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(54) **Siding profiles**

(57) This invention relates to siding profiles for wall covering, in particular in buildings, characterised by a design enabling the elimination of discontinuities between the profiles. Profiles constructed according to the invention is particularly applicable in "multi-strip" profiles.

Siding profile, particularly multi-strip profile, designed for cladding of walls in particular on buildings, comprising a core made of a solid, foamed or laminated material and an outer face layer or decorative layer or a layer of paint or other thin decorative element serving as such, as well as means for connecting and fastening, characterised in that the profile has different but mutually compatible endings shaped as transversal catches **13**, **14**, **20**, **21** containing projections **15**, **16**, **24**, **25** and grooves **17**, **18**, **22**, **23** wherein at one end the transversal catches **13**, **14** extend beyond the main body of the profile and are directed towards the face layer of the profile and at the second end the transversal catches **20**, **21** are directed in a direction opposite to the face layer of the profile.

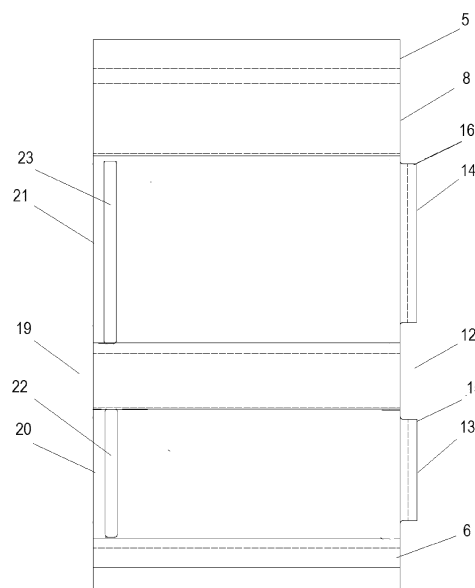


Fig.3

## Description

[0001] This invention relates to siding profiles for wall covering, in particular in buildings, characterised by a design enabling the elimination of discontinuities between the profiles. Profiles constructed according to the invention is particularly applicable in "multi-strip" profiles.

[0002] Siding profiles are widely used as wall cladding. Longitudinal profile joints are generally made with overlaps, whereas lateral joints are made using various connectors. There are different types of connectors for connecting two short edges of siding profiles. Connectors are usually made of a different material than the profiles. The joints using connectors is clearly visible on the wall.

[0003] There is also a method of joining siding profiles that involves stripping one end of the profile of its external layer and part of the core, while the other end is stripped of its internal core layer, so that an overlapped joint is created. In the case of large temperature differences, such profile joints result in discontinuities in the decorative surface of the profiles caused by shrinkage in low temperature. Such joint does not provide stability required in some cases for proper operation of the cladding.

[0004] There is also a solution wherein at one end there is a catch and a groove formed by removing part of the front surface of the profile, while the other end includes an opposite catch and groove created by removing the internal part of the profile. The catches are located across the whole width of the profile, and their joint creates five crevices on the lower and upper edges of the profiles, hindering the aesthetics and increasing water penetration. In order to connect two profiles, one end of the profile is slid onto the other, using a downwards vertical motion. The profile has to be positioned in the air exactly parallel to the installed profiles, as it is otherwise impossible to slide the catch of one profile into the groove in the other. In the case of longer profiles, this requires 2 people.

[0005] Patent application EP13461529.3 (not published) discloses profiles having appropriately shaped transversal catches at both ends consisting of a projection and a groove, wherein the catch comprises the entire width of the profile. Such a solution cannot be used in "multi-strip" profiles.

[0006] The aim of the invention was to develop profiles, especially "multi-strip" profiles that would allow simple and aesthetic joining of the shorter edges of profiles.

[0007] By properly designing the profiles, a method of joining was developed that allows for their aesthetic joining.

[0008] This invention relates to siding profiles, in particular "multi-strip" profiles, that contain a core made of a solid, foamed or laminated and optionally an outer front face. The outer layer is made of a hard material, especially PVC, and covers the entire front surface of the profile, as well as the lower and upper longitudinal edge of the profile and serves a dual purpose, namely to protect the core from damage and provide a decorative finish. The invention also specifies profiles, in which the core does not have a front face or is covered with a layer of paint or other thin decorative element. In the following description, this type of profile is treated on par with profiles having a front face layer.

[0009] A multi-strip profile means a profile which includes at least two strips, separated by an inter-strip belt. A single strip is a basic decorative part of the profile, while the inter-strip belt means a groove between strips, whose shape usually reflects the longitudinal view of the joint between two profiles. The belt may also be protruding against the surface of the strips. The profiles have a shape resembling a rectangle, with the upper strip has a recess along the whole length, whose bottom constitutes an assembly belt with known construction, as well as a sub-assembly belt in a form of a longitudinal groove or protrusion. Between the assembly belt and the upper edge of the profile is a catching flange. The face layer may or may not cover the flange. The inside of the lower strip, its lower part along its whole length, includes a longitudinal catch, usually L-shaped. It consists of the longitudinal catch and a base of the catch, that connects the longitudinal catch with the core of the profile. The longitudinal catch is located at a distance from the bottom edge of the profile which is equal to the difference between the nominal width of the profile and the covering width. Provided this rule is observed, this distance is different in each profile size. The longitudinal catch is used to create an overlapped joint between two adjacent profiles, whereas the connection is realised through inserting the catching flange of one profile into the longitudinal catch of the other profile. Between the strips is an inter-strip belt, whose external shape usually reflects the longitudinal section of the joint between two profiles. On the outside, the part below the belt includes a longitudinal support protrusion, usually reflecting the shape of the assembly belt. This protrusion is used to stabilise the position of the profile.

[0010] The invention encompasses correct formation of the ending of extruded profiles to enable joining the short edges of multi-strip siding profiles.

[0011] In the first aspect, the invention is a profile having transversal catches at the ends consisting of a projection and a groove. The groove has a depth of not less than 5% and not more than 95% of profile thickness. Regardless of the overall thickness of the profile, its thickness in the location of the groove (A) cannot be smaller than 1 mm. Preferably, the groove has a depth of 50 to 80% of profile thickness, most preferably from 50 to 75%. The projection of the catch has a thickness (B) of 90 to 5% of profile thickness. Regardless of the overall thickness of the profile, the projection cannot be thinner than 2 mm, preferably from 80 to 30%, most preferably from 80 to 50% of profile thickness. Furthermore, the thickness of the profile at the place of the groove (A) and the thickness of the projection (B) must fulfil the condition

described by formula 1.

$$B - A \geq 1 \text{ mm} \quad (1)$$

**[0012]** The transversal catches at both ends have different but mutually compatible construction and form a stable connection after they are installed, with the profile thickness at the groove ( $A_1$ ,  $A_2$ ) and the thickness of the projections ( $B_1$ ,  $B_2$ ) meeting the condition described by formulas 2 and 3.

$$A_1 + B_2 = C \quad (2)$$

$$A_2 + B_1 = C \quad (3)$$

where C is not less than 95% and not more than 100% of profile thickness.

**[0013]** Where  $A_1$  i  $B_1$  apply to one end of the profile and  $A_2$  i  $B_2$  apply to the opposite end

**[0014]** At one end, the transversal catches are on the inside of the profile and extend beyond the main body of the profile, and their projections are directed towards the face of the profile, and their length is different for the two strips. The projection is directed toward the face of the profile, while the groove is located between the tongue and the core. On the upper strip, the length of the catch is not greater than the width of the strip between the sub-assembly belt and the internal protrusion of the inter-strip belt, minus the width of the longitudinal catch. On the lower strip, the length of the transversal catch is not greater than the width of the strip between the inter-strip belt and the internal edge of the base of the longitudinal catch, minus the width of the longitudinal catch. The width of the longitudinal catch means the distance between the inner edge of the base of the longitudinal catch and the lower edge of the catch. In the case of profiles with more than two strips, the length of catches on each strip, except for the bottom strip, is the same.

**[0015]** At the other end of the profile, the transversal catch is directed towards the internal side of the profile and its length is equal to the width of individual strips. A groove-shaped catch is located on the internal surface of the profile, with a projection between the groove and the outer edge of the profile. The width of this projection is not greater than the width of a compatible groove at the other end of the profile.

**[0016]** In the case of profiles with more than two strips, the catches on both ends on consecutive strips are shaped similarly to the top strip.

