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(54) **SUPPORT ORGAN DESIGNED TO SUPPORT AND RECIPROCALLY FIX BOTTOM BENT TILES
OF A VENTILATED ROOF**

TRÄGERORGAN ZUR ABSTÜTZUNG UND GEGENSEITIGEN BEFESTIGUNG VON
SCHRÄGZIEGELN EINES BELÜFTETEN DACHS

ORGANE DE SUPPORT CONÇU POUR SUPPORTER ET FIXER DE FAÇON RÉCIPROQUE DES
TUILES À FOND INCURVÉ D'UN TOIT VENTILÉ

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WO-A2-2007/122502

DE-U1- 8 815 566

GB-A- 2 213 512

US-A- 2 106 948

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Description

[0001] The present invention relates to a support and fixing organ designed to support and reciprocally fix consecutive bottom bent tiles of a row of bottom bent tiles of a ventilated roof.

[0002] In detail, the present invention relates to a support and fixing organ designed to fix/connect bottom curved tiles to each other so as to form a truncated-conical sector, and each having a tapered axial end, indicated hereunder as the smaller end, and an opposing non-tapered axial end, indicated hereunder as the larger end, to which the explanation below shall specifically refer without thus losing its general nature.

[0003] As known, ventilated roofs of buildings are coverings designed to allow air to pass between the upper covering of the roof of the building formed of bottom/pan curved tiles and upper/cap curved tiles, and the underlying sloped supporting surface of the building on which the covering rests, indicated hereunder as the supporting plane. Due to their design, ventilated roofs therefore ensure constant ventilation of the ventilation chamber/cavity between the roof covering and the underlying supporting plane, thus reducing the formation/stagnation of humidity on the supporting plane and/or excessive heating of the building at roof level.

[0004] The roof covering is typically made by alternating concave and convex parallel rows of tiles, which extend along a transversal direction to the ridge of the roof on a lying plane parallel to the pitch of the roof one alongside the other, thus forming two layers of overlapping tiles.

[0005] The tiles forming the rows of the bottom layer indicated hereunder as "bottom curved tiles" have convex backs turned towards the supporting plane and the concavities turned upwards and have the smaller ends overlapping the larger ends of the aligned and adjacent tiles, this forming a straight water off-flow channel. The tiles forming the rows of the top layer, indicated hereunder as upper curved tiles, are arranged in an overturned position with respect to the bottom curved tiles, i.e. they each have the convex back turned upwards, and the two larger side edges arranged resting on the concave surfaces of the two underlying and adjacent bottom curved tiles, in order to be arranged astride of them.

[0006] Fixing organs are also known which are designed to fix the tiles to the supporting plane of the roof. Patent application WO2007122502 describes a fixing organ to fix together the tiles of a traditional roof, which is provided with a hook having two adjacent and curved portions of stiff wire, which, in use, engage a roof tile arranged astride of two adjacent and underlying flat tiles. The fixing organ is also provided with a tie rod fixed to the supporting plane by means of nails. The fixing organ described in WO2007122502 is unsuitable for use to make ventilated roofs, since it cannot maintain the bottom bent/curved tiles raised/spaced from the underlying supporting plan to allow formation of a ventilation chamber

between them. Furthermore, fixing of the fixing organ to the supporting plane by means of nails causes perforation of the underlying insulating layers/sheaths and thereby prejudices insulation of the roof against water infiltration.

[0007] Patent application US 2 106 948 describes a filiform fixing hook, which is structured so as to fix two bottom curved tiles belonging to two different rows of tiles to the supporting plane of a traditional roof and having two free ends slotted into corresponding fixing openings present on a roof tile positioned astride of the two curved tiles. The fixing hook described in US 2 106 948 is unsuitable for use to make a ventilated roof, since, besides not spacing the bottom curved tile from the supporting plane, it requires specific fixing openings in the roof tile.

[0008] Applications GB 2 213 512, US 1 520 751 and EP 0 939 178 describe fixing organs structured exclusively to fix flat tiles to the supporting surface of a traditional roof without cavities, i.e. an "unventilated roof". In this case, the fixing organs described in GB 2 213 512, US 1 520 751 and EP 0 939 178 are unsuitable for fixing bottom curved tiles which, as is known, have a curved cross-section, and cannot maintain the tile spaced/raised from the underlying supporting surface.

[0009] Moreover DE881556U1 and US20106948 disclose support and fixing organs which are made of a plan shaped piece of sheet metal and/or metal wires. DE8815566 U1 discloses a support and fixing organ according to the preamble of claim 1.

[0010] The Applicant has conducted a detailed study to identify a solution which specifically allows the following objectives to be achieved: reciprocally fixing/connecting the bottom curved tiles of the same row by means of fixing organs so as to obtain a "chain-like" structure and thus increase stability of the roof; spacing the bottom curved tiles from the underlying supporting plane; eliminating the presence of fixing holes on the supporting plane; simplifying installation of the tiles and their fixing, so as to reduce the realisation costs of a ventilated roof.

[0011] The present invention therefore relates to providing a solution which allows the aforesaid objectives to be achieved.

[0012] This object is achieved by the present invention insofar as it relates to a fixing and support organ designed to support and reciprocally fix the bottom curved tiles of the same row of a ventilated roof, as defined in the appended claims 1-13.

[0013] The present invention also relates to a ventilated roof as defined in claim 14.

[0014] The present invention will now be described with reference to the appended drawings, which illustrate a non-limiting embodiment thereof, wherein:

- Figure 1 is a schematic perspective view of a pitch of a ventilated roof, in which the bottom curved tiles reciprocally connected by means of support and fixing organs realised according to the present invention are shown;

- Figure 2 is a perspective view with parts in cross-section and parts removed for clarity of a pair of consecutive and partially overlapping bottom curved tiles of the ventilated roof shown in Figure 1, reciprocally fixed by means of a support and fixing organ realised according to the present invention;
- Figure 3 is a lateral perspective view of the support and fixing organ shown in Figure 2;
- Figure 4 is a lateral perspective view of the support and fixing organ shown in Figure 3 according to a different angle;
- Figure 5 is a raised lateral view of the support and fixing organ shown in Figure 3; while
- Figure 6 is a cross-section of the support and fixing organ shown in Figure 5 along line I-I.

[0015] With reference to Figure 1, the number 100 denotes in its entirety a pitch of a ventilated roof of a building (not shown), which comprises a supporting plane 200 having an upper outer surface coplanar to a reference plane A sloped with respect to the vertical side of the building at a predetermined angle, and a roof covering 300 (only partially shown in Figure 1 for reasons of clarity), which is arranged on a lying plane substantially parallel to and spaced from the reference plane A.

