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(54) **SYSTEM FOR JOINING MULLIONS TO TRANSOMS BY FRONTAL LINK**

SYSTEM FÜR DIE FRONTVERBINDUNG VON PFOSTEN UND RIEGELN

SYSTEME DE MONTAGE DE MONTANTS SUR DES TRAVERSES AU MOYEN D'UNE FIXATION FRONTALE

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Description

Application field

[0001] This patent refers to a system for joining section bars used in facades (both to mullions and transoms, be they structural or semi-structural) band frames, movable walls and in general wherever mullions are to be joined to transoms with mitred joints, without additional work. Such a system is known from document BE-A-1003563.

State of the art

[0002] A great number of systems for joining mullions to transoms by means of metal or plastic section bars are available. The most advanced systems provide for non-sequential joining of section bars by frontal insertion of transoms into mullions. This allows transom preparation before assembly, with a subsequent reduction in costs. Costs are further decreased also because this particular method enables an easier assembly process compared to that of sequential joining systems.

[0003] Unfortunately, the frontal joining systems known today, although effective, have relatively high assembly and disassembly costs. In order to decrease these costs many new solutions have been devised, with the aim of reducing preparation of the parts to be linked to the minimum.

[0004] We have thus passed from the preparation of mullions - to create notches where transoms are to be inserted - to the adjustment of the transoms themselves. The latter, after having been cut to the desired length, are milled or sheared in order to remove a portion of their outer wall, close to the ends. The transoms are then frontally inserted into side supports which have been fastened to the mullions by means of screws and are tightly locked to them with additional screws. Additionally, in order to favour the discharge of condensation water through the mullion's gutter, transom ends are milled once again, so as to obtain two projections, one on each side, directing the water into the above mentioned channel.

[0005] It is clear that mullion and transom preparation costs are very high, given the number of adjustments to be performed: double milling or shearing of transoms, milling of mullions, double perforation of mullions (in order to create the holes in which both the screws for the side supports and those needed for joining the transoms to the mullions will be fastened).

[0006] Moreover, a certain amount of labour is required both for the preparation of the section bars and the fastening of side supports in advance.

[0007] Alternative frontal fastening methods include the use of linking elements which make it possible to skip part of the section bar preparation process. According to these new methods, transoms are cut to the desired length. The ends are then closed with plastic plugs which act both as gaskets and dilatation compensators. Finally, transoms and mullions are joined together with metal bars which are placed horizontally between the two and fastened to them by means of screws. The metal bars are fitted into special transom channels or chambers, creating a typical cross-shaped joint where screws are essential to keep the structure tightly fastened. Apart from the transoms' low resistance to torsion stress, it is however necessary to pierce or shear both the mullions and the transoms, which makes preparation of the various parts expensive, although to a lesser extent.

Summary of the invention

[0008] The aim of this invention is to offer users a section bar linking system which does not require extra adjustments other than the cutting of mullions and transoms during the making of facades, band frames and movable walls. Consequently, this invention also aims at enabling frontal assembly and disassembly of section bars at extremely low costs, thus offering great economic advantages.

[0009] These and other aims are achieved by the system as defined by the claims, which is the subject matter of this invention and which is characterised by the use of section bars, an insert and spacers.

[0010] The section bars used for the making of transoms are provided with at least one channel (whose longitudinal axis is parallel to that of the section bars), developing vertically.

[0011] The section bars used for the making of mullions are provided with at least two grooves whose longitudinal axis is parallel to that of the section bars and symmetrical to the central beams. In its cross-section each groove is provided with at least one coupling jaw, one holding jaw, and one inclined plane. Each groove can be divided into two channels by a sufficiently flexible fin, whose longitudinal axis is parallel to that of the mullion, which has to be provided with at least one coupling and one holding jaw. At the end of at least one channel, a projection creates the inclined plane, while at the end of the other channel a projection creates a housing.

[0012] The insert is provided with at least one connection beam perpendicular to its body. The body of each insert is housed in at least one of the transom channels whereas the end supplied with the connection beam inevitably protrudes from the channel itself. The connection beam may vary in shape but in all cases has to be provided with at least one coupling and one holding jaw. The connection beam's end can be formed by a terminal, complementary or not to the above mentioned housing. The insert may also be supplied with a guide beam placed perpendicularly to the insert's body and in the same direction as the connection beam. This guide beam may be provided with a terminal, preferably placed at its distal end and perpendicularly to the beam. The insert body may be subdivided into two or more sections which are parallel to the transoms, joining at the mullion. The insert is provided with two or more holes, threaded or not, at

least one of which is to be located on the insert's body itself and another near the connection beam. These holes hold screws or dowels.

[0013] Fitted into the holes, the screws and dowels prevent the insert from moving vertically. Nevertheless, in order to prevent heavy glass panes or panels or minute loads from causing a downward slip of the transom, a metal profile spacer may be used, having a varied section structure.

[0014] The spacer, which may host the vertical sealing gasket and act as a support for the shutters' retaining elements, is fixed to the mullion by means of joints, gaskets or any other simple fitting method. It may have diverse shapes and may or may not be provided with a coupling jaw to be inserted in at least one of the mullion's jaws. The spacer is inserted into a specific slot for fitting or in at least one of the channels.

[0015] Each transom end may be closed by a tight plug, formed by a body having the same profile as the transom, with a support protruding from it and facing oppositely to the transom end. The support is provided with one or more slits whose clear span is the same size as that of the insert's body and may also be provided with horizontal holes.

[0016] By using the above described insert for the fixing of transoms to mullions, apart from transom cutting, all other adjustments are avoided. Transoms are previously cut to the desired length in the workshop and, if required, their ends are covered with the plugs in which the inserts are placed. Consequently, the persons in charge of assembling facades, band frames, movable walls etc., will simply have to fix the inserts to the mullions and the transoms. Assembly therefore becomes quick and easy, drastically reducing the costs and time usually required to carry out these operations.

Short description of drawings

[0017] Further characteristics and advantages of the present invention will be clearer from the description of some preferred, but not unique, embodiments of the invention showing - for information only, and without any limitation -the details of the system on the drawings enclosed herewith, where:

- fig. 1 shows the cross section of a mullion according to the invention;
- fig. 2 shows the cross section of a transom;
- fig. 3 shows the enlarged cross section of a spacer;
- fig. 4 shows an insert seen from above;
- fig. 5 shows an enlarged cross section of a mullion's seat;
- fig. 6 shows an enlarged longitudinal section of the extremity of the insert shown in fig. 4;
- fig. 7 shows a section of part of the area where the mullion and insert are joined;
- fig. 8 shows the transom, insert and plug seen from above;
- fig. 9 shows the exploded perspective view of the transom, the insert and plug previously illustrated;
- fig. 10 shows the same details described in the previous drawing, assembled together;
- fig. 11 shows the exploded perspective view of the mullion, transom, insert and plug illustrated in the previous drawings; part of the mullion has been removed in order to better show how the insert is locked into the mullion;
- fig. 12 shows the cross section of a second mullion according to the invention;
- fig. 13 shows the cross section of a second transom;
- fig. 14 shows an enlarged cross section of a second spacer;
- fig. 15 shows an enlarged cross section of part of the mullion shown in fig. 12;
- fig. 16 shows an enlarged view of a second insert, seen from above;
- fig. 17 shows a section of the mullion, transom, insert, plug and spacer shown in figures 12, 13, 14, now joined together;
- fig. 18 shows another cross section of the transom shown in fig. 13;
- fig. 19 shows the exploded perspective view of the mullion, transom, insert and plug shown in figures 12-18;
- fig. 20 shows a cross section of a third mullion according to the invention;
- fig. 21 shows the cross section of a third transom;
- fig. 22 shows the cross section of a third spacer;
- fig. 23 shows the cross section of a fourth spacer;
- fig. 24 shows the enlarged cross section of part of the mullion shown in fig. 20;
- fig. 25 shows the enlarged view of a third insert, seen from above;
- fig. 26 shows a section of the mullion, transom, insert, plug and the spacers shown in figures 20-25, joined together;
- fig. 27 shows another cross section of the transom shown in fig. 21 ;
- fig. 28 shows the cross section of a mullion and a spacer for internal walls;
- fig. 29 shows the longitudinal section of a fourth insert;
- fig. 30 shows the cross section of the spacer shown in fig. 28;
- fig. 31 shows the cross section of a transom and its corresponding insert for internal walls.

Detailed description of four preferential methods of realisation

[0018] A first example of realisation of the joining system here described, particularly suitable for continuous facades, foresees the use of insert 1, of a section bar which will create mullion 2, of a second section bar creating transom 3 and of spacer 4.

[0019] Insert 1 is formed by a body 1.1 and a connec-

tion beam 1.2 which is perpendicular to the body itself. Body 1.1 of insert 1 is divided into two parts which are parallel to transoms 3, joined together near beam 1.2. Connection beam 1.2 is provided with a coupling jaw 1.3 and a holding jaw 1.4. Insert 1 is provided with four holes, two threaded holes 1.5 along body 1.1 and two non-threaded holes 1.6 near connection beam 1.2.

[0020] The section bars used to create transoms 3 have a box-like body 3.1 and two channels 3.2 whose longitudinal axis is parallel to that of transoms 3, developing vertically. The two parts of body 1.1 of insert 1 are fitted into channels 3.2, whereas the extremity provided with connection beam 1.2 protrudes from channels 3.2.

[0021] The connection beam 1.2 protrudes from the transom 3 since there is a predetermined stop point given by the end of the channel that is created in the middle of the two parts that make up the body of the insert 1.

