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(54) Construction Panel

(57) Construction panel for assembling with other of such panels for selectively mounting in lap siding and flush siding on a wall. The construction panel has a front portion, a top portion, with a first arm and a second arm, and a bottom portion, with a third and a fourth arm.

The first arm and second arm have respectively a first and second assembly position. The third arm is configured to be introduced in a first or second arm of a second similar panel for respectively lap mounting or flush mounting. A protrusion on the fourth arm is in contact with a front surface, making the installation wind-and waterproof. The construction panel is equally equipped with a lateral interacting mechanism.

Further disclsed is a system for building selectively lap siding and flush siding on a wall.

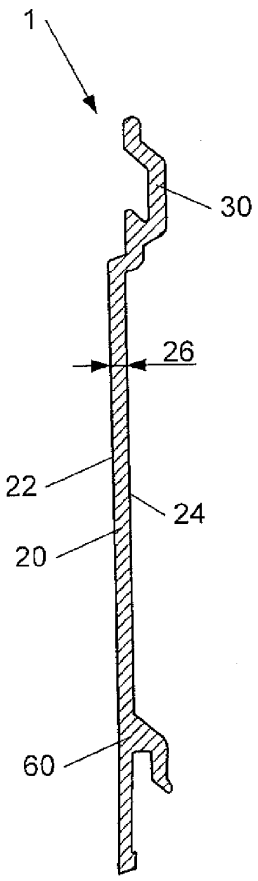

Fig. 1a

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Description

Technical field

[0001] The present invention relates to a construction panel for assembling with other of such panels, and more particularly to a construction panel for selectively mounting in lap siding and flush siding on a wall.

[0002] The present invention further relates to a system for building selectively lap siding and flush siding on a wall.

Background art

[0003] Systems for covering walls and columns are known. Such systems often comprise assembly of construction panels. Such construction panels typically contain a longitudinal flat surface and a top and bottom portion which are arranged to interact with identical or similar panels. In such systems often different construction panels are provided for lap siding of walls and for flush siding of walls. This has a disadvantage in production because often small volumes have to be produced. This is also disadvantageous for the amount of stock because more construction panels will have to be kept in stock. Thus at the end, this is a costly way of offering products to the market.

[0004] Systems are known which provide an answer to these issues. US2642968 discloses panel members which may be used to simulate the appearance of lap siding or may be used to simulate sheeting or other wall structure wherein the panels have the appearance of uniform thickness throughout. The panel members are made of thin metal sheets and have saw tooth-like flange portions extending along the top and the bottom of each panel. These saw tooth-like flange portions allow the panels to snap into position in two different arrangements to a channel-shaped studding. A similar system is disclosed in US4231206. This document discloses a construction panel which comprises both at the top and bottom parts of the panel a channel and an adjacent tongue which extends outwardly from the channel. The shape of the channel is such that it can receive the tongue of an adjacent panel for assembling panels to build up siding. The panels can be combined in two different arrangements to form selectively flush siding or lap siding. The panels are made of thin sheet metal.

[0005] All these systems known in the art for selectively assembling in flush siding and lap siding still have several disadvantages. Sheet metal panels are often damaged during handling or assembling, and also, even if they are mounted on a wall perfectly, they are easily damaged afterwards. Another disadvantage of the known systems is that they add a relative large thickness to the wall. The known systems also provide limited material and finishing options which make these systems not very attractive.

Disclosure of the invention

[0006] It is therefore an aim of the present invention to provide an improved construction panel and corresponding system for selectively building in flush siding or lap siding on a wall which is more compact, more damage-proof, easier to install and producible in a wide range of materials and finishes.

[0007] This aim is achieved according to the invention with a construction panel incorporating a front portion, a top portion, comprising a first arm and a second arm, and a bottom portion, comprising a third and a fourth arm showing the technical characteristics of the first independent claim.

[0008] The first arm comprises a first assembly position and the second arm comprises a second assembly position. The third arm comprises a positioning surface for interacting selectively on a first or second assembly position of a second similar construction panel in respectively lap mounting or flush mounting. This provides the user a choice between two ways of mounting. The fourth arm disposes of a protrusion which facilitates installation of the construction panels and avoids intrusion of moisture and wind. By the structure of a fourth arm with an aligned front surface and an extension surface which makes contact with the front surfaces in both mountings, the structure ensures overlap between two subsequent panels in both mounting methods and a good contact on a front surface avoiding intrusion of moisture and wind.

[0009] In one embodiment, the distance between the front surface of the construction panel and the front surface of the first arm is equal to the distance between the former front surface and the extension surface on the back side of the protrusion. As an effect, all visible front surfaces lie in the same plane, which gives a pleasant aesthetic view.

[0010] In further embodiments, the first or second arm of the construction panel comprises guiding means for guiding another construction panel towards the first or the second assembly position for lap or flush mounting respectively. The presence of these guiding means leaves no possibility for misalignment and facilitates mounting of the panels.

[0011] In still a further embodiment, the third arm of the construction panel is equipped with guiding means for guiding the positioning surface on the third arm towards the first or the second assembly position of an underlying construction panel for lap or flush mounting respectively. This again facilitates mounting of the panels.

[0012] In one embodiment, the guiding means of the third arm comprise a slot for encompassing a projection of the second arm of an underlying construction panel. This projection has a width corresponding to that of the slot. The advantage lies in a firmer and easier installation of the panels.

[0013] In one embodiment, the first assembly position on the first arm and the second assembly position on the

second arm both have an inclined surface for receiving the positioning surface of the third arm of a second construction panel wherein the inclined surfaces and the positioning surface are substantially parallel, allowing easier installation of the panels. The inclined surfaces ensure that during installation a panel moves towards its end position and thus that the protrusion on the fourth arm is in contact with the front surfaces.

[0014] In a further embodiment, the construction panel further comprises in the longitudinal direction on one side a groove and at the opposite side a tongue. This lateral interacting mechanism provides a stable and easy mounting, excludes any lateral movement of the panels and shows no gaps between the panels.

[0015] It is another aim of the present invention to provide a method for building selectively lap siding and flush siding on a wall using construction panels as described above. This method of building lap siding or flush siding has the advantage that the user can mount in the two mounting methods without compromising on the case of installation.

[0016] This aim is achieved according to the invention with a method comprising the steps of the independent method claim.

[0017] It is another aim of the present invention to provide a system.

[0018] This aim is achieved according to the invention with a system comprising the technical characteristics of the independent system claim. The advantage of the claimed system is that in an easy installation process, a wall in lap mounting or flush mounting can be created which always provides a perfect contact on the front surfaces avoiding intrusion of moisture and wind.

[0019] In one embodiment of the invention, the construction panel comprises an identical cross section, comprising a front portion, top portion and bottom portion, over a relatively long length in a longitudinal direction. The top portion is not aligned with the front portion. In the longitudinal direction, the construction panel comprises at one end of a tongue and at the opposite end of the panel of a groove. Both tongue and groove interact with a subsequent construction panel. The groove comprises a recess arranged to receive at least a portion of the tongue of the top portion of a subsequent construction panel, when this subsequent construction panel is positioned at an offset of the first construction panel. The effect is such that using an offset permits easier installation of the panels: once laterally in the right position, the panel can be lowered and mounted on the underlying panel.

