



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 0 704 596 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
12.02.2003 Bulletin 2003/07

(51) Int Cl.7: **E06B 5/16, E04B 2/96**

(21) Application number: **95202644.1**

(22) Date of filing: **02.10.1995**

(54) **Fire-resistant, aluminium casing**
Feuersicheres Aluminium Gehäuse
Enveloppe d'aluminium résistante au feu

(84) Designated Contracting States:
BE CH DE ES GB IE LI NL

(30) Priority: **30.09.1994 NL 9401613**

(43) Date of publication of application:
03.04.1996 Bulletin 1996/14

(73) Proprietor: **REYNOLDS ALUMINIUM HOLLAND
B.V.
NL-3846 BX Harderwijk (NL)**

(72) Inventor: **Van Herwijnen, Johannes
NL-8256 DC Biddinghuizen (NL)**

(74) Representative:
**Smulders, Theodorus A.H.J., Ir. et al
Vereenigde
Postbus 87930
2508 DH Den Haag (NL)**

(56) References cited:

EP-A- 0 384 417	EP-A- 0 518 222
EP-A- 0 607 878	FR-A- 1 264 130
US-A- 3 797 191	US-A- 4 550 542

EP 0 704 596 B1

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

[0001] The invention relates to a casing systems according to the preamble of claim 1, and to a casing-panel assembly according to the preamble of claim 12. Such casing systems and such casing-panel assemblies are known from practice and can be applied both in the form of separate casings and in the form of curtain walls.

[0002] A problem of aluminum casings is that they are not sufficiently fire-resistant for use in situations wherein an increased degree of fire-resistance is required. A typical example is a situation wherein the danger of a fire spreading from working spaces to a superjacent floor with living spaces has to be limited. For this purpose, the fire-resistance of the casings of the working spaces to fire from the inside and the fire-resistance of the casings of the living spaces to fire from the outside should meet specific minimum requirements.

[0003] Dutch standard 6069 for instance essentially requires that a facade must be able to resist a fire of a temperature rising to 900 °C in a period of half an hour, without openings being created in the facade through which the fire or smoke could spread. Without special measures, aluminum casings generally do not meet this requirement. Nevertheless, it is often desired to use aluminum casings all the same, in particular when the increased requirements regarding fire-resistance only apply to a minority of the casings or when it is desired to provide a building with a curtain wall.

[0004] In EP-A-0 686 735, which belongs to the prior art under Art 54(3) EPC in as far as its priority dates apply, a curtain wall structure is described in which a fire shielding strip is enclosed between a connecting member interconnecting outside and inside sections and one of these sections.

[0005] From FR-A-1 264 130 (HILLS) a glazing assembly constituted by frames of inside and outside sections and panels retained in openings defined by the sections is disclosed. The shown embodiments include three units which are each anchored to one section and overlap a panel mounted to that section at the side facing away from that section. These are: firstly, structures which serves for temporarily retaining the respective panel or window during assembly, secondly, slabs which, according can be made of PVC, rubber or sheet metal and, thirdly, flexible hooks for retaining the panel or window in place relative to one section until a covering profile has been mounted. It is not disclosed that the material of which the structures, slabs or hooks are made is more heat resistant than aluminium. Furthermore, the slabs and the hook do not retain an second section relative to the section to which these are anchored.

[0006] The object of the invention is to provide an aluminum casing system from which casings can be assembled having a considerably increased fire-resistance compared with conventional aluminum casings, without requiring extensive or costly adjustments.

[0007] In accordance with the present invention, this object is realized by providing a casing system in a accordance with claim 1.

[0008] A further object of the invention is to provide a casing-panel assembly with an aluminum casing having an improved fire-resistance, also without making extensive or costly adjustments.

[0009] In accordance with the present invention, this object is realized by providing a casing-panel assembly as set forth in claim 12.

[0010] The invention is based on the insight that in the event of fire on the inside or outside of a facade, the sections on the side of the fire or coupling sections made of thermally insulating material and located between the inside and outside sections are usually the first to give way, causing the panels (usually panes) to fall out of the casings, and that this can be prevented through the local provision of elements having a high heat-resistance which hold the sections at the side facing the fire in position relative to the sections located on the side of the casing facing away from the fire. Usually, these sections located on the side of the casing facing away from the fire hold out considerably longer than the sections located on the side of the fire and the above-mentioned coupling sections, so that owing to the anchors the panels are held in position for a considerably longer time. In addition, the anchors can also retain portions of locally collapsed sections in position on the side of the fire, as a result of which the hermetic sealing formed by a casing-panel assembly is maintained longer as well.

[0011] The anchors, manufactured from a material having a higher failure temperature than aluminum, should be mounted on those sections that are located on the side of the casing opposite the side where the fire risk is greatest.

[0012] For retaining the panels in the event of collapse of a section on the side of the fire, the anchors may comprise arms which overlap the panels on that side where the fire risk is greatest and which still retain the panels from that side when sections on that side have already given way because of the heat. However, instead of or in addition to the arms, the retention of the panels by the anchors can also be effected in many other manners. For instance, the anchors may each be glued to a panel with a heat-resistant adhesive, may each comprise a clamp adapted to retain a panel, may be screwed down to a panel or cooperate with fastening means, such as clamps, mounted on the panels.

[0013] Specific embodiments of the invention are set forth in the dependent claims.

[0014] Hereinafter, the invention will be further explained on the basis of some exemplary embodiments, with reference to the accompanying drawings. In these drawings:

Fig. 1 is a sectional view of a portion of a casing-panel assembly according to the invention,
Fig. 2 is a sectional view of a portion of a second

casing-panel assembly according to the invention, Fig. 3 is an elevational view of a bracket for use as part of an anchor for a casing system according to the invention,

Fig. 4 is a top plan view of an anchor for a casing system according to the invention with a bracket according to Fig. 3,

Fig. 5 is an elevational view similar to Fig. 3 of another bracket, and

Fig. 6 is a sectional view of a portion of a third casing-panel assembly according to the invention.

[0015] Corresponding parts of different embodiments of the invention are designated by mutually identical reference numerals.

[0016] Hereinafter, further particulars of the invention will at first be explained with reference to the casing-panel assembly shown in Fig. 1. After that, particulars shown in the other Figures will be discussed.