[0022] The section bars used to create mullions 2 have a box-like body 2.1 and a double seat 2.2, whose longitudinal axis is parallel to that of the section bars and rigid edges. The central beams 2.3 holding the section bar which blocks the glass or panel, are placed between the two seats 2.2. On the side facing beams 2.3, each seat 2.2 is closed by fin 2.4, whose longitudinal axis is parallel to that of mullion 2. Fin 2.4 is provided with a coupling jaw 2.5. A holding jaw 2.6 is placed opposite to jaw 2.5 on the edge of seat 2.2 facing the external side of mullion 2. At the bottom of each seat 2.2 a projection creates inclined plane 2.7. The edge facing central beams 2.3 of seat 2.2 is also inclined, thus forming another inclined plane, 2.8. A third section bar is used both as an internal glass-holder and as a spacer, 4. It is formed by body 4.1 which is provided with two beams 4.2. Each beam is provided with a coupling jaw, 4.3.

[0023] A tight plug 5 closes the ends of each transom 3. Each plug 5 is formed by a body 5.1 having the same profile as the tubular portion of transom 3 and a support 5.2 protruding from body 5.1 itself. Plug 5 is crossed by two vertical slits 5.3 having a clear span of the same size as the two parts of body 1.1 of insert 1 and by two horizontal holes 5.4, if required.

[0024] At the time of assembly, transom 3, already equipped with plugs 5 and inserts 1 at its extremities, is brought close to mullion 2, frontally.

[0025] The inserts 1 are fastened to the transom 3 by means of the dowels 7 which are inserted into the threaded holes 1.5 of the body 1.1 of the insert itself. The dowels 7 engrave the walls of the transom 3 itself, preventing the insert 1 from moving in the channels 3.2. The transom 3 is then brought close to the mullion 2, frontally.

[0026] Connection beam 1.2 of each insert 1 is fitted into each of seats 2.2 until coupling jaw 1.3 clasps to coupling jaw 2.5. The coupling of jaws 1.3 and 2.5 avoids that the group formed by transom 3 and insert 1 should detach from mullion 2.

[0027] In order to lock insert 1 and prevent the group formed by insert 1 and transom 3 from sliding vertically along mullion 2, screws 6 are inserted in holes 1.6 placed close to connection beam 1.2. These screws, which may also pass through holes 5.4 of plug 5, engrave jaw 2.6, creating horizontal grooves which prevent the above mentioned vertical sliding. By inserting screws 6 into seat 2.2, connection beam 1.2 of each insert 1 is pushed against its corresponding inclined plane 2.8. At the same time, the tips of screws 6 use the second inclined plane 2.7 as a fulcrum to lever on plug 5, forcing it to press against mullion 2, thus preventing water leakage and therefore ensuring a tight system. Two dowels 7 prevent insert 1 from moving within channels 3.2 of transom 3. Dowels 7 are inserted in threaded holes 1.5 of body 1.1 of insert 1 engraving the walls of transom 3.

[0028] Spacer 4, formed by a glass-holding section bar, prevents insert 1 from moving vertically when transom 3 has to support heavy or sudden loads.

[0029] Both beams 4.2 are inserted in the same seat 2.2 of mullion 2 in which beam 1.2 of insert 1 is housed. Jaws 4.3 couple with coupling jaw 2.5 and holding jaw 2.6 of seat 2.2 thus tightly fastening spacer 4 to mullion 2.

[0030] Spacer 4 is placed between one insert 1 and the insert above it. Its function is not only that of holding the glass, it also creates a vertical distance between one transom 3 and the other and supports them. Assembly time is therefore reduced since scribing on mullions 2 is no longer necessary.

[0031] Assembly is sequential and upward oriented. After locking mullions 2 in the desired position, a first transom 3 is fastened to two contiguous mullions 2; then, spacers 4 are fitted into the two mullions 2 placed above the first two inserts 1, then another transom 3 is fastened and the sequence continues until the facade is completed.

[0032] A second example of realisation of the joining system here described, also suitable for continuous facades, still foresees the use of an insert 1, of a section bar which will create mullion 2, of a second section bar creating transom 3 and of a spacer 4.

[0033] In this second example, apart from a coupling jaw 1.3 and a holding jaw 1.4 opposite to it, insert 1 is provided with a terminal 1.7. Insert 1 is also provided with a guiding beam 1.8 placed perpendicularly to body 1.1 and facing the same direction as connection beam 1.2. This second beam 1.8 is also provided with a terminal 1.9, placed at its distal extremity and perpendicular to beam 1.8 itself.

[0034] The section bars used to create mullions 2 have each double seat 2.2 divided into two channels 2.9 and 2.10, and by fin 2.4, which in this case is thin and flexible. Coupling jaw 2.5 and holding jaw 2.6 are placed on fin 2.4 itself; coupling jaw 2.5 facing channel 2.9 and holding jaw 2.6 facing channel 2.10. At the bottom of channel 2.10, placed towards the middle of mullion 2, a projection creates inclined plane 2.7. At the bottom of channel 2.9, placed towards the external side of mullion 2, a projection 2.11, together with the walls of channel 2.9, creates housing 2.12.

[0035] The section bar used as spacer 4, is formed by

a body 4.1 and two beams 4.2 One of the two beams is provided with a coupling jaw 4.3 while the other beam ends with a fin 4.4 placed perpendicularly to the beam 4.2 itself. Housing 4.5 of body 4.1 holds a vertical gasket 8.

[0036] At the time of assembly, transom 3, already equipped with plugs 5 and inserts 1 at its extremities, is frontally brought close to mullion 2. Connection beam 1.2 of each insert 1 is fitted into the most external channel 2.9 and guiding beam 1.8 into the second channel 2.10 until coupling jaw 1.3 clasps to coupling jaw 2.5. The encumbrance of beam 1.2 determines its correct coupling with mullion 2. In fact, it has to be greater than the distance between the lateral extremity of jaw 2.5 and the edge of channel 2.9 (net measure) thus forcing the fin to bend when connection beam 1.2 is inserted into channel 2.9. When jaws 1.3 and 2.5 clasp together, fin 2.4 returns to its original position simultaneously pushing beam 1.2 against the edge of channel 2.9 opposite to that of fin 2.4 and forcing the support area 1.4 of connection beam 1.2 against rigid edge 2.13. Eventually, terminal 1.7 places itself into housing 2.12 placed between the edges of channel 2.9 and projection 2.11.

[0037] The coupling of jaws 1.3 and 2.5 avoids that insert 1 should detach from mullion 2. The contact between the support area 1.4 and the edge 2.13 of channel 2.9 and the contact between terminal 1.7 and the walls of housing 2.12 prevents insert 1 - and therefore transom 3 - from rotating along one of its longitudinal axes.

[0038] Screws 6, which also pass through holes 5.4 of plug 5, are inserted into holes 1.6 close to connection beam and engrave holding jaw 2.6. Beam 1.8 guides screws 6 into channel 2.10. The locking with screws 6 is therefore performed by using the more central channel 2.10 and not channel 2.9 where beam 1.2 is housed. By inserting screws 6, fin 2.4 does not bend and its jaw 2.5 does not detach from jaw 1.3 of connection beam 1.2.

[0039] Both beams 4.2 are inserted in the same channel 2.9 of mullion 2 in which beam 1.2 of insert 1 is housed. Jaw 4.3 couples with coupling jaw 2.5 of fin 2.4. Fin 4.4 of the other beam 4.2 places itself in housing 2.12 thus tightly fastening spacer 4 to mullion 2.

[0040] A third example of realisation of the joining system here described, also suitable for continuous facades, still foresees the use of an insert 1, of a section bar which will create mullion 2, of a second section bar creating transom 3 and of a spacer 9. These details differ in shape but they have the same characteristics as the ones previously described.

[0041] The only variations are the absence of the two terminals 1.7 and 1.9, the shape of spacer 9 and its housing onto mullion 2. Spacer 9 is provided with two beams, 9.1 and 9.2. Beam 9.2 is provided with a coupling jaw 9.3. Beam 9.2 is fitted into the most peripheral channel 2.9 of mullion 2 and its coupling jaw 9.3 Joins with coupling jaw 2.5 of channel 2.10. The other beam 9.1 fits into the other channel 2.10.

[0042] A second spacer may be used, spacer 10, which has the double function of creating a distance between transoms 3 and supporting the elements which fasten the doors. It is provided with two beams, 10.1 and 10.2 which are fitted into yet another channel 2.14 of mullion 2 having a different position, lateral, and a different function compared to that of channels 2.9 and 2.10 which serve to lock both insert 1 and spacer 9. Spacer 10 is fastened to mullion 2 by means of gasket 11 which is provided with a relief 11.1 intended to occupy groove 2.15 within channel 2.14.

[0043] A fourth example of realisation of the joining system here described, particularly suitable for interior movable walls, uses an insert 1, a section bar suitable to create mullion 2, of a second section bar creating transom 3 and of a spacer 12. Also in this case the details differ in shape but they have the same characteristics as the ones previously described. Fin 2.4 of mullion 2 is not provided with the inclined plane 2.7, the transom is only provided with one channel 3.2 and spacer 12 has two beams, 12.1 and 12.2, one of which is provided with a coupling jaw 9.3. Beam 12.2 of spacer 12 externally embraces mullion 2. Coupling jaw 12.3 of beam 12.1 of spacer 12 joins with holding jaw 2.6 of channel 2.10.

[0044] When fixing insert 1, two dowels 13 are used to prevent insert 1 - and thereafter transom 3 - from moving vertically. These dowels are inserted in holes 1.6 placed dose to connection beam 1.2 where they engrave jaw 2.6 of fin 2.4. The fitting of the dowels 13 ends when their tips come into contact with terminal 1.9 of guide beam 1.8, thus creating an end-stop. In this case the inclined plane 2.7 is not foreseen. In fact, since the tightness of the internal walls is not necessary, no plugs are used and the fulcrum function previously described for inclined plane 2.7 is senseless.