[0016] Said ventilated roof 100 also comprises a plurality of support and fixing organs 1, which are arranged lying on the supporting plane 200, and are structured to support and maintain the roof covering 300 on the relative lying plane at a predetermined distance from the upper surface of the supporting plane 200, thus to delimit a ventilation/aeration chamber of the roof 100. Said roof covering 300 comprises a series of parallel alternate rows, concave and convex, of curved tiles, which extend along a transversal direction to the ridge line C of the pitch of the ventilated roof 100 remaining on the lying plane of said roof covering.

[0017] In particular, the rows of curved tiles form a bottom covering layer 350 of the roof covering, and a top covering layer of the roof covering (not shown), which is over the bottom covering layer 350, so as to form the surface of the visible top covering of the ventilated roof 100. In the example shown, the curved tiles correspond preferably with tiles 4, each of which is manufactured, for example, in tile, and has a truncated-conical shaped sector and a semi-elliptical transversal cross-section, and is shaped to have a smaller axial end 4a tapered with respect to an opposing larger axial end 4b.

[0018] The tiles 4 of each row of the bottom covering layer 350 indicated hereunder as bottom curved tiles 4 (since they collect the rainwater and allow it to flow off) are aligned with each other, one after the other, and are arranged so as to have the convex backs 4c turned towards the supporting plane 200 and the concavities 4d turned upwards, i.e. towards the top covering layer.

[0019] In particular, with reference to Figures 1 and 2, the bottom curved tiles 4 of each row of the bottom covering layer 350 are each arranged so as to have the trans-

versal edge of the larger end 4b turned towards ridge line C of the roof and the transversal edge of the smaller end 4b turned in the opposite direction to said ridge line C, for example towards a water collection gutter (not shown) fixed to an outer side edge of the supporting plane 200, parallel to ridge line C.

[0020] In greater detail, each bottom curved tile 4 belonging to a row of tiles has a smaller end 4a at least partially overlapping the larger end 4b of a bottom curved tile 4 aligned consecutively so as to form together with the remaining bottom curved tiles 4 of the same row a substantially straight channel for water off-flow from the roof towards the underlying collection gutter (not shown).

[0021] According to a preferred embodiment, the support and fixing organs 1 are structured to maintain the backs of the bottom curved tiles 4 at a distance from the underlying supporting plane 200 which is greater than the thickness of the bottom curved tile 4. According to a preferred embodiment, the support and fixing organs 1 are designed to maintain the backs of the bottom curved tiles 4 at a distance from the underlying supporting plane 200 which is greater than around 3 cm.

[0022] With reference to Figures 1 and 2, the support and fixing organs 1 are arranged lying on the supporting plane 200 beneath the bottom curved tiles 4 of the bottom covering layer 350 and are positioned at the overlapping axial ends 4a, 4b of the bottom curved tiles 4.

[0023] In particular, with reference to Figure 2, each support and fixing organ 1 is designed to grip two separate and reciprocally spaced portions 4e of the transversal edge of smaller end 4a of each bottom curved tile 4, which are arranged on opposite sides of the central plane of said bottom curved tile 4.

[0024] From what is described above, it should be emphasised that gripping the transversal edge of the bottom curved tile 4 at the two portions 4e spaced from each other and positioned on opposite sides of the central plane of the bottom curved tile 4 ensures that the central zone of greater depth of the concave surface 4d of the curved tile 4 is completely free of obstacles and therefore allows optimal off-flow of the water inside the channel formed by the row of bottom curved tiles 4.

[0025] According to the invention as shown in Figures 2-6 the support and fixing organ 1 is preferably, but not necessarily, made of plastic or similar material, obtained for example by means of an injection-moulding process, and comprises a rigid socket 5 shaped substantially like a trapezoidal prism or other similar shapes, with a larger base 6 resting on the supporting plane 200, and a smaller base 7, opposite the larger base 6, on which there is a concave surface 8 shaped so as to have a complementary shape to the convex back 4c of the bottom curved tile 4, so as to house the larger end 4b of it.

[0026] According to a possible embodiment, the height of the socket 5, i.e. the average distance between the larger base 6 and the smaller base 7 is greater than around 3 cm.

[0027] According to a preferred embodiment shown in

Figures 3-6, the support and fixing organ 1 also comprises a pair of rigid tongues 9, which extend in cantilever manner from the smaller base 7 of the socket 4 so as to be arranged on opposite sides of the central plane of said socket 4 at a predetermined distance from one another, and each have respective end fixing portions designed to grip the transversal edge of the smaller end 4a at two portions 4e.

[0028] With reference to Figures 2, portions 4e of the transversal edge of the smaller end 4a of the bottom curved tile 4 gripped by the fixing portions of the rigid tongues 9 are separate and reciprocally spaced and are arranged on opposite sides of the central plane of said bottom tile 4.

[0029] According to a preferred embodiment, said two rigid tongues 9 are spaced from each other so as to grip, in use, the edge of the bottom curved tile 4 and also to remain completely beneath the upper curved tiles 4. In this manner, the rigid tongues 9, besides being invisible from the outside and therefore not prejudicing the appearance of the roof, are protected from solar radiation, which would damage them and prejudice fixing.

[0030] For this purpose, the distance present between the two rigid tongues 9 of the organ 1 may be about double the thickness of the larger side edge of a upper curved tile designed to rest on the concave surface of the bottom curved tile 4 between said tongues 9.

[0031] According to a possible embodiment, the distance between the two rigid tongues 9 of the organ may conveniently be greater than 3 cm and lower than 10 cm, preferably 3.3 cm. In this manner, each cap/upper curved tile arranged astride of two adjacent bottom curved tiles 4, i.e. belonging to two rows of adjacent bottom tiles, covers two tongues belonging to two fixing organs 1 adjacent to each other.

[0032] According to a preferred embodiment shown in Figures 5 and 6, the rigid tongues 9 are substantially S-shaped, have a slightly arched transversal section so as to be substantially parallel to the underlying concave surface 8 and are arranged on two planes sloped in mirroring positions with respect to the central plane of the socket 5 at an angle between 65° and 75°, preferably 70°.

[0033] With references to Figures 5-6, each rigid tongue 9 comprises a connection segment 9a, which is fixed to a side edge of the smaller base 7 at a predetermined distance from the central plane of the socket 5 and extends vertically from said smaller base 7 along a direction substantially orthogonal to the concave surface 8.

