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(54) **Flashing with a fixing fastener, sealing the connection of the roofing to a roof-penetrating structure and a snap joint joining the flashing members**

(57) A flashing, connecting the roofing to the roof-penetrating structure, with a shape adjusted to the roof penetrating structure, consisting of members profiled from a flat, thin and partially elastically deformable material, having in the places of their mutual connection geometrically similar edges, overlapping during assembly wherein by the flashing members that are snap joint using the natural elasticity of the flashing material. A snap joint of the flashing member couple is performed by the socket (4) formed in the bottom member (A) and the bulge (5) formed in the top member (B).

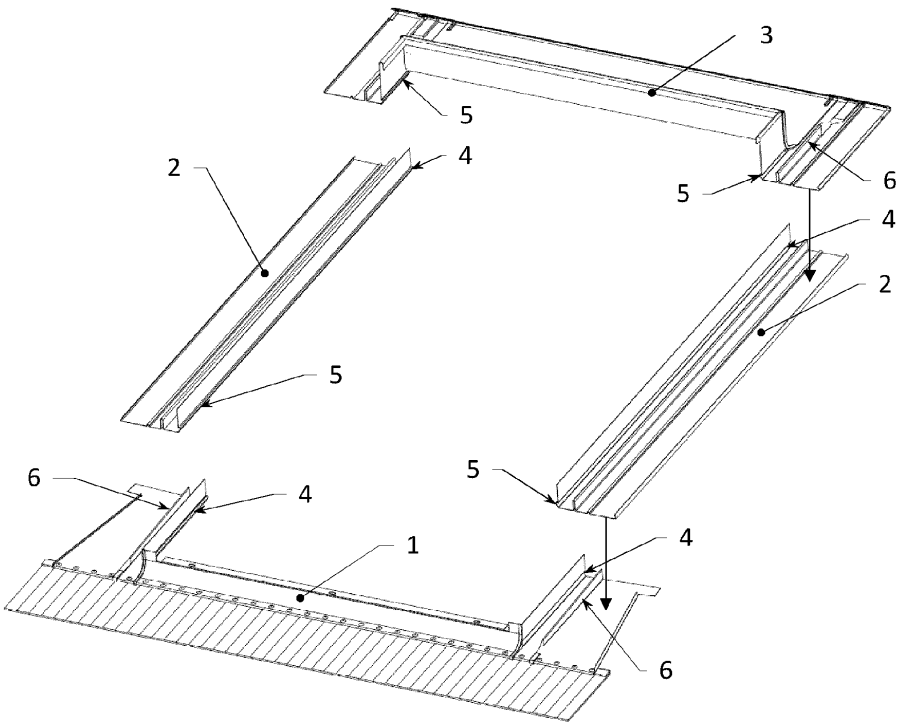

Fig. 1

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Description

[0001] The object of the invention is a flashing, sealing the connection of the roofing to the roof-penetrating structure, consisting of thin-walled profiled members, connected together during assembly.

[0002] A method of flashing assembly is known from previous solutions, in which the bottom member has a plastic mass glued from the bottom, which enables the flashing to be glued to the roofing, thus the weather tightness of the joint is ensured. The assembly of the flashing starts with placing the bottom member, which is secured to the frame of the structure penetrating the roof slope with small nails or screws. Next a lead apron is fitted to the shape of the roofing. The other members are installed in the order from top to bottom, in addition every part of the flashing partially overlaps the member below on the basis of fitting together a caving in one member to a bulging in the next one. In some solutions the side members may be multipartite, subject to the length of the roof-penetrating structure. Most often they are secured to window frame sides and to battens. The top member, which requires additional fastening, finishes the assembly of the flashing. In the existing solutions it is secured directly to the window frame with nails or screws.

[0003] These solutions have a disadvantage, which is the need to use nails or screws to secure the subsequent members of the roof flashing, and thus injuring the continuity of the structure (punching) of these members, additionally exposing the window structure to adverse weather conditions and potential corrosion centres in the place of puncture. In addition, the fastening system with nails or screws is very arduous when two (or more) sets of a structure penetrating the roof slope are installed next to each other. In this case insufficient free space between skylight flashing component parts mounted subsequently next to each other is an impediment.