[0017] The casing-panel assembly, of which a portion is shown in Fig. 1, forms part of a curtain wall. The curtain wall comprises casings 1 and panels 2, 3. The panel 2 is a siding and the panel 3 consists of two layers of glass attached to each other along the outer circumference of the panel. Interior, vertical sections of the casing 1 are formed by uprights 4 of the curtain wall. Rear faces 5 of the uprights can be mounted on the bearing structure of the building. Exterior, vertical sections of the casing 1 are formed by rails 6. By means of screws 7, the rails 6 are clamped against the uprights 4, with an insulation strip 8 clamped between the rails 6 and the uprights 4. Along their edges, the panels 2, 3 are confined between the interior and exterior sections 4 and 6 respectively.

[0018] For sealing the confinement of the panels 2, 3, swelling tape 9 is provided between the panels 2, 3 and the upright 4, which swelling tape swells when heated and then provides extra sealing. Provided between the panels 2, 3 and the rail 6 on the outside are sealing sections 10 made of rubber and having a heat-resistant composition. Provided over the rail 6, on the outside thereof, is a cover section 11, which, as a matter of fact, forms an initial protection of the rail 6 in the event of fire. In lateral direction, the panels 2, 3 are held in position by filler strips 15. For clarity's sake, these strips are shown on one side of the upright section 4 only.

[0019] A number of two types of anchors 12, 13 are arranged so as to be distributed over the length of the sections 4, 6, which anchors 12, 13 are both manufactured from stainless steel. This material has a higher failure temperature than aluminum, has a higher strength at a slight volume, enabling it to be incorporated into casings according to existing designs, and causes little contact corrosion of the aluminum.

[0020] The anchor 12 shown comprises the screw 7 and a substantially flat plate 14 forming two arms or flanges projecting in opposite directions. The screw 7 is inserted into a hole in the plate 14 and clamps the plate

14 against the rail 6. By means of the screw 7, the anchor 12 is anchored in place relative to the upright 4, i. e. the interior section. The arms formed by the plate 14 overlap the panels 2, 3 on the side opposite the upright 4.

[0021] In the event of fire on the outside of the curtain wall, first the cover section 11 and then the rail 6 on the outside of the casing will give way. However, the panels 2, 3 are nevertheless held in position by the stainless steel plates 14 of the anchors 12, which plates are mounted on the interior upright sections 4 by means of the screws 7. Owing to the foaming swelling tape 9, an adequate sealing along the edges of the panels 2, 3 also remains present if the rail 6 melts away from behind the plates 14 and the panels 2, 3 can move outwards slightly to abut against the plates 14. By that time, the rubber sections 10 will have been attacked by the heat. However, the sealing function of the rubber sections 10 is taken over by the foaming swelling tape 9 as well.

[0022] Because the arms, formed by the plate 14, of the anchor 12 also retain the rail 6 between that plate 14 and the panels 2, 3, the rail is retained relative to the interior upright 4 for a relatively long time, even when portions of the rail 6 have been attacked by the heat. This offers the advantage that an effective sealing along the edge of the panels is maintained for a longer time and the swelling tape 9 is heated less quickly. In particular, the sealing between the panels 2, 3 and the rail 6 is prevented from already giving way before the swelling tape 9 has been sufficiently heated for swelling and taking over the sealing function of the rail 6. In the event of fire, it is in particular the prevention of the penetration of smoke that is of great importance for increasing the chances of escape.

[0023] The fact that the rails 6, or at least portions thereof, are held in place for a longer time by means of the plates 14 of the anchors 12 further offers the advantage that the interior sections 4 are exposed to the direct action of the fire-caused heat at a later stage, and will therefore in many cases hold out longer.

[0024] Further, it is important that, due to the support of the panels 2, 3 via the rail 6, the panels 2, 3 are supported more uniformly than when they are exclusively retained directly by the plates 14 of the anchors 12. This also limits the load of the panels 2, 3 themselves, so that they will hold out longer in the event of fire, in particular if additional loads, by wind or explosions, also occur.

[0025] Further, under normal circumstances, there is the risk that anchors that directly engage with the panels exert local loads on the panels, in particular during expansion and shrinkage of the panels and the casing because of variations in temperature. The lifetime of panels from double glass would thus be limited.

[0026] For retarding the deterioration of the sealing along the edges of the panels 2, 3 as long as possible, it is further useful that the arms formed by the plate 14 extend to near the sealings 10 between the rail 6 and the panels 2, 3. Accordingly, the sealings 10 are held

against the panels even if the rail 6 already deflected in longitudinal direction without support.

[0027] The anchor 13 of the second type shown is presented separately in Fig. 3. This anchor 13 comprises a U-shaped plate element 16 having flanges 18 extending outwardly from free ends of the legs 17 and the screw 7 which it shares in this example with the anchor 12 of the first type and which projects from the bottom 19 of the U-shaped plate element 16.

[0028] Although the uprights 4 of a curtain wall are generally dimensioned so that they cannot entirely collapse in the case of usual standard fires on the inside of the facade, projecting parts of the uprights 4, such as the outwardly projecting flanges 20, are nevertheless vulnerable enough to collapse prematurely, as a consequence of which the connection with the exterior rails 6 is lost and the panels 2, 3 can fall outside from the casing 1. This is prevented through the use of the anchors 13 of the second type. By means of the screw 7, the U-shaped plate element 16 is mounted on the rail 6. For this purpose, a hole 22 (see Fig. 4) in the U-shaped plate element 16 through which the screw 7 passes is dimensioned so that the screw engages with the U-shaped plate element 16. In the case of fire on the inside of the facade, the rail 6 is located on the cool side of the facade, facing away from the fire, and will hence hold out for a relatively long time. In mounted condition, the flanges 18 form the arms which overlap the panels 2, 3 on the inside of the curtain wall and which keep the panels 2, 3 clamped against the cool rails 6 so that the hermetic sealing of the facade is maintained for a long time.

[0029] The assembly of a curtain wall with anchors 12 and 13 as shown in Figs 1 and 3 requires only very little more time than the assembly of a curtain wall without those anchors, because the anchors 12, 13 are fixed with the screws 7 that are provided anyway for mounting the rails 6 on the uprights 4.

[0030] In the example shown in Fig. 2, the U-shaped plate element 16 of the anchor 13 of the second type is moreover directly mounted on the upright 4. For this purpose, self-tapping screws 21 are passed through holes in the outwardly projecting flanges 18 of the U-shaped plate element 16 and screwed into the uprights 4. The anchor 13 of the second type as shown in Fig. 2 moreover has a function in the event of fire on the outside of the facade, as the anchor 12 of the first type is also attached, by means of the screw 7, to the anchor 13 of the second type. If, through heating from the outside of the facade, the flanges 20 of the upright 4 give way, then the anchors 12 of the first type remain coupled, via the anchors 13 of the second type, to the uprights 4, so that the panels 2, 3 are held in place even then. The foaming swelling tape 9 ensures that even in the case of small displacements of the panels 2, 3, a proper sealing is still maintained along the edges of the panels 2, 3.

