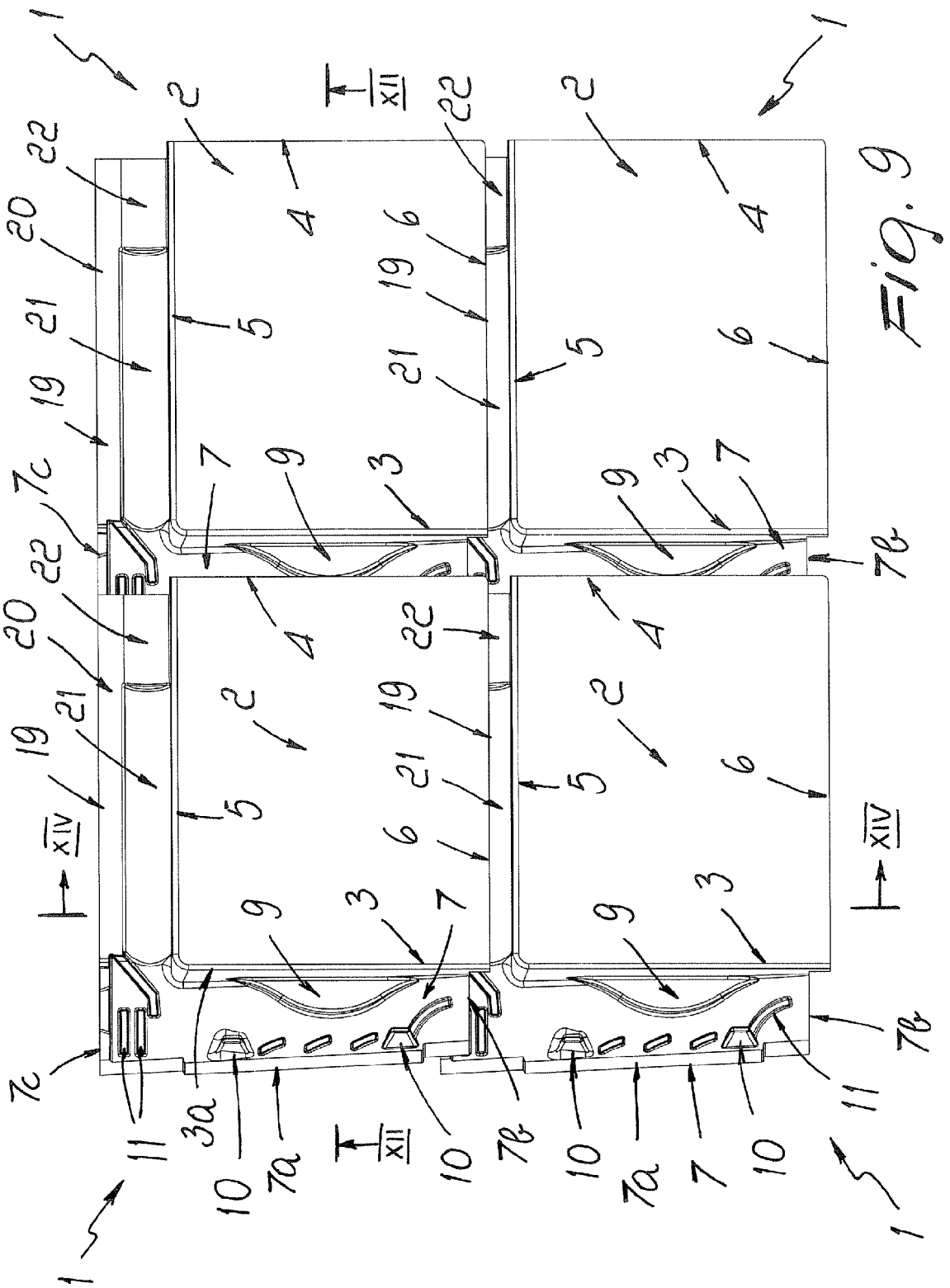

Fig. 9

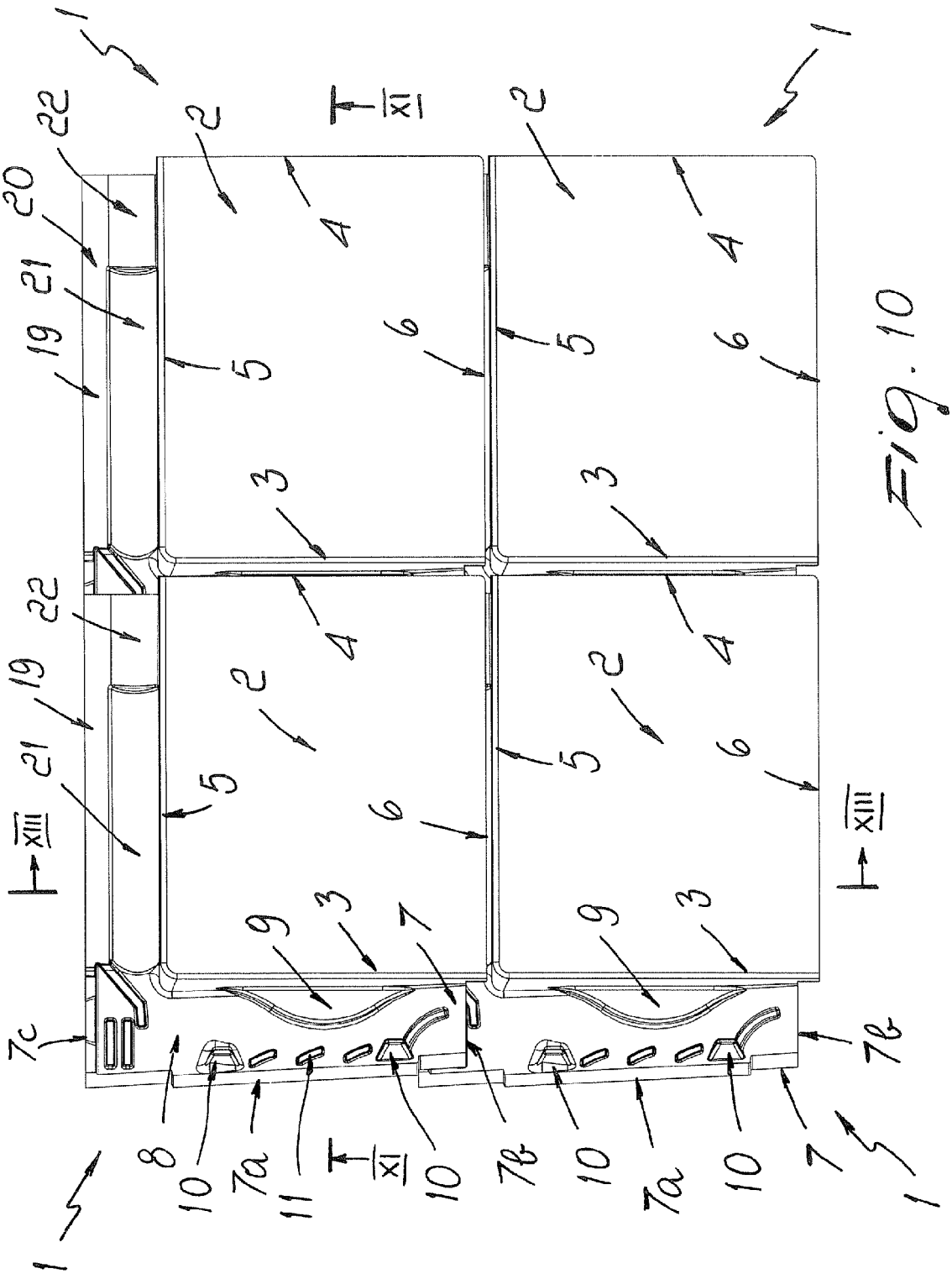

Fig. 10

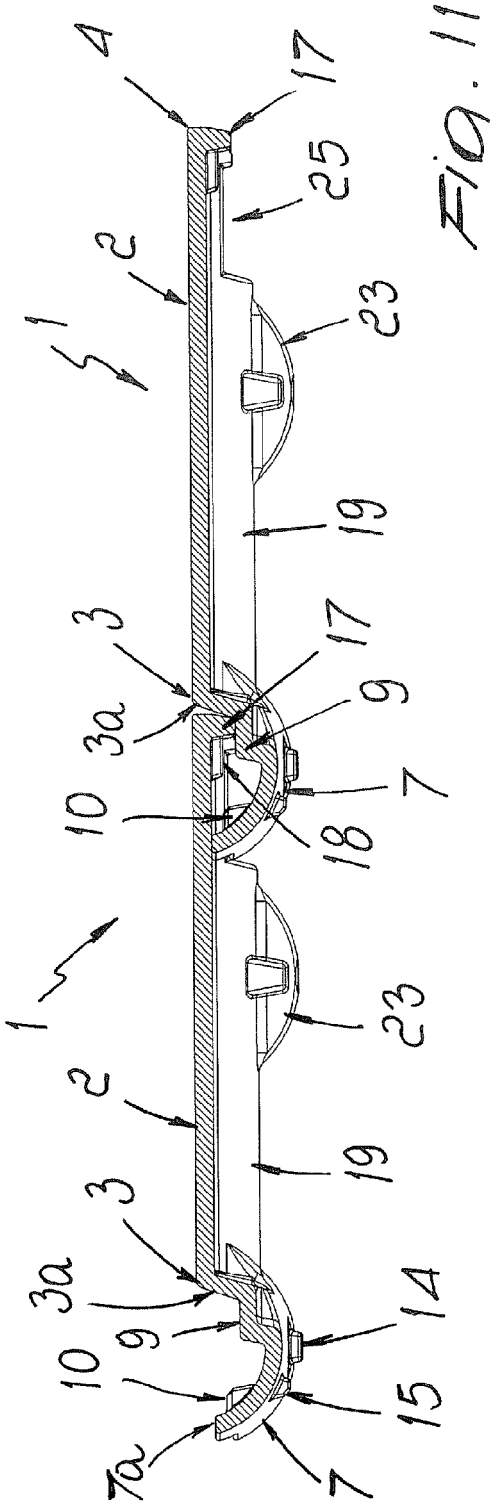