Brief description of the drawings

[0020] For a better understanding of the present invention, reference will now be made, by way of example only, to the accompanying drawings.

Figure 1a shows a cross section of a construction panel for selectively assembling in flush siding and lap siding in accordance with an embodiment of the present invention.

Figure 1b shows a cross section of an assembly of two of the construction panels of Figure 1a assembled in flush siding.

Figure 1c shows a cross section of an assembly of two of the construction panels of Figure 1a assembled in lap siding.

Figure 2 is an enlarged view of the interaction area of the two construction panels in Figure 1b (flush siding).

Figure 3a is an enlarged view of the interaction area of the two construction panels in Figure 1c (lap siding), showing two construction panels sliding into assembled state.

Figure 3b is an enlarged view of the interaction area of the two construction panels in Figure 1c (lap siding), showing the two assembled panels.

Figure 4 is an enlarged view of the top portion of the construction panel.

Figure 5 is an enlarged view of the bottom portion of the construction panel.

Figure 6 is a front view illustrating the lateral interlocking mechanism with the two construction panels shown apart.

Figure 7 is a front view illustrating the lateral interlocking mechanism with the two construction panels assembled.

Figure 8 shows a cross section of the two construction panels of Fig. 6, with view of the lateral interlocking mechanism.

Figure 9 shows a cross section of an assembly of the two laterally assembled construction panels of Fig.7.

Figure 10 shows a perspective view of the back surface of two neighbouring panels, illustrating the lateral interacting mechanism.

Figure 11 shows a perspective view of the front surface of two neighbouring panels, illustrating the lateral interacting mechanism.

Modes for carrying out the invention

[0021] The present invention will be described with respect to particular embodiments and with reference to certain drawings but the invention is not limited thereto but only by the claims. The drawings described are only schematic and are non-limiting. In the drawings, the size of some of the elements may be exaggerated and not drawn on scale for illustrative purposes. The dimensions and the relative dimensions do not necessarily correspond to actual reductions to practice of the invention.

[0022] Furthermore, the terms first, second, third and the like in the description and in the claims, are used for distinguishing between similar elements and not necessarily for describing a sequential or chronological order. The terms are interchangeable under appropriate cir-

cumstances and the embodiments of the invention can operate in other sequences than described or illustrated herein.

[0023] Moreover, the terms top, bottom, over, under and the like in the description and the claims are used for descriptive purposes and not necessarily for describing relative positions. The terms so used are interchangeable under appropriate circumstances and the embodiments of the invention described herein can operate in other orientations than described or illustrated herein.

[0024] Furthermore, the various embodiments, although referred to as "preferred" are to be construed as exemplary manners in which the invention may be implemented rather than as limiting the scope of the invention.

[0025] The term "comprising", used in the claims, should not be interpreted as being restricted to the elements or steps listed thereafter; it does not exclude other elements or steps. It needs to be interpreted as specifying the presence of the stated features, integers, steps or components as referred to, but does not preclude the presence or addition of one or more other features, integers, steps or components, or groups thereof. Thus, the scope of the expression "a device comprising A and B" should not be limited to devices consisting only of components A and B, rather with respect to the present invention, the only enumerated components of the device are A and B, and further the claim should be interpreted as including equivalents of those components.

[0026] Referring to Figure 1a, Figure 1b and Figure 1c, cross sections of a construction panel 1 and an identical construction panel 2 in accordance with an embodiment of the present invention are shown. Construction panel 1 is produced by extrusion. Therefore, the cross section of construction panel 1 is representative for the whole length of the panel. In alternative embodiments, construction panel 1 may be produced by a different process known in the art such as for example injection molding. In still another alternative embodiment, the construction panel may not have an identical cross section over the whole length of the construction panel 1 as will be discussed in more detail below in the paragraph where the lateral interacting mechanism is discussed.

[0027] Construction panel 1 comprises a front portion 20 having a front surface 22 and a back surface 24, and a first predetermined thickness 26 between the front surface 22 and the back surface 24. The construction panel 1 further comprises a top portion 30 and a bottom portion 60. Figure 4 illustrates the top portion 30 in an enlarged view. Top portion 30 comprises a first arm 7 and a second arm 8. The first arm 7 extends on the back surface 24 making a corner over about 90 degrees towards the outside of the construction panel 1 and forming a first arm front surface 32 and a first arm back surface 33 substantially parallel to front the front surface 22 and the back surface 24. The first arm 7 further comprises a first arm end surface 6 angled with respect to the first arm front surface 32 to form an inclined gliding plane. First arm 7 serves as a first assembly position 36. The angle 38 between the first arm front surface 32 and the first arm end surface 6 is smaller than 90 degrees. This has the advantage that an interacting construction panel 1 during assembling will easily position itself on the first assembly position 36 as will be described in more detail below. The angle 38 is preferably between 30 and 60 degrees. In the embodiment of Figure 4, the angle 38 is about 45 degrees.

[0028] The second arm 8 extends on the first arm back surface 33 making a corner over about 90 degrees towards the outside of the construction panel 1 and forming a first surface 42 and a second surface 43 substantially parallel to the front surface 22 and the back surface 24. This portion can be called the first section 52 of the second arm. The second arm 8 then turns back over about 45 degrees forming a third surface 44 and a fourth surface 5. In alternative embodiments this angle may be different from 45 degrees. The third surface 44 is angled with respect to the first surface 42 and the fourth surface is angled with respect to the second surface 43. This angled portion can be called the second section 56 of the second arm 8. The second arm 8 then turns again to direct a third section 54 of the second arm 8 in the same direction as the first section 52 but closer towards the front surface 22 forming a fifth surface 46 and a sixth surface 47. The fifth and sixth surfaces 46, 47 are substantially parallel to the front and back surfaces 22, 24 and forming a second predetermined thickness 55. In the embodiment of Figure 4, the second predetermined thickness 55 of the third section 54 of the second arm 8 is substantially the same as the first predetermined thickness 26 of the front portion 20. In alternative embodiments, the second predetermined thickness 55 may be more or less than the first predetermined thickness 26. The second arm 8 ends with an end surface 48. The end surface 48 is in the embodiment of Figure 4 slightly rounded. This has the advantage that the third section 54 will easily enter a slot during assembly as will be discussed in more detail below. It is further noted that fourth surface 5 of the second arm 8 is parallel to the first arm end surface 6 of the first arm 7. This has the advantage that a portion of an interacting construction panel 1 which is designed to interact with the first arm end surface 6 will also interact optimally with the fourth surface 5. This will be illustrated in more detail below when the interaction of two construction panels is discussed. The second arm 8 and especially the second section 56 of the second arm 8 serves as a second assembly position 59.

