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(54) A fixing bracket, a system comprising such a fixing bracket, and use of a fixing bracket

(57) A fixing bracket for mounting flat elements (16,17), more specifically profiled planks or long panels, in coplanarity in continuation of each other to form a building facade, comprises a central portion connecting a front portion and a rear portion. The front portion comprises an upper front finger (7) extending upwards such as to be adapted for insertion into a groove (24) of an upper of said flat elements (16) and a lower front finger extending downwards (9) such as to be adapted for supporting a front surface of a lower of said flat elements (17). The rear portion comprises a resilient tongue (11,12) extending downwards and being adapted to exert a frontwards directed force on a rear surface of said lower flat element. The lower front finger extends farther downwards than the upper front finger extends upwards from the central portion. Hereby, a flat element secured between two such brackets can be released by shifting the flat element upwards while optionally simultaneously pushing the flat element backwards.

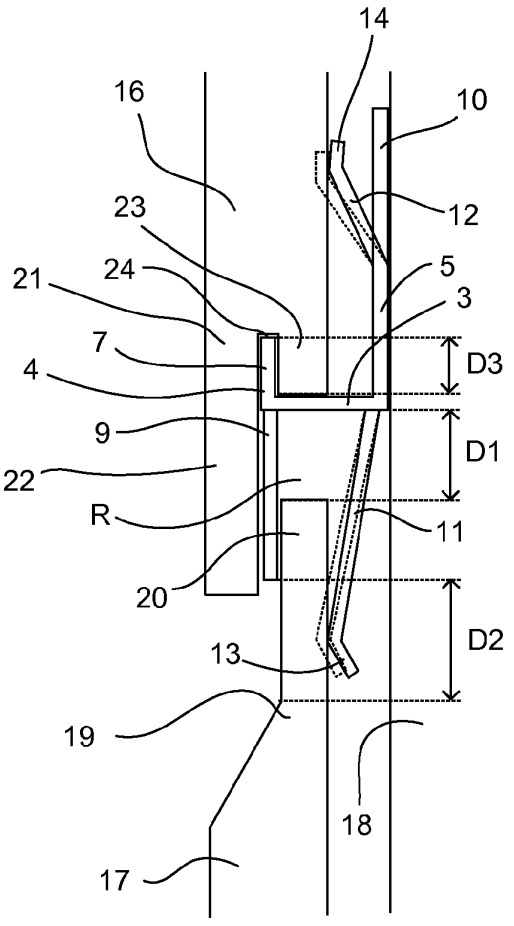

Fig. 5

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Description

[0001] The present invention relates in a first aspect to a fixing bracket or fixing clip for mounting flat elements, specifically profiled planks or long panels, in coplanarity in continuation of each other to form a building façade. More specifically, the first aspect relates to a fixing bracket according to the introductory part of claim 1. In a second aspect as defined in claim 8 the invention relates to a system comprising such a fixing bracket and at least one flat element. In a third aspect as defined in claim 13 the invention relates to use of two fixing brackets for mounting a profiled plank or long panel to a building structure to form a building façade.

[0002] Today, building façades are often constructed by positioning a number of profiled planks or elongate panels (e.g. wood, plastic, stone or Rockpanel® panels) in coplanarity in continuation of each other in the height direction of a building wall such as to form a weather screen of the building. The panels are typically positioned with their length direction extending horizontally.

[0003] Often the panels have a profile with a longitudinally extending key at the top and two longitudinally extending projections at the bottom forming a longitudinally extending groove between them. The panels at a top side are profiled such that the front surface of the panel tapers towards the rear surface to form the key. Hereby, when an upper and a lower panel are positioned in continuation of each other, the front projection of the upper panel extends to cover at least part of the key of the lower panel, and the front surfaces of the panels are substantially flush with each other.

[0004] A simple prior art method of mounting such panels on the underlying building structure uses screws inserted through the upper key to secure an upper portion of the panel, the screw heads being hidden in the mounted position by the front projection of the upper element. Also, the key of the lower panel extends into the groove of the upper panel such as to also secure a lower portion of the upper panel.

[0005] Another generally known way to mount such panels on a building structure is to apply a number of certain fixing brackets that are secured in horizontal and vertical lines to the underlying building structure to form an array of brackets. Each horizontal line of brackets (except the topmost and bottommost line) secures a bottom portion of an upper panel as well as a top portion of a lower panel to the underlying building structure. After mounting the fixing brackets are often hidden by the panels by letting part of the bottom portion of each panel extend to cover the brackets similar to the above-described securing method applying screws inserted directly through the panel key. The panels may be releasable from the brackets such as to be replaceable.

[0006] One example of this type of fixing bracket is disclosed in US 7,748,188 B2. The document discloses a fixing bracket for fastening exterior panels (e.g. shiplap) to a façade, the fixing bracket comprising fingers extending upwards and downwards for engagement with the panels. Other examples of like prior art fixing brackets are disclosed in JP 2001-032500 A and JP 2003-268952 A.

[0007] WO 94/24388 A1, on which the introductory part of claim 1 is based, discloses a fixing bracket for flexible mounting of flat elements (e.g. stone) on a façade. The elements have grooves at both a top and at a bottom portion. Upwards and downwards extending fingers of the fixing bracket engage in the opposing grooves of the elements arranged on top of each other on the façade. A transversely extending central portion connects a front portion comprising the fingers with a rear portion that is secured to the underlying building structure. The rear portion further comprises a resilient tongue extending downwards and obliquely frontwards, pushing a top portion of a lower flat element towards the lower finger of the fixing bracket. The elements are replaceable by means of resilience of the fingers, tongue and central portion.

[0008] With the fixing bracket according to WO 94/24388 A1 the flexible fixing bracket makes the resulting building façade unstable. Furthermore, durability of the façade is unsatisfactory since the resilient parts of the fixing bracket tend to deteriorate, i.e. loose resilience and become loose, over time, which makes two flat elements positioned above each other to individually move to positions in which their surfaces are no longer flush with each other. Also, since the fingers and central portion carry the flat elements, they may even break or become so deformed over time that one or more flat elements will be unintentionally released and fall off from the building façade.

[0009] On this background it is the object of the first aspect of the invention to provide a fixing bracket according to the introductory part of claim 1, from which the flat panels can be readily released, and with which the flat elements can be secured in a more stable manner while the resultant building façade is more durable.

[0010] This object is reached by means of the provision of the features of the characterizing part of claim 1.