Claims

1. System for joining mullions to transoms by frontal link, said system comprising:

- section bars used to obtain transoms (3) having a body (3.1) and at least one channel (3.2) whose longer axis is the vertical axis and whose longitudinal axis is parallel to that of transoms (3);
- section bars used to obtain mullions (2) having at least two seats (2.2) whose longitudinal axis is parallel to that of mullions (2), symmetrical to central beams (2.3); in cross section each seat (2.2) is provided with at least one coupling jaw (2.5), one holding jaw (2.6), a first inclined plane (2.7) and a second inclined plane (2.8);
- inserts (1) each of which is formed by a body (1.1) and at least one connection beam (1.2) perpendicular to its body; the body (1.1) of each insert is able to be housed in at least one of the transom channels (3.2) whereas the end sup-

plied with the connection beam (1.2) protrudes from the channel (3.2) itself; the connection beam (1.2) is provided with at least one coupling (1.3) and one holding jaw (1.4); each insert is provided with two or more holes, threaded or not, at least one of which (1.5) is to be located on the insert's body itself and at least another (1.6) close to the connection beam (1.2); these holes (1.5, 1.6) hold screws or dowels (6, 7, 13);
- spacers (4, 9, 10, 12), formed by section bars which are fixed to the mullion (2) by means of joints, gaskets (11) or any other simple fitting method,
- a tight plug (5) which closes the ends of each transom (3); each plug (5) **is formed by a body (5.1) having the same profile as transom (3) and a** support (5.2) protruding from body (5.1) itself; this support (5.2) is crossed by one or more vertical slits (5.3) having a clear span of the same size as body (1.1) of insert (1) and by horizontal holes (5.4),

wherein, at the time of assembly, a transom (3), already equipped with a plug (5) and an insert (1) at its extremities, is brought close to a relative mullion (2), frontally, and a connection beam (1.2) of each insert (1) is fitted into each of seats (2.2) until said coupling jaw (1.3) of the insert clasps to said coupling jaw (2.5) of the mullion (2),
wherein screws (6) are inserted in said holes (1.6) to engrave said jaw (2.6) and push said connection beam (1.2) of the insert against its corresponding inclined plane (2.8),
and wherein the tips of the screws (6) use the other inclined plane (2.7) as a fulcrum to lever on said plug (5), forcing it to press against mullion (2), thus preventing water leakage and therefore ensuring a tight system.

2. Joining system according to claim 1, provided with a holding jaw (2.6) on the edge (2.13) of seat (2.2) of mullion (2).

3. Joining system according to claim 1, in which each double seat (2.2) of mullion (2) is divided into two channels (2.9, 2.10) by a thin and flexible fin (2.4), whose longitudinal axis is parallel to that of mullion (2); coupling jaw (2.5) and holding jaw (2.6) are placed on fin (2.4) itself; coupling jaw (2.5) facing channel (2.9) and holding jaw (2.6) facing the other channel (2.10); at the bottom of channel (2.10), positioned towards the middle of the mullion (2), a projection creates inclined plane (2.7); at the bottom of channel (2.9), placed towards the external side of the mullion (2), a projection (2.11), together with the walls of channel (2.9), creates a housing (2.12).

4. Joining System according to claim 1, in which body (1.1) of insert (1) is divided into two parts which are parallel to transoms (3), joined together near beam (1.2).

5. Joining system according to claim 1, in which each insert (1) is also provided with a guiding beam (1.8) placed perpendicularly to body (1.1) and facing the same direction as connection beam (1.2).

6. Joining system according to claims 1 and 3, in which the extremity of connection beam (1.2) is constituted by a terminal (1.7); this terminal may be complementary or not to the geometry of the above mentioned housing (2.12) of mullion (2).

7. Joining system according to claims 1 and 5, in which the distal extremity of guiding beam (1.8) is constituted by a terminal (1.9).

8. Joining system according to claims 1, 2 and 3, in which the above mentioned screws (6) or dowels (13), passing through the holes (1.6) placed close to the **connection beam (1.2) of the insert (1) engrave a holding jaw (2.6) of the** mullion (2) thus creating horizontal seats; one or more dowels (7) inserted into the threaded holes (1.5) of the body (1.1) of the insert (1) engrave transom (3) walls.

9. Joining system according to claims 1 and 3, in which at least one coupling jaw (1.3) of the insert (1) joins with at least one coupling jaw (2.5) of the mullion (2).

10. Joining system according to claim 1, in which the spacer (4, 9, 12) is inserted into the seat (2.2) or in at least one of the channels (2.9, 2.10) meant to be joined with the insert (1).

11. Joining system according to claim 1, in which the spacer (10) is inserted into a channel (2.14) of the mullion (2) which is not meant to be joined with the insert (1).

12. Joining system according to claims 1 and 10, in which the spacer (4, 9, 12) is provided with at least one coupling jaw (4.3, 9.3, 12.3) which joins with at least one coupling jaw (2.5) of the mullion (2).

13. Joining system according to claims 1 and 11, in which the spacer (10) is fastened to the mullion (2) by means of a gasket (11) provided with a relief (11.1) which fits into a groove (2.15) of the mullion (2) itself.

14. Joining method for the assembly of a facade, band frame, movable wall and in general wherever mullions are to be joined to transoms, using a system according to claim 1, comprising the following phases of assembly:

- equipping the extremities of a transom (3) with a plug (5) and an insert (1) using screws or dowels (7) inserted in holes (1.5) of body (1.1) of insert (1) engraving the walls of said transom (3);
- fixing the section bars used to obtain the mullions (2) in the desired position;
- bringing the group formed by the transom (3), the inserts (1) and the plug (5) close to two contiguous mullions (2) frontally;
- fitting the connection beam (1.2) of each insert (1) into a seat (2.2) or channel (2.9) of the mullion (2) until the coupling jaw (1.3) of each insert (1) couples with the jaw (2.5) of the mullion (2);
- fastening a first transom (3) to two contiguous mullions (2) by means of screws (6) or dowels (13) which pass through the holes (1.6) placed close to the connection beam (1.2) of the inserts (1) and through the holes (5.4) of the plugs (5), said screws (6) acting against the inclined plane (27) as a lever on plug (5), forcing it to press against mullion (2) thus ensuring a tight system;
- fastening each insert (1) to the transom (3) by means of screws or dowels (7), which pass through additional holes (1.5) obtained in the body (1.1) of the insert (1) itself;
- fitting appropriate spacers (4, 9, 10, 12) into the two mullions (2) above the first two inserts (1) or into special channels (2.14) meant for this purpose;
- fastening subsequent transoms (3) as described above; assembly is sequential and upward oriented and continues until the facade, band frame or movable wall is completed.

Patentansprüche

1. System zum Verbinden von Pfosten mit Riegeln durch Verbindung an der Vorderseite (frontal link), wobei das System umfasst:

Profilstäbe, die zum Erzeugen von Riegeln (3) verwendet werden und einen Hauptkörper (3.1) sowie wenigstens eine Rinne (3.2) haben, deren längere Achse die vertikale Achse ist und deren Längsachse parallel zu der von Riegeln (3) ist;
Profilstäbe, die zum Erzeugen von Pfosten (2) verwendet werden und wenigstens zwei Aufnahmen (2.2) haben, deren Längsachse parallel zu der von Pfosten (2) und symmetrisch zu Mittelträgem (2.3) ist, wobei jede Aufnahme (2.2) im Querschnitt mit wenigstens einer Kupplungsklaue (2.5), einer Halteklaue (2.6), einer ersten geneigten Ebene (2.7) sowie einer zweiten geneigten Ebene (2.8) versehen ist.
Einsätze (1), von denen jeder durch einen Hauptkörper (1.1) und wenigstens einen Verbindungsträger (1.2) senkrecht zu seinem Hauptkörper gebildet wird, wobei der Hauptkörper (1.1) jedes Einsatzes in wenigstens einem der Riegel-Kanäle (3.2) aufgenommen werden kann, während das mit dem Verbindungsträger (1.2) versehene Ende aus der Rinne (3:2) selbst vorsteht, der Verbindungsträger (1.2) mit wenigstens einer Kupplung (1.3) und einer Halteklaue (1.4) versehen ist, jeder Einsatz mit zwei oder mehr Löchern mit oder ohne Gewinde versehen ist, von denen wenigstens eines (1.5) an dem Hauptkörper des Einsatzes selbst angeordnet sein muss und wenigstens ein anderes (1.6) nahe an dem Verbindungsträger (1.2), wobei diese Löcher (1.5, 1.6) Schrauben oder Dübel (6, 7, 13) aufnehmen;
Abstandshalter (4, 9, 10, 12), die durch Profilstäbe gebildet werden, die an dem Pfosten (2) mittels Verbindungen, Dichtungen (11) oder jedem beliebigen einfachen anderen Anbringungsverfahren befestigt werden
einen eng anliegenden Stopfen (5), der die Enden jedes Riegels (3) verschließt, wobei jeder Stopfen (5) durch einen Körper (5.1), der das gleiche Profil wie ein Riegel (3) hat, und einen Halter (5.2) gebildet wird, der von dem Hauptkörper (5.1) selbst vorsteht, wobei dieser Halter (5.2) von einem oder mehreren vertikalen Schlitzen (5.3), die eine lichte Weite haben, die, die gleiche Größe hat wie der Körper (1.1) des Einsatzes (1), sowie von horizontalen Löcher (5.4), gekreuzt wird,
wobei beim Zusammensetzen ein Riegel (3), der bereits mit einem Stopfen (5) und einem Einsatz (1) an seinen äußeren Enden versehen ist, an der Vorderseite nahe an einen zugehörigen Pfosten (2) gebracht wird, und ein Verbindungsträger (1.2) jedes Einsatzes (1) in jede der Aufnahmen (2.2) eingepasst wird, bis die Kupplungsklaue (1.3) des Einsatzes an der Kupplungsklaue (2.5) des Pfostens (2) eingreift,
wobei Schrauben (6) in die Löcher (1.6) eingeführt werden, um die Klaue (2.6) einzudrücken und den Verbindungsträger (1.2) des Einsatzes an seine entsprechende geneigte Ebene (2.8) zu drücken,
und wobei die Spitzen der Schrauben (6) die andere geneigte Ebene (2.7) als Drehpunkt zum Hebeln an dem Stopfen (5) verwenden, so dass er an den Pfosten (2) gepresst wird und so das Eintreten von Wasser verhindert und damit ein dichtes System gewährleistet.