[0004] Also a method of sealing the connection of the skylight to the roof slope is known, where window frame shielding members are removed for the time of window mounting in the roof and after installing the flashings they are reinstalled. In another assembly solution the shields are permanently secured to the skylight frame, and the flashing members are put under the shield after the frame has been installed. To ensure sufficiently durable and reliable fastening, the flashing must be additionally secured to the skylight frame or to the frame shield component. To this end, either typically used nails or screws may be applied. However due to the reasons presented above, this solution is often arduous or even impossible.

[0005] From GB 2430943 a solution is known, where a side member of the flashing has a seal installed, whereas a profile with a longitudinal socket parallel to the roof slope is installed on the skylight frame. During the assembly the side member with the seal installed is pushed into the socket thus sealing the connection of the flashing to the skylight frame. A disadvantage of this solution is the fact that it is not possible to adjust the depth of location of the roof-penetrating structure in the roofing, and consequently a little flexibility to potential inaccuracy of the roof slope plane workmanship.

[0006] From DE 2142733 a solution is known, where sealing of the connection of the skylight frame to the roofing consists of functionally two basic sub-assemblies:

- a flange on the whole perimeter consisting of members, having bulges with a gentle profile of the member edge on its arm secured to the skylight frame,
- a closed rigid frame with an angular profile inverted by 180 ° against the flange, having a hook-shaped bend on the arm of the profile mating the flange.

[0007] After installing the flange and securing it to the skylight frame the frame is put on, resulting in mutual elastic meshing of the both members.

[0008] The object of the invention is a flashing, profiled from a flat thin material, joining the roof-penetrating building structure, in particular a skylight or a roof hatch, to the roofing, easy to install and providing a durable and efficient connection of the members together without the need to use additional fasteners and tools.

[0009] A characteristic feature of the invention are springy snaps shaped directly in the flashing members, on overlapping surfaces.

[0010] The snaps basically facilitate and expedite the flashing assembly by elimination of both additional fasteners and tools. The only assembly-related activities are manual fitting and clamping of successively overlapping members along the indicated edges, on which the snaps are formed. An advantage of the solution proposed is first of all immediate after clamping, durable and effective connection of flashing members together. After assembly and snapping the last closing member, a rigid complete flashing is formed. This flashing, by its matching shape, adjoins the roofing and the roof-penetrating structure rigidly and durably. The solution proposed leads to savings in time and labour.

[0011] In addition the solution proposed is exceptionally advantageous, e.g. in the cases of sets with two or more skylights installed next to each other in a short distance, making the application of classic flashings with fasteners difficult or impossible. It may also allow the required distance between windows to be shortened. An unquestionable advantage of the solution presented is also the possibility of multiple assembly and dismantling of flashing components if necessary.

[0012] For a rectangular profile of the roof-penetrating structure a flashing most often comprises three types of components profiled from a flat, thin and deformable material.

- the bottom flange, installed first,
- the side members, arranged symmetrically,
- the top flange, installed as the last member closing the circuit.

[0013] These components, are formed from a flat shape, generally are L-shaped, fitting the roof-penetrating structure. In the arm parallel to the roof slope they have one or advantageously more ridges, formed longitudinally to the roof inclination direction, for efficient discharge of rainwater and to seal the connection to the roofing. However the arm adjoining the roof-penetrating structure is usually flat or in the case of a different shape of this structure, it is fitted to its profile. The bottom member embraces the whole bottom edge of the roof-penetrating structure and a part of side edges. Analogically, the top member embraces the whole top edge of the roof-penetrating structure and a part of side edges. Both the bottom and the top flange in the areas of their connection to the side members have geometrically similar edges, overlapping during the assembly. Most often during assembly the mating members are put on each other, next they are secured to the structure, e.g. a skylight frame with screws or nails.