[0011] The lower front finger is thus longer than the upper front finger, which makes it possible to easily release a flat element secured to two fixing brackets mounted to secure an upper and a lower portion, respectively, of the flat element. This may be achieved by simply shifting the flat element a suitable distance upwards. When shifting the flat element upwards, the upper front finger of the lower bracket will thus release the lower portion of the flat element while the lower front finger of the upper bracket still engages the top portion of the flat element. The released bottom portion of the flat element can then be pivoted frontwards (i.e. outwards) and subsequently moved downwards such as to also release the top portion of the flat element from the upper bracket.

[0012] When the two brackets are positioned at a suitable distance from each other (the suitable distance being dependent on the height of the flat element), the secured flat element can thus slide a short distance up-

wards until the lower projection at the backwards or rear side (the rear projection) of the lower portion of the flat element has moved beyond the upper front finger such that the lower portion of the flat element is free to move frontwards. In other words a suitable play is provided for the secured flat element when being shifted in the upwards direction.

[0013] In the secured position the bottom portion of the flat element can be secured due to the upper front finger of the lower fixing bracket extending into the groove of the bottom portion. The upper portion of the flat element can be secured due to the resilient tongue pushing the upper portion against the lower front finger. Since none of the load-carrying parts of the fixing bracket (central portion, fingers) thus need be flexible or resilient in order to make the flat element releasable, the flat element is secured in a more reliable, stable and durable manner.

[0014] Due to the force on the flat element exerted by the resilient tongue of the upper fixing bracket, shifting the flat element upwards may in some instances be done more easily if the flat element (or the top portion of the flat element) is first or simultaneously pushed backwards such that the upper portion of the flat element no longer abuts the lower front finger of the upper fixing bracket.

[0015] By a reversed releasing operation the flat element can similarly be readily secured to the fixing brackets. Both releasing a flat element from and securing a flat element to the brackets (e.g. to replace the flat element) can thus be readily carried out without the use of tools.

[0016] Dependent claims 2 to 7 define preferred embodiments of the first aspect of the invention as defined in claim 1.

[0017] In preferred embodiments the lower front finger is at least 1.2, preferably at least 1½, more preferred at least 2, even more preferred at least 2½, and most preferred at least 3 times longer than the upper front finger, but preferably no more than 10, preferably no more than 7, most preferred no more than 5 times longer than the upper front finger. This ensures that the flat element is safely secured when in the secured position, it still however being possible to release the upper portion of the flat element from the lower front finger and the resilient tongue when tilting or pivoting the lower portion frontwards.

[0018] In a preferred embodiment the rear portion of the fixing bracket further comprises an upper rear finger extending upwards, the upper rear finger comprising a resilient tongue adapted such that when the rear projection of the two longitudinally extending projections of the upper flat element is inserted between the upper front and rear fingers, the tongue exerts a frontwards directed force on the rear surface of the bottom portion of the upper flat element securing the rear projection against the upper front finger to thereby secure the bottom portion of the upper flat element. While ensuring a more reliable attachment of the flat element, this also makes it even easier to release the flat element since the resilient tongue of the rear finger will automatically push the lower portion outwards when it has been released from the upper front finger of the bracket. The lower portion will thus be automatically ejected to pivot frontwards as soon as the rear projection of the lower portion has been shifted beyond the upper front finger of the bracket.

[0019] In a preferred embodiment the fixing bracket is in one piece, preferably cut or punched out from one preferably metal plate after which it has been bent into shape. This provides a low cost way of providing a strong bracket with suitably resilient tongue(s). The upper and lower front fingers are further preferably provided displaced in a sideward direction when viewing the fixing bracket from the front, and preferably at least two of each finger type are provided on the bracket, the fingers more preferred being positioned symmetrically about a centre plane of the bracket.

[0020] In a preferred embodiment the resilient tongue (s) is (are) formed as a flat, plate-shaped, preferably substantially plane member, which is inclined in a frontwards direction. Each resilient tongue further preferably extends from and is attached at one end to the upper rear finger. This provides suitable strength, durability and resilience of the tongue(s).

[0021] In a preferred embodiment the fingers, and preferably the central portion as well as an upper rear finger, are each formed as a flat, substantially plane member, the upper and lower front fingers being substantially coplanar, the front fingers extending upwards and downwards, respectively, from a front end of and preferably at substantially right angles to the central portion, the upper rear finger further preferably extending upwards from a rear end of and preferably at substantially right angles to the central portion. This provides a strong, stiff and durable bracket structure, especially as regards the load-bearing parts.

[0022] In a preferred embodiment the fixing bracket further comprises a lower rear finger adapted to be positioned at a distance from the lower flat element when mounted, and the (lower) resilient tongue is inclined frontwards at an angle such as to allow the lower flat element to be released by pivoting the bottom portion of this frontwards. This provides room at the upper portion for the flat element to be slightly rotated after release of the bottom portion, whereby the upper portion can be slid downwards such as to release the flat element from the bracket.

[0023] In its second aspect as defined in claim 8 the invention relates to a system comprising a fixing bracket according to any one of the above embodiments and at least one flat element.

[0024] Objects of and advantages gained with the system of the second aspect of the invention are similar to those described above in relation to the first aspect.

[0025] In an embodiment of the second aspect of the invention each flat element at a top side is profiled such that the front surface of the flat element tapers towards the rear surface to form the longitudinally extending key

of the top portion of the flat element, whereby two front surfaces of an upper and lower of said flat elements secured in continuation of each other to the fixing bracket will substantially be flush with each other. This provides a more uniform resultant building façade.

[0026] In a preferred embodiment the two longitudinally extending projections of the lower portion of the flat element are in the form of a front projection and a rear projection, the front projection extending farther downwards than the rear projection such that in a mounted position the upper front finger is covered or hidden by the front projection. This also provides a more uniform resultant building façade with concealed fixing brackets.

[0027] In a preferred embodiment one fixing bracket is mounted to form a lower fixing bracket, a similar, upper fixing bracket being mounted at a distance upwards from the lower fixing bracket, the top portion of one of said at least one flat elements being secured to the upper fixing bracket, the bottom portion being secured to the lower fixing bracket, the upper and lower fixing brackets being mounted at such distance from each other that the secured flat element can be released by shifting the flat element upwards while optionally simultaneously pushing the flat element backwards, until a rear projection of the bottom portion of the flat element has moved beyond the upper front finger of the lower fixing bracket. Advantages connected to this embodiment are described above. Preferably, an upper and/or a lower rear finger of each of the upper and lower fixing brackets comprise(s) at least one hole through which a fastening means such as a screw has been inserted into a building structure such as to fasten the fixing brackets to the building structure, the respective rear finger(s) preferably abutting the building structure. This provides a reliable attachment of the fixing brackets to the underlying building structure.