**[0017]** At the end where the transversal catches are located on the internal side of the profile, the face surface, or the external surface of the profile in profiles without a face surface, is shorter than the core by the width of the longitudinal catch. The transversal catch occupies from 0.6% to 30% of the profile's length, but no less than 6 mm and no more than 200 mm, whereas the width of the projection is no more than 50% of the width of the transversal catch and no less than 3 mm. At the end where the projections are directed towards the internal side of the profile, the projection is as wide as the groove at the other end, while the projection at the other end may be narrower than the width of its corresponding groove. Preferably, both projections are as wide as the grooves compatible with them on the opposite ends.

**[0018]** In the second aspect, the invention is a profile having transversal catches at the ends consisting of a projection and a groove. The groove has a depth of not less than 5% and not more than 95% of profile thickness. Regardless of the overall thickness of the profile, its thickness in the location of the groove (A) cannot be smaller than 1 mm. Preferably, the groove has a depth of 50 to 80% of profile thickness, most preferably from 50 to 75%. The projection has a thickness (B) of 90 to 5% of profile thickness. Regardless of the overall thickness of the profile, the projection cannot be thinner than 2 mm, preferably from 80 to 30%, most preferably from 80 to 50% of profile thickness. Furthermore, profile thickness where the groove is located (A) and projection thickness (B) have to meet the condition described by formula 1.

$$B - A \geq 1 \text{ mm} \quad (1)$$

**[0019]** The transversal catches at both ends have different but mutually compatible construction and form a stable connection after they are installed, with the profile thickness at the groove ( $A_1$ ,  $A_2$ ) and the thickness of the projections ( $B_1$ ,  $B_2$ ) meeting the condition described by formulas 2 and 3.

$$A_1 + B_2 = C \quad (2)$$

5

$$A_2 + B_1 = C \quad (3)$$

where C is not less than 95% and not more than 100% of profile thickness.

**[0020]** Where  $A_1$  i  $B_1$  apply to one end of the profile and  $A_2$  i  $B_2$  apply to the opposite end.

10 **[0021]** At one end, the transversal catches are on the inside of the profile and extend beyond the main body of the profile, and their projections are directed towards the face of the profile, and their length is different for the two strips. The projection is directed toward the face of the profile, while the groove is located between the projection and the core.

**[0022]** On the upper strip, the length of the transversal catch is not greater than the width of the strip between the sub-assembly belt and the internal protrusion of the inter-strip belt, minus the width of the longitudinal catch. On the lower strip, the length of the catch is not greater than the width of the strip between the inter-strip belt and the internal edge of the base of the longitudinal catch, minus the width of the longitudinal catch. The width of the longitudinal catch means the distance between the inner edge of the base of the longitudinal catch and the lower edge of the longitudinal catch. In the case of profiles with more than two strips, the length of transversal catches on each strip, except for the bottom strip, is the same.

20 **[0023]** The projections at both catches at this end are no longer than half of a given transversal catch, but they can be divided into several sections, with gaps corresponding to the width of catch sections between them. The length of individual sections of projections in the transversal catch is no greater than 50% of the length of the transversal catch in the case of single transversal catch and no smaller than 30% of the length of a transversal catch. The projections in transversal catches in this variant of the invention are divided into sections. The length of a single section of projection is not smaller than 3 mm . Preferably, the projection is divided into at least two sections, with the overall length of projections being not smaller than 40% and not greater than 50% of the profile width.

25 **[0024]** At the other end of the profile, the transversal catch is directed towards the internal side of the profile and its length is equal to the width of individual strips. A groove-shaped catch is located on the internal surface of the profile, with a projection between the groove and the outer edge of the profile. The width of this projection is not greater than the width of a compatible groove at the other end of the profile. The projections of both transversal catches at this end are no longer than half of the length of a given transversal catch, but they can be divided into several sections, with gaps corresponding to the width of catch sections between them. The length of individual sections of projections in the transversal catch is no greater than 50% of the length of the transversal catch in the case of single transversal catch and no smaller than 30% of the length of the transversal catch. The projections in transversal catches in this variant of the invention are divided into sections. The length of a single section of projection is not smaller than 3 mm . Preferably, the projection is divided into at least two sections, with the overall length of projections being not smaller than 40% and not greater than 50% of the profile width.

30 **[0025]** The transversal catches on both ends are compatible with each other, so that during assembly, when they are positioned with a vertical offset equal to the length of a single section of projection, the sections of projection in one profile correspond to the gaps in projection in the other profile, and after assembly the projections on one profile interlock with the projections on the other.

35 **[0026]** In the case of profiles with more than two strips, the transversal catches on both ends on consecutive strips are shaped similarly to the transversal catch on the top strip.

40 **[0027]** At the end where the transversal catches are located on the internal side of the profile, the face surface, or the external surface of the profile in profiles without a face surface, is shorter than the core by the width of the longitudinal catch. The transversal catch occupies from 0.6% to 30% of the profile's length, but no less than 6 mm and no more than 200 mm, whereas the width of the projection is no more than 50% of the width of the transversal catch and no less than 3 mm. At the end where the projections are directed towards the internal side of the profile, the projection is as wide as the groove at the other end, while the projection at the other end may be narrower than the width of its corresponding groove. Preferably, both projections are as wide as the grooves compatible with them on the opposite ends.

45 **[0028]** Details of the invention are shown and explained in the drawings, which illustrate all variants and types of the invention but are merely examples of embodiments. All the embodiments shown in figures 1 to 15 are shown in one version of symmetry, however the invention also relates to the inverted symmetrical profiles i.e. elements shown in these figures on the left may be on the right, and accordingly the elements shown on the right can be on the left. Figures showing only a portion of a profile also apply to the cases when a given type of ending is in an opposite position.

50 **[0029]** The individual figures in the drawing are:

Figure 1 is a profile view of the invention in its first aspect,  
 Figure 2 is a profile view of figure 1 in a view from the inside,  
 Figure 3 is the relationship between the lengths of the transversal catches at both ends of the profile,  
 Figure 4 is the view of transversal catches on one end of the profile,  
 5 Figure 5 is a cross-section of the transversal catches in plane A according to figure 1,  
 Figure 6 is a cross-section of the transversal catch in plane B according to figure 2,  
 Figure 7 is a system of two profiles prior to assembly, viewed from the inside  
 Figure 8 is a joint between two profiles in a view from the inside,  
 Figure 9 is a cross section through a joint between two profiles,  
 10 Figure 10 is a profile view of the invention in the embodiment of the second aspect of the invention,  
 Figure 11 is a profile view according to figure 10 in a view from the inside,  
 Figure 12 is the relationship between the lengths of the transversal catches at both ends of the profile,  
 Figure 13 is a cross-section of the transversal catch in plane C according to figure 10,  
 Figure 14 is a cross-section of the transversal catch in plane D according to figure 11,  
 15 Figure 15 is a cross section through a joint between two profiles,

**[0030]** Figure 1 shows a view of the profile according to the invention in its first aspect. Profile (1) according to the invention comprises a core (2), whose upper part over the entire length includes a groove (3), the bottom of which is an assembly belt (4). A catching flange (5) is located between the assembly belt and (4) and the upper edge of the profile.  
 20 Along the whole length of the bottom part of the profile is a longitudinal catch (6), in which the flange of the adjacent profile snaps when installed. The inner side of the profile (1) includes a longitudinal support protrusion (7) corresponding in shape to the assembly belt (4) and used for stabilising the profile on the substrate. Below the assembly belt, the profile has a sub-assembly belt (8) in a form of a longitudinal groove. More or less halfway through the width of the profile, there is an inter-strip belt (9), with a shape corresponding to the sub-assembly belt (8). The inter-strip belt divides  
 25 the surface of the profile into two parts, forming two strips (10,10'). The core (2) is covered by the face layer (11) on the outside. At one end (12) the profile (1) has two transversal catches (13, 14) projecting beyond the main body of the profile (1). Both catches (13, 14) have corresponding shapes and consist of projections (15,16) and grooves (17,18), wherein the lower catch (13) is shorter than the upper catch (14).

**[0031]** Figure 2 shows a view of the profile (1) in the view from the inside. At the end (19) the profile (1) has two internal transversal catches (20,21) in the form of grooves (22, 23) and projections (24,25). The transversal catch (20) on the  
 30 bottom strip (10) comprises a section between the lower edge of the inter-strip belt (9) and the edge of the longitudinal catch (6), while the transversal catch (21) on the upper strip (10') comprises a section between the lower edge of the sub-assembly belt (8) and the upper edge of the support protrusion (7).