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Fig. 11

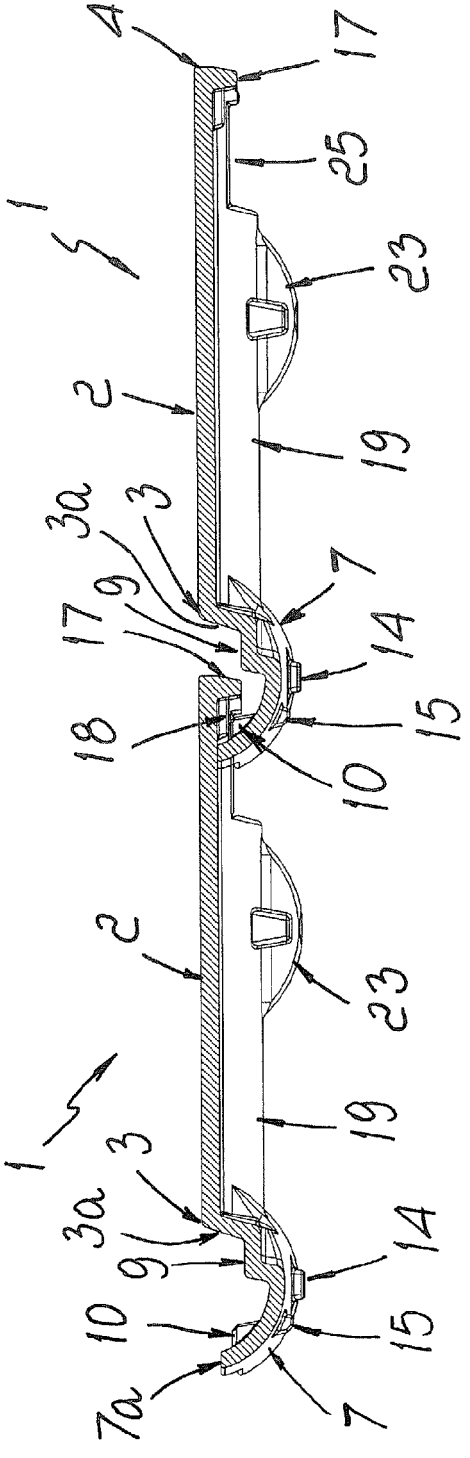
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