[0034] In the example shown in Figure 5, each rigid tongue 9 also comprises a first intermediate segment 9b, which extends in cantilever manner from the free end of the connection segment 9a along a direction parallel to the concave surface 8 and to the central plane of the socket 5 so as to be arranged above the concave surface 8 and has a free end which extends beyond said underlying smaller base 7.

[0035] In particular, the inner surface of the connection segment 9a and the bottom surface of the first interme-

diate segment 9b of each of the two rigid tongues 9 delimit, together with a portion of the area of the concave surface 8 immediately beneath the first intermediate segment 9b, a housing or bottom groove 11 sized so as to house and grip a portion of the larger end 4b of a first bottom curved tile 4.

[0036] In this case, the first intermediate segment 9b of each rigid tongue 9 extends above the concave surface 8 remaining at a distance higher than or equal to the thickness of the bottom curved tile 4, so as to allow its larger end 4b to be inserted into/removed from the two bottom grooves 11.

[0037] Each rigid tongue 9 also comprises a second intermediate segment 9c, which is fixed to the free end of the first intermediate segment 9b and extends orthogonally to the first intermediate segment 9b upwards, i.e. in the opposite direction to the socket 5; and a hooking segment 9d which extends in cantilever manner from the free end of the second intermediate segment 9c so as to be arranged above the first intermediate segment 9b and remaining parallel to it and extends towards the socket 5 so as to extend above one of the two portions 4e of the transversal edge of the lower end 4a of the bottom curved tile 4 and thus grip it.

[0038] With reference to Figure 5, the upper surface of an end portion of the first intermediate segment 9b, the inner surface of the second intermediate segment 9c and the lower surface of the hooking segment 9d of each connection tongue 9a delimit between them a top groove 12 designed to house and grip one of the two portions 4e of the transversal edge of the lower end 4a of the second bottom curved tile 4, so that it is overlapping the larger end 4b of the first bottom curved tile 4 gripped in turn in the two bottom grooves 11.

[0039] In particular, the hooking segment 9d, the second intermediate segment 9c, and the end portion of the first intermediate segment 9b opposite the connection segment 9a of the two rigid tongues 9 define the two end connection portions of said tongues 9 designed to grip the two portions 4e of the transversal edge of the smaller end 4a of the second bottom curved tile 4.

[0040] From what is described above, it should be emphasised that the support and fixing organs 11, due to the presence of the tongues 9, are capable of reciprocally fixing the adjacent bottom curved tiles 4 of the same row to form an advantageously stable "chain-like" system.

[0041] With reference to Figures 3 and 4, the socket 5 is designed to have aeration channels or through-holes 13 which develop parallel to the central plane of the socket 5, while the larger base 6 comprises a plate, on which there are a plurality of through-holes 14 designed to allow aeration of the surface of the supporting plane 200 covered by said larger base 6.

[0042] The supporting surface of the larger base 6 on the supporting plane 200 is also shaped so as to have longitudinal teeth 15 which extend parallel to the central plane of the socket 5a thus being arranged alongside the through-holes 14 and which are spaced from each other

so as to allow air to pass between the surface of the larger base 6, the through-holes 14 and the supporting plane 200.

[0043] The longitudinal teeth 15 also have rectangular sections and conveniently define a hooking surface of the support and fixing organ 1 to the supporting plane 200.

[0044] In use, the embodiment of a ventilated roof 1 envisages: positioning each support and fixing organ 1 resting on the supporting plane 200 with the two end fixing portions oriented on the opposite side with respect to ridge line C, so as to insert the larger end 4b of the first bottom curved tile 4 inside the bottom grooves 11 of the support organ 1; and to insert the smaller end 4a of the second bottom curved tile 4 inside the upper grooves 12 of the support and fixing organ 1, so that the two end fixing portions of the two tongues 9 grip the two portions 4e of the transversal edge of the smaller end 4a of the second curved tile 4, so as to fix the latter to the first bottom curved tile 4.

[0045] The advantages of the ventilated roof and the support and fixing organ described above are clear.

[0046] The presence of the support socket allows the bottom curved tiles to be spaced from the supporting surface, thus creating the underlying ventilation chamber.

[0047] The tongues of the support organ, due to their position spaced from the central plane, are protected and concealed beneath the overlying roof tile, thereby offering both a visual advantage, since they are not visible from the outside, and a technical advantage, since they are not exposed to solar rays and consequently are not subject to the deterioration caused by them, particularly if they are made of plastic. Furthermore, the tongues grasp the bottom curved tile in two separate points and thereby prevent any swinging movement of the bottom curved tile around its longitudinal axis, thus increasing stability of the ventilated roof and therefore advantageously allowing someone to walk on the upper roof covering of the ventilated roof in total safety during maintenance operations.

[0048] The support and fixing organ is also simple to install, does not require any holes in the supporting surface and guarantees ventilation at the installation points as well.

[0049] In conclusion, the support organ guarantees optimal off-flow of water into the straight channel formed by bottom curved tiles. In fact, the arrangement of the two end fixing portions on opposite sides of the central plane of the socket keeps the central concave part of greater depth of the bottom curved tile completely free, allowing the rainwater to flow more easily along the channel, heavily reducing generation of spray outwards.

[0050] In conclusion, it is clear that changes and variants may be made to the ventilated roof and the support organ described above according to the Claims without deviating from the scope of the present invention.

[0051] In particular, according to a different embodiment of the support organ (not shown), the two rigid

tongues are replaced by a central tongue with a larger width which extends in cantilever manner from the socket so as to be arranged above the concave surface and thus to form a single bottom groove, and has on the opposite end two separate and curved L-shaped tabs towards the socket which form the two end hooking portions of the support organ.

[0052] In particular, the central tongue is arranged parallel to the smaller base of the socket and has a width substantially equal to the width of the smaller base, while the two tabs are fixed onto the edge of the central tongue, arranged on the opposite side with respect to the socket, so as to be reciprocally spaced and arranged on opposite sides of the central plane of the socket. The tabs are also folded so as to form two upper grooves designed to grip the two separate portions of the smaller end of the tile.

Claims

1. A support and fixing organ (1) designed, in use, to be arranged lying on a supporting plane (200) of a ventilated roof (100) and structured to reciprocally fix a pair of bottom curved tiles (4) of the same row of bottom curved tiles and support them so as to maintain the relative convex backs raised from the underlying supporting plane (200) to form a ventilation chamber; a first axial end (4b) of a first bottom curved tile (4) being arranged beneath a second axial end (4a) of a second bottom curved tile (4) aligned with and adjacent to said first bottom curved tile (4); said support and fixing organ being **characterised by** comprising:

a rigid socket (5) which is substantially shaped like a trapezoidal prism, and comprises a larger lower base (6) designed to lie on said supporting plane (200), and a smaller top base (7) on which there is a concave surface (8) shaped to have a complementary shape to the convex back (4c) of the first bottom curved tile (4), so as to house said first end (4b) of the first bottom curved tile (4) and maintain the convex back (4c) raised from said supporting plane (200) at a predetermined distance from it; and a pair of rigid tongues (9), which extend in cantilever manner above the top base (7) so as to be arranged on opposite sides of the central plane of said socket (5) at a predetermined distance between them, and have respective end fixing portions which are designed to grip corresponding portions (4e) of the transversal edge of the second axial end (4a) of said second bottom curved tile (4).