[0031] Further, in the event of fire on the inside of the casing, the attachment of the arms 18 of the anchor 13 of the second type to the interior upright achieves the

advantage that portions of the upright 4 are held in position and contribute to the retention of the panels 2, 3 even when other portions of that upright have already given way. As does the retention of the rail 6 by the plates 14 in the event of fire on the outside, the longer retention of the uprights 4 in the event of fire on the inside achieves the advantage that the sealing along the edges of the panels is maintained for a longer time and in a better manner, and that the panels 2, 3 are longer supported in a more uniform manner than when the support is directly taken over by the arms 18. Further, because of the arrangement of the swelling tape 9 on the inside of the panel, it is important that the swelling tape yields an effective sealing especially as long as and where the uprights 4 are (still) present.

[0032] In fact, for mounting the arms 18 on the upright, many alternative possibilities exist. Instead of screws, heat-resistant nails or clamps can be applied. Also, the arms and the uprights can be constructed so that outer ends of the arms engage behind flanges of or with holes in the upright.

[0033] In longitudinal direction of the sections 4, 6, the plate-shaped portions of the anchors 12, 13 preferably have a length of some centimeters. This is on the one hand sufficient for retaining the panels 2, 3 in position when one of the sections 4, 6 gives way completely or partly, and on the other hand requires only slight amounts of the relatively costly stainless steel.

[0034] The anchor 13 of the second type, shown in Fig. 4, comprises a nut 34 and a bolt 23 having a diameter adapted for cooperation with holes 24 (in Figs 3 and 4 indicated by dot and dash lines) in the legs 17, connecting to the bottom 19, of the U-shaped plate element 16 and corresponding holes in the outwardly projecting flanges 20 of the upright 4. With the bolts 23, anchors 13 of the second type can be locked in longitudinal direction of the sections 4, 6, if it is desired to provide the anchors 13 at locations where no screws 21 can be provided. Instead of the bolts 23, other elements can also be used for fixing anchors 13 of the second type in longitudinal direction of the sections 4, 6, such as flanged lips fitting into holes in one of the sections 4 or 6 or spring dowels, or rivets such as pop rivets, if they are sufficiently heat-resistant.

[0035] Fig. 5 shows a variant of a U-shaped plate element 16 for application as part of an anchor 13 of the second type, wherein the legs 17 connecting to the bottom 19 of the U-shaped plate element 16 are of unequal length. As a result, the distance from the outwardly projecting flanges 18 to the bottom 19 of the U-shaped plate element 16 is different for each of the two flanges. This U-shaped plate element 16 is suitable for retaining panels of different thicknesses in position on both sides of casing sections 4, 6.

[0036] Fig. 6 shows a casing system assembled into a casing-panel assembly designed for use as separate casing in an opening in a facade. The casing comprises aluminum inside and outside sections 4 and 6 respec-

tively for confining edges of panels 2, 3 therebetween. The inside and outside sections 4, 6 are both fixed through rolling to joint coupling sections 25 made from thermally insulating material.

[0037] In the event of fire, such casings involve the particular problem that the sections 25 made from thermally insulating material often already give way before the aluminum section 4 or 6 on the side of the fire does, as a consequence of which the confinement of the panels 2, 3 is lost and the panels fall out of the casing.

[0038] In the casing shown in Fig. 6, the resistance to fire on the inside of the casing is increased by distributing local anchors 26 of a third type over the length of the sections 4, 6. These anchors 26 of the third type are also manufactured from stainless steel. These anchors 26 of the third type are each designed as plate elements flanged so as to be L-shaped and having first and second legs 27, 28, extending at an angle relative to each other, and an outwardly flanged hook edge 29 always provided at an outer end of the second legs 27, 28. In mounted condition, the flanged hook edges 29 are each anchored to one of the outside sections 6, as they each catch into a groove 30 in the outside section 6. The first legs 27, always connecting to the second legs 28 opposite the hook edges 29, each form an arm which, in mounted condition, overlaps one of the panels 2, 3 on the side of the interior section 4.

[0039] Generally, in the event of fire on the inside of the casing, the thermally insulating sections 25 give way first, followed by the sections 4 on the inside. However, owing to the anchors 26 hooked into the section 6 on the outside, the panels 2, 3 are still held in position, because the arms 27 overlapping the panels 2, 3 retain the panels 2, 3. Because the flanges of the interior section 4 and sealing rubbers 10 give way, the panels 2, 3 will in fact move away from the exterior section through some distance. However, the foaming swelling tape 9 ensures that a sufficient sealing is nevertheless maintained along the edges of the panels 2, 3.

[0040] If the anchors of the third type are used in vertical portions of the casing, it is important that they are anchored in longitudinal direction of the sections 4, 6, preventing the anchors 26 from sliding downwards. For this purpose, the anchors 26 can for instance be screwed down, be provided with lips fitting into holes in the exterior section 6, or be provided with a hook edge which is waved in longitudinal direction of the sections 4, 6 and grips in the groove 30 with pretension.

[0041] The fact that owing to the presence of the hook edges 29 no holes have to be drilled in the sections 6 for mounting the anchors 26 is particularly advantageous when the anchors 26 are arranged in the lower portion of the casing, because in the sections 4, 6 no holes need to be made which would have to be blanked and which, in the case of inadequate blanking, form a source of leakage.

[0042] The outer ends of the arms 27 each catch into a groove 33 in the interior aluminum section 4. As a re-

sult, flanges of the interior sections 4 which retain the sealing sections 10 remain in position for a longer time when, in the event of fire on the inside of the facade, they become soft and/or give way partly. This further retards the reduction of the sealing action of the casing which occurs in the event of fire. Because the panels 2, 3 are retained for a longer time via the flanges of the sections 4 and the sealing sections 10 located between those flanges and the panels 2, 3, a uniform support of the panels 2, 3 is maintained during a longer time, just as in the example according to Fig. 1, so that the panels themselves are less loaded. In this example, too, under normal circumstances, local loads exerted on the panels by the anchors are avoided, because under normal circumstances, the anchors 26 do not directly engage with the panels 2, 3.

[0043] In particular with sections as shown in Fig. 6, wherein the section 4 or 6 located on the side of the casing facing away from the fire has a relatively small volume, the advantage that the section 4 or 6 located on the side of the casing facing away from the fire remains protected against direct heat action for a longer time due to the retention by the anchor 26 of at least parts of the section 6 or 4 respectively on the side of the fire, remains of great importance.