Fig. 12

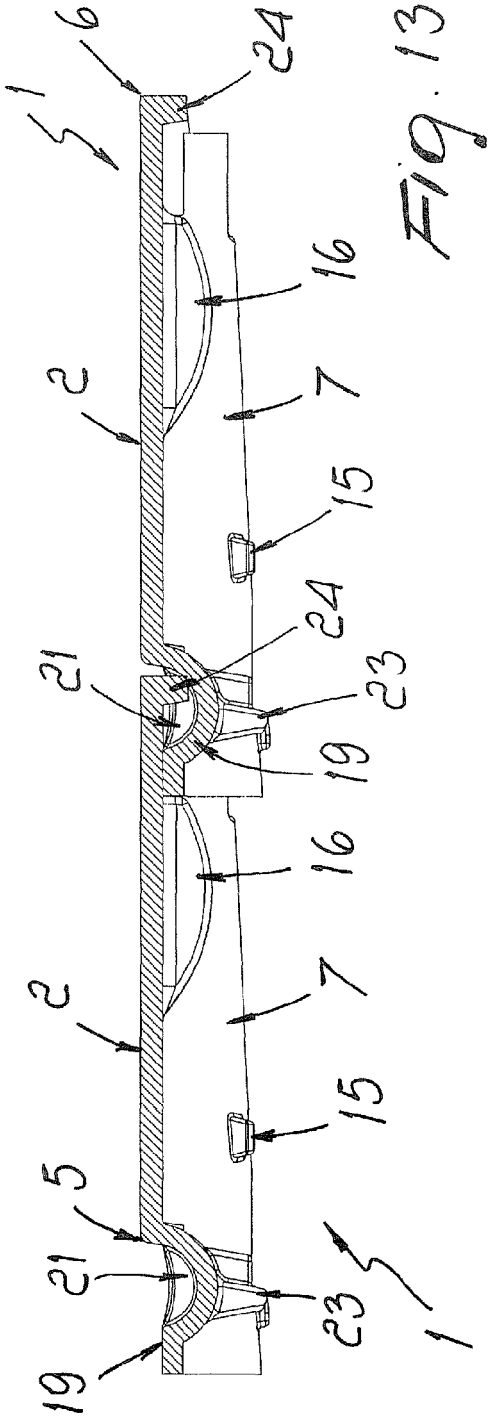
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Fig. 13