[0029] Figure 5 illustrates the bottom portion 60 in an enlarged view. The bottom portion 60 comprises a third arm 9. The third arm 9 extends on the back surface 24 making a corner over about 90 degrees towards the outside of the construction panel 1 and forming a third arm front surface 62 and a third arm back surface 63 substantially parallel to the front surface 22 and the back surface 24. The third arm 9 further comprises a slot surface 66 substantially perpendicular to the back surface

24 and extending from the back surface 24 towards the third arm front surface 62. A third arm top surface 64 is extending on the back surface 24 and angled over an angle 68 with respect to the back surface 24. The third arm top surface 64 forms the connection between the back surface 24 and the third arm back surface 63. In the embodiment of Figure 5 the angle is about 45 degrees. In alternative embodiments, the angle 68 may be more or less than 45 degrees. The third arm 9 further comprises a positioning surface 4 starting at the end of the third arm front surface 62 and forming an angle 69 with respect to the third arm front surface 62. The third arm 9 ends with an end surface 67. The end surface 67 is in the embodiment of Figure 5 slightly rounded and connects the end of positioning surface 4 with the end of the third arm back surface 63 in a rounded way. This has the advantage that the third arm 9 will be received smoothly in an interaction portion of a corresponding construction panel 1 during assembly.

[0030] The bottom portion 60 further comprises a fourth arm 10. The fourth arm 10 comprises a fourth arm front surface 72 which is an extension of the front surface 22 in the same plane and forming in practice thus a single surface. The fourth arm further comprises a fourth arm back surface 74 slightly angled with respect to the back surface 24 towards the front surface 72. The angle 76 is preferably between 0 and 10 degrees. In the embodiment of Figure 5, the angle is about 2 degrees. In an alternative embodiment the angle 76 is zero and the fourth arm back surface 74 is parallel to the fourth angle front surface 72. The fourth arm back surface 74 together with the third arm front surface 62 and the slot surface 66 form a slot 78. The fourth arm 10 further comprises at the end a protrusion 3.The protrusion 3 extends on the fourth arm back surface 74 away from the fourth arm front surface 72 and in a direction perpendicular to the fourth arm front surface 72 which is the X-direction illustrated on the drawing. The extension ends in an extension surface 70. The extension surface 70 is substantially parallel to the front surface 22 and is positioned in substantially the same plane as the back surface 24. The fourth arm 10 ends with an end surface 71. The end surface 71 is connecting the end of the fourth arm front surface 72 and the outside end of the extension surface 70. The end surface 71 is angled with respect to the fourth arm front surface 72 towards the inside of the construction panel 1. The angle 75 is smaller than 90 degrees. This has the advantage that, when the construction panel is assembled, water will be guided to the front surface of the construction panel 1.

[0031] The construction panels 1 can be mounted according to two different arrangements. Either the visible front surfaces 22 of all construction panels 1 are mounted substantially in the same plane (this is called "flush mounting"), or the front surfaces 22 of all construction panels 1 are arranged cascade-like (this is termed "lap mounting"). According to the latter arrangement, each construction panel 1 is on the top portion 30 partly covered by a part of the bottom portion 60 of another construction panel 1, and all construction panels 1 are slightly tilted. This will be illustrated in more detail below. Referring now to Figure 1b and Figure 2, assembling a construction panel 1 on an identical construction panel 2 will be described in more detail for flush mounting and thus for building a flush siding on a wall. Mounting construction panels 1, 2 on a wall is done starting at the bottom of a wall and building up upwards. Thus firstly, in Figure 1b, the first construction panel 2 is mounted to the wall. This can for example be done by providing one or more screws through the second section 52 of the top portion 30 of the construction panel 2. In other embodiments however the connection of the construction panel to the wall can be done by any other connecting technologies known in the art. In that way, surface 43 is connected to the wall or to a frame on the wall. Subsequently, a following construction panel 1 is brought in position above the first construction panel 2. The following construction panel 1 is then moved downwards such that the slot 78 of the following construction panel 1 moves over the third section 54 of the first construction panel 2. This relative movement proceeds until the inclined positioning surface 4 of the following construction panel 1 comes into contact with the inclined surface 5 of the first construction panel 2. The width of the slot 78 is designed such that it corresponds to the width 55 of the third section 54. During the downwards movement extension surface 70 of the following construction panel 1 is brought into contact with the first arm front surface 32. This interconnection of the top portion 30 and the bottom portion 60 has several advantages. First, when moving downwards, the inclined surface 4 of the following construction panel 2 creates guidance for guiding the slot 78 towards the third section 54. Secondly, the inclined surface 74 of the following construction panel 1 avoids that the third section 54 of the following construction panel 1 gets stuck in the slot 78. Thirdly, the extension 3 and especially the extension surface 70 contacting the first arm front surface 32 ensures that the different front surfaces 22 are aligned vertically when assembled. Fourthly, when the inclined surface 4 contacts the inclined surface 5, both having substantially the same angle, the inclined surface 4 moves downwardly following the direction of the inclined surfaces 4, 5 until the fourth arm back surface 74 of the following construction panel 1 contacts the surface 46 of the first construction panel 2. This ensures that the chamber 102 formed between the top portion 30 of the first construction panel 2 and the bottom portion 60 of the following construction panel 1 is closed. This is advantageous for mounting on an extern wall to avoid penetration of water towards the underlying wall, even in situations where there is a lot of wind. In the end position, the following construction panel 1 is kept in position three-dimensionally. The X-direction is realised in the direction towards the wall by the contact between the extension surface 70 and the first arm front surface 32, as well as the contact between the fourth arm back surface 74 and the surface 46. The X-direction away

from the wall is realised by positioning surface 4 being in contact with surface 5. The latter also realises the downwards Y-direction. The upwards Y-direction is realised by fixing the following construction panel 1 to the wall or a construction on the wall. The latter is also fixing the following construction panel 1 in the Z-direction.

[0032] Referring now to Figure 1c, Figure 3a and Figure 3b, assembling a construction panel 1 on an identical construction panel 2 will be described in more detail for lap mounting and thus for building a lap siding on a wall. Figure 3a illustrates two construction panels sliding into assembled state (lap siding), whereas Figure 3b shows the end of this process where the two panels are finally assembled. Similar as for flush mounting, mounting construction panels 1, 2 on a wall is done starting at the bottom of a wall and building up upwards. Thus firstly, in Figure 1c, the first construction panel 2 is mounted to the wall similar as discussed above for flush mounting. Subsequently, a following construction panel 1 is brought in position above the first construction panel 2. Then, the third arm back surface 63 is brought into contact with surface 46 and the following construction panel 1 is further moved downwards along this contact plane. This will continue until the third arm 9 starts to move inwardly when the third arm top surface 64 moves towards surface 44 and positioning surface 4 contacts first arm end surface 6 to move towards the end position as illustrated in Figure 1c and Figure 3a and Figure 3b. This interconnection has again several advantages. Firstly, surface 46 on the first construction panel 2 provides an easy accessible initialisation surface for making contact with the following construction panel 1. Secondly, the inclined surfaces 44, 64, 6 and 4 guide the following construction panel towards his end position with no risk for misalignment. Thirdly, once the following construction panel is in his end position the panel will remain in position without the need to keep it in place while the top portion can be connected to wall. A chamber 103 formed between the top portion 30 op the first construction panel 2 and the bottom portion 60 of the following construction panel 1 is closed. As discussed above, boundaries are made by the contact between the extension surface 70 of the following construction panel 1 and the front surface 22 of the first construction panel 2, and also by the contact between the inclined positioning surface 4 of the following construction panel 1 and the first arm end surface 6 of the first construction panel 2. Similar as for flush mounting, this is advantageous for mounting on an underlying wall to avoid penetration of water, even in situations where there is a lot of wind. Once fixed on top, similar as for flush mounting, the following construction panel 1 is kept in position three-dimensionally. The X-direction is realised in the direction towards the wall by the contact between the extension surface 70 and the front surface 22. The X-direction away from the wall is realised by positioning surface 4 being in contact with the first arm top surface 6. The latter also realises the end position in the downwards Y-direction. The upwards Y-direction is realised by fixing the following construction panel 1 to the wall or a construction on the wall. The latter is also fixing the following construction panel 1 in the Z-direction.