[0044] The arms 27 also extend to near the sealing sections 10 between the section 4 and the panels 2, 3, so that the panels are supported precisely at the location where this is effective for maintaining the sealings along the edges of the panels as long as possible.

[0045] An anchor 26 may also retain a panel 3 in another manner than by the arm 27 for instance by being fastened to the panel with glue or cooperating with a clamp that is clamped over an edge of the panel. It is also possible that the arms 26 are provided with arms 27 and are optionally mounted on the interior sections 4, for instance with self-tapping screws or hook edges. The anchors ensure that the interior and exterior sections 4 and 6 are held together, also if the thermally insulating connecting sections 25 give way, while the anchors are not exposed to view all the same. The anchors then form brackets which are anchored both to the interior and to the exterior sections 4 and 6 and which bridge the thermally insulating connecting sections 25 for retaining the interior and exterior sections 4 and 6 relative to each other in case the thermally insulating connecting sections give way.

[0046] The section 6 on the outside of the casing is composed of a bearing section 31 and circumferentially closed, tubular glazing bead sections 32, coupled to the bearing section 31 by means of a snap attachment. Since the glazing bead sections 32 are constructed as circumferentially closed, tubular sections, they can resist a greater pressure exerted by the panels than conventional glazing bead sections having separate snap finger flanges catching into the bearing section. These conventional glazing bead sections have to be additionally attached to the bearing sections by means of

screws, to be able to resist the pressure exerted by the swelling tape 9 in the event of fire. Owing to the tubular design of the glazing bead sections 32 shown, the provision of screws is not necessary, so that the attachment can be carried out more quickly and no holes which may cause leakage need to be made.

[0047] The use of the circumferentially closed, tubular glazing bead sections 32 is also advantageous in combination with other casing sections, which may or may not be provided with anchors for retaining the panels in the event of fire, such as one-piece casing sections without thermally insulating coupling sections. In the case of one-piece casing sections without thermally insulating coupling sections, the heat dissipation in the event of fire is such that the prevailing requirements with regard to fire-resistance can typically be met without special adjustments.

Claims

1. A casing system comprising aluminum outside and inside sections (6 and 4 respectively) for confining edges of a panel (2, 3) there between, **characterized by** local anchors (12, 13, 26), made from a material of a higher failure temperature than aluminum, to be distributed over the length of the sections (4, 6), said anchors (12, 13, 26) being adapted for anchoring in mounted condition relative to one of the inside and outside sections (4 or 6 respectively) and, in mounted condition, to retain said panel (2, 3) relative to said one of the inside and outside sections (4 or 6 respectively), independently of the condition of the opposite one of said one of the inside and outside sections (6 or 4 respectively) and to retain said opposite section (6 or 4 respectively) relative to said one of the inside and outside sections (4 or 6 respectively).
2. A casing system according to claim 1, wherein at least a number of the anchors (12, 13, 26) each comprise at least one arm (14, 18, 27), said arm, in mounted condition overlapping one of the panels (2, 3) on the side of the opposite section (6 or 4 respectively).
3. A casing system according to claim 2, wherein at least a number of the anchors (12, 13) each comprise two of said arms (14, 18) projecting in opposite directions.
4. A casing system according to claim 2 or 3, wherein the anchor (12, 13, 26) comprises a plate-shaped element (14, 16, 26), of which said arm (14, 18, 27) forms a part.
5. A casing system according to any one of claims 2-4, wherein at least a number of the anchors (12, 13, 26) are designed so that the arm or arms (14, 27) of each of said anchors, in mounted condition, also retain the opposite section (6 or 4 respectively) relative to said inside or outside section 4 or 6 respectively.
6. A casing system according to any one of claims 2-4, wherein at least a number of the anchors (13), in mounted condition, are arranged to mount the arm or arms (18) of each of said anchors on the opposite section (6 or 4 respectively), to retain the opposite section (6 or 4 respectively) relative to said inside or outside section (4 or 6 respectively).
7. A casing system according to claim 5 or 6, wherein the arms have a length so that, in mounted condition, they extend to near sealings between the opposite section (6 or 4 respectively) and the panel (2, 3).
8. A casing system according to claim 4, wherein the plate-shaped element is provided with a hole (22, 24) and the anchor further comprises a pin-shaped fastening element (23) having a diameter adapted for cooperation with said hole (24).
9. A casing system according to claim 4, wherein the plate-shaped element comprises a flanged lip and at least one of the sections is provided with holes in which the lip fits in mounted condition.
10. A casing system according to any one of the preceding claims, wherein at least a number of the anchors (26) are each constructed as plate elements flanged so as to be L-shaped and having an outwardly flanged hook edge (29) at an outer end of one of the legs (28).
11. A casing system according to any one of claims 1-9, wherein at least a number of the anchors (12, 13, 26) are each constructed as a U-shaped plate element (16) having at least one flange (18) outwardly projecting from a free end of a leg and a fastening element (7) projecting outwardly from the bottom of the U-shaped plate element (16).
12. A casing-panel assembly, comprising aluminum outside and inside sections (6 and 4 respectively) wherebetween edges of a panel (2, 3) are confined, **characterized by** local anchors (12, 13, 26) distributed over the length of the sections and made from a material having a higher failure temperature than aluminum, said anchors (12, 13, 26) each being anchored relative to one of the inside and outside sections (4 or 6 respectively) for retaining said panel (2, 3) relative to said one of the inside and outside section (4 or 6 respectively) independently of the condition of the opposite one of said inside and out-

side sections (6 or 4 respectively) and for retaining said opposite one of said one of the inside and outside sections relative to said one of the inside and outside sections (4 or 6 respectively).

13. A casing-panel assembly according to claim 12, wherein at least a number of the anchors (12, 13, 26) each comprise at least one arm (14, 18, 27, said arm overlapping one of the panels (2, 3) on the side of the opposite section (6 or 4 respectively).

14. A casing-panel assembly according to claim 13, wherein the arm or arms (14, 27) of at least a number of the anchors (12, 13, 26) also retain the opposite section (6 or 4 respectively) relative to said inside or outside section (4 or 6 respectively).

15. A casing-panel assembly according to claim 13, wherein the arm or arms (18) of at least a number of the anchors are mounted on the opposite section (6 or 4 respectively), for retaining the opposite section (6 or 4 respectively).

16. A casing-panel assembly according to claim 14 or 15, wherein the arms of at least a number of the anchors extend to near sealings between the opposite section (6 or 4 respectively) and the panel (2, 3).