**[0032]** Figure 3 shows the relationship between the lengths of transversal catches at both ends (12, 19), wherein the positioning of projections (15,16) on the inner side of the profile is shown in dashed lines, as they are not visible in this view. Transversal catches (13, 14) at the end (12) projecting beyond the main body of the profile (1) are shorter than the catches compatible with them (20, 21) on the other end of the profile (19) by the width of the longitudinal catch (6).  
 35

**[0033]** Figure 4 shows a view of transversal catches (13,14) at the end (12). Projections (15, 16) of the transversal catches (13, 14) have a height of not more than 2/3 of the thickness of the profile (1).  
 40

**[0034]** Figure 5 is a cross-section of the transversal catch (13) of profile (1) in plane A according to figure 1. Projection (15) has a width equal to the width of the groove (17). In this embodiment, the transversal catch (13) has a thickness corresponding to about 2/3 of the thickness of the core (2) with face layer (26).  
 45

**[0035]** Figure 6 is a cross-section of the transversal catch (21) of the profile in plane B according to figure 2. Projection (25) has a width equal to the width of the groove (23). In this embodiment, the transversal catch (21) has a thickness corresponding to about 2/3 of the thickness of the core (2) with face layer (26).  
 50

**[0036]** Figure 7 is a system of two profiles (1,1') prior to assembly, viewed from the inside. Profile (1) is placed next to the other profile (1') at a distance equal to the width of longitudinal catch (6) in such a way that the projections (15',16') of the catches (13',14') are located opposite the grooves (22,23) of the second profile (1). Then, after the profile is moved down, the joint is stabilised by the longitudinal catch (6) catching onto the flange of the profile installed in previous row.  
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**[0037]** Figure 8 is a joint between two profiles (1,1') in a view from the inside.

**[0038]** Figure 9 is a cross section through a joint between two profiles (1,1').

**[0039]** Figure 10 is a view of a profile according to the invention in the embodiment of the second aspect of the invention. Profile (1) according to the invention comprises a core (2), whose upper part over the entire length includes a groove (3), the bottom of which is an assembly belt (4). A catching flange (5) is located between the assembly belt and (4) and the upper edge of the profile. Along the whole length of the bottom part of the profile is a longitudinal catch (6), in which the flange of the adjacent profile snaps when installed. The inner side of the profile (1) includes a longitudinal support protrusion (7) corresponding in shape to the assembly belt (4) and used for stabilising the profile on the substrate. Below the assembly belt, the profile has a sub-assembly belt (8) in a form of a longitudinal groove. More or less halfway through  
 60

the width of the profile, there is an inter-strip belt (9), with a shape corresponding to the sub-assembly belt (8). The inter-strip belt divides the surface of the profile into two parts, forming two strips (10,10'). The core (2) is coated with a face layer (11). At one end (30) the profile (1) has two transversal catches (31,32) projecting beyond the main body of the profile (1). Both transversal catches (31,32) have corresponding shapes and consist of projections (33,34) and grooves (35,36), wherein the lower catch (31) is shorter than the upper catch (32). The projections (35,36) are divided into sections (35-35', 36-36') with gaps between them (37,38) having a width corresponding to the length of a single projection (35, 36). For clarity, figure 10 shows only some of the sections of the projections (35, 36) and gaps (37, 38).

[0040] Figure 11 is a view from the inside of the profile of the second end (39) of the profile (1) in the embodiment of the second aspect of the invention. Profile (1) at the end (39) has two transversal catches (40, 41) having projections (42, 43) separated from the core (2) by grooves (44,45). The transversal catch (40) on the bottom strip (10) comprises a section between the lower edge of the inter-strip belt (9) and the edge of the longitudinal catch (6), while the transversal catch (41) on the upper strip (10') comprises a section between the lower edge of the sub-assembly belt (8) and the upper edge of the support protrusion (7). The projections (42,43) are divided into sections (42-42', 43-43') with gaps between them (46,47) having a width corresponding to the length of a single projection (42, 43). The length of a single section of the projection (42,43) at one end (39) of the profile (1) corresponds to the length of a single gap (37, 38) between sections of the projection (35, 36) at the other end of the profile (1). For clarity, figure 11 shows only some of the sections of the projections (42, 43) and gaps (46, 47).

[0041] Figure 12 shows the relationship between the lengths of transversal catches at both ends (30,39), wherein the positioning of projections (35,36) of transversal catches (31,32) on the inner side of the profile (1) is shown in dashed lines, as they are not visible in this view. Transversal catches (31, 32) at the end (30) projecting beyond the main body of the profile are shorter than the catches compatible with them (40,41) on the other end of the profile (39) by the width of the longitudinal catch (6).

[0042] Figure 13 is a cross-section of the transversal catch (32) of the profile (1) in plane C according to figure 10. Projection (36) has a width equal to the width of the groove (34). In this embodiment, the transversal catch (32) has a thickness corresponding to about 2/3 of the thickness of the core (2) with face layer (26).

[0043] Figure 14 is a cross-section of the transversal catch (41) of the profile (1) in plane D according to figure 11. Projection (43) has a width equal to the width of the groove (45). In this embodiment, the transversal catch (41) has a thickness corresponding to about 2/3 of the thickness of the core (2) with face layer (26).

[0044] Figure 15 is a cross section through a joint between two profiles (1,1').

## Claims

1. Siding profile, particularly multi-strip profile, designed for cladding of walls in particular on buildings, comprising a core made of a solid, foamed or laminated material and an outer face layer or decorative layer or a layer of paint or other thin decorative element serving as such, as well as means for connecting and fastening, **characterised in that** the profile 1 has different but mutually compatible endings shaped as transversal catches 13, 14, 20, 21 containing projections 15, 16, 24, 25 and grooves 17, 18, 22, 23 wherein at one end the transversal catches 13, 14 extend beyond the main body of the profile and are directed towards the face layer 11 of the profile 1 and at the second end the transversal catches 20, 21 are directed in a direction opposite to the face layer 11 of the profile 1.
2. Profile according to claim 1 **characterised in that** the single transversal catch 13, 14, 20, 21 comprises from 0.6% to 30% of the length of the profile 1 but not less than 6 mm and not more than 200 mm, wherein the projection 15, 16, 24, 25 comprises not more than 50% of the width of the catch 13, 14, 20, 21 but not less than 3 mm.
3. Profile according to claim 1 or 2, **characterised in that** the transversal catch 13 on the lower strip 10 is not longer than the width of the strip 10 between the inter-strip belt 9 and the inner edge of the base of the longitudinal catch 6 minus the width of the longitudinal catch 6.
4. Profile according to claim 1 or 2 or 3, **characterised in that** the transversal catch 14 on the upper strip 10' is not longer than the width of strip 10' between the sub-assembly belt 8 and the inner edge of the inter-strip 7 minus the width of the longitudinal catch 6.
5. Profile according to claim 1 or 2 or 3 or 4, **characterised in that** the transversal catch 20 on the lower strip 10 is not longer than the width of the strip 10 between the inter-strip belt 9 and the inner edge of the base of the longitudinal catch 6.
6. Profile according to claim 1 or 2 or 3 or 4 or 5, **characterised in that** the transversal catch 21 on the upper strip 10'

is not longer than the width of strip 10' between the sub-assembly belt 8 and the inner edge of the inter-strip belt 7.

