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(54) **Flashing for sealing the connection of a roof-penetrating structure to the adjacent roof covering**

(57) Flashing, comprising a bottom collar, side members and a top collar, divided functionally into a lapping part and a covering part, installed overlapping each other and overlapping the adjoining covering components, in which the top member (3) has partially pivoting members (6), having an option of angular tilting in the axis parallel to the longitudinal edge of the top collar, basically perpendicular to the direction of roof inclination.

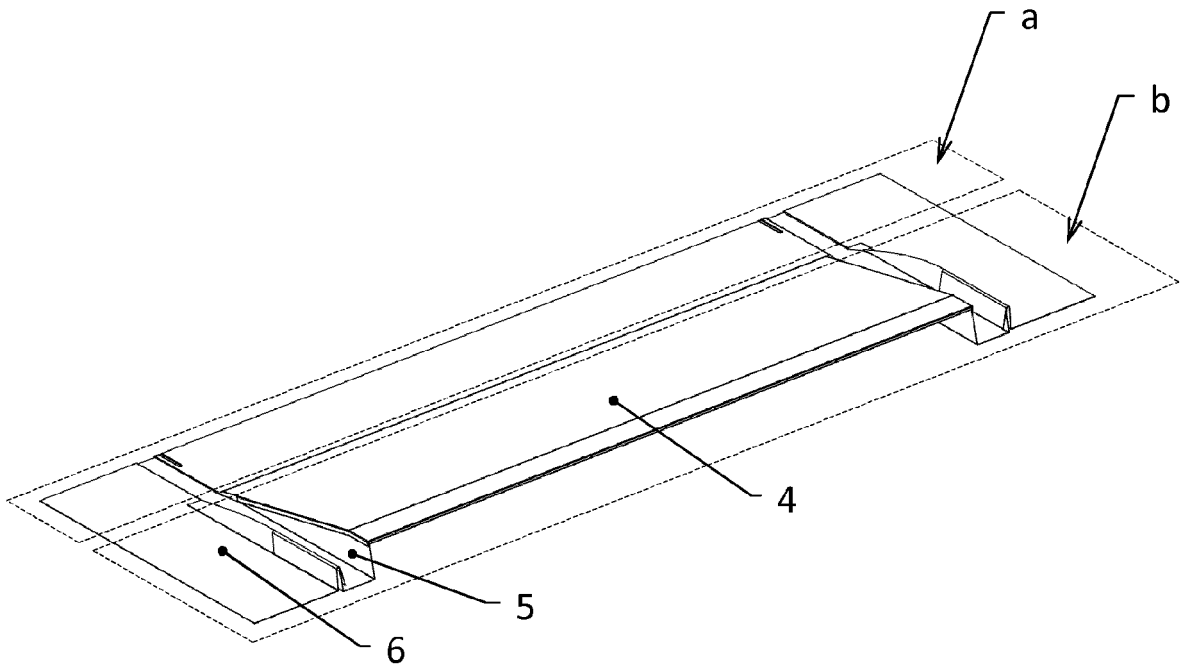

Fig. 2

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Description

[0001] The subject of the invention is a flashing comprising members connected together during the roof assembly, which seals the connection of a small-size component roof covering to a structure penetrating the roof covering. A structure like this may be for instance a roof window frame, a roof hatch frame, a solar panel frame or another structural member penetrating the roof covering.

[0002] Solutions of a flashing to seal a connection of a roof window installed in the roofing to the roof covering, comprising a bottom member, side members, with their number equal to the number of covering components adjacent to the window, and a top member are known from the market. Side members are interleaved alternately with the roof covering. The last installed top member has material allowances, which are bent with a tinman's hammer to ensure a tight fit to the roofing components. This solution may leak due to incorrect assembly and carelessness.

[0003] A solution of a flashing for tiled or slated roofs, comprising similar members as the ones mentioned above but being fully shaped prefabricated units is also known. This solution, being a fairly convenient and quick to install, has an additional spacer on the whole length of the connection of the window sheeting to the flashing top member. In this solution the spacer is necessary. Its function is to compensate the level difference of the roof window sheeting and the flashing top member arising from the tile or slate thickness. Such a solution allows this flashing to be used both with thin-walled and thick-walled tiles or slates, with the use of a spacer.