Patentansprüche

1. Gehäusesystem mit Aluminiumaußen- und -innenprofilen (6 bzw. 4) zum Halten von Rändern einer Platte (2, 3) zwischen diesen, **gekennzeichnet durch** über die Länge der Profile (4, 6) verteilte lokale Anker (12, 13, 26) aus einem Material mit einer höheren Ausfalltemperatur als Aluminium, wobei die Anker (12, 13, 26) im montierten Zustand zum Verankern in bezug auf das Innen- oder das Außenprofil (4 bzw. 6) und, im montierten Zustand, zum Halten der Platte (2, 3) in bezug auf das Innen- oder Außenprofil (4 bzw. 6) unabhängig vom Zustand des entgegengesetzten Profils, also des Innen- oder des Außenprofils (6 bzw. 4), und zum Halten des entgegengesetzten Profils (6 bzw. 4) in bezug auf das Innen- oder das Außenprofil (4 bzw. 6) geeignet sind.

2. Gehäusesystem nach Anspruch 1, bei dem wenigstens eine Anzahl von Ankern (12, 13, 26) jeweils mindestens einen Arm (14, 18, 27) aufweist, wobei der Arm im montierten Zustand eine der Platten (2, 3) auf der Seite des gegenüberliegenden Profils (6 bzw. 4) überlappt.

3. Gehäusesystem nach Anspruch 2, bei dem wenigstens eine Anzahl der Anker (12, 13) jeweils zwei in entgegengesetzte Richtungen vorstehende Arme

(14, 18) aufweist.

4. Gehäusesystem nach Anspruch 2 oder 3, bei der der Anker (12, 13, 26) ein plattenförmiges Element (14, 16, 26) aufweist, von welchem der Arm (14, 18, 27) ein Teil bildet.

5. Gehäusesystem nach einem der Ansprüche 2-4, bei dem wenigstens eine Anzahl der Anker (12, 13, 26) derart ausgebildet ist, daß der Arm oder die Arme (14, 27) jedes der Anker im montierten Zustand auch das gegenüberliegende Profil (6 bzw. 4) in bezug auf das Innen- bzw. das Außenprofil (4 bzw. 6) hält bzw. halten.

6. Gehäusesystem nach einem der Ansprüche 2 - 4, bei dem wenigstens eine Anzahl von Ankern (13) im montierten Zustand zum Anbringen des Arms oder der Arme (18) jedes der Anker am gegenüberliegenden Profil (6 bzw. 4) ausgebildet ist, um das gegenüberliegende Profil (6 bzw. 4) in bezug auf das Innen- oder das Außenprofil zu halten.

7. Gehäusesystem nach Anspruch 5 oder 6, bei dem die Länge der Arme derart bemessen ist, sie sich im montierten Zustand bis nahe an Dichtungen zwischen dem gegenüberliegenden Profil (6 bzw. 4) und der Platte (2, 3) erstrecken.

8. Gehäusesystem nach Anspruch 4, bei dem das plattenförmige Element mit einem Loch (22, 24) versehen ist und der Anker ferner ein stiftförmiges Befestigungselement (23) mit einem Durchmesser aufweist, der zum Zusammenwirken mit dem Loch (24) geeignet ist.

9. Gehäusesystem nach Anspruch 4, bei dem das plattenförmige Element eine Flanschlippe aufweist und wenigstens eines der Profile mit Löchern versehen ist, in welche die Lippe im montierten Zustand paßt.

10. Gehäusesystem nach einem der vorhergehenden Ansprüche, bei dem wenigstens eine Anzahl Anker (26) jeweils als Plattenelemente ausgebildet sind, die mit einem Flansch zu L-Form geformt sind und einen nach außen geflanschten Hakenrand (29) an einem äußeren Ende eines der Schenkel (28) aufweisen.

11. Gehäusesystem nach einem der Ansprüche 1 - 9, bei dem wenigstens eine Anzahl der Anker (12, 13, 26) jeweils als U-förmiges Plattenelement (16) mit wenigstens einem von einem freien Ende eines Schenkels nach außen ragenden Flansch (18) und einem vom Boden des U-förmigen Plattenelements (16) nach außen ragenden Befestigungselement (7) ausgebildet sind.

12. Anordnung aus einem Gehäuse und einer Platte, mit Aluminiumaußen- und -innenprofilen (6 bzw. 4) zum Halten von Rändern einer Platte (2, 3) zwischen diesen, **gekennzeichnet durch** über die Länge der Profile (4, 6) verteilte lokale Anker (12, 13, 26) aus einem Material mit einer höheren Ausfalltemperatur als Aluminium, wobei die Anker (12, 13, 26) im montierten Zustand zum Verankern in bezug auf das Innen- oder das Außenprofil (4 bzw. 6) und, im montierten Zustand, zum Halten der Platte (2, 3) in bezug auf das Innen- oder Außenprofil (4 bzw. 6) unabhängig vom Zustand des entgegengesetzten Profils, also des Innen- oder des Außenprofils (6 bzw. 4), und zum Halten des entgegengesetzten Profils in bezug auf das Innen- oder das Außenprofil (4 bzw. 6) geeignet sind.
13. Anordnung aus Gehäuse und Platte nach Anspruch 12, bei der wenigstens eine Anzahl von Ankern (12, 13, 26) jeweils mindestens einen Arm (14, 18, 27) aufweist, wobei der Arm im montierten Zustand eine der Platten (2, 3) auf der Seite des gegenüberliegenden Profils (6 bzw. 4) überlappt.
14. Anordnung aus Gehäuse und Platte nach Anspruch 13, bei der der Arm oder die Arme (14, 27) wenigstens einer Anzahl der Anker im montierten Zustand auch das gegenüberliegende Profil (6 bzw. 4) in bezug auf das Innen- bzw. das Außenprofil (4 bzw. 6) hält bzw. halten.
15. Anordnung aus Gehäuse und Platte nach Anspruch 13, bei der der Arm oder die Arme (18) wenigstens einer Anzahl der Anker am gegenüberliegenden Profil (6 bzw. 4) angebracht sind, um das gegenüberliegende Profil (6 bzw. 4) zu halten.
16. Anordnung aus Gehäuse und Platte nach Anspruch 14 oder 15, bei der die Arme wenigstens einer Anzahl der Anker sich bis nahe an Dichtungen zwischen dem gegenüberliegenden Profil (6 bzw. 4) und der Platte (2, 3) erstreckt.
- intérieur et extérieur (4 ou 6 respectivement) indépendamment de la condition de l'autre parmi lesdits profilés intérieur et extérieur (6 ou 4 respectivement) et de retenir ledit profilé opposé (6 ou 4 respectivement) par rapport au premier desdits profilés intérieur et extérieur (4 ou 6 respectivement).
2. Système d'enchâssement selon la revendication 1, dans lequel un certain nombre des ancrages (12, 13, 26) au moins comprennent chacun au moins un bras (14, 18, 27), ledit bras chevauchant, en condition montée, l'un des panneaux (2, 3) sur le côté du profilé opposé (6 ou 4 respectivement).
3. Système d'enchâssement selon la revendication 2, dans lequel un certain nombre des ancrages (12, 13) au moins comprennent chacun deux desdits bras (14, 18) qui se projettent dans des directions opposées.
4. Système d'enchâssement selon l'une ou l'autre des revendications 2 et 3, dans lequel l'ancrage (12, 13, 26) comprend un élément en forme de plaque (14, 16, 26), dont fait partie ledit bras (14, 18, 27).
5. Système d'enchâssement selon l'une quelconque des revendications 2 à 4, dans lequel au moins un certain nombre des ancrages (12, 13, 26) sont ainsi conçus que le bras ou les bras (14, 27) de chacun desdits ancrages, en condition montée, retient aussi le profilé opposé (6 ou 4 respectivement) par rapport audit profilé intérieur ou extérieur (4 ou 6 respectivement).
6. Système d'enchâssement selon l'une quelconque des revendications 2 à 4, dans lequel au moins un certain nombre des ancrages (13) sont agencés, en condition montée, afin de monter le bras ou les bras (18) de chacun desdits ancrages sur le profilé opposé (6 ou 4 respectivement), pour retenir le profilé opposé (6 ou 4 respectivement) par rapport audit profilé intérieur ou extérieur (4 ou 6 respectivement).
7. Système d'enchâssement selon l'une ou l'autre des revendications 5 et 6, dans lequel les bras ont une longueur telle que, en condition montée, ils s'étendent jusqu'à proximité des étanchements entre le profilé opposé (6 ou 4 respectivement) et le panneau (2, 3).
8. Système d'enchâssement selon la revendication 4, dans lequel l'élément en forme de plaque est pourvu d'un trou (22, 24), et l'ancrage comprend en outre un élément de fixation (23) en forme de tige ayant un diamètre adapté pour coopérer avec ledit trou (24).