[0028] In its third aspect as defined in claim 13 the invention relates to use of two similar fixing brackets for mounting a flat element to a building structure to form a building façade.

[0029] The third aspect of the invention provides advantages similar to those described above in relation to the first and second aspects of the invention. However, with this aspect of the invention the respective lower front finger of the brackets need not necessarily be longer than the upper front finger. Instead, the upper front finger of each fixing bracket is so much longer than the rear projection of the lower portion of the flat element so that the bottom portion rests on the upper front finger. Hereby, when the fixing brackets are mounted at a suitable mutual distance the upper portion of the flat element is displaceable upwards with a distance to allow for the flat element to be released from the fixing brackets by shifting the flat element upwards, until the rear projection of the bottom portion has moved beyond the upper front finger of the lower fixing bracket.

[0030] The flat element can thus be released from the brackets with a movement (i.e. an upwards shift) that is similar to the releasing movement to be used with any of the first and second aspects of the invention. And again, simultaneously pushing the flat element backwards may accommodate the upwards shift of the flat element and thereby accommodate release of the flat element.

[0031] In a preferred embodiment of the third aspect of the invention the bottom portion of the flat element rests on the lower fixing bracket, a distance from an upper, distal end of the longitudinally extending key of the flat element to the central part of the upper fixing bracket is larger than a distance from an upper, distal end of the upper front finger of the lower fixing bracket to a lower distal end of the rear projection of the flat element, and a distance from a lower, proximal end of the longitudinally extending key of the flat element to a lower, distal end of the lower front finger of the upper fixing bracket is larger than the distance from the upper, distal end of the upper front finger of the lower fixing bracket to the lower distal end of the rear projection of the flat element. These structural features and mutual distances allows for the flat element to be released from the fixing brackets with a suitable movement in the upwards direction.

[0032] The brackets and flat elements used according to the third aspect of the invention may comprise any of the optional and preferred features as described above in relation to the first and second aspects of the invention, thereby gaining similar advantages.

[0033] In the following the invention will be described by means of examples of embodiments with reference to the drawings in which

Fig. 1 shows a perspective view of a first embodiment of the fixing bracket according to the first aspect of the invention, which may form part of the system according to the second aspect of the invention, and which may be used in embodiments according to the third aspect of the invention,

Fig. 2 shows a front view of the fixing bracket of Fig. 1,

Fig. 3 shows a side view of the fixing bracket of Fig. 1,

Fig. 4 shows a perspective view of a panel to be mounted by means of the fixing bracket of Fig. 1, the panel further being suitable for being used in embodiments of second and third aspects of the invention

Fig. 5 shows a side view of the fixing bracket of Fig. 1 in a use position in which it secures an upper and a lower panel to form an embodiment of the system according to the second aspect of the invention as well as an embodiment of the use according to the third aspect of the invention,

Fig. 6 shows a perspective view of a second embodiment of the fixing bracket according to the first aspect of the invention positioned to secure a lower panel to form an embodiment of the system according to the second aspect of the invention as well as an embodiment of the use according to the third aspect of the invention,

Fig. 7 shows a side view of the fixing bracket of Fig. 6 in a use position in which it secures an upper and

a lower panel to form an embodiment of the system according to the second aspect of the invention as well as an embodiment of the use according to the third aspect of the invention, and

Fig. 8 shows a side view of an embodiment of a fixing bracket positioned to form another embodiment of the use according to the third aspect of the invention.

[0034] In the drawings similar elements or elements of the same function of different embodiments are provided with similar reference numbers. Generally in the specification "up", "down", "upwards", "downwards" and like expressions refer to directions of the respective building elements in a mounted position forming a vertical building wall. Note that in principle the building wall may be inclined, the said expressions in this case referring accordingly to similarly inclined directions. Similarly, "front", "frontwards" and like expressions refer to at the outer side of the wall or a direction away from the wall, "back", "backwards", "rear", "rearwards" and like expressions referring to an inner side of the wall or a direction towards the wall.

[0035] Figs 1 to 3 show a first embodiment of a fixing bracket or fixing clip according to the first aspect of the invention. The bracket comprises a transversely extending central portion 1 comprised of two central parts 2, 3 connecting a front portion 4 and a rear portion 5 of the bracket. The front portion 4 comprises two upper front fingers 6, 7 extending upwards and two lower front fingers 8, 9 extending downwards. The rear portion 5 comprises an upper rear finger 10. Each of the fingers 6 to 10 as well as the central parts 2, 3 are each formed as flat, plane members or flanges. The front fingers 6, 8; 7, 9 extend substantially in coplanarity and in extension of each other, respectively, when seen from the side, cf. Fig. 3. The front fingers 6, 8; 7, 9 each extend upwards and downwards from a front end of and at substantially right angles to respective central parts 2; 3. The upper rear finger 10 extends upwards from rear ends of and at substantially right angles to both central parts 2, 3. All fingers 6 to 10 extend substantially in parallel with one another.

[0036] From the front end of the central portion 1 the lower front fingers 8, 9 extend farther downwards than the upper front fingers 6, 7 extend upwards; more specifically the lower front fingers 8, 9 are in the present embodiment about 3.5 times longer than the upper front fingers 6, 7.

[0037] The upper rear finger 10 extends at a bottom or downwards end into a lower resilient tongue 11 that is inclined or slanted (bent) frontwards to form an angle with the upper rear finger 10 of about 20° (in an unloaded position). Further, from the upper rear finger 10 an upper resilient tongue 12 extends inclined or slanted frontwards to form an angle with the upper rear finger 10 of about 35° (in an unloaded position). The resilient tongues 11, 12 thus extend inclined upwards and frontwards, and downwards and frontwards, respectively, but note that each of them might extend for example reversely, i.e. downwards instead of upwards and vice versa, respectively. The resilient tongues 11, 12 are each formed as flat, plate-shaped, preferably substantially plane members, which are bent in the frontwards direction from the rear finger 10. Each resilient tongue 11, 12 extends from and is attached at one end to the upper rear finger 10. At an opposite end each tongue 11, 12 extends into small portions, 13, 14, respectively, that are bent slightly backwards, the purpose being to allow for the force exerted on a rear surface of the panels to be exerted on a larger area, cf. below.