[0004] The objective of the invention is to introduce a versatile flashing, comprising the minimum number of members connected together without tools during the roof assembly, and sealing the connection of the roof covering comprising small-size components, in particular tiles or slates, to a structure penetrating the roof covering, both embedded in the roofing and penetrating the roof.

[0005] If tiled or slated coverings are used, the flashing side members typically cover the sealing of connection of one covering layer to a structure penetrating or embedded in the roof. Their shape and size is fitted to a single covering component.

[0006] A roof covering with small-size tiles or slates requires the flashing to be installed together with the roof covering by applying individual layers, starting with the lowermost layer. Individual flashing members are typically installed by covering of their arm parallel to the roof slope with subsequent covering layers, whereas the arm adjacent to the outer surface of the roof-penetrating structure is usually secured to the structure walls or to its flashing.

[0007] The covering component plane is not parallel to the roof slope. This arises from the lapping method of connecting the individual roof covering layers. The angle between the plane of the covering component and the plane of the roof slope results from the ratio of the length and height of the roof covering component. The lapping stepped structure of the roof covering forces the flashing profile to be adjusted to maintain full tightness and weather resistance.

[0008] The flashing in the form and shape of the full roof covering penetrating structure comprises basically three types of members: the bottom collar, top collar and symmetrically arranged side members, the size of which depends on the size of the corresponding covering component. The number of side members depends on the size of the roof covering penetrating structure. A tight connection of the flashing members to each other, to the roof covering and to the roof covering penetrating structure requires that they are precisely shaped to match the anticipated shape of the covering components. This requirement reduces the versatility of the flashing by restricting its use to strictly defined shape and thickness of the roof covering components. The top collar is key, as well as the method of its connection to the side members. In known solutions, the inclination of the top collar plane adjoining the covering member in the flashing corner is set at the production stage and is adjusted to the specific thickness of the covering component. The proposed solution allows the scope of applicability of flashings to increase considerably by application of a versatile top collar, where each of symmetrically arranged side members is partially pivoting, elastically tilting during assembly, in order to adjust to the inclination and thickness of the covering component while maintaining tightness.

[0009] The essence of the solution according to the invention is the top collar structure, which consists of the following members permanently joined together: the central member of the top collar and typically symmetrically arranged side members of the top collar, comprising water discharging channels and partially pivoting members. The central member of the top collar is a basically oblong piece with its profile comprising two functional parts: the lapping part, onto which the roof covering layer is overlaid and the covering part, connected to the roof covering structure or its flashing. Both the functional lapping part and the covering part are present on the whole length of the top collar.

[0010] The central member of the top collar may be a single piece or may consist of modules, connected together to provide the required length.

[0011] Symmetrically, at the ends of the central member there are water-discharging channels with their width compatible with the water-discharging channels in the collar side members. The channels in some embodiments may be components formed together with the central member from the same piece of material. If the collar is higher, it may be advantageous, for process considerations, that the water-discharging channels are separate components, tightly connected at the ends of the central member at the production stage.

[0012] The water-discharging channels, shaped basically towards the roof inclination, are intermediary mem-

bers between the central member of the top collar and the partially pivoting members, which perform the function of the last, in terms of assembly order, components of the side collar. The partially pivoting member is tightly and inseparably connected to the water-discharging channel only in the lapping part, which is to be covered by the roof covering layer. The covering part of the partially pivoting member has an option of restricted angular tilting in the axis parallel to the longitudinal edge of the top collar, basically perpendicular to the roof inclination and the water-discharging channel.

[0013] The connection of the water discharging channel and the partially pivoting member in the part covering from the weather is protected by properly formed adjacent surfaces in the both connected members. In the water-discharging channel it is the channel arm, advantageously perpendicular to the roof surface, whereas the partially pivoting member has a ridge, advantageously in the shape of the inverted V letter, profiled in parallel to the channel arm. The channel arm is located between the ridge arms and advantageously touches with its whole length one of them, which provides a protection against natural precipitation and other atmospheric phenomena. The mutual contact of the mentioned components is provided by natural elasticity of the collar material. The ridge and the adjoining channel arm are formed so that after the water-discharging channel and the partially pivoting member have been joined together, they both press each other elastically, thus maintaining the tightness of the connection. The total height of the channel ridge-arm couple defines the possible range of the angular tilt, and thus the scope of the roof covering component thickness that can be sealed. If the maximum tilt is exceeded, the connection leaks, therefore the biggest acceptable thickness of the covering member should be defined. Such a solution makes the whole flashing substantially versatile in application for coverings with various small-size components, as well as it enables the top collar to accurately adjoin the covering components.