[0033] As discussed above, the construction panel 1 contains several inclined planes, meant for interlocking construction panels 1, such as the first arm end surface 6 at the first assembly position 36, the surface 5 at the second assembly position 59, and the positioning surface 4 at the third arm. These planes form substantially the same angle with the front and back surfaces 22, 24 of the front portion 20. Preferably, this angle is between 30° and 60°.

[0034] When arranged in flush mounting as discussed above, two construction panels 1 interlock via various contact lines creating a first air chamber 102. The third section 54 of the first construction panel 2 receives the slot 78 of the following construction panel 1. The second assembly position 59 is used: the positioning surface 4 of the following construction panel 1 rests on the inclined guiding surface 5 of the second arm 8. Moreover, the protrusion 3 of the following construction panel 1 seals the whole system by contacting the first arm front surface 32.

[0035] These multiple contacts in combination with fixation to an underlying surface via orifices applied in the second section 56 of the second arm 8 preclude further motion of the construction panel when mounted. An air chamber 102 is formed between the two construction panels 1, 2. The aim of this air chamber is to prevent moisture from further creeping up and contacting the underlying surface.

[0036] There are two particular advantages to flush mounting. First, there is a non-negligible economic advantage: part of the first arm front surface 32 is still visible in flush mounting. The choice between first and second assembly position 36, 59 is in essence a choice between two vertical positions. Thus, flush mounting helps reducing the material needed, i.e. the number of construction panels needed for covering the underlying surface. The second advantage is an extra aesthetic effect.

[0037] When arranged in lap mounting as discussed above, the two construction panels 1, 2 interlock through different contact lines. The positioning surface 4 of the third arm 9 of the following construction panel 1 is received by the first assembly position 36 of the first construction panel 2 which has an inclined gliding surface 6, A third contact is formed by the protrusion 3 of the following construction panel 1 against the front surface 22 of the first construction panel 2. It should be noted here that the fourth arm back surface 74 front of the following construction panel 1 does not make contact with the front surface 22 of the front portion 20 of the first construction panel 2.

[0038] Protrusion 3 has several functions. Firstly, the protrusion facilitates installing the construction panels 1 whereas direct contact between the two construction panels 1, 2 at this point would make interlocking more difficult. Secondly, the positioning of protrusion 3 at the

lower end of construction panel 1 at a lower point between the panels as compared to a direct contact helps to avoid intrusion of moisture and increases the level of wind resistance.

[0039] It will also be appreciated that changes can be made to the above discussed embodiments to alter the overall appearance of the construction panel 1. For example, the cross section of the protrusion can become a semicircle, the gradual decrease of the thickness of the fourth arm 10 can be replaced by a slight bending or a local thickness decrease, etc.

[0040] Although the present invention is described as a thick and robust construction panel wherein the front portion is preferably between 4 and 7mm, one of the main advantages of the present invention lies in the fact that the resulting overall thickness of construction panel 1 does not require much space especially when the overall thickness of the construction panel 1 is compared to the predetermined thickness 26 of the front portion 20. Indeed, one of the described embodiments of the present invention has an overall thickness which is maximum four times the predetermined thickness 26 of the front portion, which is an advantage when construction panels need to be installed in a confined space where loss of space needs to be reduced.

[0041] One of the advantages of the present invention is that it can be manufactured in a wide range of materials. In present embodiments, the present invention is manufactured in, but not limited to, metal (aluminium, stainless steel, etc.) or polymers.

[0042] Although only a limited amount of the embodiments are described, it will be understood that regarding this mechanism, various changes may be made in form, shape, angle and size, which result in the same effect as described above. Referring now to Figures 6 to 11, a lateral assembly of construction panels will be described in more detail. Construction panels typically can have a length of several meters. However, a wall can be longer requiring a combination of more than one panel next to each other. Typically, neighbouring panels contact each other at their ends but no mechanism is applied for further interlocking. In the embodiment of figures 6 to 11 the construction panels include a laterally interlocking mechanism Construction panels 80 and 81 are construction panels with over the largest part of their length the same cross section 90 as the one discussed in the embodiments of construction panel 1 but with on the one end equipped with a tongue 84 as shown on the figures for construction panel 80 and on the other end equipped with a groove 85 as shown on the figures for construction panel 81. For clarity on the drawings however, only the end with the tongue 84 is shown for construction panel 80 and the end with the groove 85 is shown for construction panel 81.

[0043] The tongue 84 on one end of the construction panels 80, 81 is an extension extending on the overall cross section 90 of the construction panel with a thickness 86 which is thinner than the thickness 26 of the front portion 20 of the construction panel. In a preferred embodiment the thinner tongue is centered on the thicker part of the construction panel. A first part of the tongue 84 is extending on the front portion 20 and the fourth arm 10 forming a first part of the tongue parallel with the front surface 22 of the construction panel. A second part of the tongue 84 is formed in the top portion of the construction panel. The second part extends on the first arm of the top portion of the construction panel. This second part of the tongue 84 ensures that also in flush mounting there is no gap between two construction panels. The resulting tongue 84 has thus a first part 92 parallel with the front surface, subsequently an inclined part 89 following the first part of the first arm and ending with a part 94 parallel with the first arm front surface. In this embodiment the groove is not formed on the second arm, nor on the third arm.

[0044] The groove 85 on the opposite end of the construction panels 80, 81 also has a first part formed in the front portion 20 and the fourth arm 10 of the construction panel. In this first part of the groove 85 the cross section of the groove is parallel to the front surface 22 as can be best seen in figure 8. The width 96 of the groove corresponds to the width 86 of the tongue 84 on the opposite side of the construction panel. The depth 96 of the groove corresponds to the length 97 of the tongue 84 on the opposite side of the construction panel. The groove 85 has a second part formed similar as the groove on the first arm. This second part first has an inclined part 88 following the first arm and ends with a part 93. Over the depth 96 where the end of the construction panel has a groove 85, the preferred embodiment has no second arm. Further, at the panel end containing the groove, part of the material of the back surface 24 is removed or alternatively not formed creating a recess 87. As will be explained in more detail below this feature allows an easier installation of the construction panels.

[0045] As described above, the construction panel 80, 81 can be produced, among other techniques, by extrusion. Typically, groove 85 , tongue 84 and recess 87 are made using techniques such as, but not limited to, milling in a step after extrusion of the construction panel.