2. Verbindungssystem nach Anspruch 1, das mit einer Halteklaue (2.6) am Rand (2.13) der Aufnahme (2.2) des Pfostens (2) versehen ist.

3. Verbindungssystem nach Anspruch 1, wobei jede doppelte Aufnahme (2.2) des Pfostens (2) durch ei-

nen dünnen und flexiblen Steg (2.4), dessen Längsachse parallel zu der des Pfostens ist, in zwei Rinnen (2.9, 2.10) unterteilt wird; die Kupplungsklaue (2.5) und die Halteklaue (2.6) an dem Steg (2.4) angebracht werden, die Kupplungsklaue (2.5) einer Rinne (2.9) zugewandt ist und die Halteklaue (2.6) der anderen Rinne (2.10) zugewandt ist, am Boden der Rinne (2. 10), zur Mitte des Pfostens (2) hin positioniert, ein Vorsprung eine geneigte Ebene (2.7) erzeugt, am Boden der Rinne (2.9), zur Außenseite des Pfostens (2) hin angeordnet, ein Vorsprung (2.11) zusammen mit den Wänden der Rinne (2.9) ein Gehäuse (2.12) erzeugt.

4. Verbindungssystem nach Anspruch 1, wobei der Hauptkörper (1.1) des Einsatzes (1) in zwei Teile unterteilt ist, die parallel zu Riegeln (3) sind und in der Nähe des Trägers (1.2) miteinander verbunden sind.

5. Verbindungssystem nach Anspruch 1, wobei jeder Einsatz (1) auch mit einem Führungsträger (1.8) versehen ist, der senkrecht zu dem Hauptkörper (1.1) angeordnet ist und in der gleichen Richtung gewandt ist wie Verbindungsträger (1.2).

6. Verbindungssystem nach den Ansprüchen 1 und 3, wobei das äußere Ende des Verbindungsträgers (1.2) durch einen Abschluss (1.7) gebildet wird und dieser Abschluss komplementär zur Form des Gehäuses (2.2) des Pfostens (2) sein kann oder nicht.

7. Verbindungssystem nach den Ansprüchen 1 und 5, wobei das distale Ende des Führungsträgers (1.8) durch einen Abschluss (1.9) gebildet wird.

8. Verbindungssystem nach den Ansprüchen 1, 2 und 3, wobei die Schrauben (6) oder Dübel (13), die durch die Löcher (1.6) hindurch treten, die nahe an dem Verbindungsträger (1.2) des Einsatzes (1) angeordnet sind, eine Halteklaue (2.6) des Pfostens (2) eindrücken und so horizontale Aufnahmen erzeugen, wobei ein oder mehrere Dübel (7), die in die Gewindelöcher (1.5) des Hauptkörpers (1.1) des Einsatzes (1) eingeführt sind, Wände von Riegeln (3) eindrücken.

9. Verbindungssystem nach den Ansprüchen 1 und 3, wobei wenigstens eine Kupplungsklaue (1.3) des Einsatzes mit wenigstens einer Kupplungsklaue (2.5) des Pfostens (2) verbunden ist.

10. Verbindungssystem nach Anspruch 1,wobei der Abstandshalter (4, 9, 12) in die Aufnahme (2.2) oder in wenigstens eine der Rinnen (2.9, 2.10) eingeführt ist, die zur Verbindung mit dem Einsatz (1) bestimmt sind.

11. Verbindungssystem nach Anspruch 1, wobei der Abstandshalter (10) in eine Rinne (2.14) des Pfostens (2) eingeführt ist, die nicht zur Verbindung mit dem Einsatz (1) bestimmt ist.

12. Verbindungssystem nach den Ansprüchen 1 und 10, wobei der Abstandshalter (4, 9, 12) mit wenigstens einer Kupplungsklaue (4.3, 9.3, 12.3) versehen ist, die mit wenigstens einer Kupplungsklaue (2.5) des Pfostens (2) verbunden ist.

13. Verbindungssystem nach den Ansprüchen 1 und 11, wobei der Abstandshalter (10) mittels einer Dichtung (11), die mit einem Profil (11.1) versehen ist, das in eine Nut (2.15) des Pfostens (2) selbst passt, an dem Pfosten (2) befestigt ist.

14. Verbindungsverfahren zum Zusammensetzen einer Fassade, eines Leistenrahmens (band frame), einer beweglichen Wand und für den allgemeinen Einsatz dort, wo Pfosten mit Riegeln zu verbinden sind, unter Verwendung eines Systems nach Anspruch 1, wobei es die folgenden Phasen des Zusammensetzens umfasst:

Ausstatten der äußeren Enden eines Riegels (3) mit einem Stopfen (5) und einem Einsatz (1) unter Verwendung von Schrauben oder Dübeln (7), die in Löcher (1,5) eines Hauptkörpers (1.1) des Einsatzes (1) eingesetzt sind und die Wände des Riegels (3) eindrücken;
Befestigen der Profilstäbe, die zum Erzeugen der Pfosten (2) verwendet werden, in der gewünschten Position;
Bringen der Gruppe, die durch den Riegel (3), die Einsätze (1) und den Stopfen (5) gebildet wird, nahe an zwei benachbarte Pfosten (2) an der Vorderseite;
Einpassen des Verbindungsträgers (1, 2) jedes Einsatzes (1) in eine Aufnahme (2.2) oder eine Rinne (2.9) des Pfostens (2), bis die Kupplungsklaue (1.3) jedes Einsatzes (1) mit der Klaue (2.5) des Pfostens (2) in Verbindung kommt;
Befestigen eines ersten Riegels (3) an zwei benachbarten Pfosten (2) mittels Schrauben (6) oder Dübeln (13), die durch die Löcher (1.6) hindurch treten, die nahe an dem Verbindungsträger (1.2) der Einsätze (1) angeordnet sind und durch die Löcher (5.4) der Stopfen (5), wobei die Schrauben (6) auf die geneigte Ebene (27) wie ein Hebel auf den Stopfen (5) wirken und ihn an den Pfosten (2) pressen, um so ein dichtes System zu gewährleisten,
Befestigen jedes Einsatzes (1) an dem Riegel (3) mittels Schrauben oder Dübeln (7), die durch zusätzliche Löcher (1.5) hindurch treten, die in dem Hauptkörper (1.1) des Einsatzes (1) selbst hergestellt sind;

Einsetzen passender Abstandshalter (4, 9, 10, 12) in die zwei Pfosten (2) oberhalb der ersten zwei Einsätze (1) oder in spezielle Rinnen (2, 14), die für diesen Zweck bestimmt sind;
Befestigen folgender Riegel (3) wie oben beschrieben, wobei der Zusammenbau aufeinander folgend und nach oben gerichtet abläuft und andauert, bis die Fassade, der Leistenrahmen oder die bewegliche Wand fertig gestellt ist.

Revendications

1. Système de montage de montants sur des traverses au moyen d'une fixation frontale, ledit système comprenant :

- des profilés servant à former des montants (3), ayant un corps (3.1) et au moins un canal (3.2) dont l'axe le plus long est l'axe vertical et l'axe longitudinal est parallèle à celui des traverses (3) ;
- des profilés servant à former des montants (2), ayant au moins deux sièges (2.2) dont l'axe longitudinal est parallèle à celui des montants (2), symétriques par rapport à des poutrelles centrales (2.3) ; chaque siège (2.2) étant doté dans sa section transversale d'au moins une griffe d'accouplement (2.5), d'une griffe de maintien (2.6), d'un premier plan incliné (2.7) et d'un second plan incliné (2.8) ;
- des inserts (1) constitués chacun d'un corps (1.1) et d'au moins une poutrelle d'assemblage (1.2) perpendiculaire à ce corps ; le corps (1.1) de chaque insert peut se loger dans l'un au moins des canaux (3.2) de la traverse, tandis que l'extrémité dotée de la poutrelle d'assemblage (1.2) dépasse du canal (3.2) lui même ; la poutrelle d'assemblage (1.2) est pourvu d'au moins une griffe d'accouplement (1.3) et une griffe de maintien (1.4) ; chaque insert est pourvu de deux trous ou davantage, filetés ou non, dont l'un au moins (1.5) doit se trouver sur le corps d'insert lui-même et au moins un autre (1.6) près de la poutrelle d'assemblage (1.2) ; ces trous (1.5, 1.6) maintiennent des vis ou des goujons (6, 7, 13) ;
- des cales d'écartement (4, 9, 10, 12) formées par des profilés qui sont fixés au montant (2) par des éléments d'assemblage, des joins rigides (11) ou tout autre procédé simple d'ajustement ;
- un bouchon ajusté (5) qui ferme les extrémités de chaque montant (3) ; chaque bouchon (5) est constitué d'un corps (5.1) ayant le même profil que le montant (3) et d'un support (5.2) dépassant du corps (5.1) lui-même ; ce support (5.2) est traversé par une ou plusieurs fentes verticales (5.3) dont la largeur d'ouverture est de même dimension que le corps (1.1) de l'insert (1), et par des trous horizontaux (5.4),

dans lequel, au moment de l'assemblage, un montant (3), déjà équipé à ses extrémités d'un bouchon (5) et d'un insert (1), est amené à proximité d'un montant correspondant (2) par l'avant, et une poutrelle d'assemblage (1.2) de chaque insert (1) est installée dans chacun des sièges (2.2) jusqu'à ce que ladite griffe d'accouplement (1.3) de l'insert se referme sur ladite griffe d'accouplement (2.5) du montant (2),
dans lequel des vis (6) sont introduites dans lesdits trous (1.6) pour marquer d'une empreinte ladite griffe (2.6) et pousser ladite poutrelle d'assemblage (1.2) de l'insert contre son plan incliné correspondant (2.8),
et dans lequel les pointes des vis (6) utilisent l'autre plan incliné (2.7) comme point d'appui pour faire levier sur ledit bouchon (5), en le forçant à s'appuyer contre le montant (2), ce qui prévient les fuites d'eau et garantit donc l'étanchéité du système.