[0014] The connection of the water-discharging channel to the central member and to the partially pivoting member must ensure tightness and weather resistance, therefore advantageously the top collar, comprising the mentioned components, should be made in whole as a prefabricated unit.

[0015] The proposed solution according to the invention allows the assembly inconveniences resulting from the need to bend and fit the collar members to the covering components to be eliminated, in addition it significantly facilitates the installation by the application of the versatile top collar.

[0016] The solution according to the invention is illustrated in the embodiment shown in pictures, where the individual figures present:

fig. 1 - the complete flashing,
fig. 2 - the complete top collar,
fig. 3 - details of the side part of the top collar,
fig. 4 and fig. 5 - the collar in the cross-section,
fig. 6 - the collar in the cross-section sequences.

[0017] The complete flashing consists of the bottom collar 1, side members 2 and the top collar 3, as shown in fig. 1.

[0018] The complete top collar 3 consists of the central member 4, symmetrically arranged water-discharging channels 5 and the partially pivoting member 6. The side part of the top collar 3 basically consists of the water-discharging channel 5 and the partially pivoting member 6, which during assembly are connected to the side members 2 of the flashing.

[0019] The top collar 3 is an oblong piece with its profile comprising two functional parts surrounded by the dotted line in Fig. 2: the lapping part a, onto which the roof covering layer is overlaid and the covering part b, connected during assembly on the roof to the roof covering structure or its flashing. The central member 4 of the top collar 3 in this solution is a single piece, however for considerably wide covering penetrating structures it can comprise modules connected together to ensure the required length of this collar member.

[0020] The water-discharging channels 5 are arranged symmetrically, connected inseparably and tightly to the central member 4, shaped towards the roof inclination, with their width compatible with the width of the analogous channels in the flashing side members 2. The partially pivoting members 6, which perform the function of the last, in terms of the assembly sequence, parts of the side collar 2 are connected to the channels 5. The partially pivoting member 6 is tightly and inseparably connected to the channel 5 in the lapping part a. The covering part b of the partially pivoting member 6 has an option of elastic restricted angular tilt in the axis c, basically parallel to the longitudinal edge of the top collar 3. The position of the axis c is naturally set during tilting of the covering part b of the partially pivoting member 6, which is determined by the design of this member.

[0021] The connection of the water-discharging channel 5 and the partially pivoting member 6 in the part b covering from the weather is protected by properly formed adjacent surfaces in the both connected members. In the water-discharging channel 5 it is the channel arm 51, shown among others in cross-sections Fig. 4 and Fig. 5, formed at an angle to the channel bottom surface and basically to the roof, so as to ensure the rainwater and other elements are blocked, while the partially pivoting member 6 has its ridge 61 in the shape of the inverted V letter, profiled in parallel to the channel 5 arm 51. The arm 51 is located between the ridge 8 arms 611 and 612 and touches with its edge the arm 612 on its whole length in the covering part b, which provides a protection against natural precipitation and other atmospheric phenomena. The arm 51 of the channel in this embodiment may be fitted with an additional sealing edge 511, shown in Fig. 4 and Fig. 5, formed by bending of a part of the surface of the arm 51 at an acute angle towards

the roof surface. This solution will increase the tightness of the connection by causing a better pressing of the sealing surfaces to each other.

[0022] The ridge 61 is formed by tilting of arms 611 and 612 used as the joint of the partially pivoting member 6 in the lapping part a shown in the A-A cross-section in Fig. 6. The tilt of the arm 51 in the channel 5 is shaped in a similar manner. The example of method of shaping of arms 611, 612 and 51 by tilting by an angle close to 90° is shown in the cross-section sequence A-A, B-B and C-C in Fig. 6. The mutual contact of the above mentioned parts is provided by the use of natural elasticity of the collar sheet material. The arm 612 of the ridge 61 and the adjoining arm 51 of the channel 5 are formed so that after connecting the water-discharging channel 5 to the partially pivoting member 6 they both press each other elastically, thus maintaining the tightness of connection. The total height of the ridge 61 - arm 51 couple defines the possible range of the angular deflection of the covering part b of the partially pivoting member 6, and thus the maximum thickness of the member 9 of the roof covering.