2. The support organ according to Claim 1, wherein the free ends of said rigid tongues (9) are folded so as to form grooves (12) structured to internally house

said portions (4e) of the transversal edge of said second axial end(4a) of said second bottom curved tile (4).

3. The support organ according to Claim 2, wherein each rigid tongue (9) is folded so as to form with the underlying top base (7) a bottom groove (11) designed to house internally a portion of said first axial end (4b) of said first bottom curved tile (4).
4. The support organ according to Claim 3, wherein said rigid tongues (9) each comprise a connection segment (9a) fixed to the socket (5) so as to extend along a direction orthogonal to the top base (7), and a first intermediate segment (9b), which extends above the top base (7) remaining substantially parallel to the top base (7) and forms together with the connection segment (9a) and the top base (7) one of said bottom grooves (11).
5. The support organ according to Claim 4, wherein each of said rigid tongues (9) also comprises a second intermediate segment (9c), which is fixed on the free end of the first intermediate segment (9b) and extends orthogonally to the first intermediate segment (9b); and a hooking segment (9d) which extends in cantilever manner from the free end of the second intermediate segment (9c) so as to be arranged above the first intermediate segment (9b) remaining parallel thereto and forms together with the second intermediate segment and a portion of the first intermediate segment (9b) one of said end fixing portions.
6. The support organ according to any of Claims 1 to 5, wherein the bottom base (6) of the socket (5) is shaped so as to have a plurality of gripping longitudinal teeth designed to fix the socket (5) to the supporting plane (200).
7. The support organ according to any of Claims 1 to 6, wherein the bottom base (6) of the socket (5) has a plurality of openings/through-holes (14).
8. The support organ according to any of Claims 1 to 7, wherein the rigid tongues (9) are substantially S-shaped and have a slightly arched transversal section substantially parallel to the underlying concave surface (8) of the bottom base (7).
9. The support organ according to any of Claims 1 to 8, wherein the rigid tongues (9) are arranged on two planes sloped in mirroring positions with respect to the central plan of the socket (5) so as to form an angle between 65° and 75°.
10. The support organ according to any one of the previous Claims, wherein the distance between two rigid

tongues (9) is around double the thickness of the larger side edge of a bottom curved tile (4).

11. The support organ according to any one of the previous Claims, wherein the socket (5) has a height greater than around 3 cm.
12. The support organ according to any one of the previous Claims, wherein the distance between the rigid tongues (9) is between around 3 cm and around 10 cm.
13. The support organ according to any one of the previous Claims, manufactured in plastic material by means of an injection-moulding process.
14. A ventilated roof (100) comprising a supporting plane (200) coplanar to a reference plane (A), and a covering layer (300), which is arranged on a lying plane substantially parallel to and spaced from the reference plane (A) at a predetermined distance from it and comprises a plurality of rows of bottom curved tiles (4) parallel to and spaced from each other; said ventilated roof (100) being **characterised by** comprising a plurality of support organs (1) of the bottom curved tiles (4) made according to any one of the previous Claims.

Patentansprüche

1. Ein Träger- und Befestigungsorgan (1), das dazu ausgestaltet ist, bei der Verwendung so angeordnet zu werden, dass es auf einer Trägerebene (200) eines belüfteten Daches (100) liegt, und das so aufgebaut ist, dass es ein Paar von gekrümmten Bodenziegeln (4) der gleichen Reihe von gekrümmten Bodenziegeln gegenseitig befestigt und sie so trägt, dass die jeweiligen konvexen Rückseiten, die von der zugrunde liegenden Trägerebene (200) abgehoben sind, so gehalten werden, dass sie eine Belüftungskammer bilden;
wobei ein erstes axiales Ende (4b) eines ersten gekrümmten Bodenziegels (4) unterhalb eines zweiten axialen Endes (4a) eines zweiten gekrümmten Bodenziegels (4), der zu dem ersten gekrümmten Bodenziegel ausgerichtet und neben diesem angeordnet ist, vorgesehen ist;
wobei das Träger- und Befestigungsorgan **dadurch gekennzeichnet ist, dass** es aufweist:

einen festen Sockel (5), der im Wesentlichen wie ein trapezförmiges Prisma geformt ist und eine größere untere Basis (6) aufweist, die so gestaltet ist, dass sie auf der Trägerebene (200) liegt, und eine kleinere obere Basis (7), auf welcher es eine konkave Oberfläche (8) gibt, die so geformt ist, dass sie eine zu der konvexen Rück-