2. Système de montage selon la revendication 1, pourvu d'une griffe de maintien (2.6) sur le bord (2.13) du siège (2.2) du montant (2).

3. Système de montage selon la revendication 1, dans lequel chaque siège double (2.2) de montant (2) est divisé en deux canaux (2.9, 2.10) par une ailette mince et flexible (2.4) dont l'axe longitudinal est parallèle à celui du montant (2) ; la griffe d'accouplement (2.5) et la griffe de maintien (2.6) sont placées sur l'ailette (2.4) elle-même, la griffe d'accouplement (2.5) face au canal (2.9) et la griffe de maintien (2.6) face à l'autre canal (2.10) ; au fond du canal (2.10), positionnée en direction du milieu du montant (2), une projection crée un plan incliné (2.7) ; au fond du canal (2.9), positionnée en direction du côté externe du montant (2), une projection (2.11), conjointement aux parois du canal (2.9), crée un logement (2.12).

4. Système de montage selon la revendication 1, dans lequel le corps (1.1) de l'insert (1) est divisé en deux parties parallèles aux traverses (3) et reliées entre elles à proximité de la poutrelle (1.2).

5. Système de montage selon la revendication 1, dans lequel chaque insert (1) est également pourvu d'une poutrelle de guidage (1.8) placée perpendiculairement au corps (1.1) et face à la même direction que la poutrelle d'assemblage (1.2).

6. Système de montage selon les revendications 1 et 3, dans lequel l'extrémité de la poutrelle d'assemblage (1.2) est constituée d'un plot (1.7) dont la géométrie peut être complémentaire ou non du logement (2.12) de montant (2) mentionné ci-dessus.

7. Système de montage selon les revendications 1 et 5, dans lequel l'extrémité distale de la poutrelle de guidage (1.8) est constituée d'un plot (1.9).

8. Système de montage selon les revendications 1, 2 et 3, dans lequel les vis (6) ou goujons (13) mentionnés ci-dessus et traversant les trous (1.6) placés à côté de la poutrelle d'assemblage (12.) de l'insert (1) marquent d'une empreinte une griffe de maintien (2.6) du montant (2) en créant ainsi des sièges horizontaux ; un ou plusieurs goujons (7) introduits dans les trous filetés (1.5) du corps (1.1) de l'insert (1) marquent d'une empreinte les parois de la traverse (3).

9. Système de montage selon les revendications 1 et 3, dans lequel au moins une griffe d'accouplement (1.3) de l'insert (1) s'assemble à au moins une griffe d'accouplement (2.5) du montant (2).

10. Système de montage selon la revendication 1, dans lequel la cale d'écartement (4, 9, 12) est introduite dans le siège (2.2) ou dans l'un au moins des canaux (2.9, 2.10) destinés à être assemblé à l'insert (1).

11. Système de montage selon la revendication 1, dans lequel la cale d'écartement (10) est introduite dans un canal (2.14) du montant (2) qui n'est pas destiné à être assemblé à l'insert (1).

12. Système de montage selon les revendications 1 et 10, dans lequel la cale d'écartement (4, 9, 12) est pourvue d'au moins une griffe d'accouplement (4.3, 9.3, 12.3) qui s'assemble à au moins une griffe d'accouplement (2.5) du montant (2).

13. Système de montage selon les revendications 1 et 11, dans lequel la cale d'écartement (10) est fixée au montant (2) par un joint rigide (11) pourvu d'un relief (11.1) qui s'ajuste dans une gorge (2.15) du montant (2) lui-même.

14. Procédé de montage pour l'assemblage de façades, de chambranles, de parois amovibles et, de façon générale, de tous assemblages de montants à des traverses, utilisant un système selon la revendication 1 et comprenant les phases suivantes d'assemblage :

- équiper les extrémités d'une traverse (3) d'un bouchon (5) et d'un insert (1) au moyen de vis ou de goujons (7) introduits dans des trous (1.5) du corps (1.1) de l'insert (1) en marquant d'une empreinte les parois de ladite traverse (3) ;
- fixer les profilés utilisés pour former les montants (2) dans la position souhaitée ;
- amener l'ensemble formé par la traverse (3), les inserts (1) et le bouchon (5) à côté de deux montants (2) contigus, par l'avant ;
- ajuster la poutrelle d'assemblage (1.2) de chaque insert (1) dans un siège (2.2) ou un canal (2.9) du montant (2) jusqu'à ce que la griffe d'accouplement (1.3) de chaque insert (1) s'accouple à la griffe (2.5) du montant (2) ;
- fixer une première traverse (3) à deux montants contigus (2) au moyens de vis (6) ou de goujons (13) qui passent à travers les trous (1.6) placés près de la poutrelle d'assemblage (1.2) des inserts (1) et à travers les trous (5.4) des bouchons (5), lesdites vis (6) prenant appui contre le plan incliné (27) pour faire levier sur le bouchon (5), en le forçant à s'appuyer contre le montant (2) et en garantissant ainsi l'étanchéité du système.
- fixer chaque insert (1) à la traverse (3) au moyen de vis ou de goujons (7) qui passent à travers des trous supplémentaires (1.5) formés dans le corps (1.1) de l'insert (1) lui-même ;
- ajuster des cales d'écartement (4, 9, 10, 12) appropriées dans les deux montants (2) au-dessus des deux premiers inserts (1) ou dans des canaux spéciaux (2.14) prévus à cette fin ;
- fixer les traverses suivantes (3) ainsi qu'il a été décrit ci-dessus ; l'assemblage est séquentiel, s'effectue de bas en haut et se poursuit jusqu'à ce que la façade, le chambranle ou la paroi amovible soit terminé.