[0023] To provide tightness of the connection of the water-discharging channel 5 to the central member 4 and to the partially pivoting member 6, the top collar is made in whole as a prefabricated unit.

Claims

1. Flashing for sealing the connection of the roof covering penetrating structure to the adjoining external roof covering in the form of small size tiled or slated components, comprising a bottom collar, side members and a top collar, divided functionally into a lapping part and a covering part, installed overlapping each other and overlapping the adjoining covering components, **characterised in that** the top member (3) has partially pivoting members (6), having an option of angular tilting in the axis parallel to the longitudinal edge of the top collar, basically perpendicular to the direction of roof inclination.

2. Flashing as claimed in claim 1, **characterised in that** each partially pivoting member (6) is inseparably connected, through a water-discharging channel (5), to the central member (4) of the top collar (3).

3. Flashing as claimed in claim 2, **characterised in that** the partially pivoting member (6) has in its covering part (b) a ridge (61) with its profile in the shape of the inverted V letter or similar, shaped in parallel to the mating arm (51) of the water-discharging channel (5).

4. Flashing as claimed in claim 3, **characterised in that** the arm (51) of the channel (5) is between the arms (611) and (612) of the ridge (61), forming movable sealing of the connection of the channel (5) to the partially pivoting member (6).

5. Flashing as claimed in claim 4, **characterised in that** the arm (51) of the channel (5) has a sealing edge (511) elastically pressed down to one of the ridge (6) arms.

6. Flashing as claimed in claim 4, **characterised in that** the movable connection of the partially pivoting member (6) to the water-discharging channel (5) is located in the covering part (b).

7. Flashing as claimed in claim 2, **characterised in that** the inseparable connection of the partially pivoting member (6) to the water-discharging channel (5) is located in the lapping member (a).

8. Flashing as claimed in claim 1, **characterised in that** the partially pivoting member (6) with the ridge (61) is formed from a single piece of material.