[0046] Referring to figures 6 and 7, mounting construction panels 80 and 81 on a wall is done starting from the right to the left, mounting the panels vertically on lower panels is described above. Construction panel 80 is first mounted to the wall. Subsequently, the second panel 81 is brought in position for installation. Here, the presence of recess 87 turns out to be useful as it allows panel 81 to be lifted above a top portion of an already installed construction panel in a previous row when sliding to the right into position as shown in figure 6. By the positioning and dimensioning of the recess the inclined part 89 and offset part 94 are moving in the recess when the construction panel 81 is laterally moved towards construction panel 80. Once laterally in the right position, the panel 81 is then lowered as illustrated in figure 7 and mounted on a lower panel or other connection technologies known

in the art.

[0047] The above described construction panels with the cross section of one of the described embodiments and the lateral tongue-groove mechanism as described above provides several advantages. The specific shape of the construction panel is designed to provide a stable and easy mounting. Through the use of multiple contact lines, air chambers and gliding planes, degrees of freedom are severely reduced, resulting in wind- and waterproof construction panels. A lateral interacting mechanism further excludes any eventual possibility of lateral movement of the panels. Furthermore, an assembled wall will have no gaps. This is not only advantageous from a technical point of view but provides also a positive effect on the overall aesthetic of a resulting wall.

Claims

1. A construction panel (1) for assembling with other of such panels for selectively mounting in lap siding and flush siding on a wall, comprising a front portion (20) comprising a front surface (22) and a back surface (24),
a top portion (30) on one side of said front portion (20), said top portion comprising a first arm (7) and a second arm (8), and
a bottom portion (60) on the other side of said front portion (20), said bottom portion comprising a third arm (9) and a fourth arm (10);
wherein
said first arm (7) extending on said back surface (24) and comprising a first assembly position (36) and a first arm front surface (32) substantially parallel to said front surface (22);
said second arm (8) extending on said first arm (7) and comprising a second assembly position (59);
said third arm (9) extending on said back surface and comprising a positioning surface (4) for interacting selectively on said first assembly position (36) or said second assembly position (59) in respectively lap mounting and flush mounting;
said fourth arm (10) comprising a fourth arm front surface (72) aligned with said front surface (22) and an extension surface (70) opposite to said fourth arm front surface (72) for making contact with said front surface (22) in lap mounting or with said first arm front surface (32) in flush mounting.

2. A construction panel (1) according to claim 1, wherein the distance between said front surface (22) and said first arm front surface (32) is equal to the distance between said front surface (22) and said extension surface (70).

3. A construction panel according to any one of the preceding claims, wherein said second arm comprises guiding means for guiding another construction panel towards said second assembly position (59) for flush mounting.

4. A construction panel according to any one of the preceding claims, wherein said second arm comprises further guiding means for guiding another construction panel towards said first assembly position (36) for lap mounting.

5. A construction panel according to any one of the preceding claims, wherein said third arm comprises guiding means for guiding said positioning surface (4) towards said second assembly position (59) for flush mounting, or towards said first assembly position (36) for lap mounting.

6. A construction panel according to claim 5 wherein said guiding means of the third arm comprises a slot (78).

7. A construction panel according to claim 6, wherein said guiding means of said second arm comprises a projection (54) wherein the width of the projection (54) corresponds to the width of the slot (78).

8. A construction panel according to any one of the preceding claims, wherein said second assembly position (59) comprises an inclined surface (5) for receiving said positioning surface (4) of another construction panel, wherein said inclined surface (5) of said second assembly position is substantially parallel to said positioning surface (4).

9. A construction panel according to any one of the preceding claims, wherein said first assembly position (36) comprises an inclined surface (6) for receiving said positioning surface (4) of another construction panel, wherein said inclined surface (6) of said first assembly position is substantially parallel to said positioning surface (4).

10. A construction panel (1, 80, 81) according to any one of the preceding claims, said construction panel (1, 80, 81) further comprises in the longitudinal direction on one side a groove and at the opposite side of said one side a tongue wherein said groove comprises a recess arranged to receive at least that portion of said tongue which is formed on said top portion (30) of said construction panel (1, 80, 81).

11. A construction panel (1) for assembling with other of such panels for selectively mounting in lap siding and flush siding on a wall, comprising a front portion (20) comprising a front surface (22) and a back surface (24),
a top portion (30) on one side of said front portion (20), said top portion comprising a second front surface (32) spaced from said first front surface (22),

first positioning means for receiving another construction panel in lap mounting and second positioning means for receiving another construction panel in flush mounting, and

a bottom portion (60) on the other side of said front portion (20), said bottom portion comprising third positioning means for selectively positioning said construction panel (1) on another construction panel, and closing means for contacting said first front surface (22) or said second front surface (32) of another construction panel in respectively lap mounting and flush mounting.

12. A method for building selectively lap siding and flush siding on a wall using construction panels according to any one of the claim 1 to 11 comprising the steps of mounting a first construction panel (2) on a lower side of the wall; positioning said positioning surface (4) selectively on said first assembly position (36) or on said second assembly position (59) for selecting between respectively lap mounting and flush mounting.

13. A system for building selectively lap siding and flush siding on a wall comprising at least a first construction panel (1) and a second construction panel (2, 80),

said first construction panel (1) comprising a front portion (20) and a top portion (30), said front portion (20) comprising a front surface (22) and a back surface (24), said top portion comprising a first arm (7) and a second arm (8), wherein said first arm (7) extending on said back surface (24) and comprising a first assembly position (36) and a first arm front surface (32) substantially parallel to said front surface (22), and said second arm (8) extending on said first arm (7) and comprising a second assembly position (59);

and

said second construction panel (2, 80) comprising a front portion (20') and a bottom portion (60'), said front portion (20') comprising a front surface (22') and a back surface (24'), said bottom portion (60') comprising a third arm (9') and a fourth arm (10'), wherein

said third arm (9') extending on said back surface (24') and comprising a positioning surface (4') for interacting selectively on said first assembly position (36) or said second assembly position (59) of said first construction panel (1) in respectively lap mounting and flush mounting, and

said fourth arm (10') comprising a fourth arm front surface (72') aligned with said front surface (22') and an extension surface (70') opposite to said fourth arm front surface (72') for making contact with said front surface (22) of said first construction panel (1) in lap mounting or with said first arm front surface (32) of said first construction panel (1) in flush mounting.

14. A system according to claim 13, said system comprising at least a third construction panel (81) for assembling to said second construction panel (80),

said second construction panel (80) further comprising in the longitudinal direction on one side a tongue (84), and

said third construction panel (81) comprising at an end opposite to said one side of said second construction panel a groove (85),

wherein said groove (85) comprises a recess (87) arranged to receive at least that portion of said tongue (84) which is formed on a top portion (95) of said second construction panel (80).

15. A construction panel (80, 81) for assembling with other of such construction panels for building a wall, comprising a body portion comprising an identical cross section over a relatively long length with respect to dimensions of said cross section in a longitudinal direction, said cross section comprising a top portion, a front portion and a bottom portion, wherein said top portion is not aligned with said front portion and wherein said top portion of a first construction panel and said body portion of a following construction panel interact over an interacting distance when assembled,

a groove on one end of said body portion for interacting with a subsequent construction panel in the longitudinal direction, and

a tongue at the opposite of said one end of said body portion, said tongue comprising at least one portion on said top portion of said cross section, wherein said groove comprises a recess arranged to receive said at least one portion of said tongue on said top portion of a subsequent construction panel in the longitudinal direction when said subsequent construction panel is positioned at an offset of said first construction panel equal to said interacting distance.