- seite (4c) des ersten gekrümmten Bodenziegels (4) komplementäre Form hat, um das erste Ende (4b) des ersten gekrümmten Bodenziegels (4) aufzunehmen und die konvexe Rückseite (4c) abgehoben von der Trägerebene (2) mit einem festgelegten Abstand von dieser zu halten; und ein Paar von festen Zungen (9), die sich in auskragender Weise oberhalb der oberen Basis (7) so erstrecken, dass sie an gegenüberliegenden Seiten der zentralen Ebene des Sockels (5) mit einem festgelegten Abstand zwischen sich angeordnet sind, und die jeweilige Befestigungs- endabschnitte aufweisen, die dazu ausgestaltet sind, entsprechende Abschnitte (4e) der Querkante des zweiten axialen Endes (4a) des zweiten gekrümmten Bodenziegels (4) zu greifen.
2. Das Trägerorgan nach Anspruch 1, wobei das freie Ende der festen Zungen (9) so gefaltet ist, dass es Nuten (12) bildet, die dazu ausgestaltet sind, in sich die Abschnitte (4e) der Querkante des zweiten axialen Endes (4a) des zweiten gekrümmten Bodenziegels (4) aufzunehmen.
3. Das Trägerorgan nach Anspruch 2, wobei jede feste Zunge (9) so gefaltet ist, dass sie mit der unten liegenden oberen Basis (7) eine Bodennut (11) bildet, die dazu ausgestaltet ist, in sich einen Abschnitt des ersten axialen Endes (4b) des ersten gekrümmten Bodenziegels (4) aufzunehmen.
4. Das Trägerorgan nach Anspruch 3, wobei die festen Zungen (9) jeweils ein Verbindungssegment (9a) aufweisen, das so an dem Sockel (5) befestigt ist, dass es sich entlang einer Richtung senkrecht zu der oberen Basis (7) erstreckt, und ein erstes mittleres Segment (9b), welches sich oberhalb der oberen Basis (7) erstreckt, wobei es im Wesentlichen parallel zu der oberen Basis (7) bleibt und zusammen mit dem Verbindungssegment (9a) und der oberen Basis (7) eine der Bodennuten (11) bildet.
5. Das Trägerorgan nach Anspruch 4, wobei jede der festen Zungen (9) außerdem ein zweites mittleres Segment (9c) aufweist, welches an dem freien Ende des ersten mittleren Segments (9b) befestigt ist und sich senkrecht zu dem ersten mittleren Segment (9b) erstreckt; und ein Hakensegment (9d), das sich in auskragender Weise von dem freien Ende des zweiten mittleren Segments (9c) erstreckt, sodass es oberhalb des ersten mittleren Segments (9b) angeordnet ist, parallel zu diesem bleibt und zusammen mit dem zweiten mittleren Segment und einem Abschnitt des ersten mittleren Segments (9b) einen der Befestigungs- endabschnitte bildet.
6. Das Trägerorgan nach einem der Ansprüche 1 bis 5, wobei die Bodenbasis (6) des Sockels (5) so geformt ist, dass sie eine Mehrzahl von longitudinalen Greifzähnen aufweist, die dazu ausgestaltet sind, den Sockel (5) an der Trägerebene (200) zu befestigen.
7. Das Trägerorgan nach einem der Ansprüche 1 bis 6, wobei die Bodenbasis (6) des Sockels (5) eine Mehrzahl von Öffnungen/Durchgangslöchern (14) aufweist.
8. Das Trägerorgan nach einem der Ansprüche 1 bis 7, wobei die festen Zungen (9) im Wesentlichen S-förmig sind und einen leicht gebogenen quer verlaufenden Abschnitt aufweisen, der im Wesentlichen parallel zu der unten liegenden konkaven Oberfläche (8) der Bodenbasis (7) angeordnet ist.
9. Das Trägerorgan nach einem der Ansprüche 1 bis 8, wobei die festen Zungen (9) auf zwei Ebenen angeordnet sind, die in gespiegelten Positionen relativ zu der zentralen Ebene des Sockels (5) so geneigt sind, dass sie einen Winkel zwischen 65° und 75° bilden.
10. Das Trägerorgan nach einem der vorhergehenden Ansprüche, wobei der Abstand zwischen zwei festen Zungen (9) etwa das Doppelte der Dicke der größeren Seitenkante eines gekrümmten Bodenziegels (4) beträgt.
11. Das Trägerorgan nach einem der vorhergehenden Ansprüche, wobei der Sockel (5) eine Höhe aufweist, die größer als etwa 3 cm ist.
12. Das Trägerorgan nach einem der vorhergehenden Ansprüche, wobei der Abstand zwischen den festen Zungen (9) zwischen etwa 3 cm und etwa 10 cm liegt.
13. Das Trägerorgan nach einem der vorhergehenden Ansprüche, hergestellt aus Kunststoffmaterial mithilfe eines Spritzgießverfahrens.
14. Ein belüftetes Dach (100) mit einer Trägerebene (200), die koplanar zu einer Referenzebene (A) ist, und einer Abdeckschicht (300), die auf einer liegenden Ebene im Wesentlichen parallel zu und beabstandet von der Referenzebene (A) mit einem festgelegten Abstand von dieser angeordnet ist und eine Mehrzahl von Reihen von gekrümmten Bodenziegeln (4) aufweist, die parallel zu und voneinander beabstandet liegen; wobei das belüftete Dach (100) **dadurch gekennzeichnet ist, dass** es eine Mehrzahl von Trägerorganen (1) der gekrümmten Bodenziegel (4) aufweist, die nach einem der vorhergehenden Ansprüche hergestellt sind.

Revendications

1. Un organe de support et de fixation (1) conçu, en utilisation, pour être disposé à plat sur un plan de support (200) d'un toit ventilé (100) et structuré pour fixer réciproquement une paire de tuiles à fond incurvé (4) de la même rangée de tuiles à fond incurvé et les supporter afin de maintenir les dos convexes en saillie du plan de support (200) sous-jacent pour former une chambre de ventilation; une première extrémité axiale (4b) d'une première tuile à fond incurvé (4) étant disposée au-dessous d'une seconde extrémité axiale (4a) d'une seconde tuile à fond incurvé (4) alignée et adjacente à ladite première tuile à fond incurvé (4);
 ledit organe de support et de fixation étant caractérisé comme ayant:
 un socle rigide (5) qui est en essentiellement formé comme un prisme trapézoïdal, et qui comprend une base inférieure plus large (6) conçue pour être à plat sur ledit plan de support (200), et une base supérieure plus petite (7) sur laquelle il y a une surface concave (8) formée pour avoir une forme complémentaire au dos convexe (4c) de la première tuile à fond incurvé (4), afin de loger la dite première extrémité (4b) de la première tuile à fond incurvé (4) et pour maintenir le dos convexe (4c) en sailli dudit plan de support (200), à une distance prédéfinie de celui-ci; et
 une paire de languettes (9), qui s'étend en montage cantilever au-dessus de la base supérieure (7) afin d'être disposée sur les bords opposés du plan central dudit socle (5) à une distance prédéterminée entre eux, et ont des parties de fixation des extrémités respectives qui sont conçues pour accrocher les parties correspondantes (4a) du bord transversal de la seconde extrémité axiale (4a) de ladite seconde tuile à fond incurvé (4).
2. L'organe support selon la revendication 1, dans lequel les trois extrémités de ladite languette rigide (9) sont pliées afin de former des rainures (12) structurées pour loger intérieurement lesdites parties (4e) du bord transversal de ladite seconde extrémité axiale (4a) de ladite seconde tuile à fond incurvé (4).
3. L'organe support selon la revendication 2, dans lequel chaque languette rigide (9) est pliée afin de former avec la base supérieure sous-jacente (7) une gorge inférieure (11) conçue pour loger intérieurement une partie de ladite extrémité axiale (4b) de ladite première tuile à fond incurvé (4).
4. L'organe support selon la revendication 3, dans lequel lesdites languettes rigides (9) comprennent chacune un segment de connexion (9a) fixé au socle (5) afin de se prolonger le long d'une direction orthogonale à la base supérieure (7), et un premier segment intermédiaire (9b), qui se prolonge au-dessus de la base supérieure (7), restant sensiblement parallèle à la base supérieure (7) et forme ensemble avec le segment de connexion (9a) et la base supérieure (7) une desdites gorges inférieures (11).
5. L'organe support selon la revendication 4, dans lequel chacune desdites languettes rigides (9), comprend aussi un second segment intermédiaire (9c), qui est fixé sur l'extrémité libre du premier segment intermédiaire (9b), et se prolonge orthogonalement au premier segment intermédiaire (9b); et un segment d'accrochage (9d) qui se prolonge en montage cantilever depuis la première extrémité libre du second segment intermédiaire (9b) en restant parallèle à cela et forme ensemble avec le second segment intermédiaire et une partie du premier segment intermédiaire (9b) une desdites parties de fixation d'extrémité.
6. L'organe support selon l'une quelconque des revendications 1 à 5, dans lequel la base inférieure (6) du socle (5) est formée afin d'avoir une pluralité de dents longitudinales d'accrochage conçues pour fixer le socle (5) au plan support (200).
7. L'organe support selon l'une quelconque des revendications 1 à 6, dans lequel la base inférieure (6) du socle (5) a une pluralité de trous traversant ou d'ouvertures (14).
8. L'organe support selon l'une quelconque des revendications 1 à 7, dans lequel les languettes rigides (9) sont sensiblement en forme en S et ont une section transversale légèrement arquée sensiblement parallèle à la surface concave sous-jacente (8) de la base inférieure (7).
9. L'organe support selon l'une quelconque des revendications 1 à 8, dans lequel les languettes rigides (9) sont positionnées sur deux plans inclinés dans une position miroir par rapport à un plan central du socle (5) afin de former un angle compris entre 65° et 75°.
10. L'organe support selon l'une quelconque des revendications précédentes, dans lequel la distance entre deux languettes rigides (9) est à peu près le double de l'épaisseur du bord latéral plus large d'une tuile à fond incurvé (4).
11. L'organe support selon l'une quelconque des revendications précédentes, dans lequel le socle (5) a une hauteur plus importante qu'environ 3 cm.
12. L'organe support selon l'une quelconque des reven-