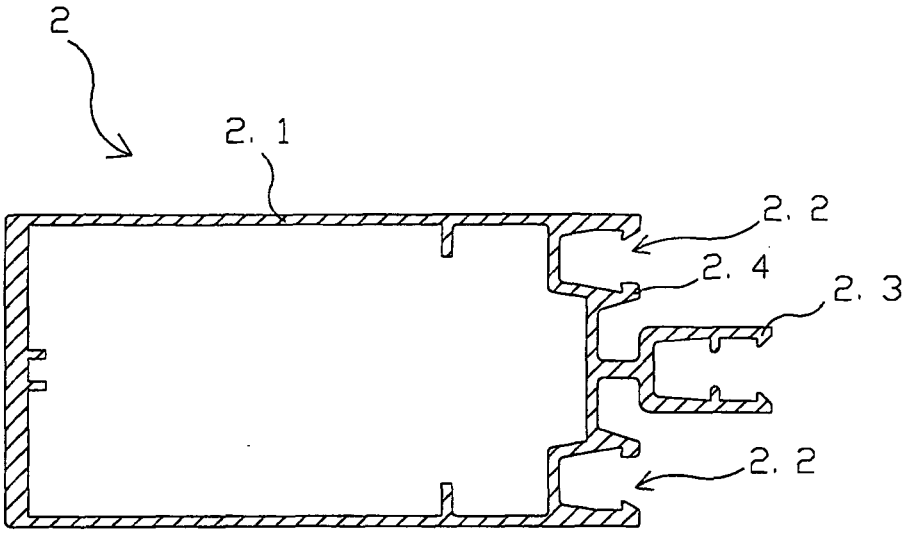


FIG. 1

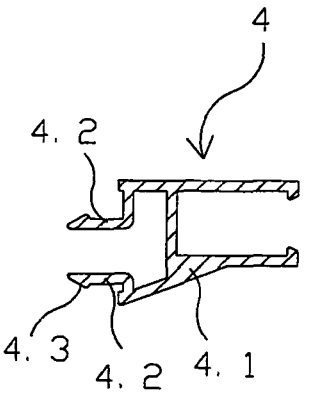


FIG. 3

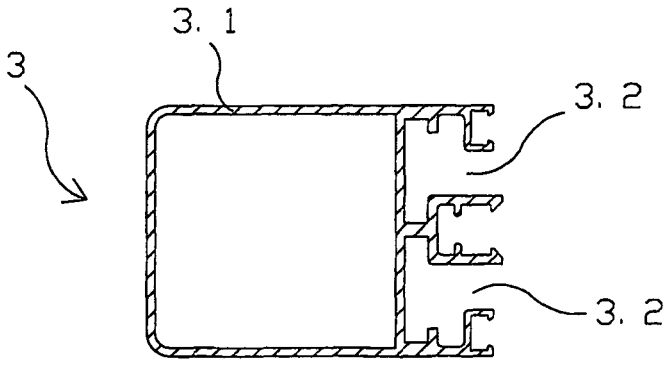


FIG. 2

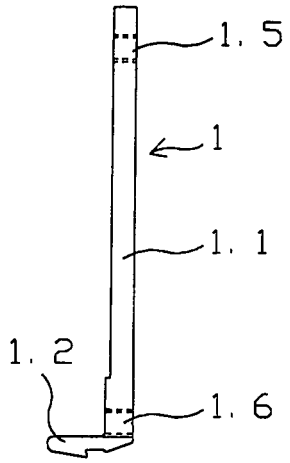


FIG. 4

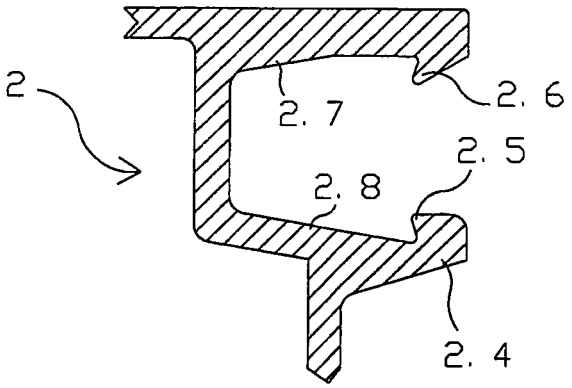


FIG. 5

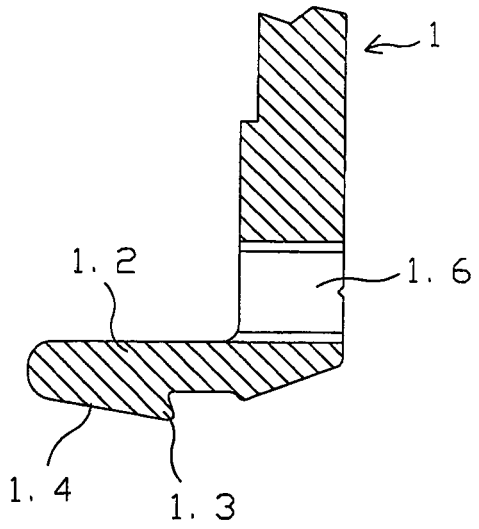


FIG. 6

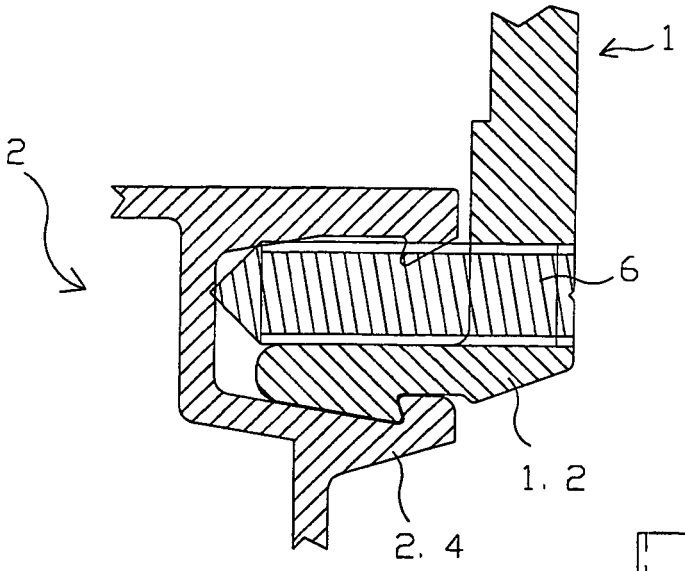


FIG. 7

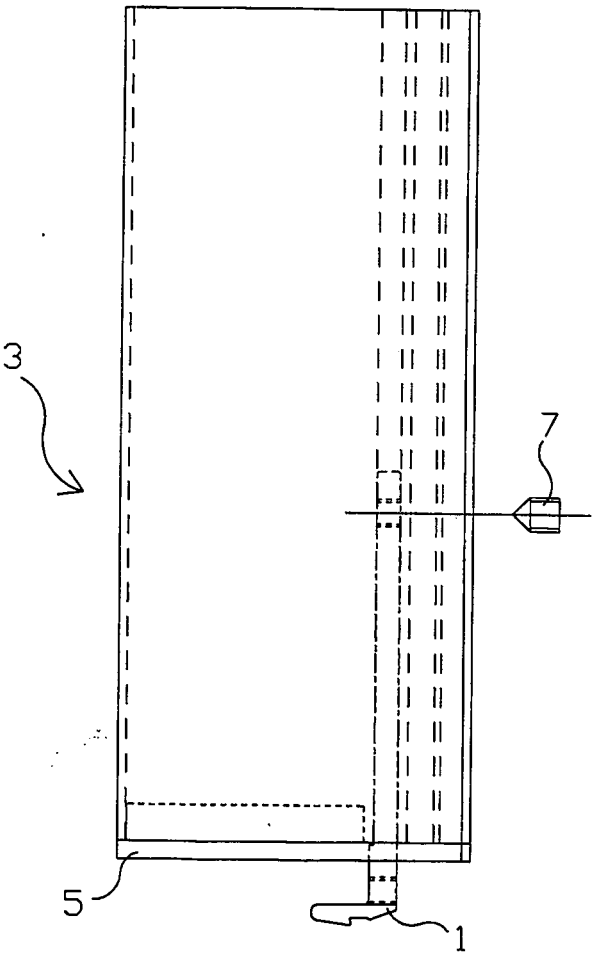