- 5        7. Siding profile, particularly multi-strip profile, designed for cladding of walls in particular on buildings, comprising a core made of a solid, foamed or laminated material and an outer face layer or decorative layer or a layer of paint or other thin decorative element serving as such, as well as means for connecting and fastening, **characterised in that** the profile 1 has different but mutually compatible endings shaped as transversal catches 31, 32, 40, 41 containing projections 35, 36, 42, 43 and grooves 33, 34, 44, 45 wherein at one end the transversal catches 31, 32 extend beyond the main body of the profile and are directed towards the face layer 11 of the profile 1 and at the second end the transversal catches 40, 41 are directed in a direction opposite to the face layer 11 of the profile 1, moreover the projections 35, 36, 42, 43 comprise no more than 50% and no less 30% of the length of transversal catches 31, 32, 40, 41.
- 10       8. Profile according to claim 7 **characterised in that** the single transversal catch 31, 32, 40, 41 comprises from 0.6% to 30% of the length of the profile 1 but not less than 6 mm and not more than 200 mm, wherein the projection 35, 36, 42, 43 comprises not more than 50% of the width of the catch 31, 32, 40, 41 but not less than 3 mm.
- 15       9. Profile according to claim 7 or 8 **characterized in that** the projections 35, 36, 42, 43 are divided into sections, wherein sections of projections 35, 36, 42, 43 are separated by gaps 37, 38, 46, 47 ... equal in length to the sections of projections 35, 36, 42, 43 in transversal catches 31, 32, 40, 41.
- 20       10. Profile according to claim 9, **characterised in that** a single section of the projection 35, 36, 42, 43 is no shorter than 3 mm.
- 25       11. Profile according to claim 7 or 8 or 9 or 10, **characterised in that** a single groove 33, 34, 44, 45 has a depth of not less than 5% and not more than 95% of the thickness of profile 1, wherein, regardless of the thickness of the profile 1, the thickness of the profile 1 at the groove 33, 34, 44, 45 is not less than 1 mm.
- 30       12. Profile according to claim 11 **characterised in that** the groove 33, 34, 44, 45 has a depth of 50 to 80% of the thickness of the profile 1.
- 35       13. Profile according to claim 12 **characterised in that** the groove 33, 34, 44, 45 has a depth of 50 to 75% of the thickness of the profile 1.
- 40       14. Profile according to claim 7 or 8 or 9 or 10 or 11 or 12 or 13, **characterised in that** the projection of the catch 31, 32, 40, 41 has a thickness of 5% to 90% of the thickness of profile 1 and furthermore the thickness of profile 1 at the groove 33, 34, 44, 45 (A) and the thickness of the projection 35, 36, 42, 43 (B) must satisfy a formula of  $B - A \geq 1 \text{ mm}$ , wherein, regardless of the thickness of the profile 1, the thickness of the projection 35, 36, 42, 43 is not less than 2 mm.
- 45       15. Profile according to claim 14 **characterised in that** the projection 35, 36, 42, 43 has a thickness corresponding to preferably from 30% to 80% of the thickness of the profile 1.
- 50       16. Profile according to claim 15 **characterised in that** the projection 35, 36, 42, 43 has a thickness corresponding to preferably from 50 to 80% of the thickness of the profile 1.