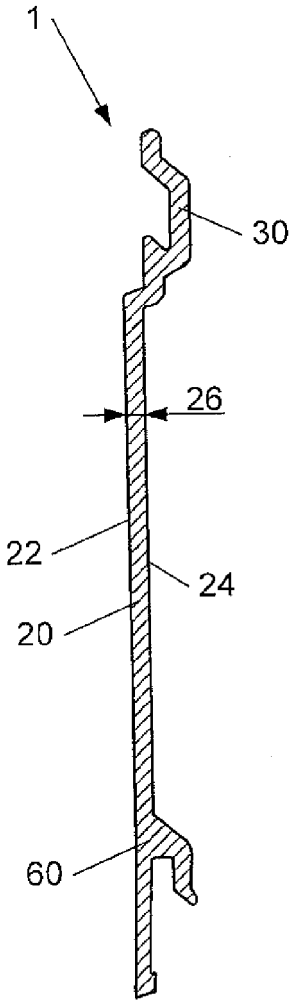

Fig. 1a

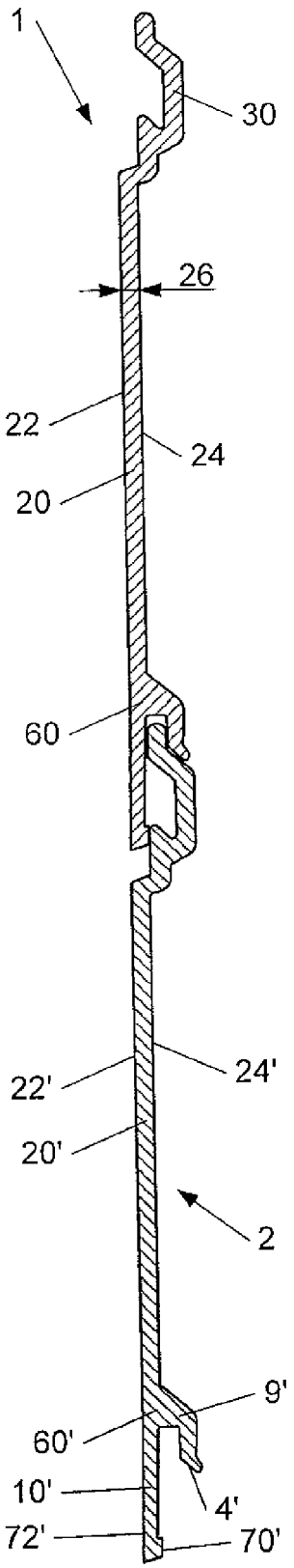

Fig. 1b

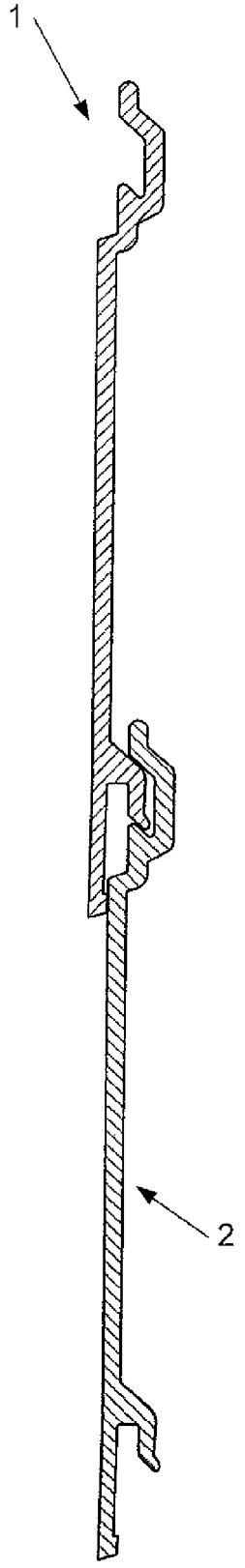

Fig. 1c

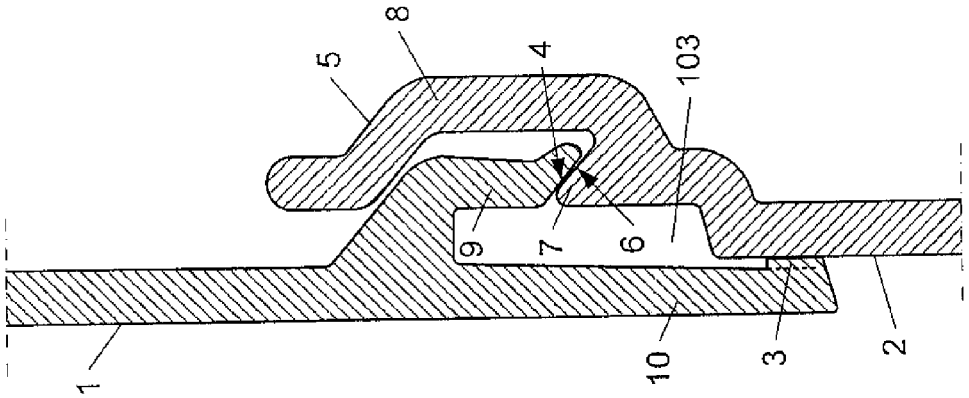

Fig. 3b

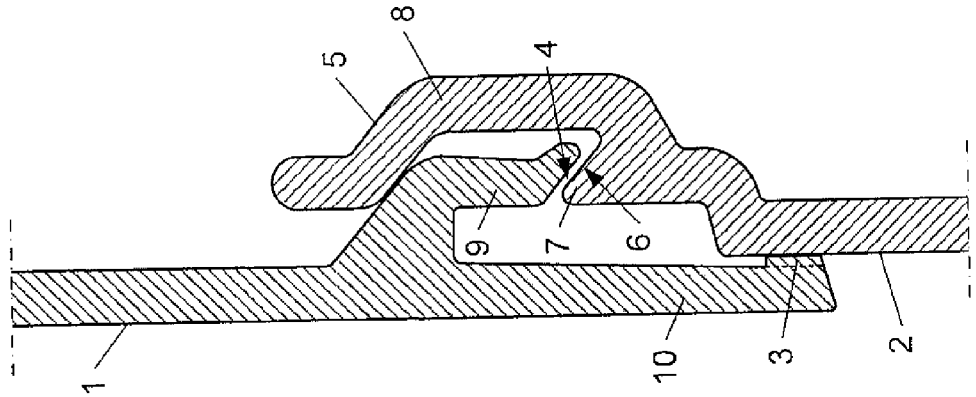

Fig. 3a