[0014] A new feature that distinguishes the proposed solution is the use of a snap connection of a couple of members together, using the natural elasticity of the flange material, in addition this connection is accomplished by a socket formed in one member and a bulge in the other one. The socket is advantageously formed in the member, which in the overlapping joint is the bottom member, while the bulge is formed in the top member. Both the socket and the bulge have a shape fitted to each other and are advantageously located on elastically deformable edges adjoining the roof-penetrating structure in a manner that enables them to be elastically deformed and the bulge to be put into the socket during assembly. The maximum cross-wise dimension of the socket and bulge is limited by the limit of elasticity of the arm on which they are located. The socket is advantageously a concavity profiled on the whole length of the anticipated connection of members, whereas the bulging in the mating member may be made either in a similar manner as the concavity, on the whole length of the connection or on its part. However in this case one should take into account a lower friction force, blocking the mutual shift of the members, which may result in an uncontrolled parting of the members.

[0015] To provide adequate mutual pressure of the socket-bulge couple the arm that is parallel to the roof slope should be so formed that it has a member placed in parallel to the arm adjoining the roof-penetrating structure, on which the snap members are located. To this end e.g. the profile draining ridges may be utilised. The assembly and joining of the flashing members together consists in putting one member onto the other one so that the bulge is placed directly over the socket, and next pressed manually to place the bulge elastically in the socket. At the same time the ridges of both members overlap, blocking their mutual shift crosswise. A large contact area and a sufficient mutual pressure force allow the members to be securely and efficiently friction joined. Longitudinal profiles of the snaps allow the members to shift against each other before they are snapped during the assembly and the flushing to be precisely fitted to the dimensions of the roof-penetrating structure, which is a considerable advantage of the solution proposed.

[0016] The shape of the socket-bulge couple must prevent uncontrolled parting of the members, either by the weather or an accidental action of people or animals. The snap profiles with a semi-circular, trapezoidal and triangular shape proposed in the solution provide such security. However it does not restrict the possibility of using different profiles, ensuring the effective operation of the snap.

[0017] Where the use of longitudinal snap profiles is less advantageous, point snaps according to the same method may be applied. A socket in a solution like this is a local concavity advantageously shaped regularly, while a bulge is a geometrically similar figure in the mating member. A solution like this blocks all degrees of freedom of a mutual movement of the two members connected. When needed, more socket-bulge couples may be used in the area of member connection. This solution limits the possibility of longitudinal adjustment of reciprocal member position.

[0018] The flashing acc. to the invention is presented in fig. 1. It usually consists of four main members, made of a flat metal sheet shape, lap joined towards the roof inclination:

- the bottom flange 1, installed first,
- two side members 2 located symmetrically along the roof slope, installed second,
- the top flange 3, installed as the last member closing the circuit.

[0019] The length of the side members 2 may be changed when needed, for adjustment of the longitudinal dimension of the flashing. Also more side members 2 may be applied. The used member names result from their situation on an inclined flat roof slope understood customarily.

[0020] In the first embodiment, the bottom flange 1 in the places of connection to the side members 2 has on a certain length longitudinal sockets 4 or the bottom flange 1, into which the bulges 5 of the side members 2 are snap pressed.

[0021] Each lap joint in the flashing, shown in a cross-section crossing the lap joint in fig. 2 forms a socket-bulge joint couple, in which the socket 4 is formed in the member that in the lap joint is the bottom member A, while the bulge 5 is formed in the top member B.

[0022] The side arm of the bottom flange 1 adjoining the roof-penetrating structure and the socket formed in the arm are elastically deformable, which is used for snap joining of A and B members. A ridge 6 is used as the snap opposite bearing surface, and this ridge is a standard component of the flushing, known in the market. The ridge 6 formed on the whole length of the side member 2 is put onto the ridge in the bottom flange 1. The bulges

5 of the side members 2 may be made either on the anticipated length of the lap joint of the bottom flange1 to the side member 2 or advantageously on the whole length of the side member 2. In this case a profile is formed, in which the bulge 5 in the side member performs a function of the socket 4 for the bulge 5 of the top flange 3. When more flashing members are needed, in particular side members 2, the principle of their connection is identical as in the above described case utilising one side member 2.