FIG. 8

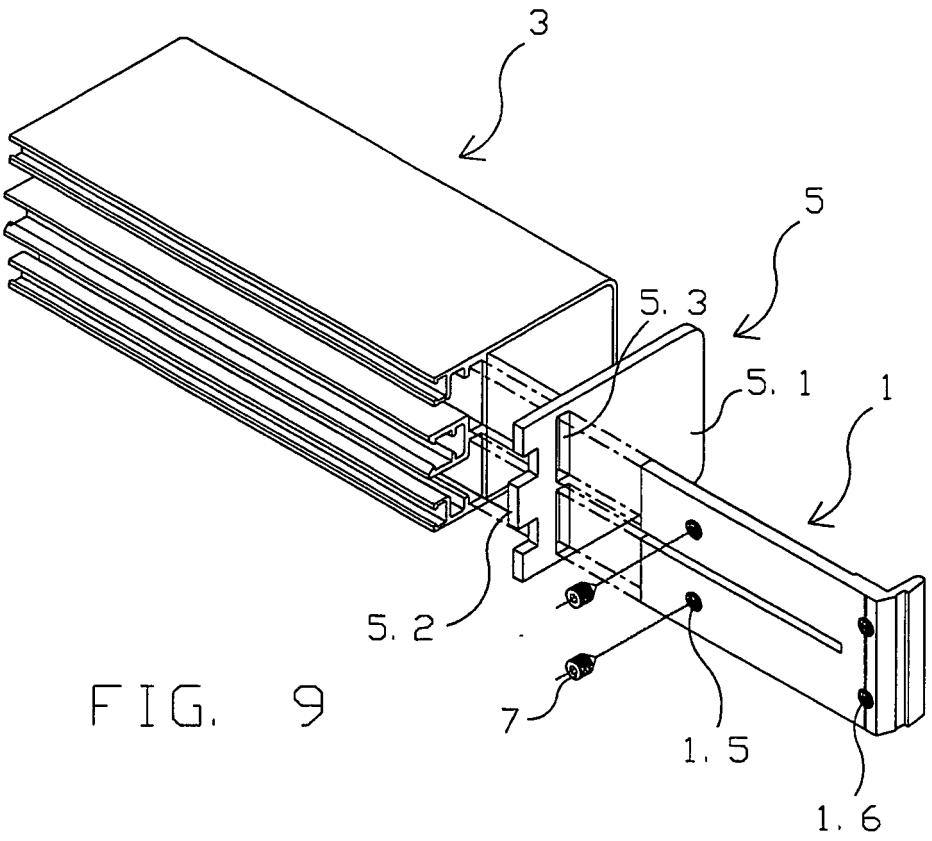


FIG. 9

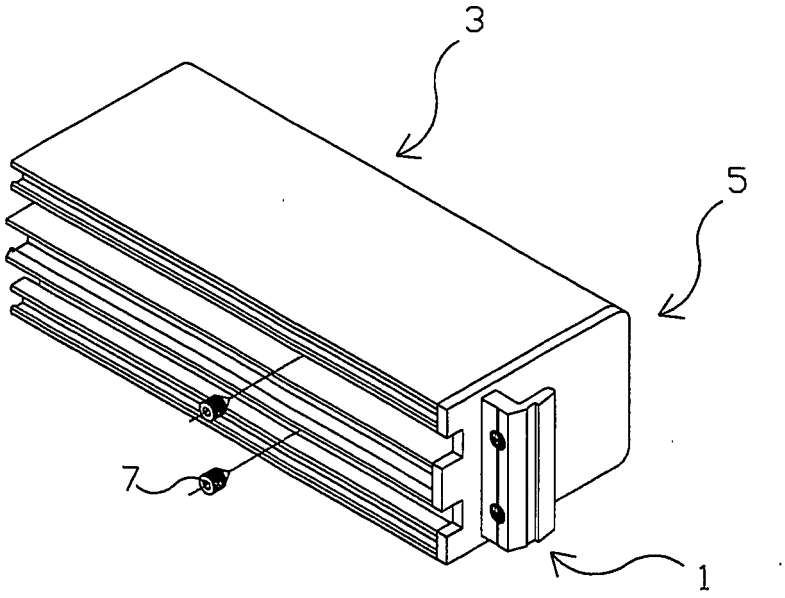


FIG. 10

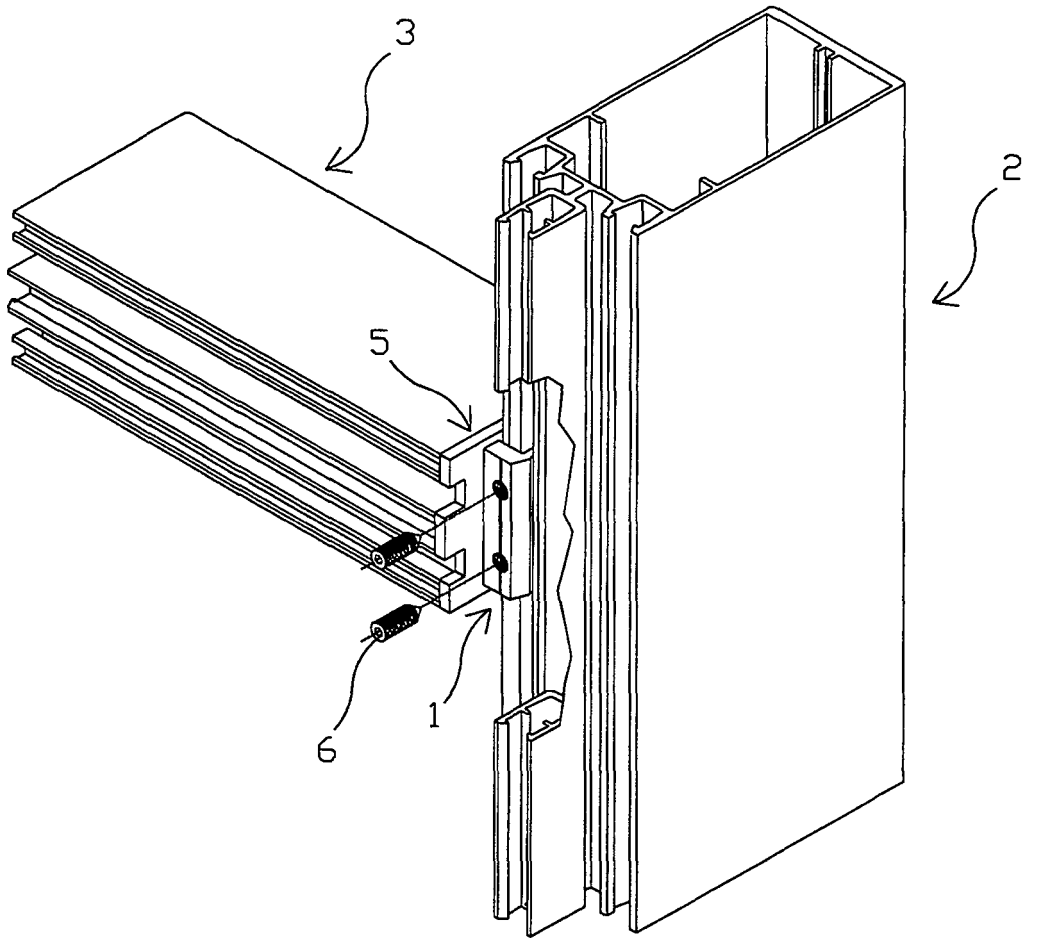


FIG. 11

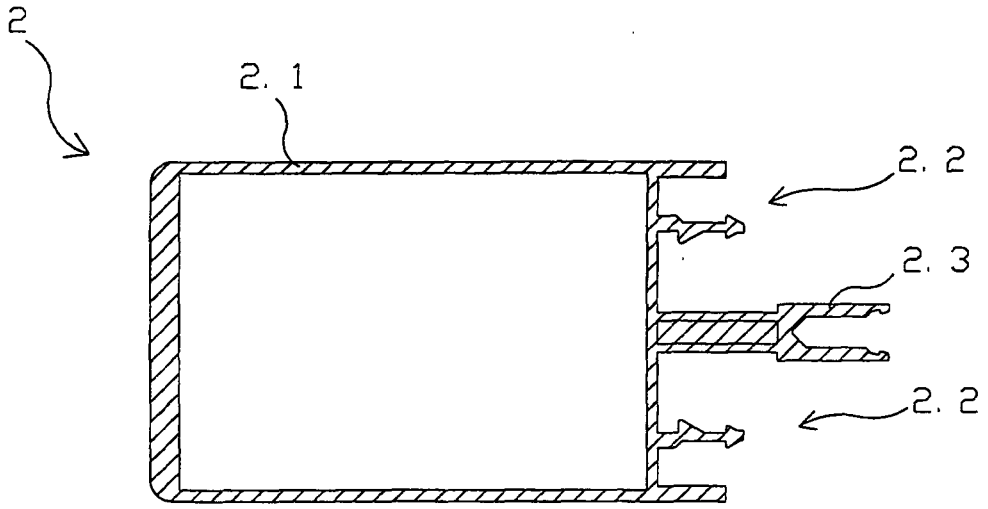


FIG. 12

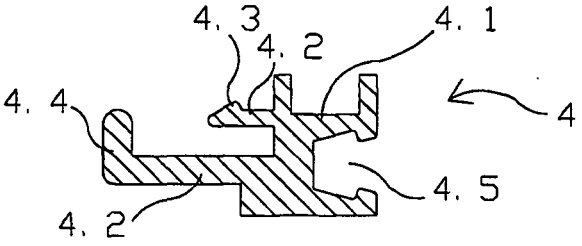


FIG. 14

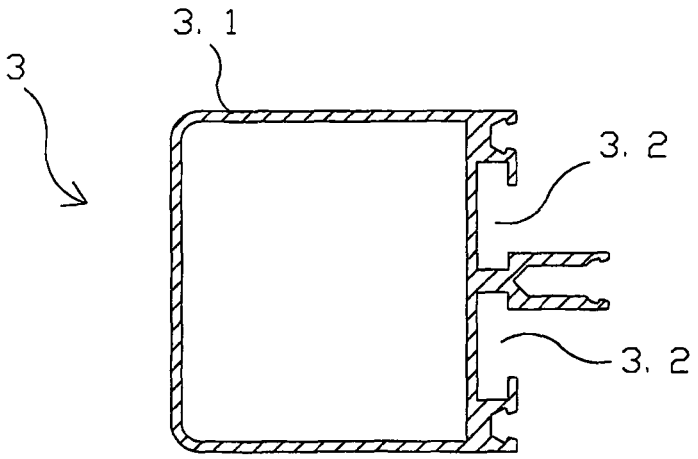


FIG. 13

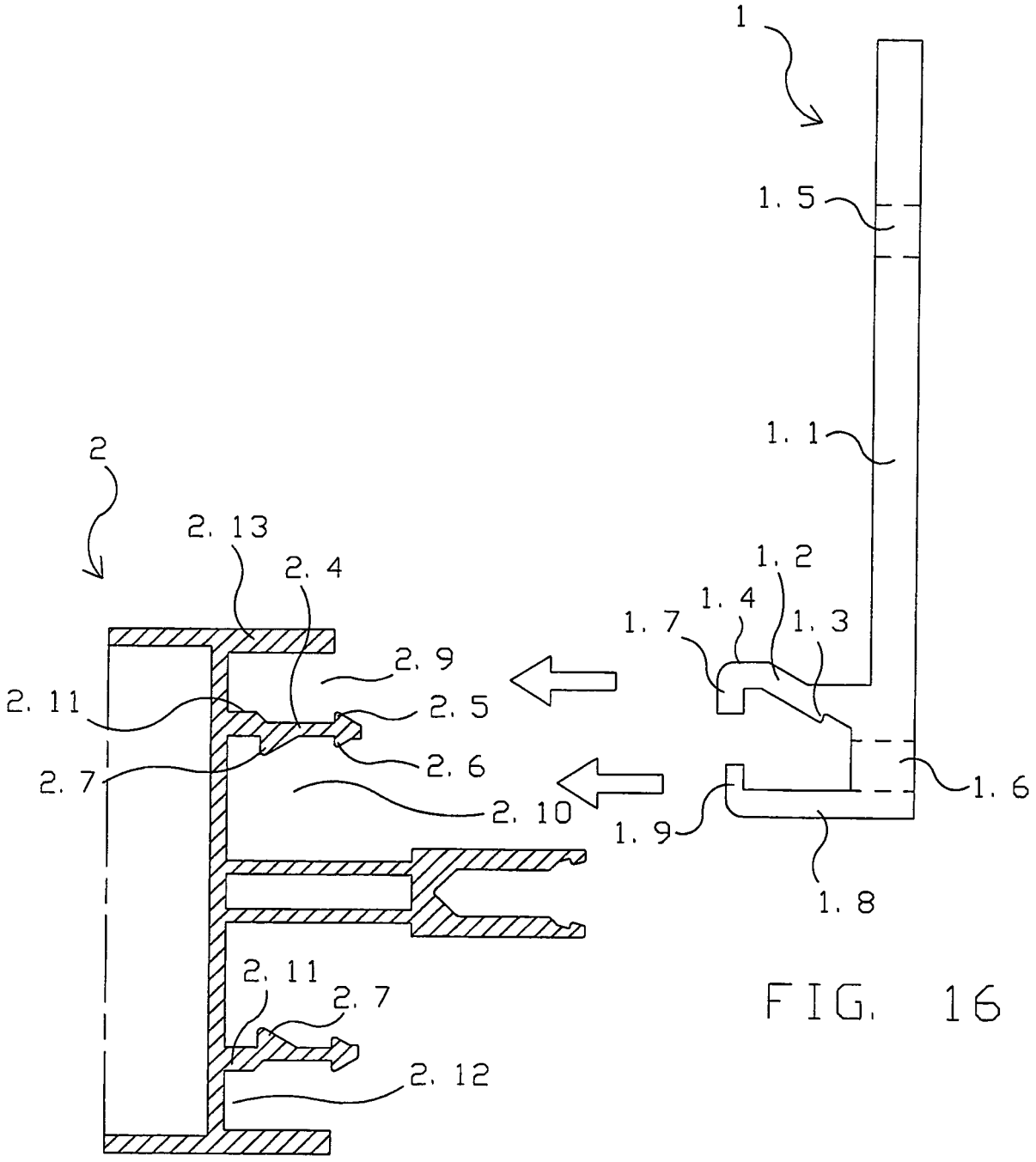