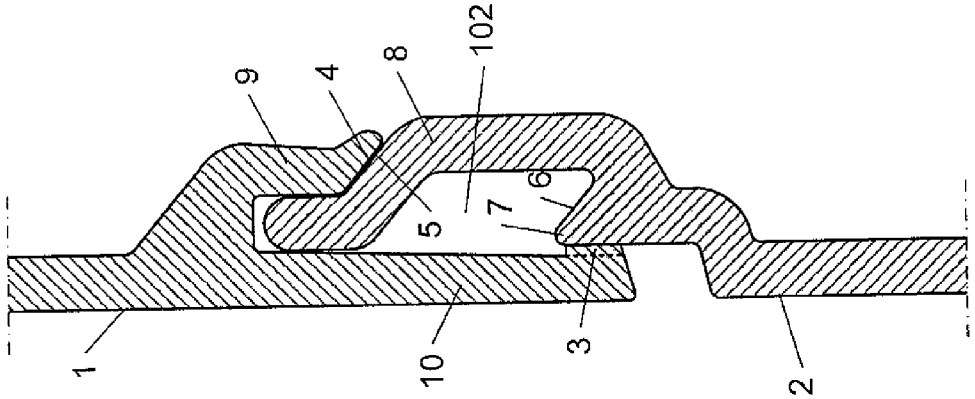

Fig. 2

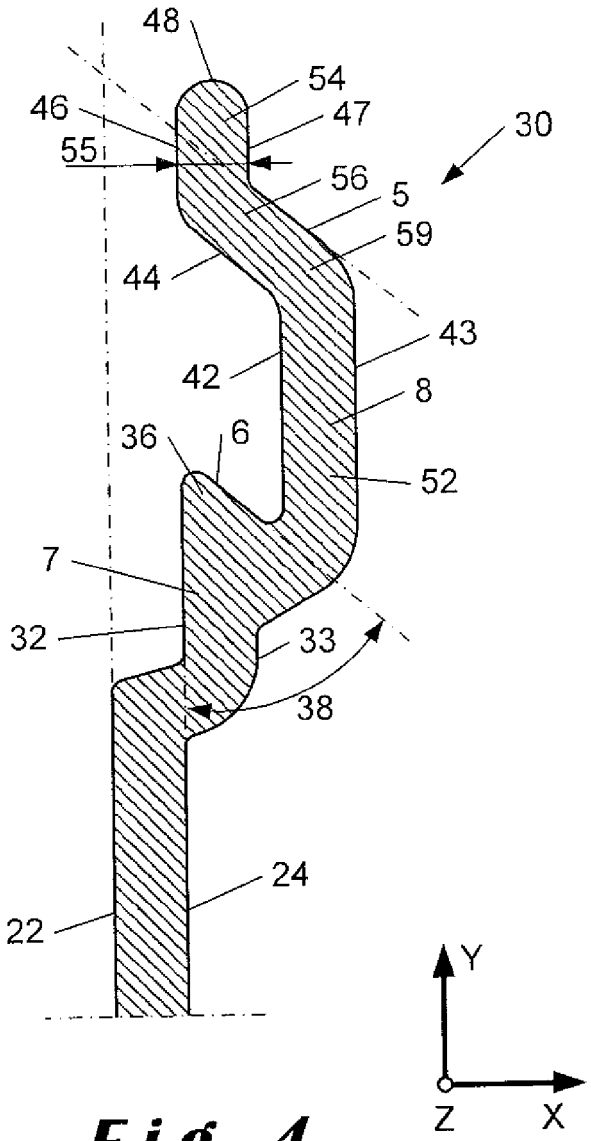
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Fig. 4

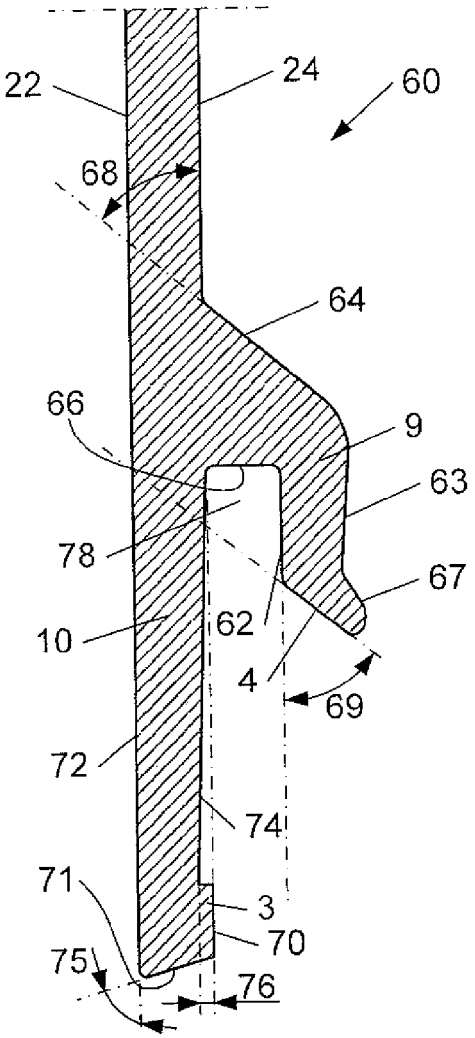
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Fig. 5