[0023] The socket-bulge snap couple profiles proposed in the solutions, shown in fig. 2, may have a trapezoidal a, triangular b or semi-circular c shape. Other profiles may be used, providing comparably effective connection of the flushing members. The trapezoidal shape a is the most effective solution of the snap, however more difficulties should be taken into account if the joint were to be dismantled. The height of the bulge 5 is so adjusted that its angular displacement during assembly does not exceed the member limit of elasticity. However it does not restrict the possibility of using different profiles, ensuring the effective operation of the snap. This securing system ensures stiffening of the connection of individual members of the flashing and a complete blockade of the movement of the members against each other.

[0024] In the second embodiment, shown in the cross-section in fig. 3 and 4, the flashing with basically the same shape uses a longitudinal profile of the snap in the Z shape. A skew arm 7 of the bottom member A in the lap joint is the member that is manually elastically deflected against the base plane. Thus in the connection of the bottom flange 1 to the side members 2 the skew arm 7 in the bottom flange 1 is the deflected arm, while in the connection the side member 2 - the top flange 3 the skew arm 7 in the side member 2 is deflected. The angle α of inclination of the skew arm 7 and the arm 8 against the base plane, is advantageously selected so that during assembly its deflection in the direction shown by the arrow in fig. 3 is within the material elasticity and does not leas to its permanent set.

[0025] As its opposite bearing surface the ridge 6 is used, as in the first example of the invention. After pressing the top member B attached in the skew arm 7 returns to its natural position and adjoining the similarly shaped arm 8 in the bottom member A it causes a permanent pressure of the both flashing members connected to each other, as shown in fig. 4. A joint formed this way is durable and its securing is sure, at the same time it enables the flashing to be dismantled fast and without destruction.

Claims

1. Flashing, connecting the roofing to the roof-penetrating structure, with a shape adjusted to the roof penetrating structure, consisting of members profiled from a flat, thin and partially elastically deformable material, having in the places of their mutual connection geometrically similar edges, overlapping during assembly is **characterised in that** the flashing members are snap joint using the natural elasticity of the flashing material.

2. Flashing as claimed in claim 1 **characterised in that** the snap joint of the flashing member couple is performed by a socket (4) formed in the bottom member (A) and a bulge (5) formed in the top member (B).

3. Flashing as claimed in claim 2 **characterised in that** the socket (4) and the bulge (5) are formed in a manner that enables them to be elastically deformed and the bulge to be pressed into the socket during assembly.

4. Flashing as claimed in claim 2 **characterised in that** the socket (4) and the bulge (5) have a shape geometrically similar and matching each other after mounting.

5. Flashing as claimed in claim 2, **characterized in that** the flashing members are formed from a flat shape according to the specified edges.

6. Flashing as claimed in claim 4 **characterised in that** the socket (4) and the bulge (5) have a semicircular profile.