dications précédentes, dans lequel la distance entre les languettes rigides (9) est comprise entre environ 3 cm et environ 10 cm.

13. L'organe support selon l'une quelconque des revendications précédentes, fabriqué en matière plastique par des moyens de moulage par injection. 5
14. Un toit ventilé (100) comprenant un plan de support (200) coplanaire à un plan de référence (A), et une couverture (300), qui est positionnée sur un plan de réception sensiblement parallèle à et espacé du plan de référence (A) à une distance prédéterminée de celui-ci et comprend une pluralité de rangées de tuiles à fond incurvé (4) parallèle à et espacé les unes des autres; ledit toit ventilé (100) étant **caractérisé en ce qu'il** comprend une pluralité d'organe support (1) des tuiles à fond incurvé (4) fabriquée selon l'une quelconque des revendication précédentes. 10 15 20

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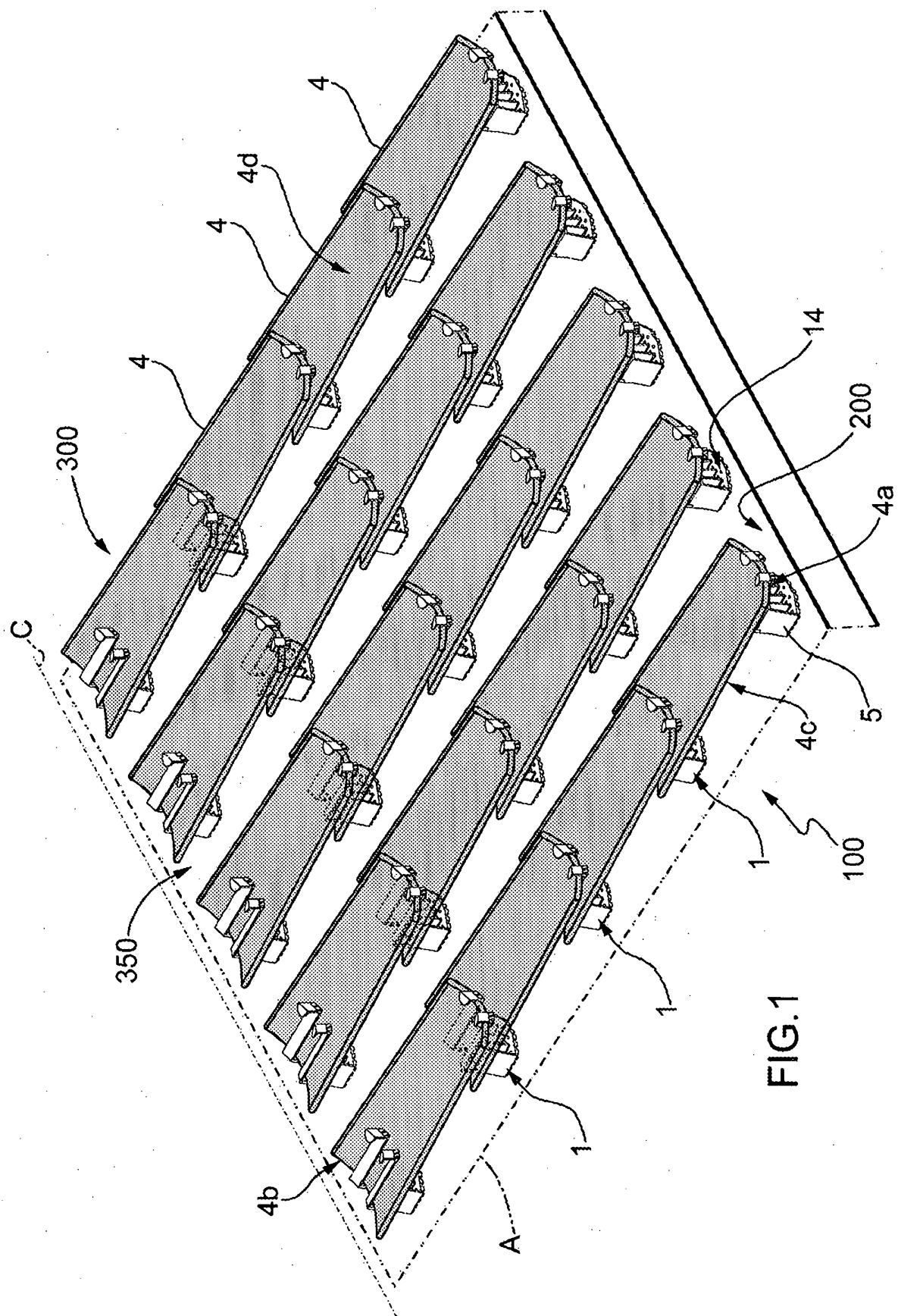