[0038] The fixing bracket is in one, integral piece and has been punched out from one metal plate after which it has been bent into shape. The upper and lower front fingers 6 to 9 are further provided displaced from each other in a sideward direction when viewing the fixing bracket from the front (Fig. 2). The respective upper and lower front fingers 6 to 9 are positioned symmetrically about a centre plane P of the bracket, respectively, cf. Figs 1 and 2. Note that the bent parts forming transitions between the different parts of the bracket as well as some of the other transitions are rounded as shown in Fig. 1 rather than the sharp corners shown in Figs 3 and 4, as well as Fig. 5. As regards the tongues 11, 12 the respective transitions to the small portions 13, 14 is thus also more rounded to efficiently allow for the force exerted on a rear surface of the panels to be exerted on a larger area of the panels.

[0039] The upper rear finger 10 further comprises a hole 15 for insertion of a screw to mount the bracket on an underlying building structure, such as a wood bar. To this end the upper rear finger 10 also comprises backwards bent, sharp upper corners that are to be forced into the underlying building structure during mounting of the bracket to prevent the fixing bracket from rotating about the hole 15.

[0040] Fig. 4 schematically shows a flat element in the form of an elongate, profiled panel 16, 17, for example a wood, plastic, stone, or Rockpanel® panel.

[0041] Fig. 5 shows the fixing bracket of Figs 1 to 3 in a position in which it is used for mounting two similar such panels, more specifically an upper panel 16 and a lower panel 17. Fig. 5 thus shows a small part of a building façade or weather screen constructed by a number of similar panels, which are positioned in coplanarity in continuation of each other in the height direction of an underlying building structure 18 such that their front surfaces are substantially flush with each other.

[0042] The panels of the façade, including panels 16, 17, are generally, but not necessarily, similar to each other and form elongate panels positioned with their length direction extending horizontally, i.e. in the depth direction of the drawing plane of Fig. 4.

[0043] The panels each have substantially similar profile and cross-sectional shape throughout the length. As can be seen best in Fig. 4, cf. the lower panel 17, the panels are each at a top portion 19 profiled such that a

front surface of the panel tapers towards a rear surface to form a longitudinally extending key 20 that extends upwards. At a bottom portion 21 each of the panels further has two longitudinally extending projections 22, 23 that each projects downwards and extends in the length direction of the panel. These two projections take the form of a front projection 22 and a rear projection 23, respectively, forming a longitudinally extending groove 24 between them. In the present embodiment the front projection 22 is longer than the rear projection 23 such that in a mounted position the upper front fingers 6, 7 as well as the lower front fingers 8, 9 of the bracket are covered and hidden by the front projection 22.

[0044] A number of fixing brackets similar to that of Figs 1 to 3 are secured in horizontal and vertical lines to the underlying building structure 18 to form an array of brackets (not shown). Each horizontal line of brackets (except the topmost and bottommost line) secures a bottom portion of an upper panel (in Fig. 4 bottom portion 21) as well as a top portion of a lower panel (in Fig. 4 top portion 19) to the underlying building structure 18.

[0045] The fixing brackets are mounted at similar mutual vertical distances from each other, this distance being so that the panels can be released by shifting the panel upwards, until the rear projection of the bottom portion of the upper panel has moved beyond the upper front finger of the lower fixing bracket.

[0046] Referring to Fig. 5, when the rear projection 23 is inserted between the upper front finger 7 and the rear finger 10, the upper tongue 12 exerts a frontwards directed force (directed to the left in Fig. 5) on the rear surface of the bottom portion 21 of the upper panel 16 securing the rear projection 23 against the upper front finger 7 to thereby secure the bottom portion 21. Similarly, when the key 20 of the lower panel 17 is inserted between the lower front fingers 8, 9 and the building structure 18, the lower tongue 11 exerts a frontwards directed force on the rear surface of the top portion 19 of the lower panel 17 securing the key 20 against the lower front fingers 8, 9 to thereby secure the top portion 19. In Fig. 5 the tongues 11, 12 in the unloaded position, in which the panels are released, are shown in broken lines.

[0047] Referring to the upper panel 16 of Fig. 5, because of the distance or play between the key 20 and the central parts 2, 3 of an upper bracket (not shown, but similar to that shown with respect to the lower panel 17) the panel 16 can manually be shifted upwards until the rear projection 23 has moved beyond the upper front fingers 6, 7 of the fixing bracket. When releasing the panel 16 (cf. the lower panel 17 of Fig. 5) the panel 16 is thus shifted upwards until the rear projection 23 has moved beyond the upper front fingers 6, 7 of the fixing bracket. The shifting movement is eased by pushing the panel 16 backwards, thus pivoting also the tongues 12, 11 of respective upper and lower brackets in the backwards or rear direction. The upper tongue 12 of the lower bracket then automatically pushes or pivots the lower portion 21 outwards. The lower front fingers 8, 9 of the upper bracket are positioned at such distance from the building structure 18 that room R is provided for the upper portion of the flat element to be slightly rotated (clockwise in Fig. 5) after release of the bottom portion 21 so that the upper portion 19 of the panel 16 can be slid downwards and completely release the panel 16 from the fixing bracket.

[0048] In the mounted position shown in Fig. 5 the bottom portion 21 of the upper panel 16 rests on the fixing bracket; more specifically, a bottom of the groove 24 rests on respective upper, distal ends of the upper front fingers 6, 7.

[0049] In Fig. 5 distance D1 is the distance in the up-down direction from an upper, distal end of the key 20 of the lower panel 17 to the central parts 2, 3 of the fixing bracket. Distance D2 is the distance in the up-down direction from a lower, proximal end of the key 20 to respective lower, distal ends of the lower front fingers 8, 9. The lower, proximal end of the key 20 is defined as that position from the top of the panel in which the key 20 changes its profile, i.e. in the present embodiment the position in which the panel's front surface changes direction. Thus, the front surface of the key 20 extends substantially linearly, preferably linearly in the up-down direction, in its entire length. (Note in this context that in principle the key 20 may extend linearly in the entire height of the panel 16, 17.) Distance D3 is the distance in the up-down direction from an upper, distal end of the upper front fingers 6, 7 to a lower, distal end of the rear projection 23 of the upper panel 16. In this context, note that as long as D1 > D3, and D2 > D3 for one and the same panel, it is possible to release the panel in the explained way.