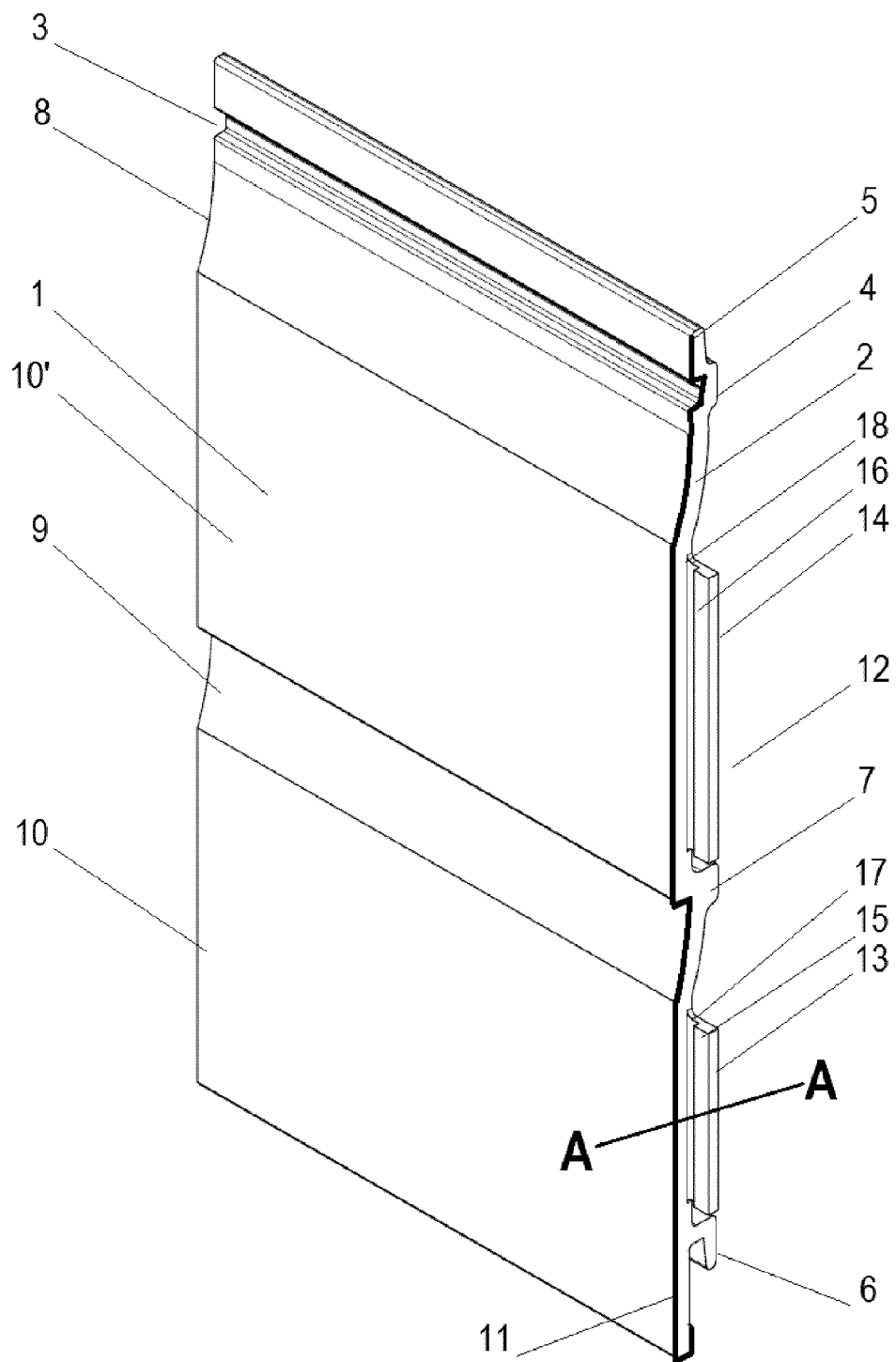


Fig.1

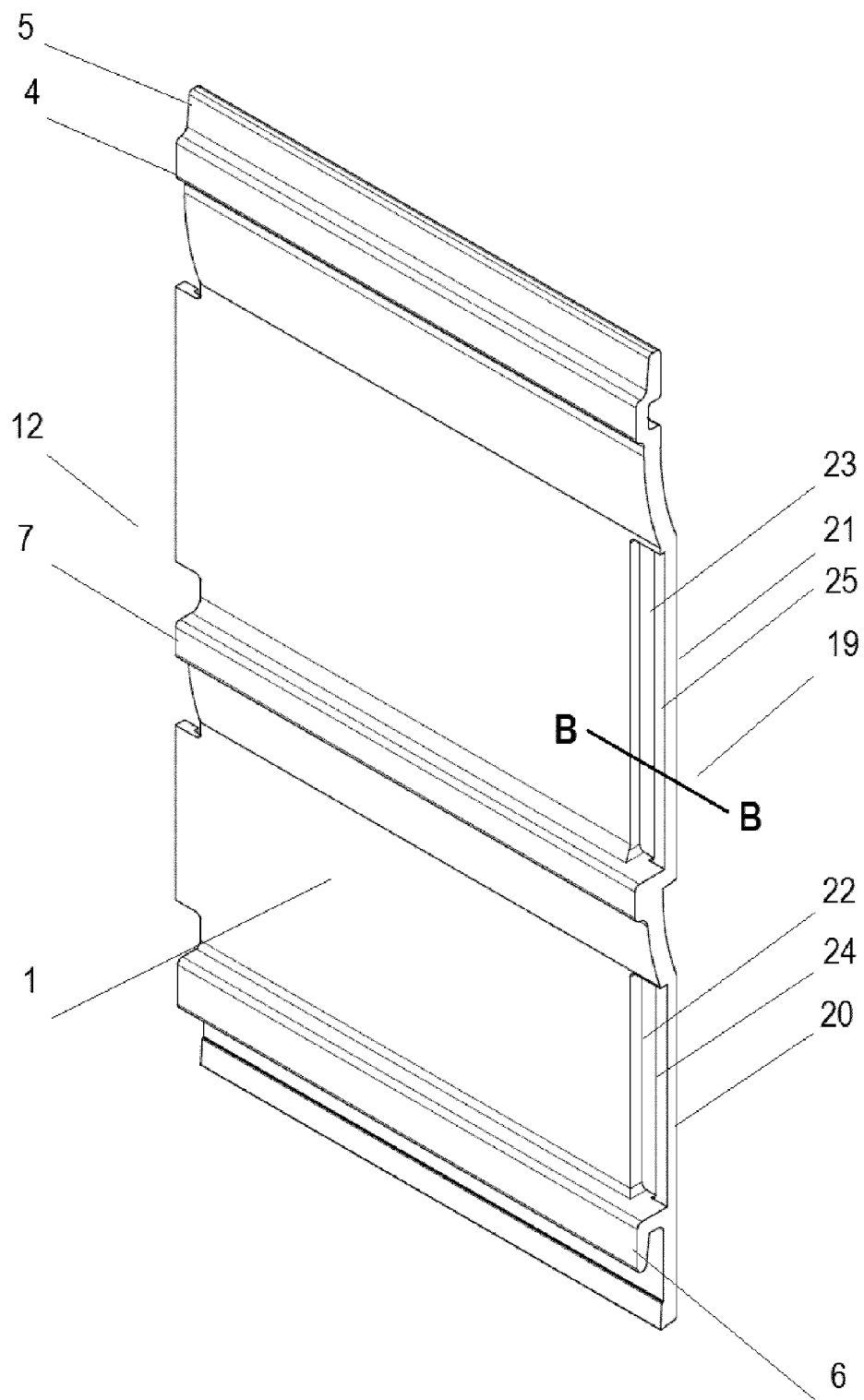


Fig.2

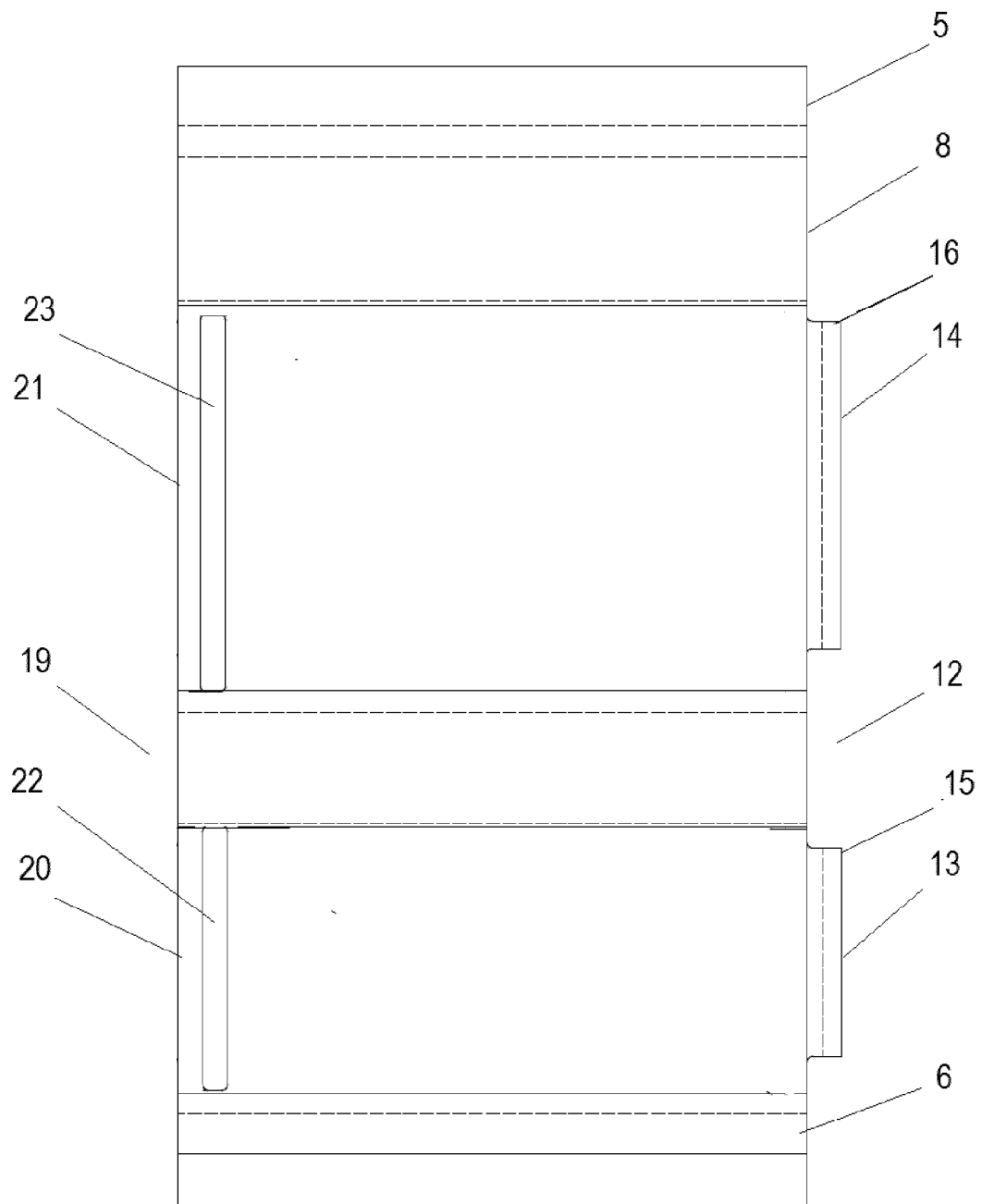


Fig.3

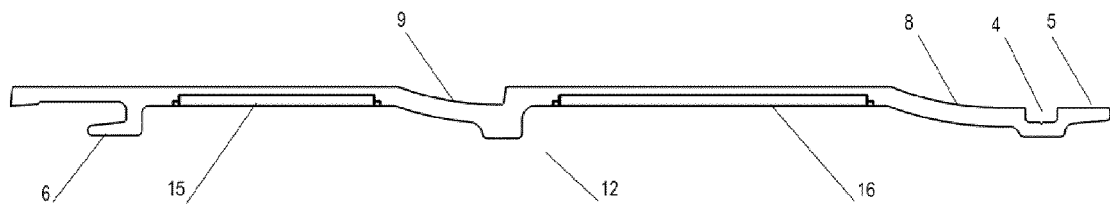


Fig. 4

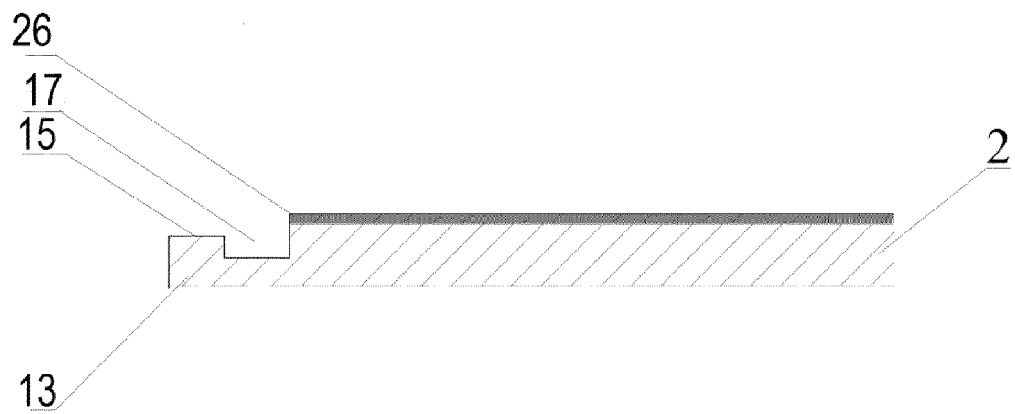


Fig. 5

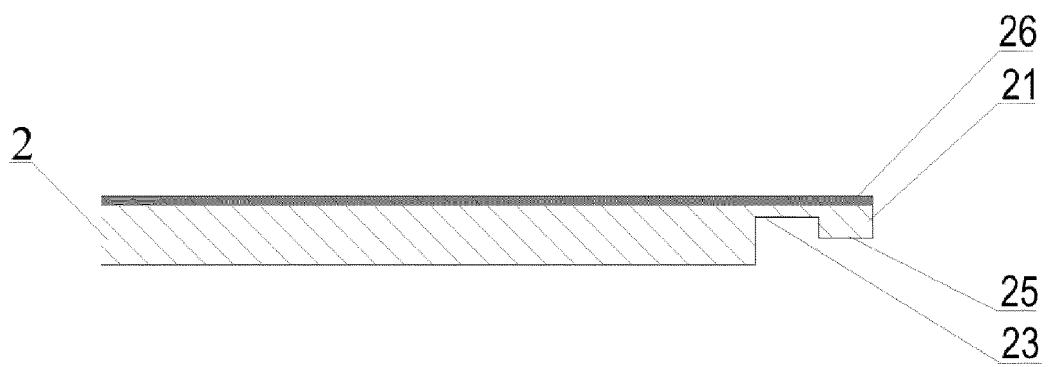


Fig. 6

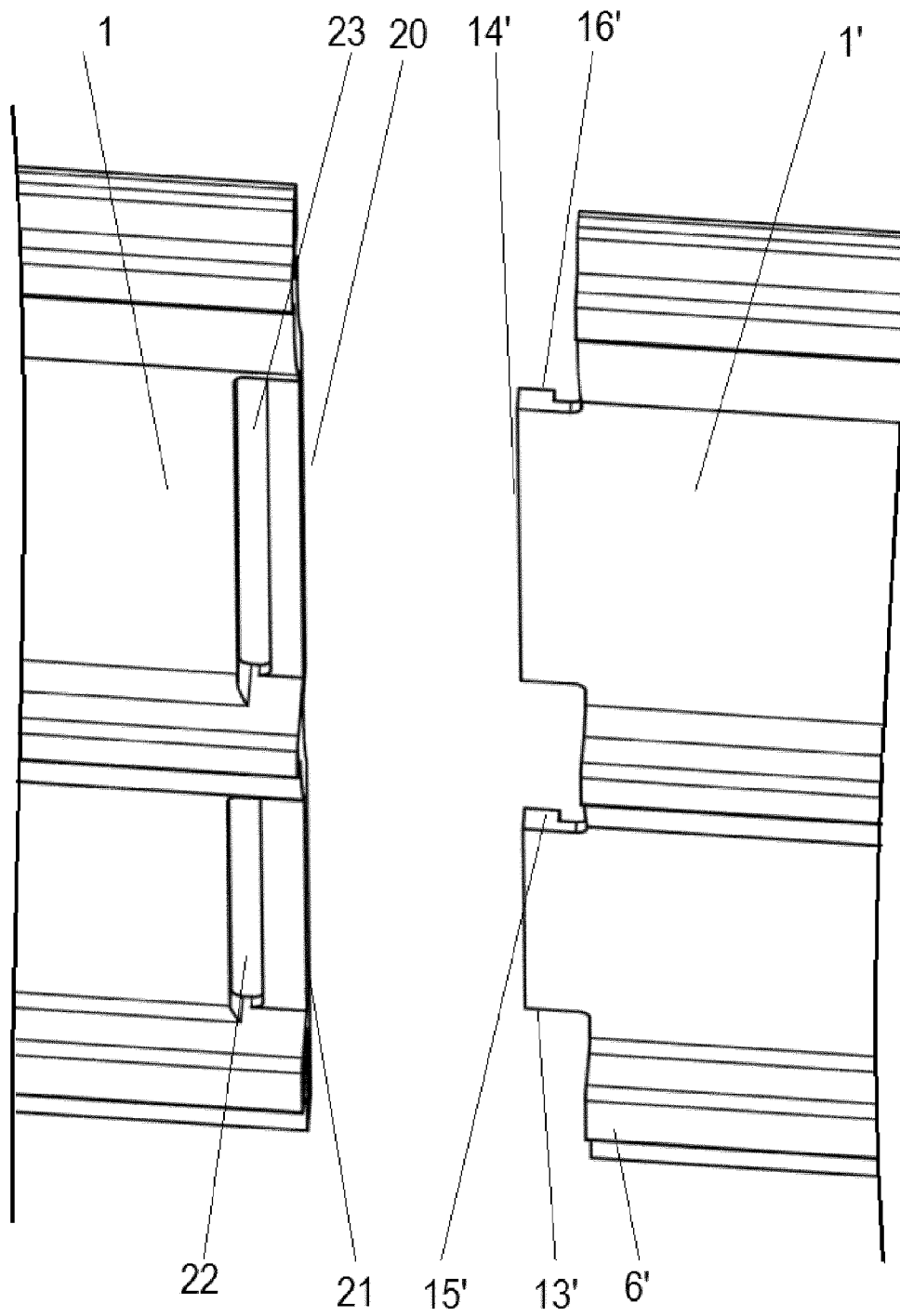


Fig.7

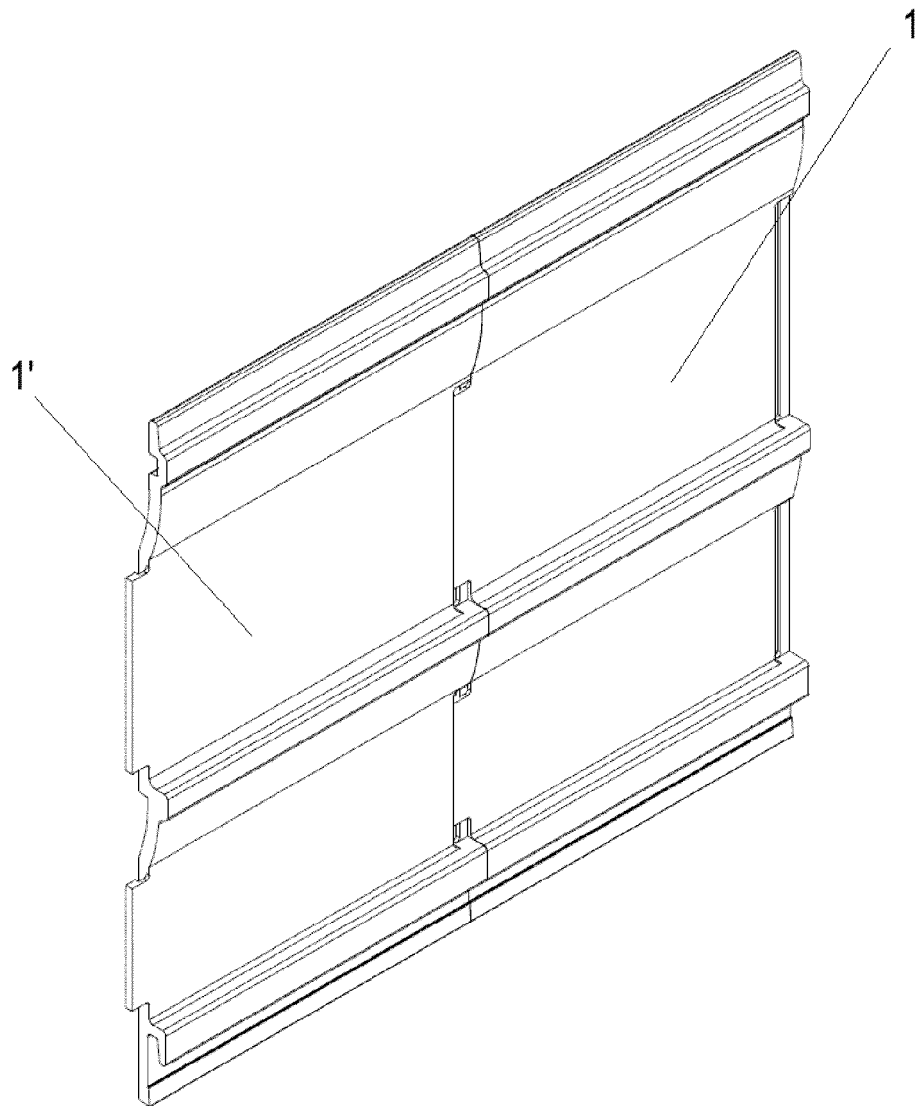


Fig.8