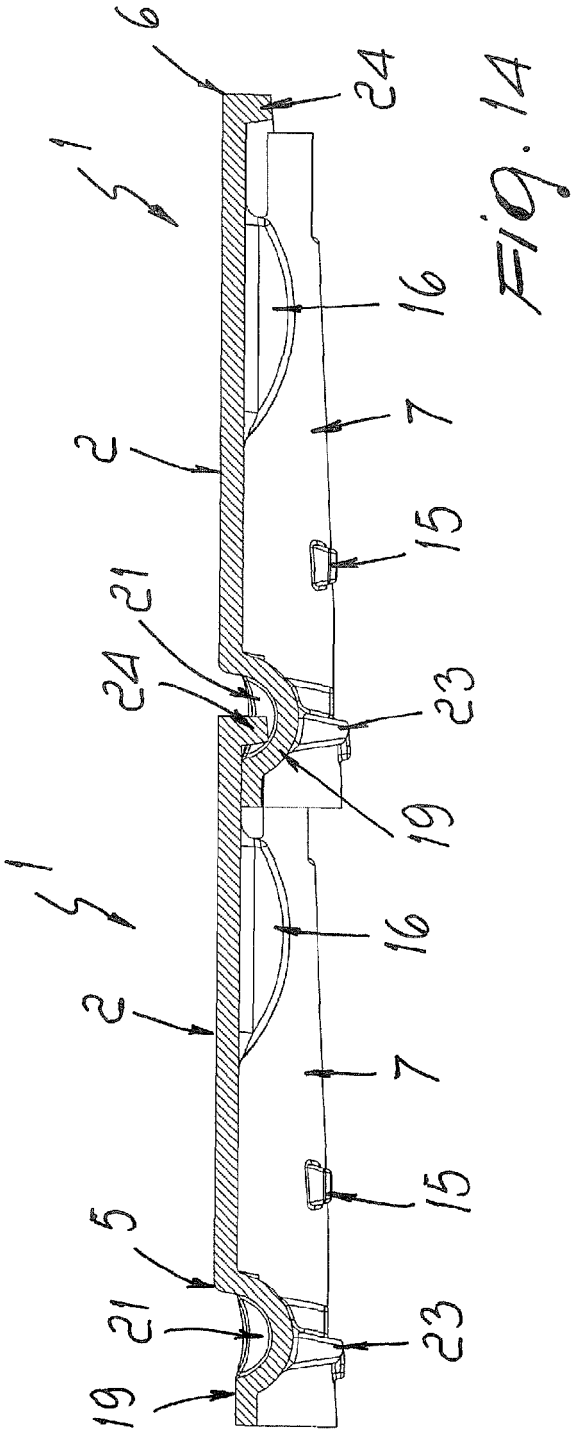
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Fig. 14

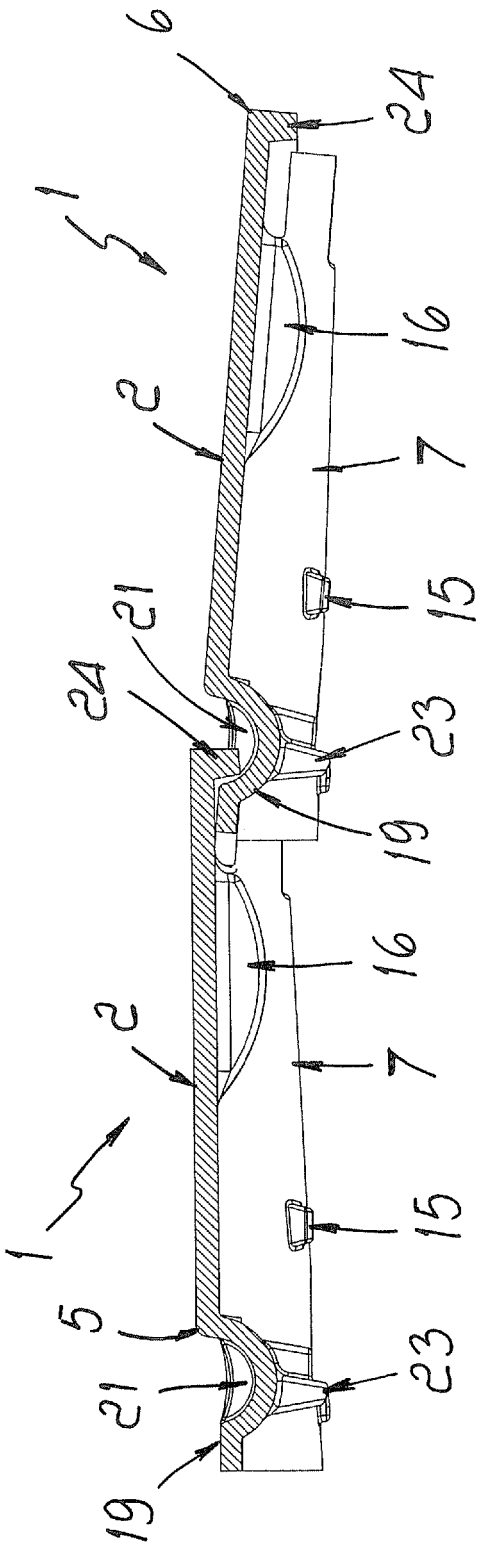