[0050] Referring to the embodiment of the fixing bracket of Figs 1 to 3 and 5 it is understood that the bracket may be manufactured in ways different from being punched out of one plate, and that it may be manufactured from other materials than metal, such as moulded from plastic or aluminium.

[0051] Further, the different parts of the bracket, for instance the different fingers can be positioned in a variety of suitable ways. Accordingly, Figs 6 and 7 show a second embodiment of the fixing bracket according to the invention in which these features are varied.

[0052] Thus, Fig. 6 shows a fixing bracket mounted on a building structure (in this case a wood bar or column) to secure a lower panel 17, and Fig. 7 shows this fixing bracket securing both the lower 17 and an upper panel 16, the view of Fig. 7 thus corresponding to that of Fig. 5. Note that this fixing bracket is in many ways, including function, similar to that of the first embodiment, and that in the following primarily differences from the first embodiment will be described. Thus, elements not described in the following are substantially similar to those of the previous embodiment. The panels used in this embodiment are of the type as illustrated in Fig. 4, although the transition to the upper key 20 is curved in an initial portion instead of being straight.

[0053] In the fixing bracket of Figs 6 and 7 the central

portion 1 comprises only a single part 2 that connects the front portion 4 and rear portion 5. Similarly, the front portion 4 comprises only a single upper front finger 6 and lower front finger 8, respectively. The rear portion 5 comprises an upper rear finger 10. Each of the fingers 6, 8, 10 as well as the central part 2 are formed as flat, plane members or flanges. This embodiment of the fixing bracket may thus be manufactured for example by means of a metal or plastic casting process or by welding respective metal or plastic, one-piece front and rear portions 4, 5 to a one-piece central part 2. Each of these elements or even the whole fixing bracket may be manufactured for example as extruded aluminium. Note that the lower front finger 8 is again longer than the upper front finger 6. Further, with the present embodiment the lower resilient tongue 11 curves from a straight portion that abuts the wall into an inclined portion that is bent frontwards, cf. Fig. 7.

[0054] The rear finger 10 comprises two holes 15 (not visible) for insertion of respective screws 25, of which the head is visible in Figs 6 and 7, or like attachment means to mount the bracket to the underlying building structure 18. As is visible in Fig. 7 the screws 25 may be used as abutment for the upper panel 16 and may for this purpose be fitted with a suitable resilient cap or the like such as to provide a function similar to that of the upper resilient tongue as described above with reference to the first embodiment.

[0055] Fig. 8 illustrates an example of use of two similar fixing brackets according to the third aspect of the invention. Again, this embodiment of a fixing bracket is in many ways, including function and use, similar to that of the above two embodiments of the first aspect of the invention, and that in the following primarily differences from the first and second embodiments will be described. Elements not described in the following are substantially similar to the corresponding ones of the previous embodiments.

[0056] The fixing bracket used in the embodiment of Fig. 8 is similar to that of the above first embodiment of the first aspect of the invention, except for the noteworthy fact that the lower front fingers 8, 9 (of which only finger 9 is visible in Fig. 8) are not longer than the upper front fingers 6, 7 (of which only finger 7 is visible in Fig. 8), instead it is somewhat shorter. However, it is understood that the lower front fingers 8, 9 may instead be longer than as well as be of the same length of the upper front fingers 6, 7.

[0057] To achieve the same function with respect to dismounting the panels 16, 17 as with the previous embodiments the upper front fingers 6, 7 of the fixing bracket are each so much longer than the rear projection 23 of the lower portion 21 of the applied flat elements 16, 17 that a bottom surface of the groove 24 of the bottom portion 21 rests on upper surfaces of the respective upper front fingers 6, 7. Hereby, when two similar such fixing brackets are mounted at a suitable mutual distance the upper portion 19 of a secured flat element 16, 17 is displaceable upwards with a distance to allow for the flat element 16, 17 to be released from the fixing brackets by shifting the flat element 16, 17 upwards, until the rear projection 23 of the bottom portion 21 has moved beyond the upper front fingers 6, 7 of the lower fixing bracket. A suitable distance between the two fixing brackets involves in this case that enough play is provided between the upper portion 19 of the lower flat element 16 and the central parts 2, 3 (of which only central part 3 is visible in Fig. 8), i.e. the distance between the upper portion 19 of the lower flat element 16 and the central parts 2, 3 is larger than the length of the rear projection 23 of the upper flat element 17. The flat element 16, 17 can then similar to the previous embodiments be released from the brackets with an upwards movement of translation. And again, simultaneously pushing the flat element 16, 17 backwards or rearwards accommodates the upwards movement of the flat element and thereby accommodates release of the flat element 16, 17.

[0058] Note that similar to the above considerations with reference to Fig. 5, also in the embodiments of Figs 6 to 8 it holds true that for one and the same panel 16, 17 the relationship between distances D1 to D3 is so that D1 > D3, and D2 > D3, this making it possible to release the panel 16, 17.

[0059] The fixing bracket, the system and the use as explained above by means of examples can be varied further within the scope of the appended claims. For example, the fixing bracket may, as part of its rear portion, further comprise a lower rear finger that extends downwards from the upper rear finger. The lower tongue may be cut out from the lower rear finger similar to the upper tongue. Also, screw holes may be provided for instance in part of the lower tongue (e.g. in the linear portion of the lower tongue of the embodiment of Figs 6 and 7) or in a lower rear finger. Furthermore, other attachment devices may form part of the fixing bracket, e.g. in the form of pins cut out from a metal rear portion of the bracket and bend backwards.

[0060] Note that the term "finger" as used in this specification is to be understood in its widest possible sense and is thus generally not meant to indicate any specific shape or form other than that each "finger" extends in a direction. The "fingers" may thus take any other suitable form than flanges or flat elements as long as they fulfil their inherent purpose, such as rod-shaped, whether circular-cylindrical or with another cross-sectional shape, such as rectangular, quadratic, or triangular.

Claims

1. A fixing bracket for mounting flat elements, more specifically profiled planks or long panels, in coplanarity in continuation of each other to form a building façade, comprising
   a central portion connecting a front portion and a rear portion, the front portion comprising an upper front

finger extending upwards such as to be adapted for insertion into a groove of an upper of said flat elements and a lower front finger extending downwards such as to be adapted for supporting a front surface of a lower of said flat elements,
the rear portion comprising a resilient tongue extending downwards and being adapted to exert a frontwards directed force on a rear surface of said lower flat element,
characterized in that
from the central portion the lower front finger extends farther downwards than the upper front finger extends upwards.