7. Flashing as claimed in claim 4 **characterised in that** the socket (4) and the bulge (5) have a trapezoidal profile.

8. Flashing as claimed in claim 4 **characterised in that** the socket (4) and the bulge (5) have a triangular profile.

9. Flashing as claimed in claim 4 **characterised in that** the socket (4) and the bulge (5) have a Z-shaped profile.

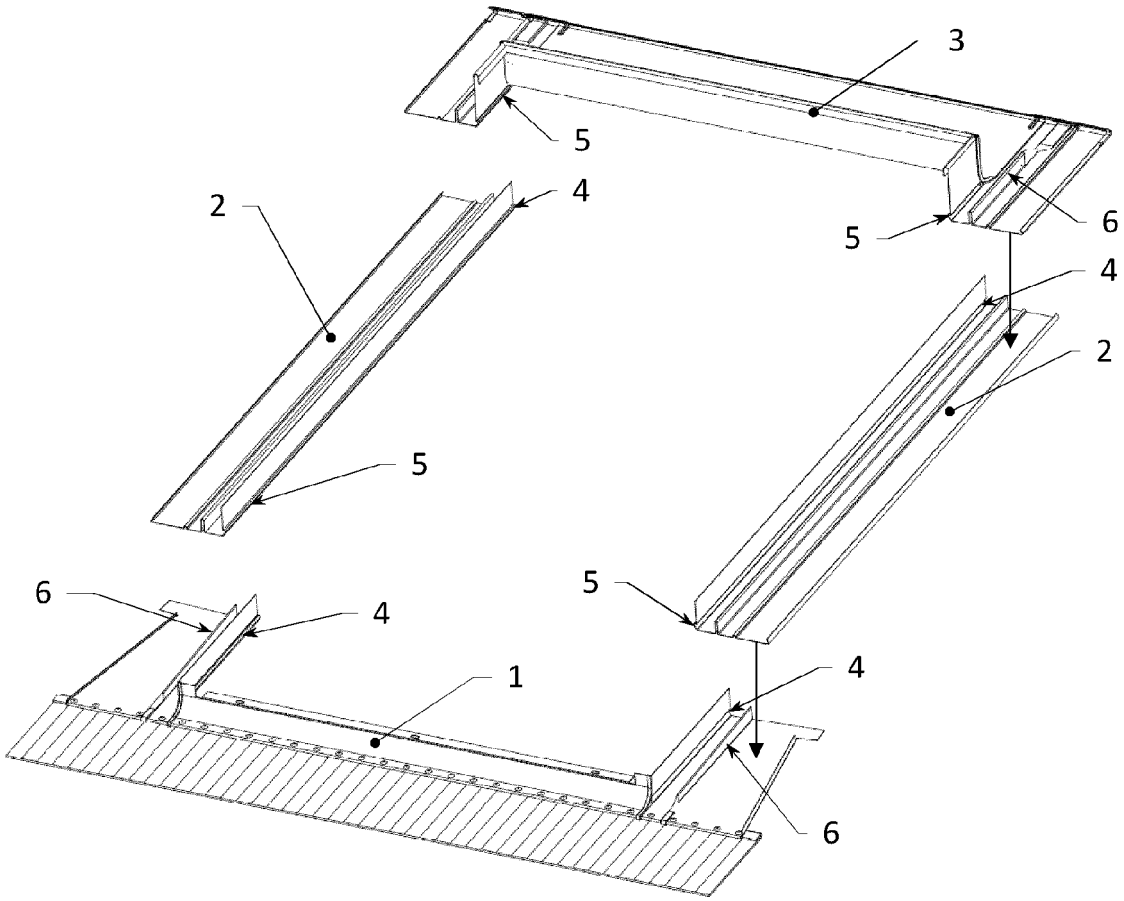

Fig. 1

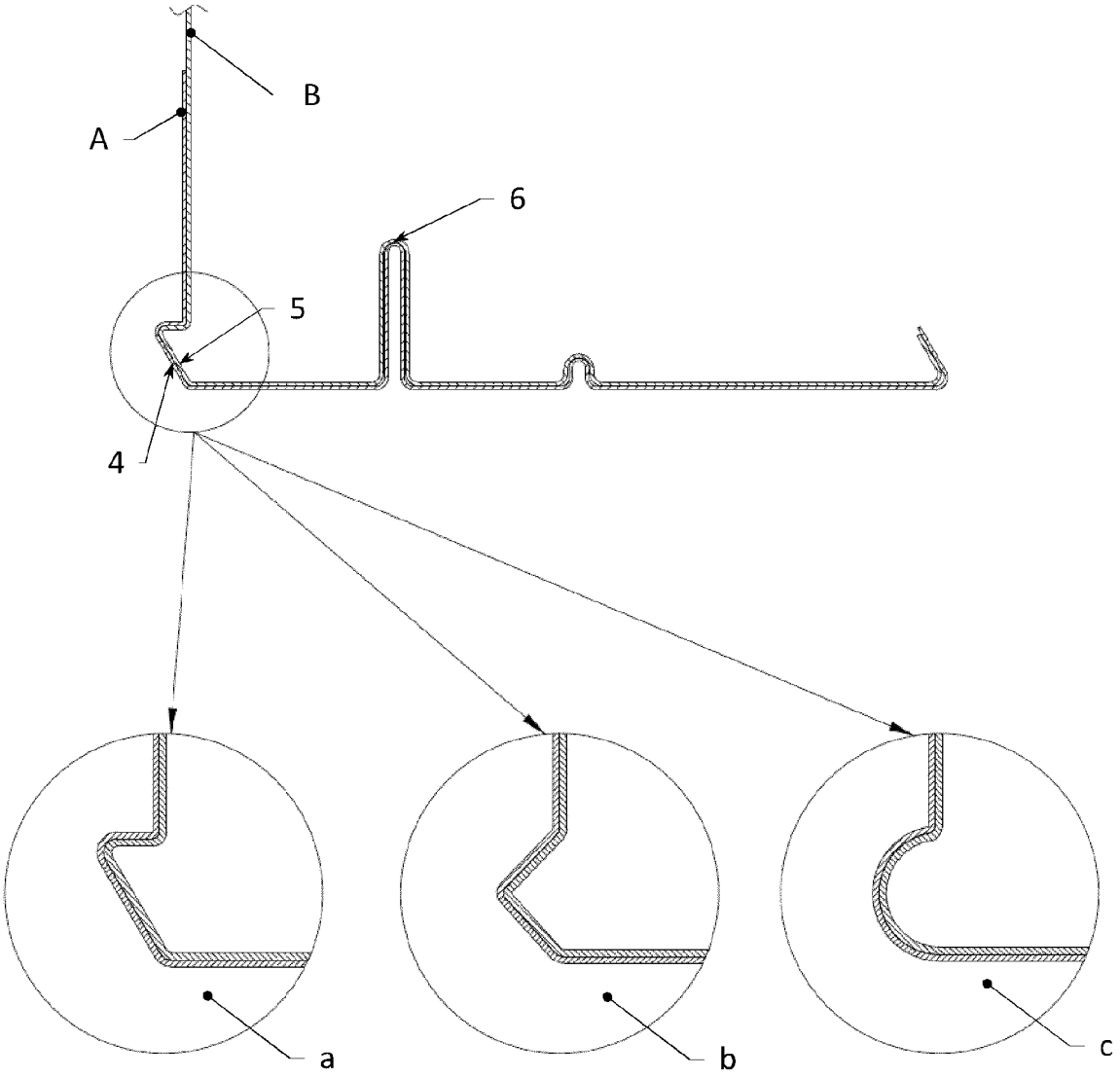