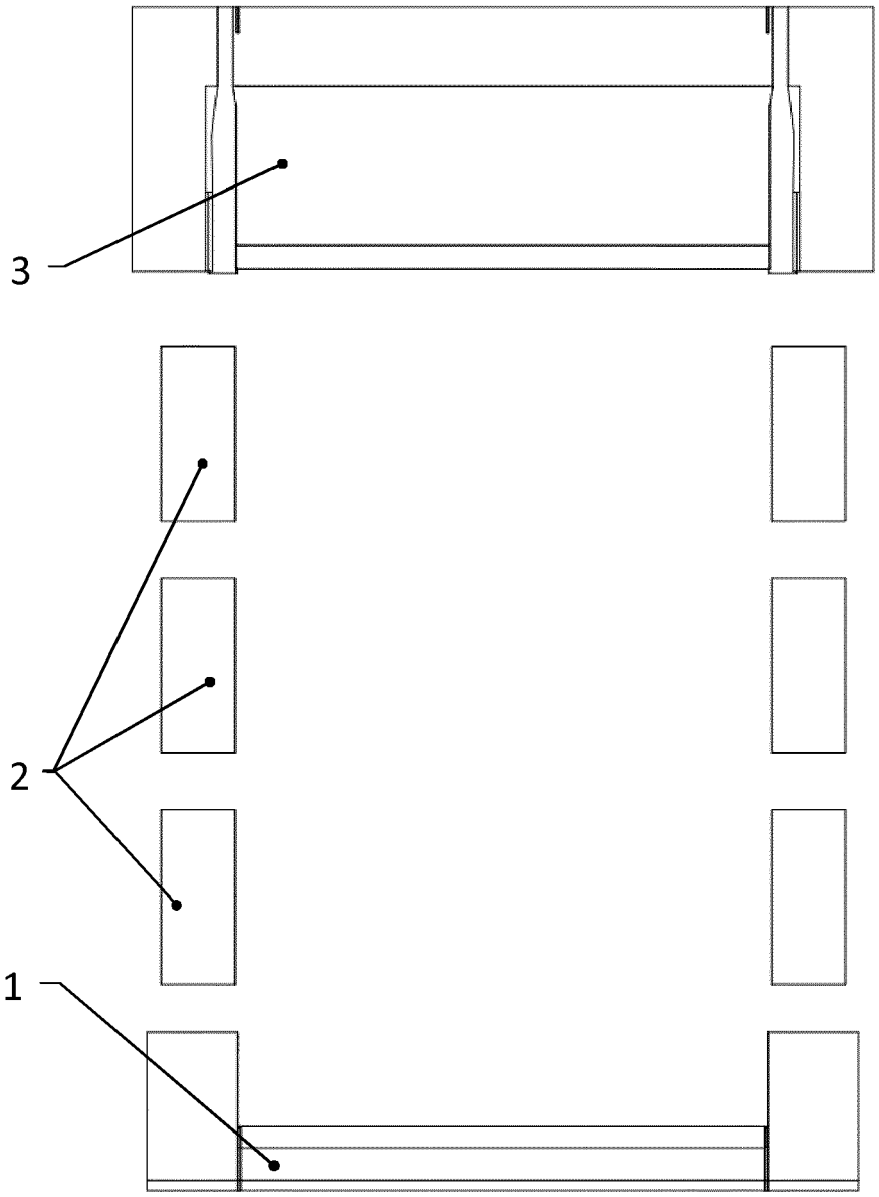

Fig. 1

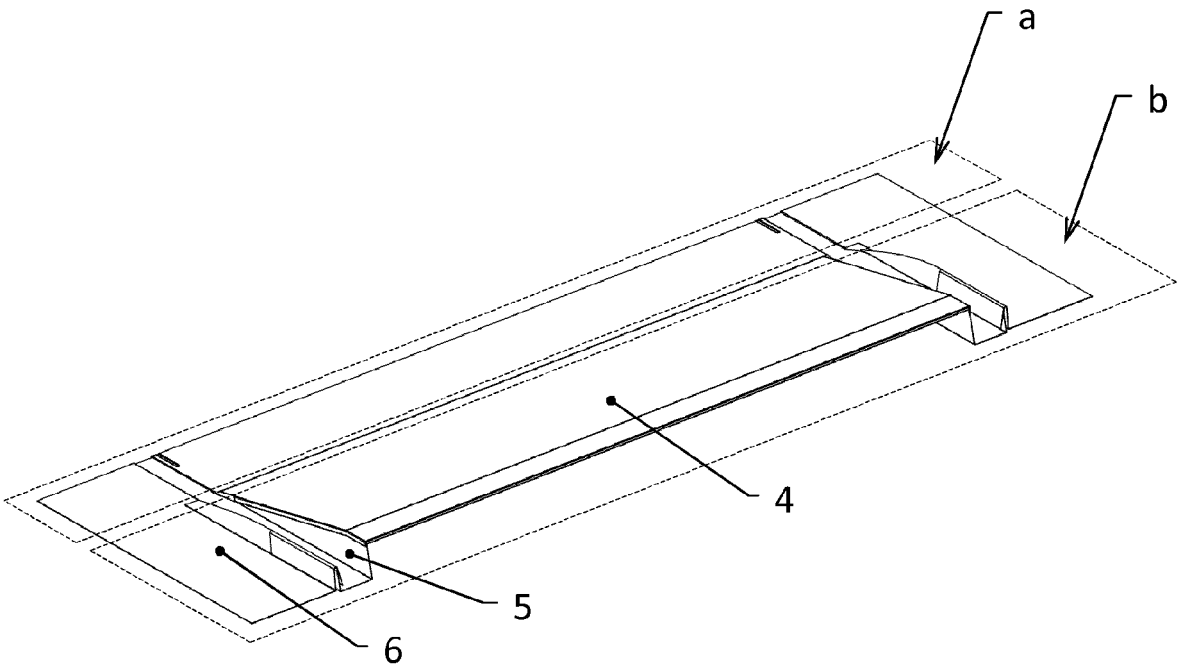

Fig. 2