2. A fixing bracket according to claim 1, wherein the lower front finger is at least 1.2, preferably at least 1½, more preferred at least 2, even more preferred at least 2½, and most preferred at least 3 times longer than the upper front finger, and/or
wherein the lower front finger is no more than 10, preferably no more than 7, most preferred no more than 5 times longer than the upper front finger.

3. A fixing bracket according to any one of the previous claims, wherein the rear portion of the fixing bracket further comprises an upper rear finger extending upwards, the upper rear finger comprising a resilient tongue adapted such that when a rear projection of two longitudinally extending projections of the upper flat element forming the groove is inserted between the upper front and rear fingers, the tongue exerts a frontwards directed force on the rear surface of the bottom portion of the upper flat element securing the rear projection against the upper front finger to thereby secure the bottom portion of the upper flat element.

4. A fixing bracket according to any one of the previous claims, wherein the resilient tongue(s) is (are) formed as a flat, plate-shaped, preferably substantially plane member, which is inclined in a frontwards direction.

5. A fixing bracket according to claims 3 and 4, wherein each resilient tongue extends from and is attached at one end to the upper rear finger.

6. A fixing bracket according to any one of the previous claims, wherein the fingers, and preferably the central portion as well as an upper rear finger, are each formed as a flat, substantially plane member, the upper and lower front fingers being substantially coplanar, the front fingers extending upwards and downwards, respectively, from a front end of and preferably at substantially right angles to the central portion, the upper rear finger further preferably extending upwards from a rear end of and preferably at substantially right angles to the central portion.

7. A fixing bracket according to any one of the previous claims, further comprising a lower rear finger adapted to be positioned at a distance from the lower flat element when mounted, and the (lower) resilient tongue is inclined frontwards at an angle such as to allow the lower flat element to be released by pivoting the bottom portion of this frontwards.

8. A system comprising a fixing bracket according to any one of the previous claims and at least one said flat elements, the at least one flat element being of the type having a profile with a front surface and a rear surface, a top portion of which comprises a longitudinally extending key and a bottom portion of which comprises two longitudinally extending projections forming a longitudinally extending groove between them, the upper front finger being adapted for insertion into the groove of the flat element to secure the bottom portion of the element, the lower front finger of the fixing bracket being adapted for supporting the longitudinally extending key of a front surface of the flat element, the resilient tongue being adapted such that when the longitudinally extending key of the lower flat element is fitted between the lower front and rear fingers, the tongue exerts a frontwards directed force on a rear surface of the key of the lower flat element securing the key against the lower front finger to thereby secure the top portion of the lower flat element.

9. A system according to claim 8, wherein each flat element at a top side is profiled such that the front surface of the flat element tapers towards the rear surface to form the longitudinally extending key of the top portion of the flat element, whereby two front surfaces of an upper and lower of said flat elements secured in continuation of each other to the fixing bracket will be substantially flush with each other.

10. A system according to claim 8 or 9, wherein the two longitudinally extending projections of the lower portion of the flat element are in the form of a front projection and a rear projection, the front projection extending farther downwards than the rear projection such that in a mounted position the upper front finger is covered or hidden by the front projection.

11. A system according to any one of claims 8 to 10, wherein the fixing bracket is mounted to form a lower fixing bracket, a similar, upper fixing bracket being mounted at a distance upwards from the lower fixing bracket, the top portion of one of said at least one flat elements being secured to the upper fixing bracket, the bottom portion being secured to the lower fixing bracket, the upper and lower fixing brackets being mounted at such distance from each other that the secured flat element can be released by shifting the flat element upwards while optionally simultane-

ously pushing the flat element backwards, until a rear projection of the bottom portion of the flat element has moved beyond the upper front finger of the lower fixing bracket.

12. A system according to claim 11, wherein an upper and/or a lower rear finger of each of the upper and lower fixing brackets comprise(s) at least one hole through which a fastening means such as a screw has been inserted into a building structure such as to fasten the fixing brackets to the building structure, the respective rear finger(s) preferably abutting the building structure.

13. Use of two similar fixing brackets, each optionally according to any one of the previous claims, for mounting a flat element, more specifically a profiled plank or long panel, to a building structure to form a building façade,
each fixing bracket comprising a central portion connecting a front portion and a rear portion, the front portion comprising an upper front finger extending upwards and a lower front finger extending downwards, the rear portion comprising a resilient tongue extending downwards,
a lower of said two fixing brackets being mounted to form a lower fixing bracket, an upper of said two fixing brackets being mounted at a distance upwards from the lower fixing bracket,
the flat element having a profile with a front surface and a rear surface, a top portion of which comprises a longitudinally extending key and a bottom portion of which comprises two longitudinally extending projections forming a longitudinally extending groove between them,
the top portion being secured to the upper fixing bracket by means of the lower front finger of the upper fixing bracket supporting a front surface of the key, and the resilient tongue exerting a frontwards directed force on a rear surface of the key securing the key against the lower front finger,
the bottom portion being secured to the lower fixing bracket by means of the upper front finger of the lower fixing bracket extending into the groove of the flat element, the upper front finger of each fixing bracket is longer than a rear projection of the two longitudinally extending projections of the flat element so that the bottom portion rests on the upper front finger,
the upper and lower fixing brackets being mounted at a distance from each other corresponding to a height of the flat element with the key of the flat element positioned at a distance from the central part of the upper bracket such as to be displaceable upwards towards the central part of the upper bracket with a distance adequate to allow for the secured flat element to be released from the fixing brackets by shifting the flat element upwards while optionally simultaneously pushing the flat element backwards, until the rear projection of the bottom portion has moved beyond the upper front finger of the lower fixing bracket.

14. Use according to claim 13, wherein
the bottom portion of the flat element rests on the lower fixing bracket,
a distance from an upper, distal end of the longitudinally extending key of the flat element to the central part of the upper fixing bracket is larger than a distance from an upper, distal end of the upper front finger of the lower fixing bracket to a lower distal end of the rear projection of the flat element, and
a distance from a lower, proximal end of the longitudinally extending key of the flat element to a lower, distal end of the lower front finger of the upper fixing bracket is larger than the distance from the upper, distal end of the upper front finger of the lower fixing bracket to the lower distal end of the rear projection of the flat element.