FIG. 1

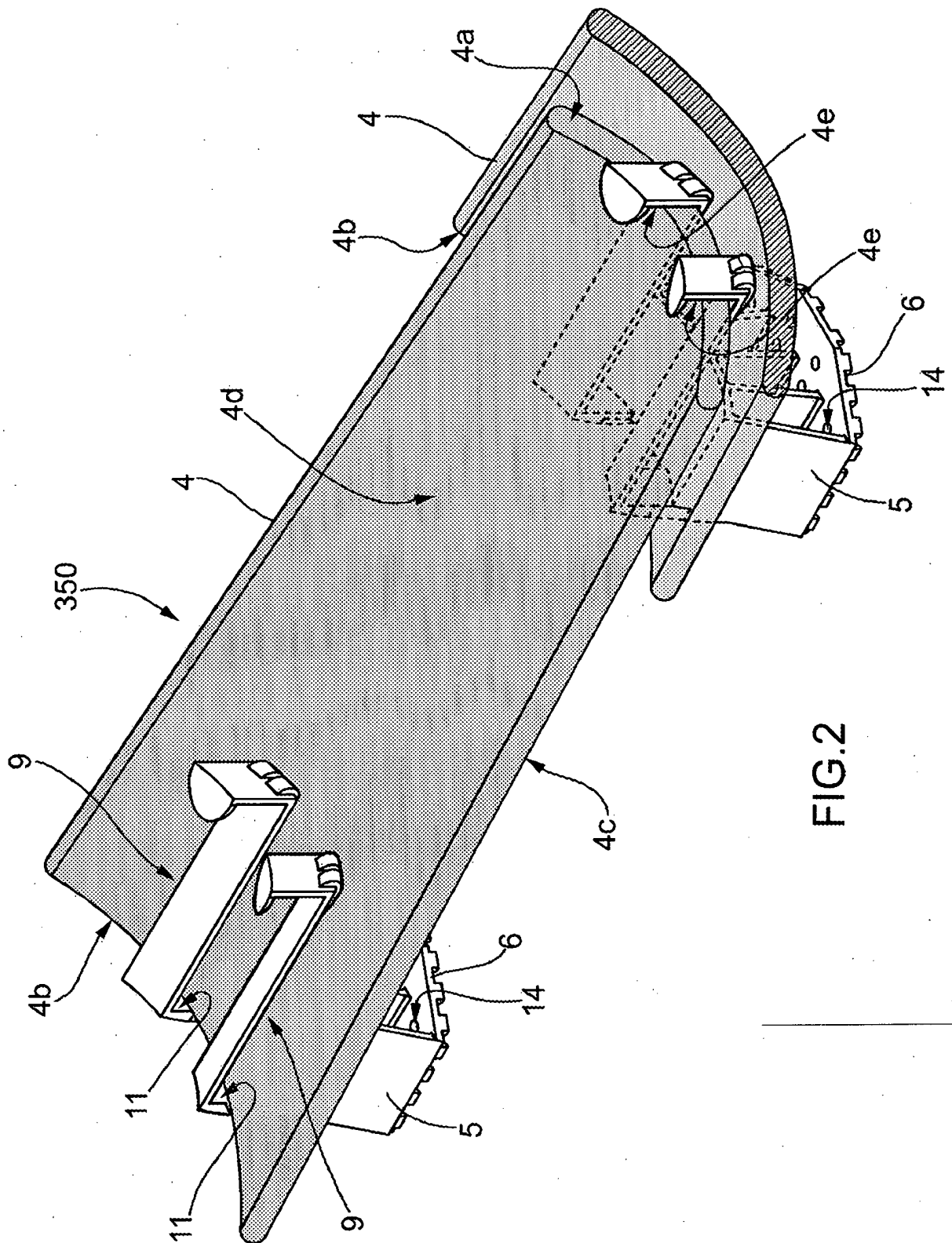


FIG. 2

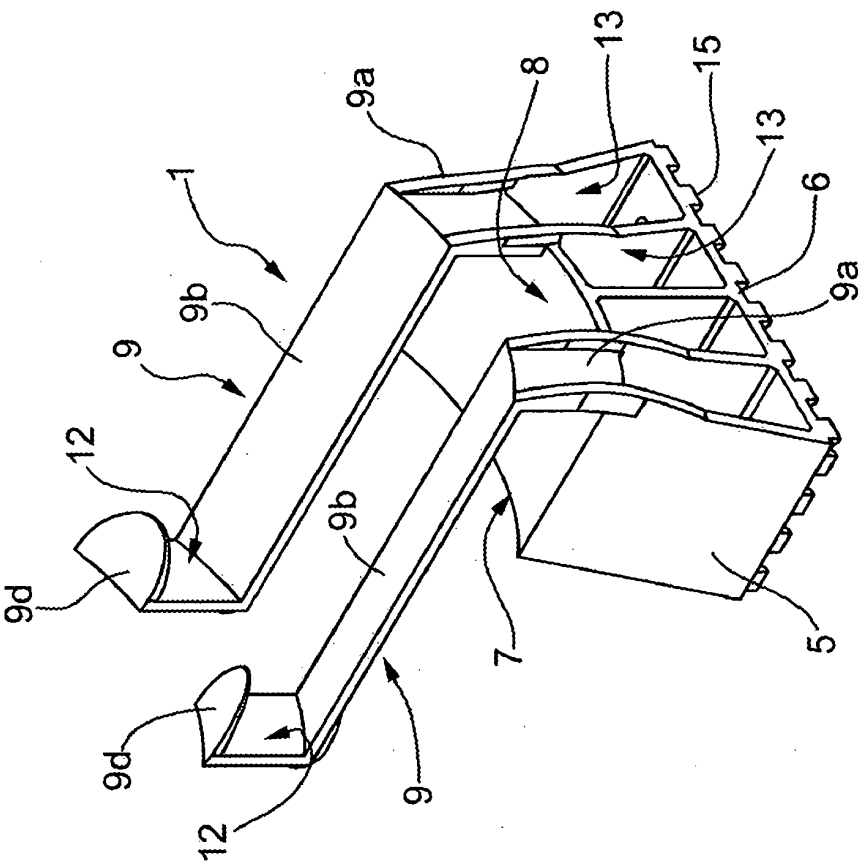


FIG.3

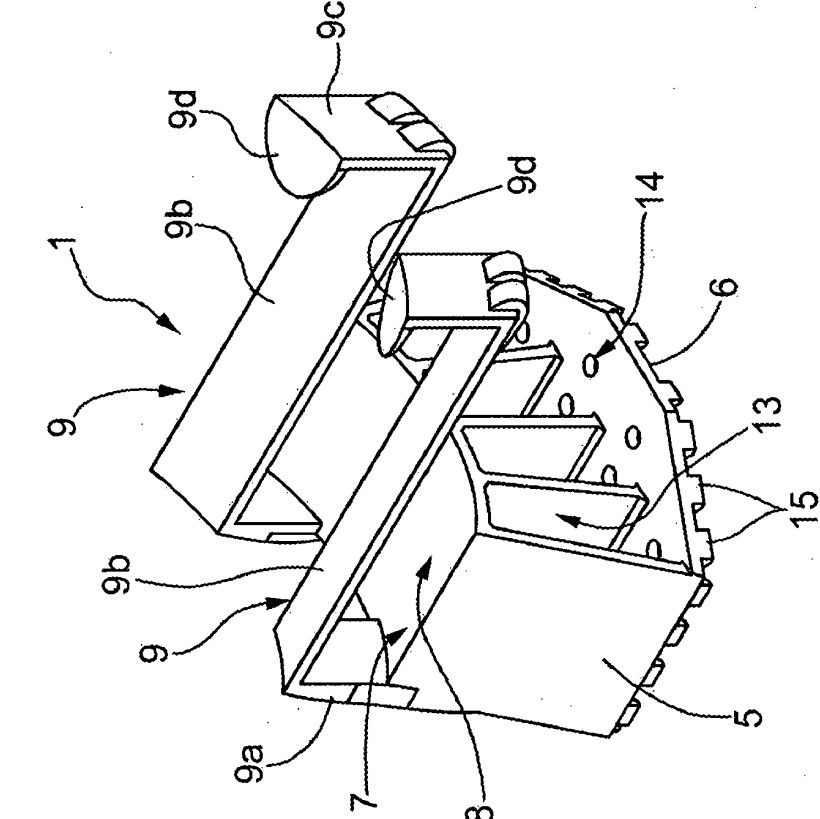


FIG.4