Fig. 2

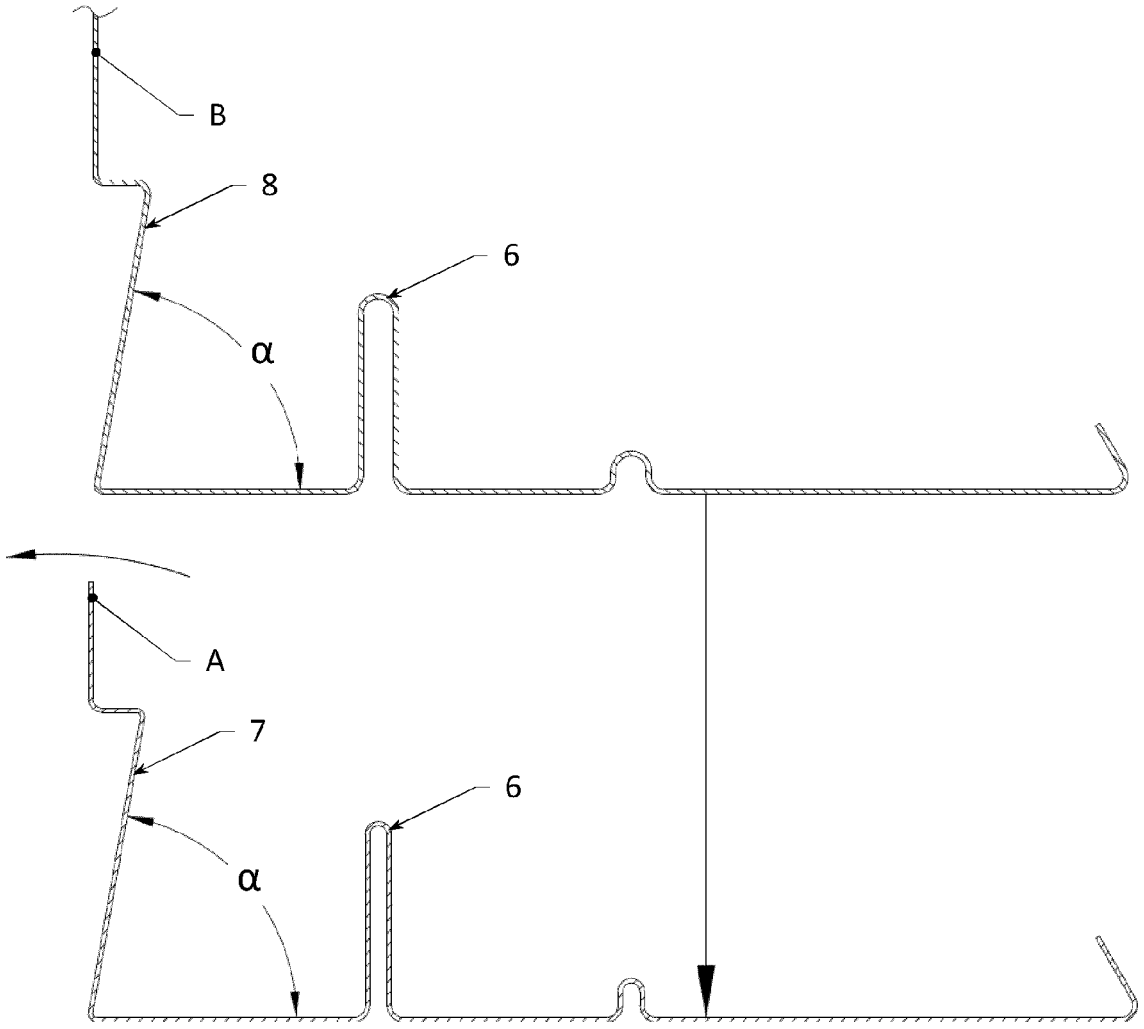

Fig. 3

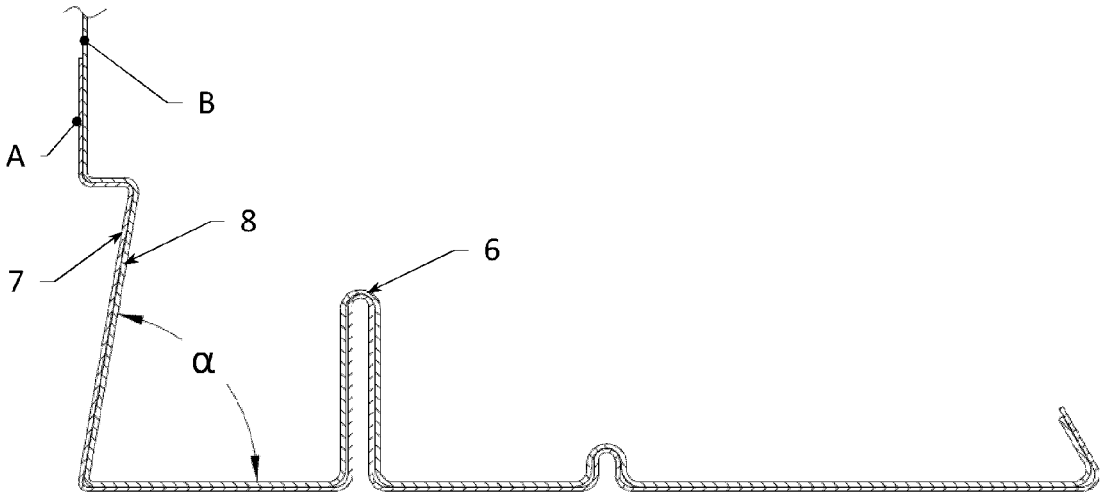

Fig. 4

REFERENCES CITED IN THE DESCRIPTION

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- DE 2142733 A **[0006]**