15. Use according to claim 13 or 14,
wherein the rear portions of the respective fixing brackets further comprise respective upper rear fingers extending upwards, the upper rear fingers each comprising a resilient tongue, the resilient tongue of the lower fixing bracket exerting a frontwards directed force on the rear surface of the bottom portion of the flat element securing the rear projection against the upper front finger to thereby secure the bottom portion of the flat element, and/or
wherein each flat element at a top side is profiled such that the front surface of the flat element tapers towards the rear surface to form the longitudinally extending key of the top portion of the flat element, whereby two front surfaces of an upper and lower of said flat elements secured in continuation of each other to the fixing bracket will be substantially flush with each other, and/or
wherein the two longitudinally extending projections of the lower portion of the flat element are in the form of a front projection and a rear projection, the front projection extending farther downwards than the rear projection such that in a mounted position the upper front finger is covered or hidden by the front projection.

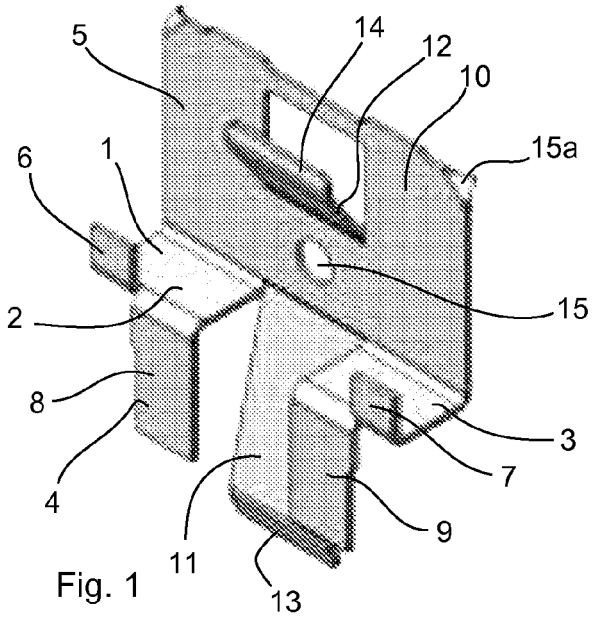

Fig. 1

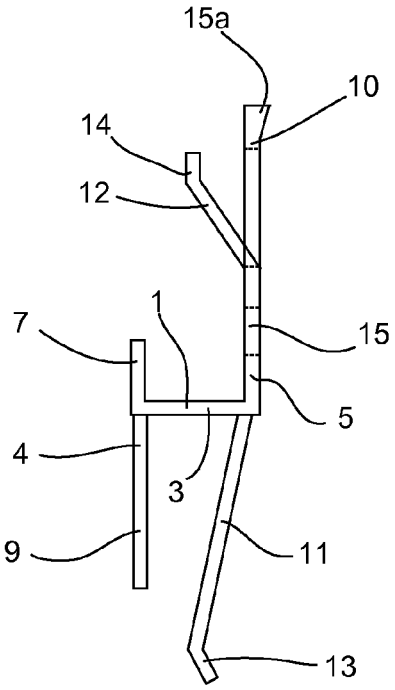

Fig. 3

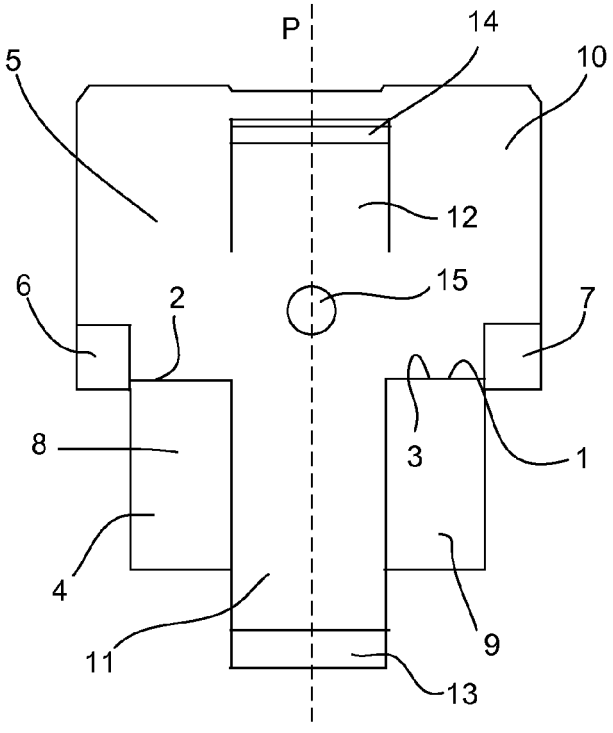

Fig. 2

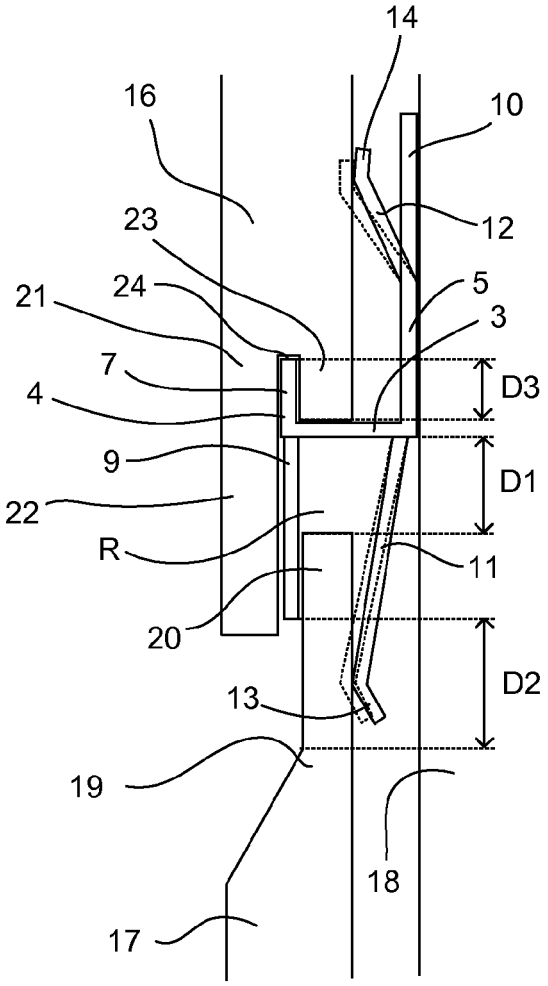
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Fig. 5