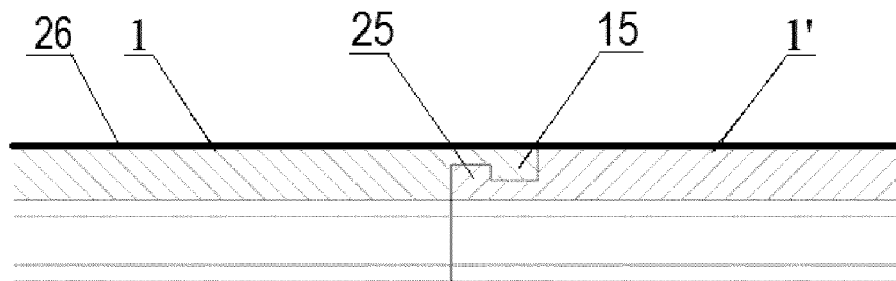


Fig.9

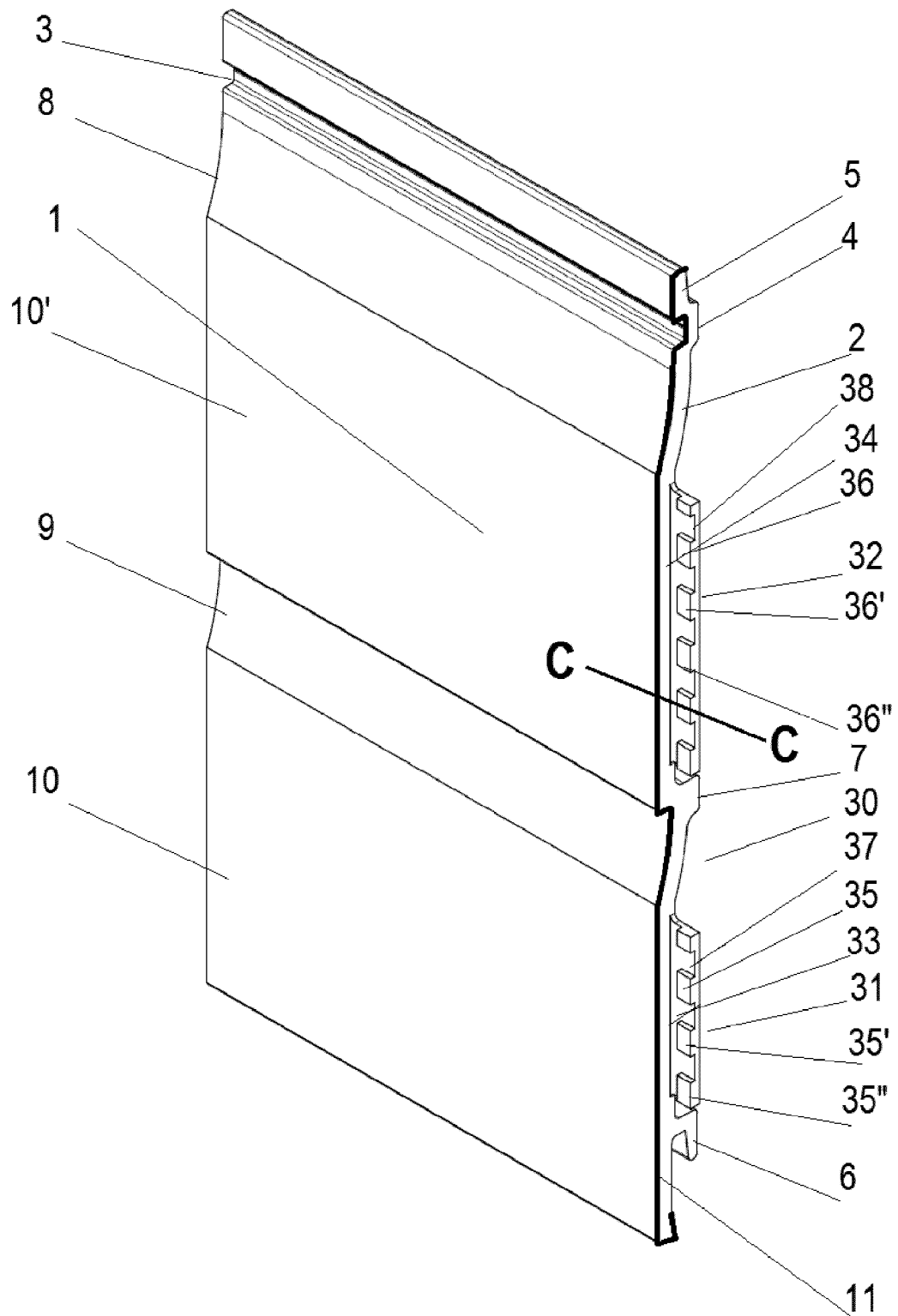


Fig.10

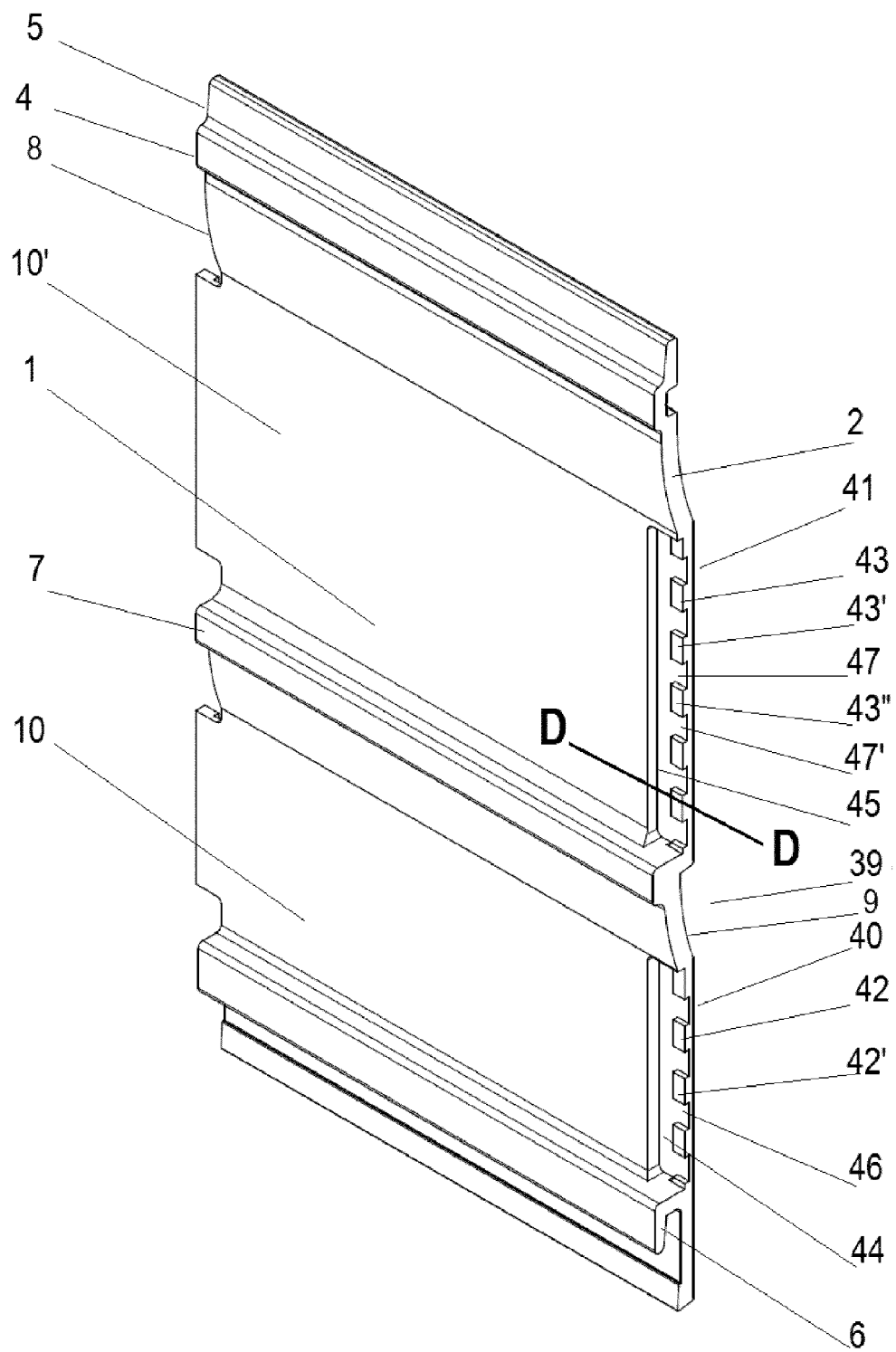


Fig.11

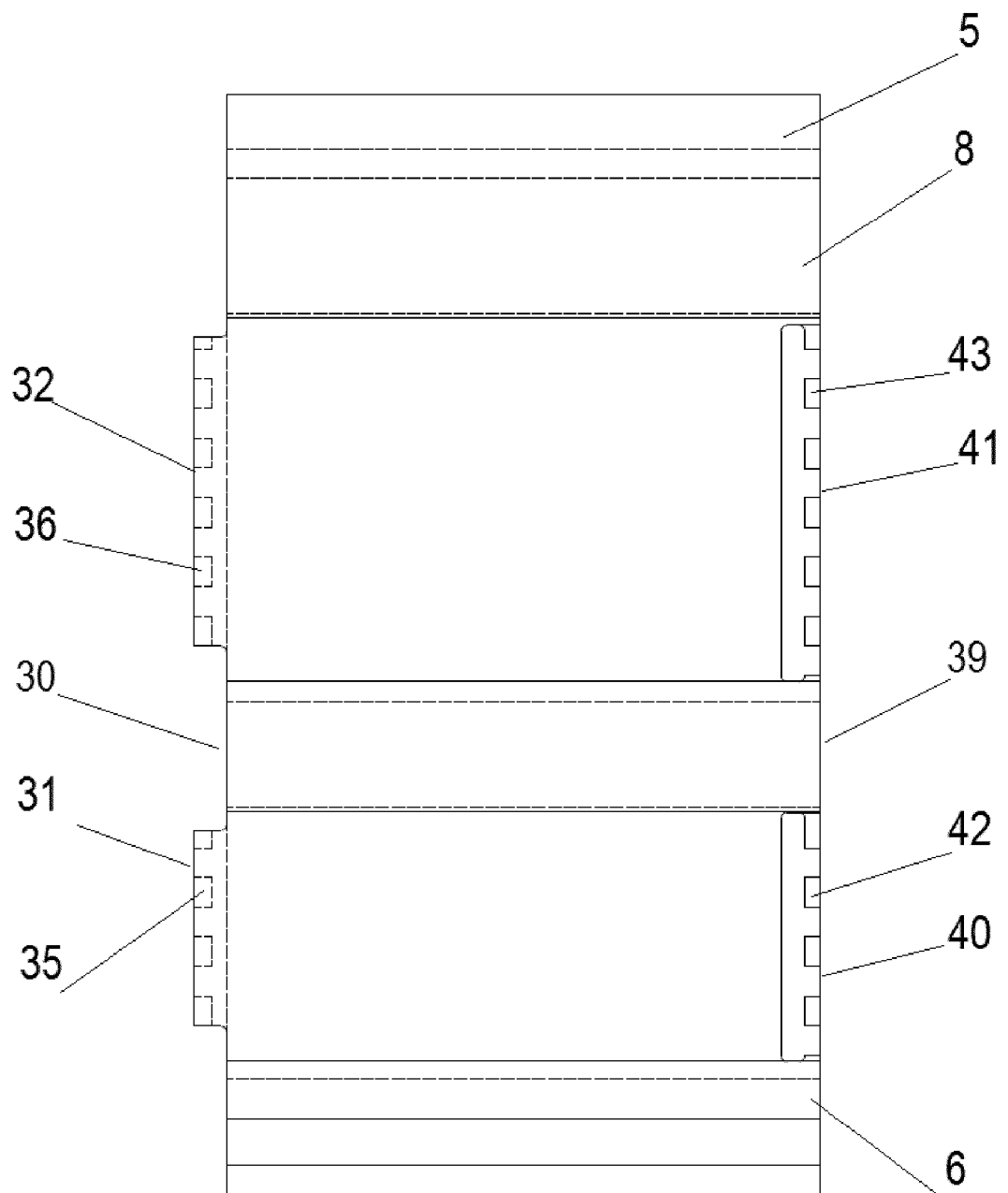


Fig.12

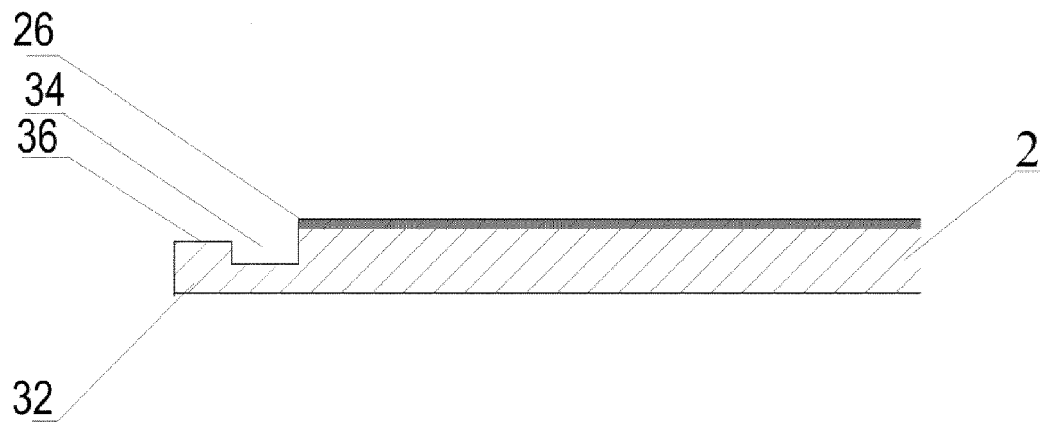


Fig.13

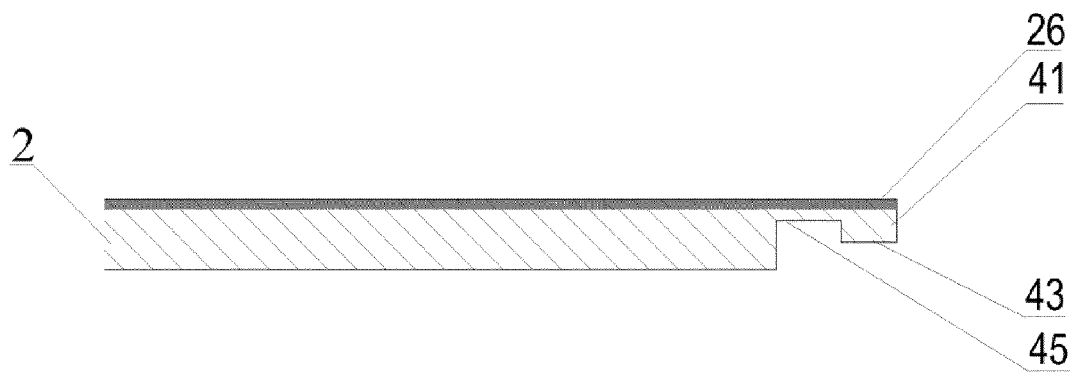


Fig.14

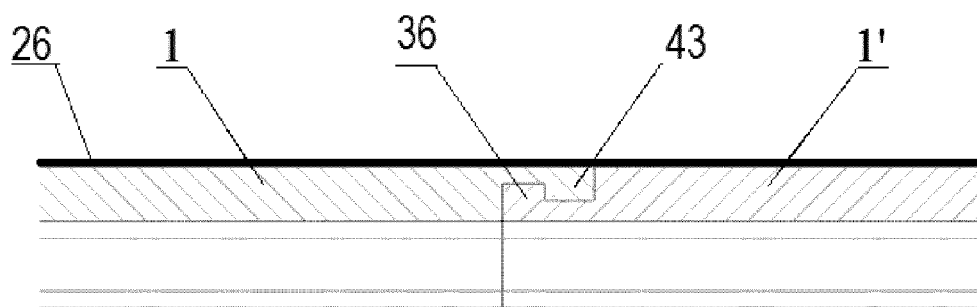


Fig.15



## EUROPEAN SEARCH REPORT

Application Number  
EP 13 46 1538

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	DE 10 2006 024184 A1 (HIPPER AUGUST [DE]) 29 November 2007 (2007-11-29)	1	INV. E04F13/08 E04F13/18
A	* page 4, paragraph 28 - page 5, paragraph 37; figures 1-4 *	2-9	
Y	EP 2 096 230 A1 (KRONOPLUS TECHNICAL AG [CH]) 2 September 2009 (2009-09-02) * page 4, column 5, paragraph 18 - column 6, paragraph 23 * * claims 1,13,15; figures 3-5 *	1	
A	US 2010/122505 A1 (JAKIEL GARY G [US]) 20 May 2010 (2010-05-20) * page 1, paragraph 25 - page 4, paragraph 45; figures 1-8 *	1-3,5-7	
			TECHNICAL FIELDS SEARCHED (IPC)
			E04F F16B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		14 March 2014	Ayiter, Johan
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14-03-2014

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