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Fig. 15

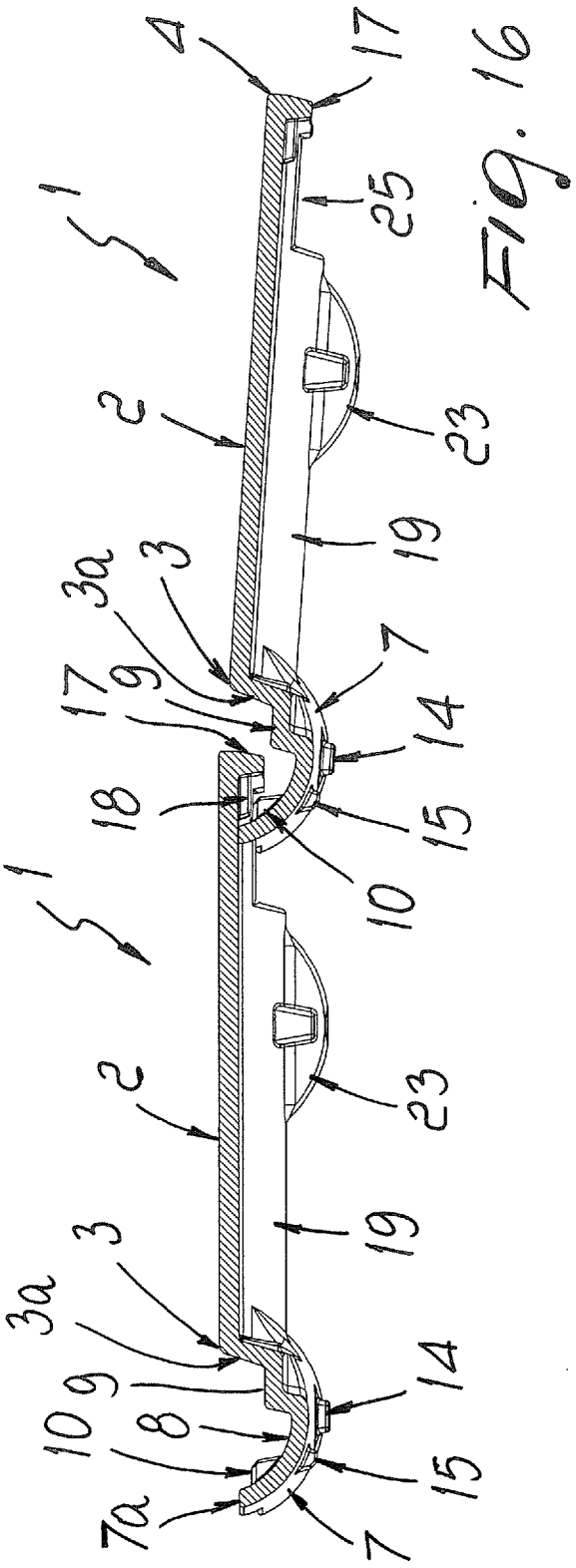
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Fig. 16

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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