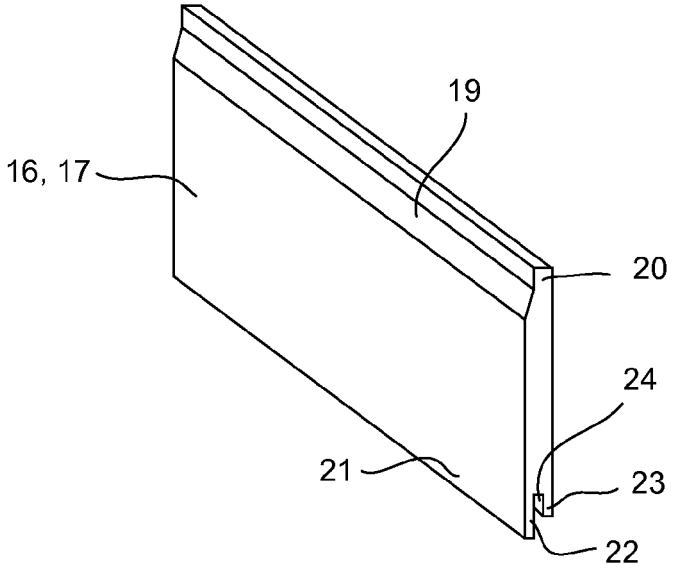
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Fig. 4

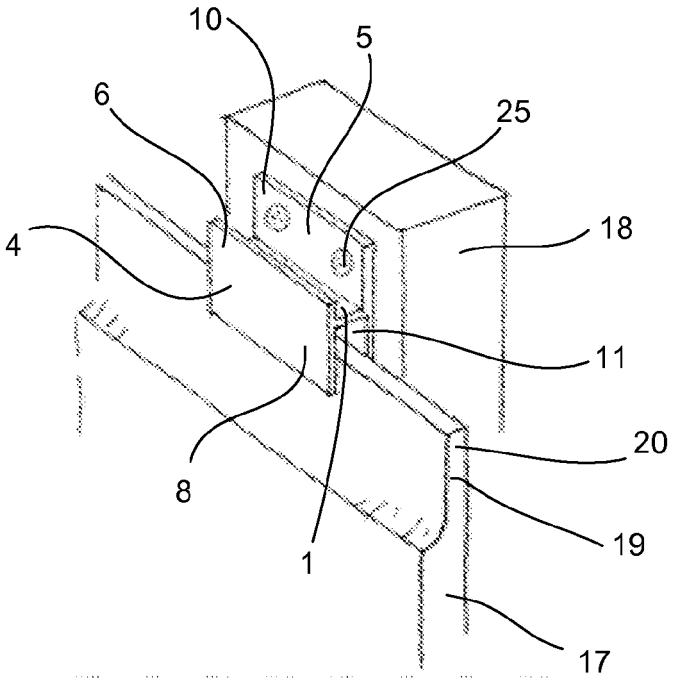
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Fig. 6

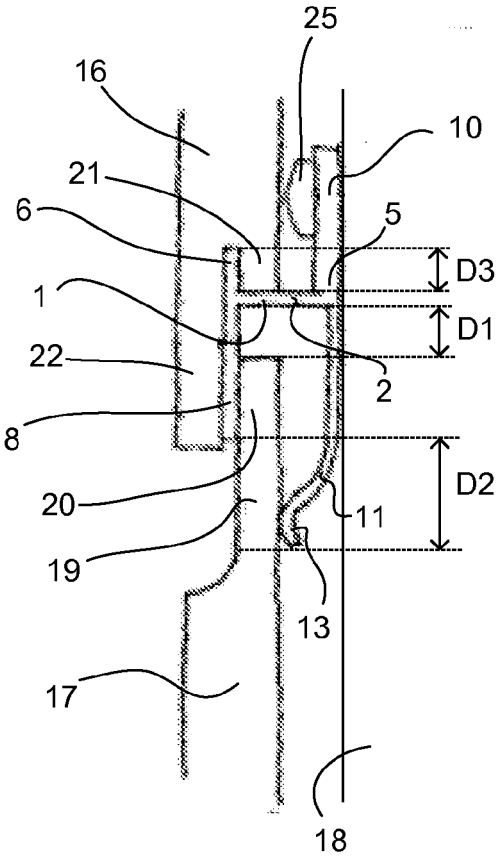
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Fig. 7

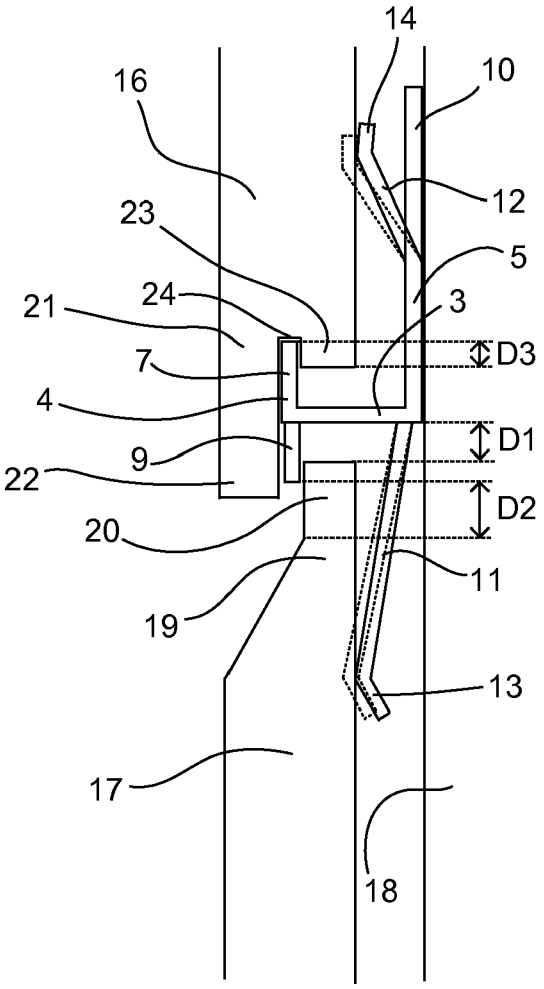

Fig. 8

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EUROPEAN SEARCH REPORT

Application Number
EP 10 18 9633

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X	DE 103 22 346 A1 (F V MUELLER DACHZIEGELWERKE GM [DE]) 9 December 2004 (2004-12-09) * figures 1,3 *	1,2,4, 6-11,13, 14	INV. E04F13/08
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E04F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	24 March 2011	Severens, Gert

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24-03-2011

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