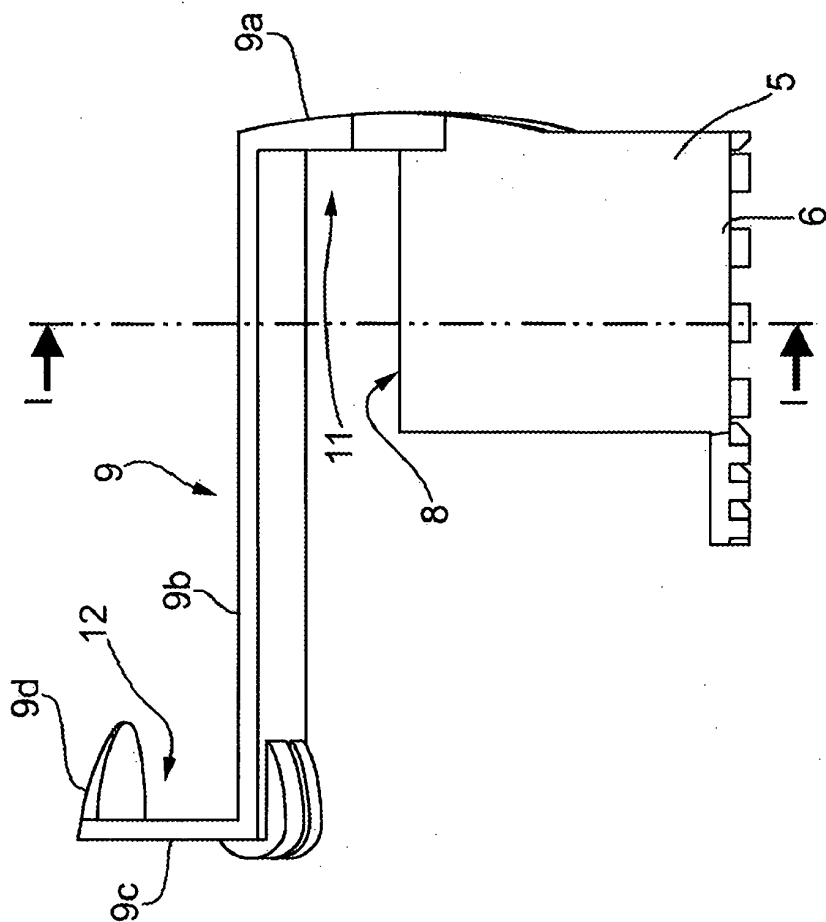


FIG. 5

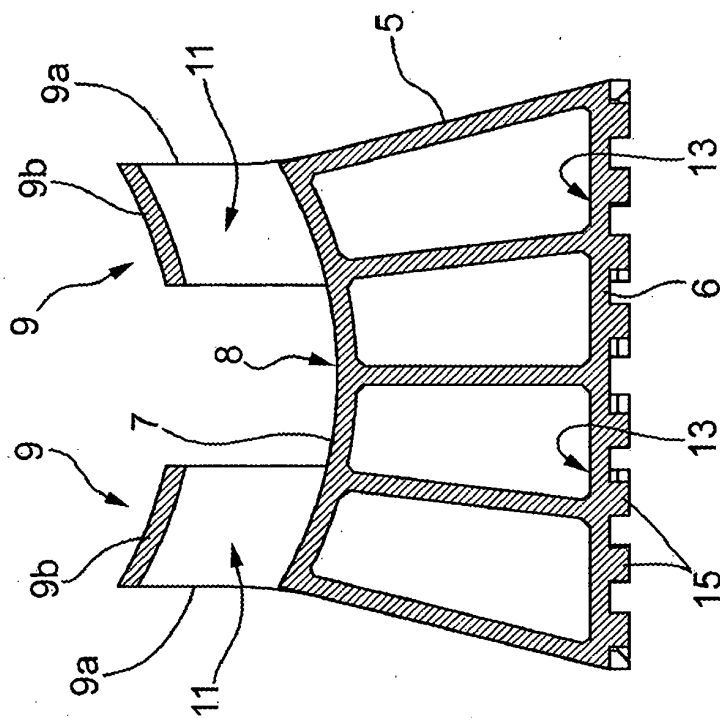


FIG. 6

REFERENCES CITED IN THE DESCRIPTION

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