Revendications

1. Système d'enchâssement comprenant des profilés en aluminium extérieur et intérieur (6 et 4 respectivement) afin de confiner entre eux les bordures d'un panneau (2, 3), **caractérisé par** des ancrages locaux (12, 13, 26) réalisés en un matériau présentant une température de défaillance plus élevée que l'aluminium, distribués sur la longueur des profilés (4, 6), lesdits ancrages (12, 13, 26) étant adaptés afin d'être ancrés en condition montée par rapport à l'un des profilés intérieur et extérieur (4 ou 6 respectivement) et, en condition montée, de retenir ledit panneau (2, 3) par rapport à l'un desdits profilés

9. Système d'enchâssement selon la revendication 4, dans lequel l'élément en forme de plaque comprend une lèvre à bride et en ce que l'un au moins des profilés est pourvu de trous dans lesquels se loge la lèvre en condition montée. 5
10. Système d'enchâssement selon l'une quelconque des revendications précédentes, dans lequel au moins un certain nombre des ancrages (26) sont construits chacun sous forme d'élément en plaque bridée de manière à présenter une forme en L et comportant un bord en crochet bridé vers l'extérieur (29) à une extrémité extérieure de l'une des pattes (28). 10
11. Système d'enchâssement selon l'une quelconque des revendications 1 à 9, dans lequel au moins un certain nombre des ancrages (12, 13, 26) sont construits chacun comme élément en plaque en forme de U (16) ayant au moins une bride (18) qui se projette vers l'extérieur depuis une extrémité libre d'une patte et un élément de fixation (7) qui se projette vers l'extérieur depuis le fond de l'élément en plaque en forme de U (16). 20
12. Ensemble formé d'un panneau et d'un enchâssement, comprenant des profilés en aluminium extérieur et intérieur (6 et 4 respectivement) entre lesquels sont confinées les bordures d'un panneau (2, 3), **caractérisé par** des ancrages localisés (12, 13, 26) distribués sur la longueur des profilés et réalisés en un matériau ayant une température de défaillance plus élevée que celle de l'aluminium, lesdits ancrages (12, 13, 26) étant ancrés chacun par rapport à l'un des profilés intérieur et extérieur (4 ou 6 respectivement) pour retenir ledit panneau (2, 3) par rapport audit profilé intérieur et extérieur (4 ou 6 respectivement) indépendamment de la condition du profilé intérieur ou extérieur opposé (6 ou 4 respectivement) et pour retenir ledit profilé opposé desdits profilés intérieur et extérieur par rapport au premier des profilés intérieur et extérieur (4 ou 6 respectivement). 25
13. Ensemble formé d'un panneau et d'un enchâssement, selon la revendication 12, dans lequel au moins un certain nombre des ancrages (12, 13, 26) comprennent chacun au moins un bras (14, 18, 27), ledit bras recouvrant l'un des panneaux (2, 3) sur le côté du profilé opposé (6 ou 4 respectivement). 30
14. Ensemble formé d'un panneau et d'un enchâssement, selon la revendication 13, dans lequel le bras ou les bras (14, 27) d'au moins un certain nombre des ancrages (12, 13, 26) retiennent aussi le profilé opposé (6 ou 4 respectivement) par rapport audit profilé intérieur ou extérieur (4 ou 6 respectivement). 35
15. Ensemble formé d'un panneau et d'un enchâssement, selon la revendication 13, dans lequel le bras ou les bras (18) d'au moins un certain nombre des ancrages sont montés sur le profilé opposé (6 ou 4 respectivement), pour retenir le profilé opposé (6 ou 4 respectivement). 40
16. Ensemble formé d'un panneau et d'un enchâssement selon l'une ou l'autre des revendications 14 et 15, dans lesquels les bras d'au moins un certain nombre des ancrages s'étendent jusqu'au voisinage d'étanchements entre le profilé opposé (6 ou 4 respectivement) et le panneau (2, 3). 45
17. Ensemble formé d'un panneau et d'un enchâssement, selon la revendication 12, dans lequel au moins un certain nombre des ancrages (12, 13, 26) comprennent chacun au moins un bras (14, 18, 27), ledit bras recouvrant l'un des panneaux (2, 3) sur le côté du profilé opposé (6 ou 4 respectivement). 50
18. Ensemble formé d'un panneau et d'un enchâssement, selon la revendication 13, dans lequel le bras ou les bras (14, 27) d'au moins un certain nombre des ancrages (12, 13, 26) retiennent aussi le profilé opposé (6 ou 4 respectivement) par rapport audit profilé intérieur ou extérieur (4 ou 6 respectivement). 55