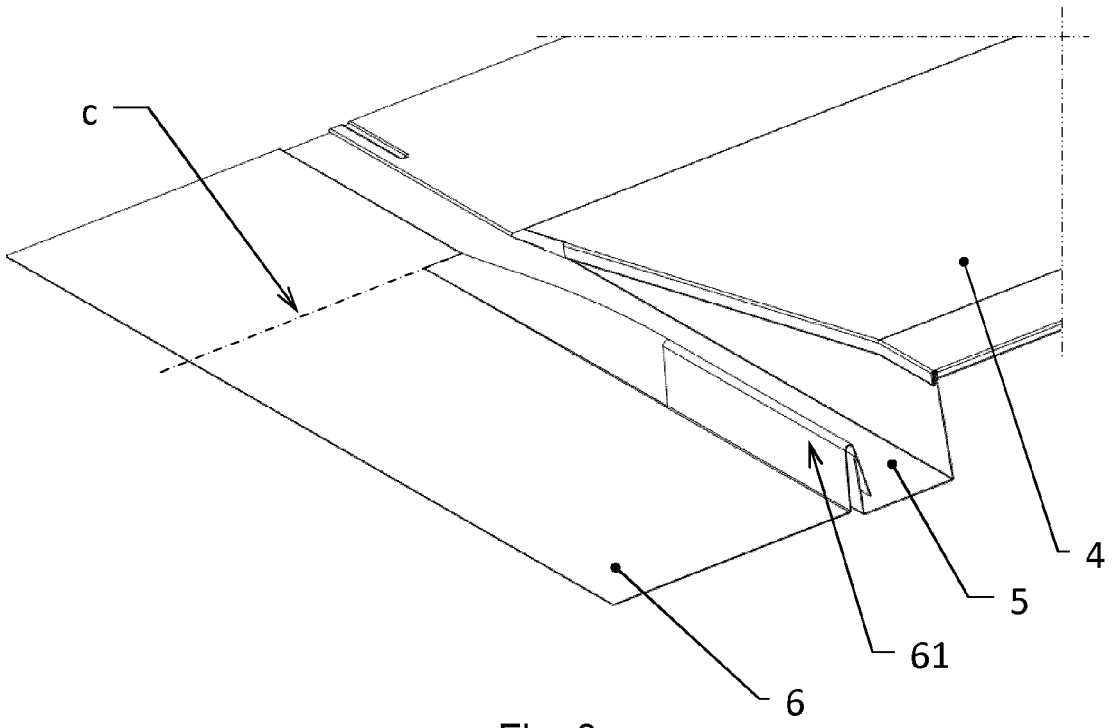

Fig. 3

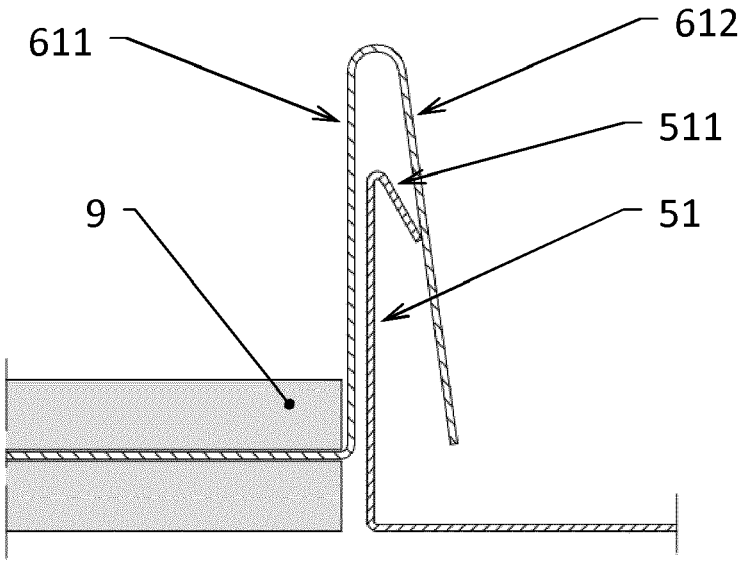

Fig. 4