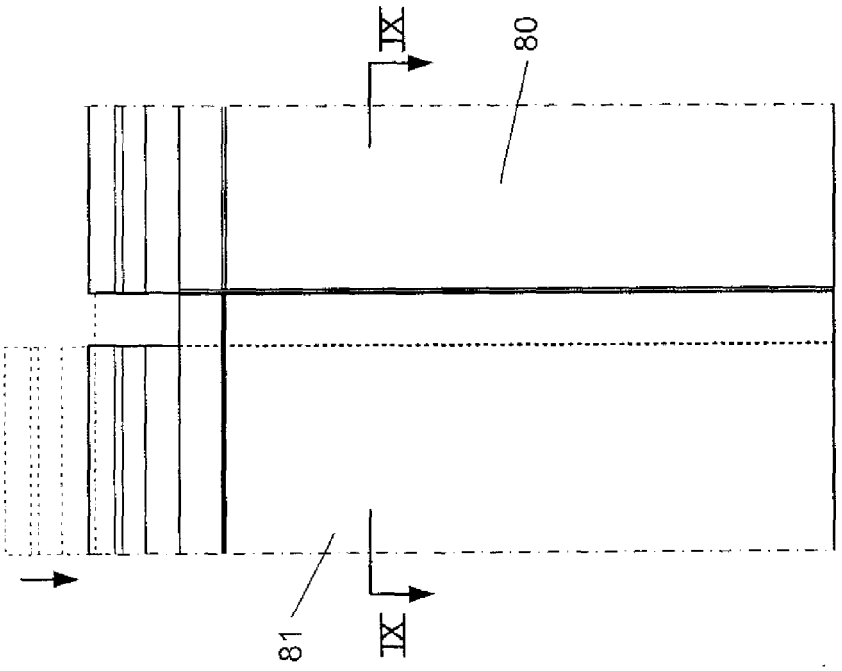

Fig. 7

Fig. 9

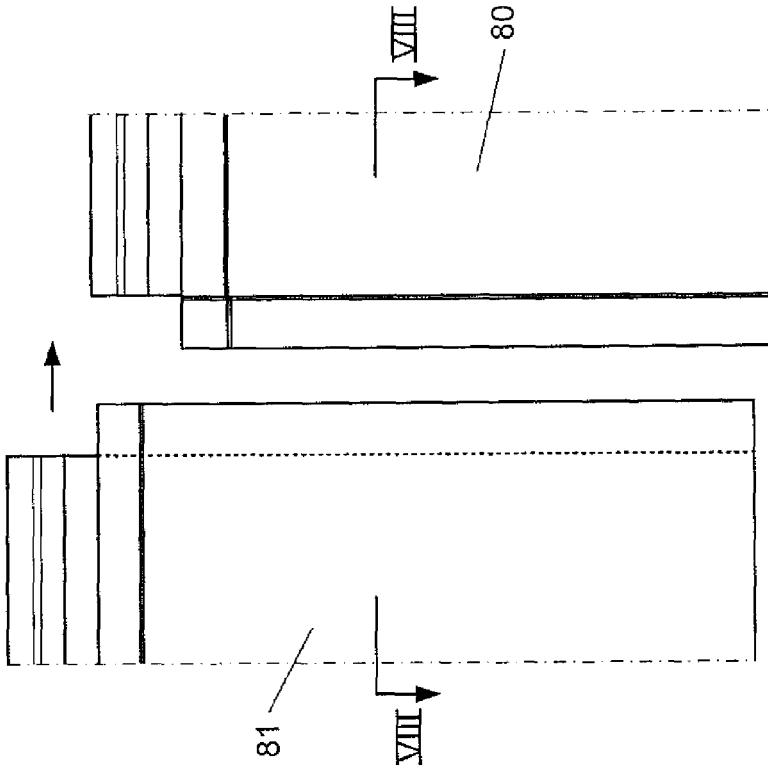

Fig. 6

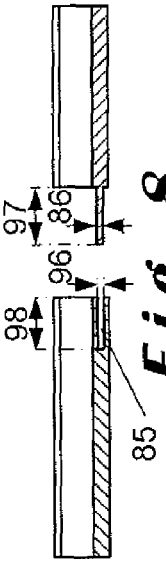

Fig. 8

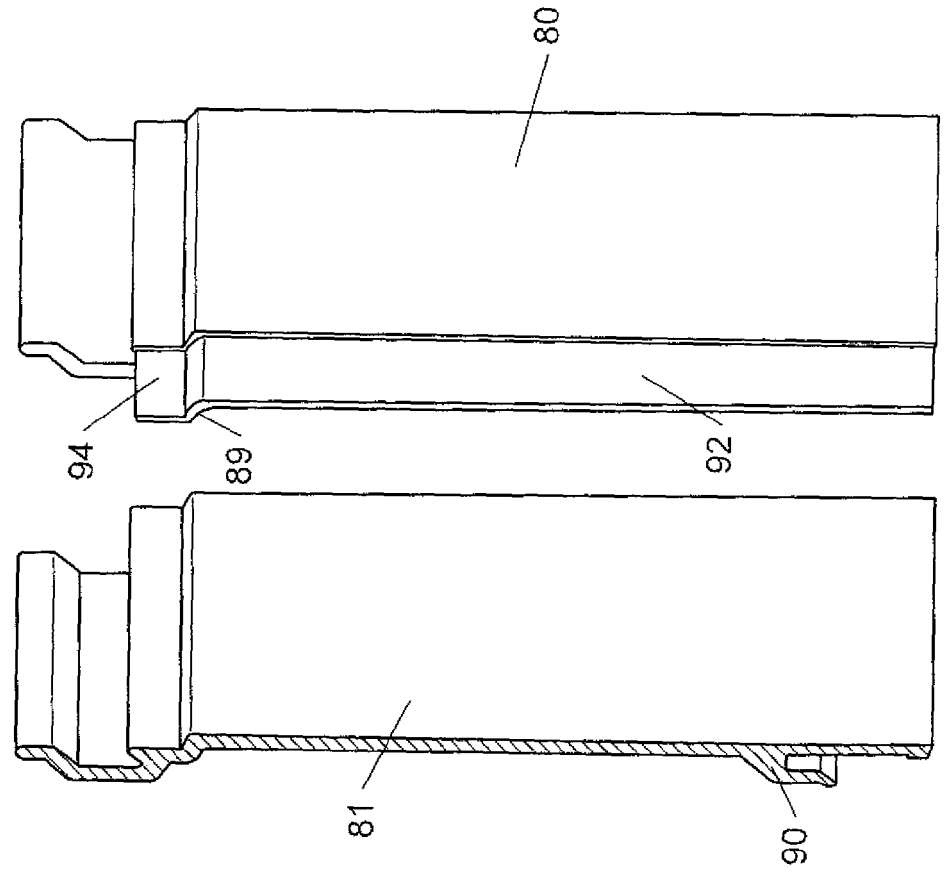

Fig. 11

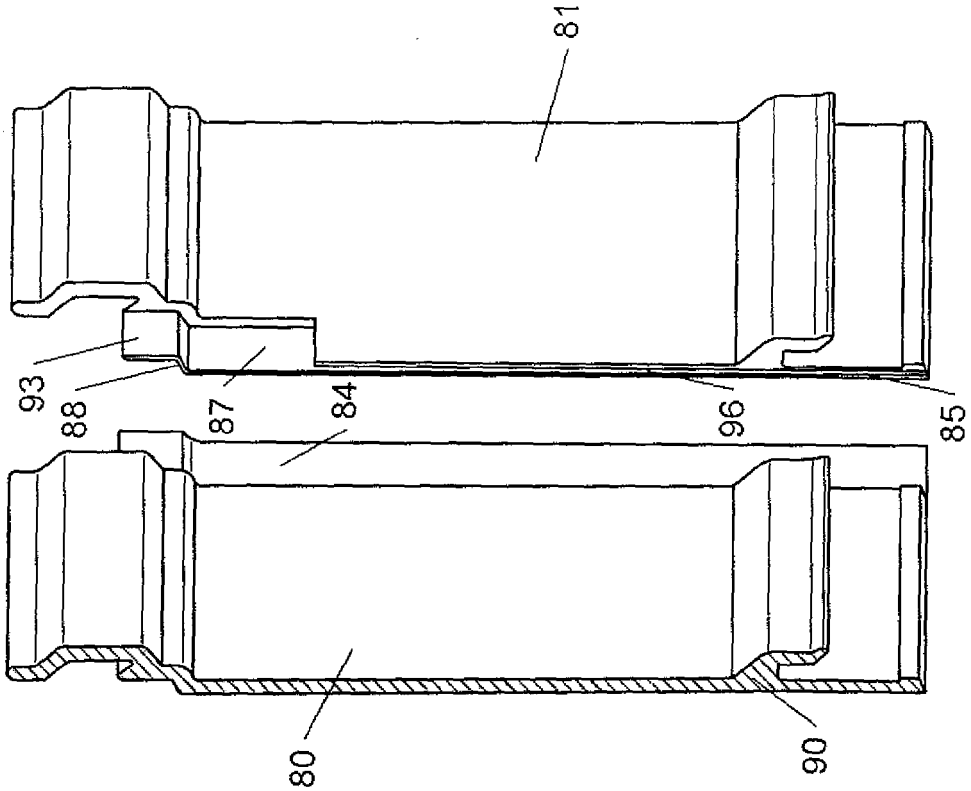

Fig. 10

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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