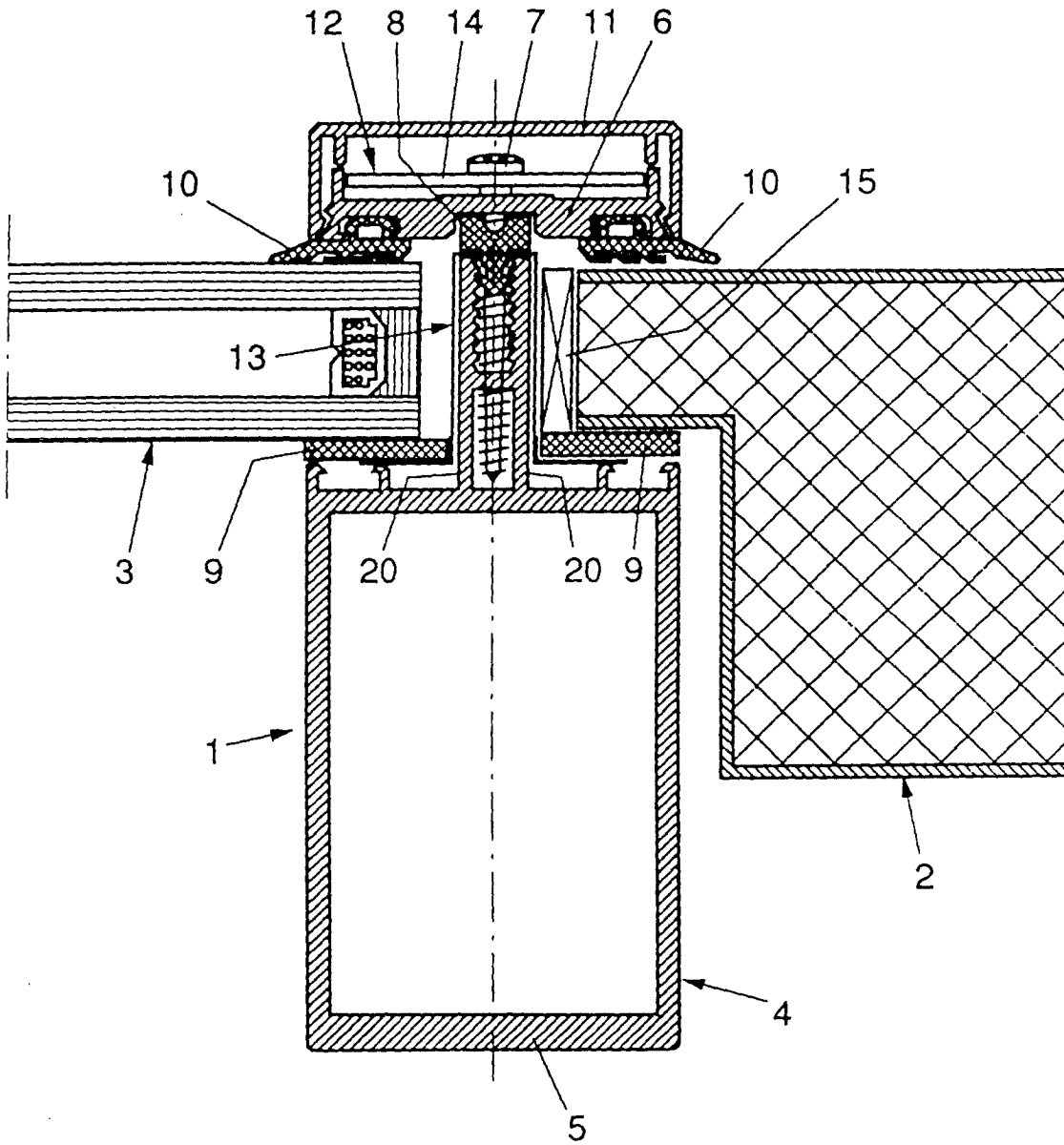
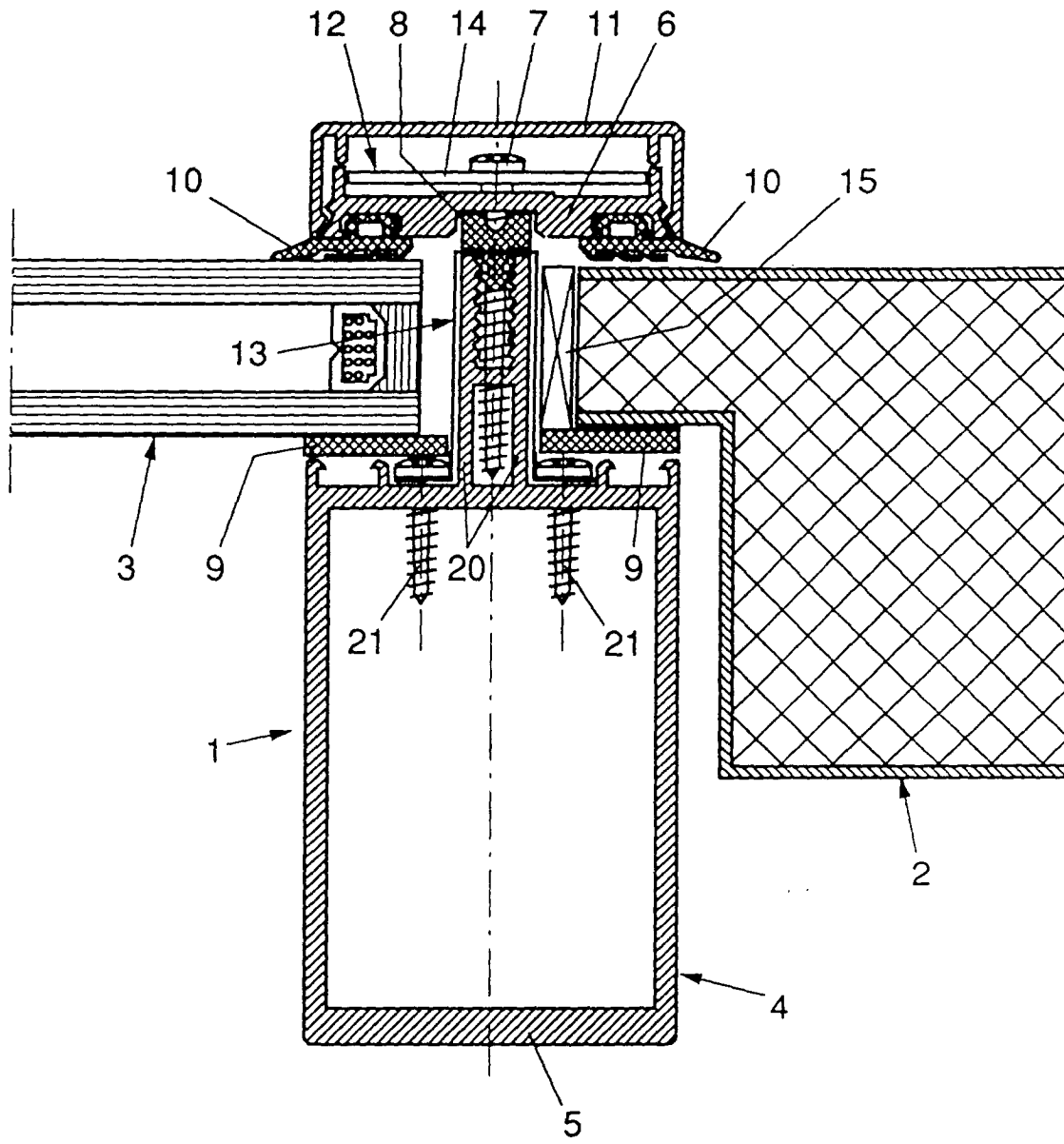