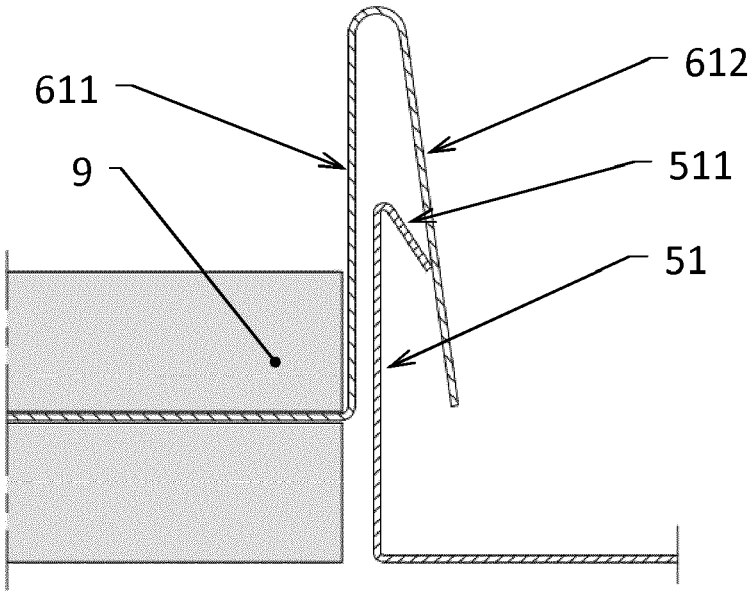

Fig. 5

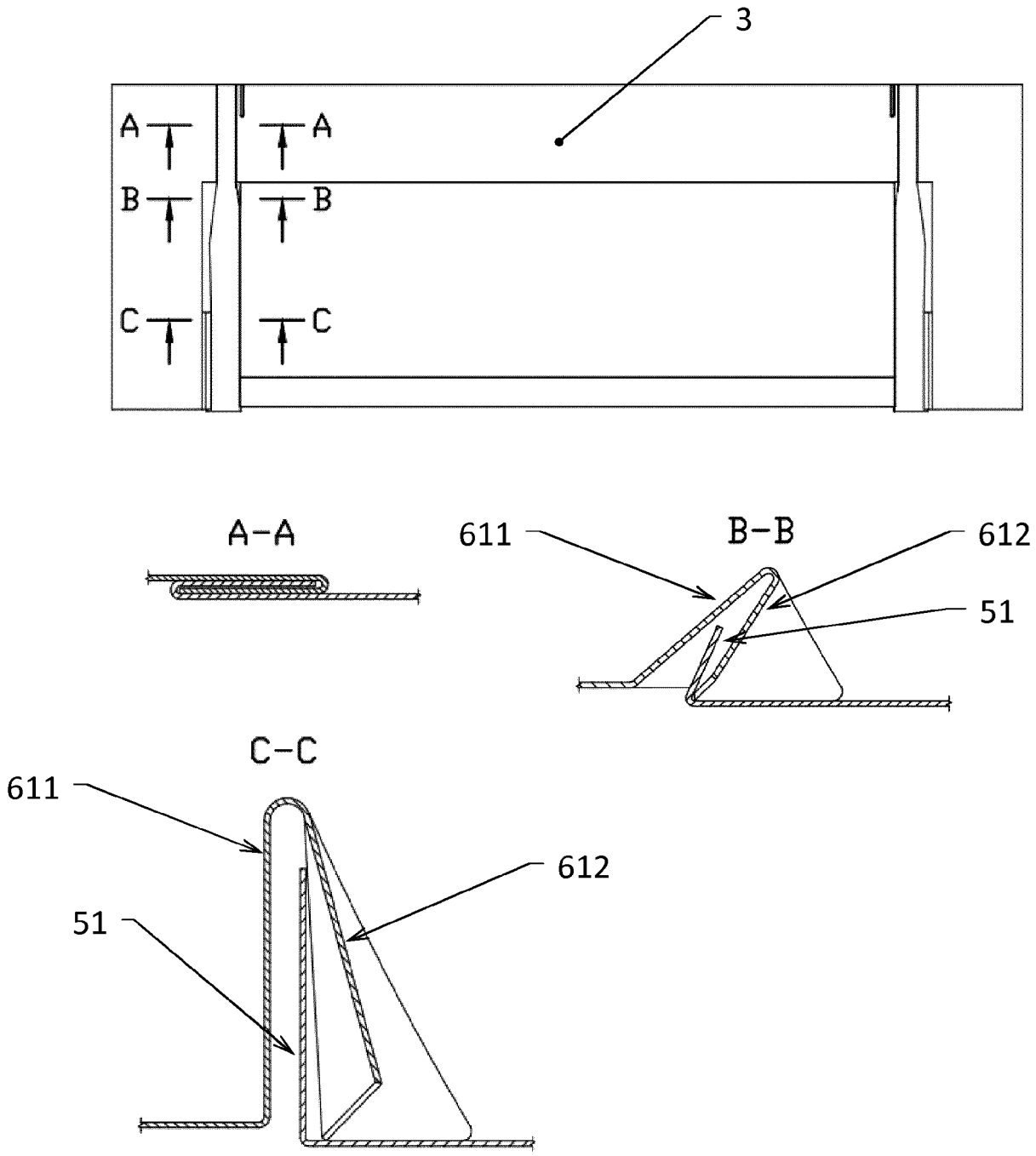

Fig. 6