FIG. 1



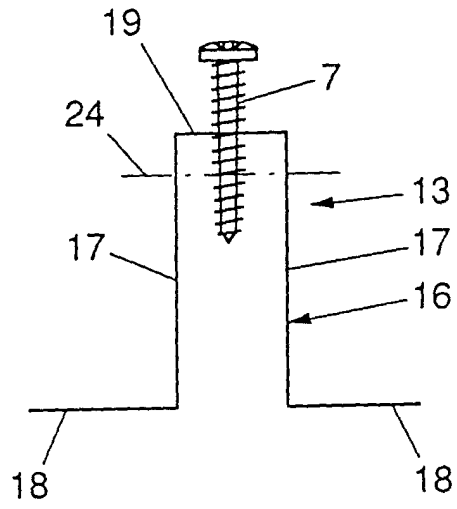


FIG. 3

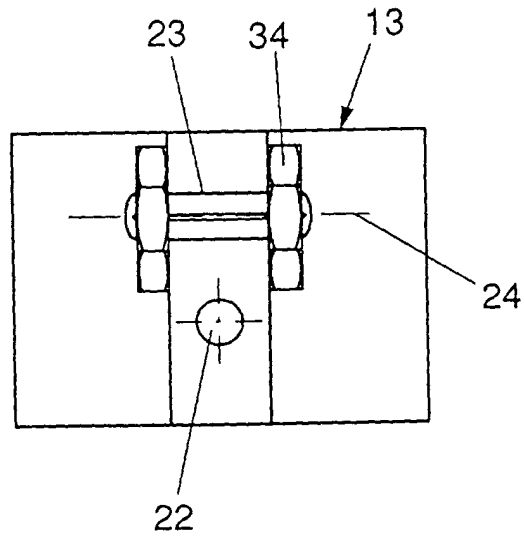


FIG. 4

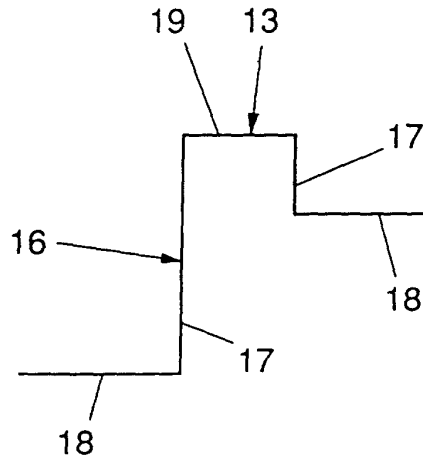


FIG. 5

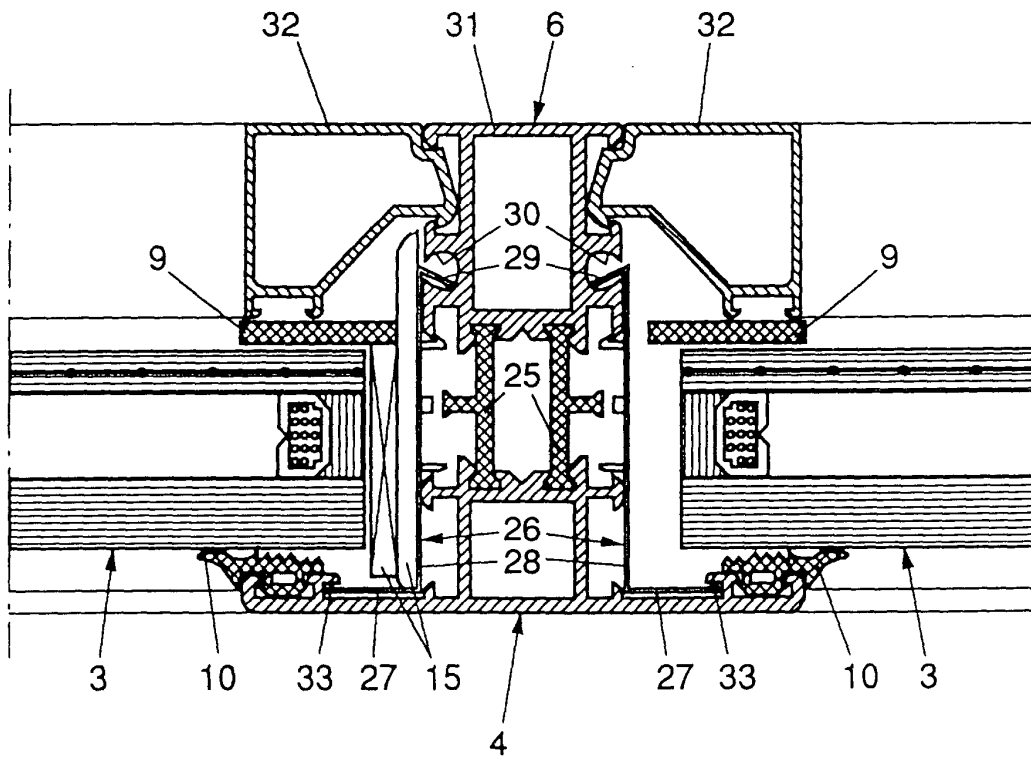


FIG. 6