FIG. 15

FIG. 16

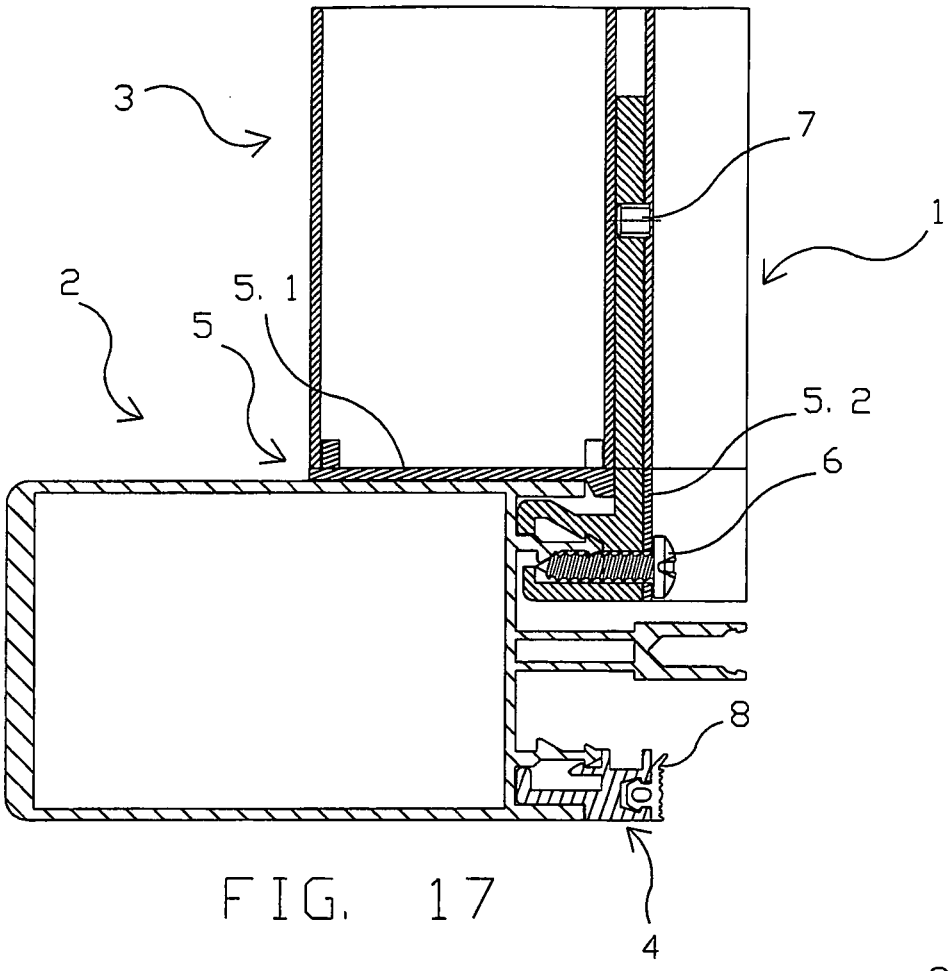


FIG. 17

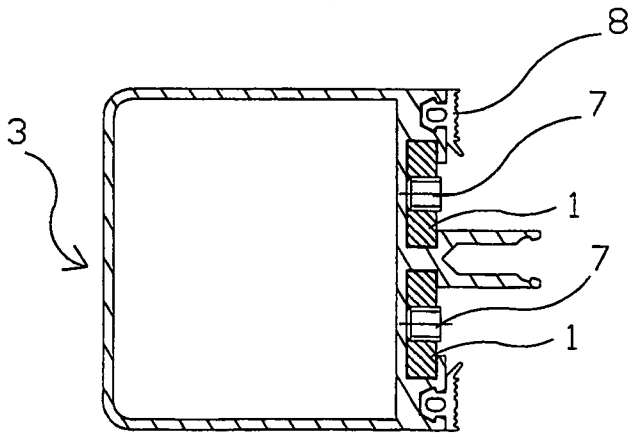


FIG. 18

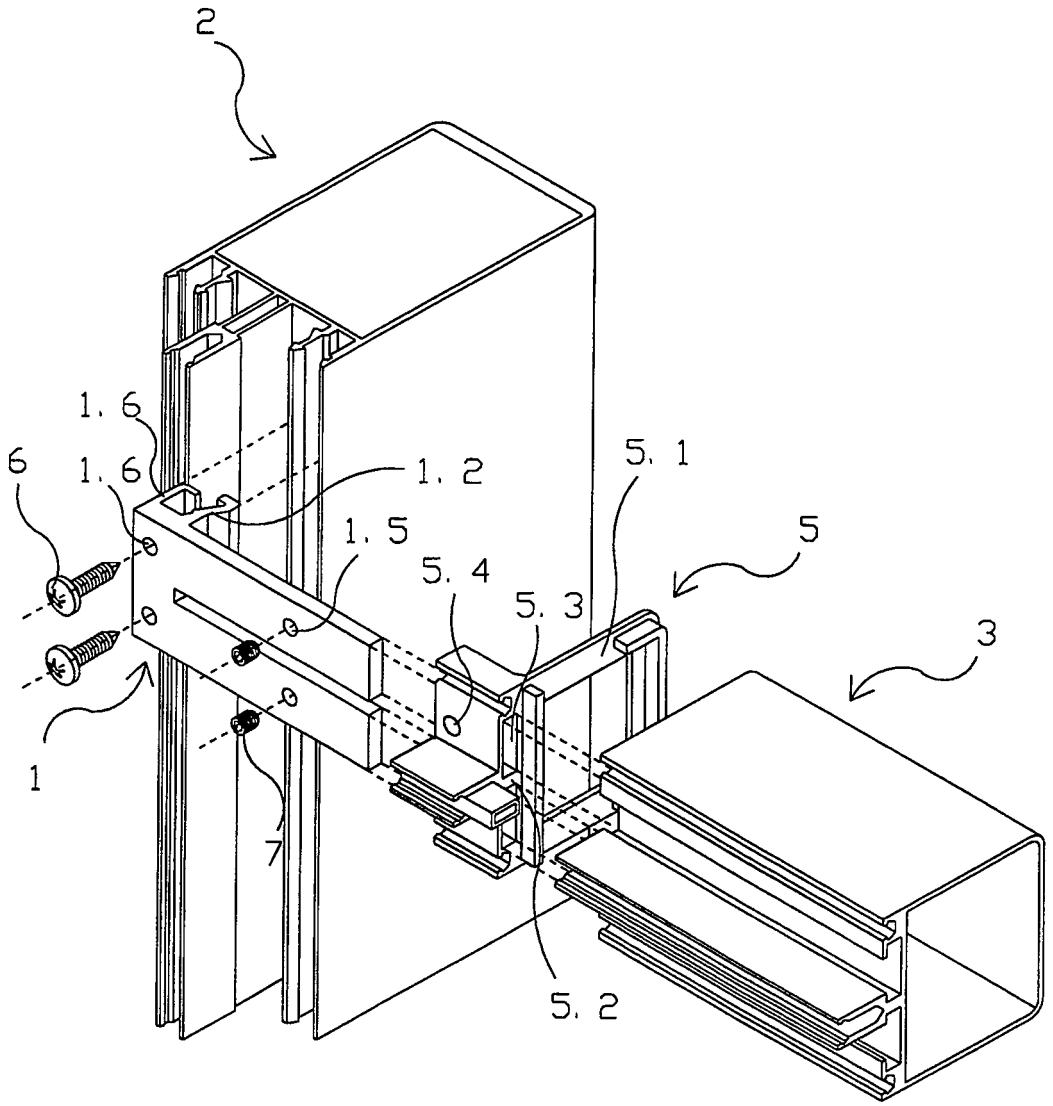


FIG. 19

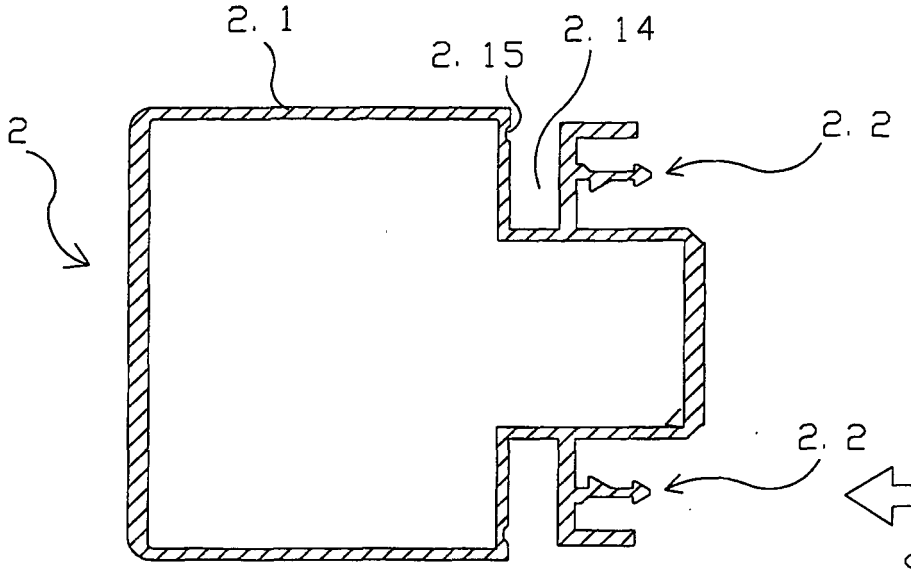


FIG. 20

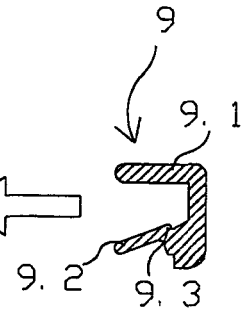


FIG. 22

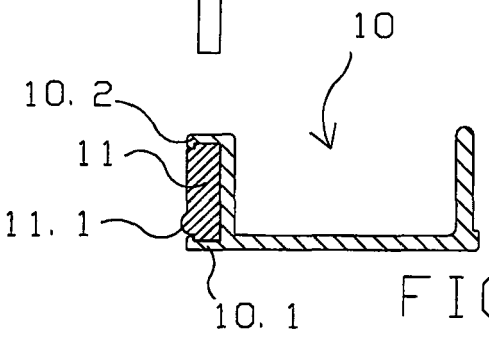


FIG. 23

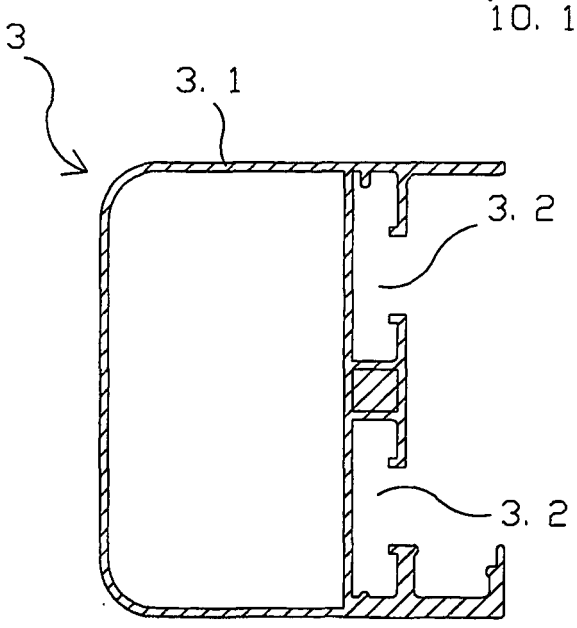


FIG. 21

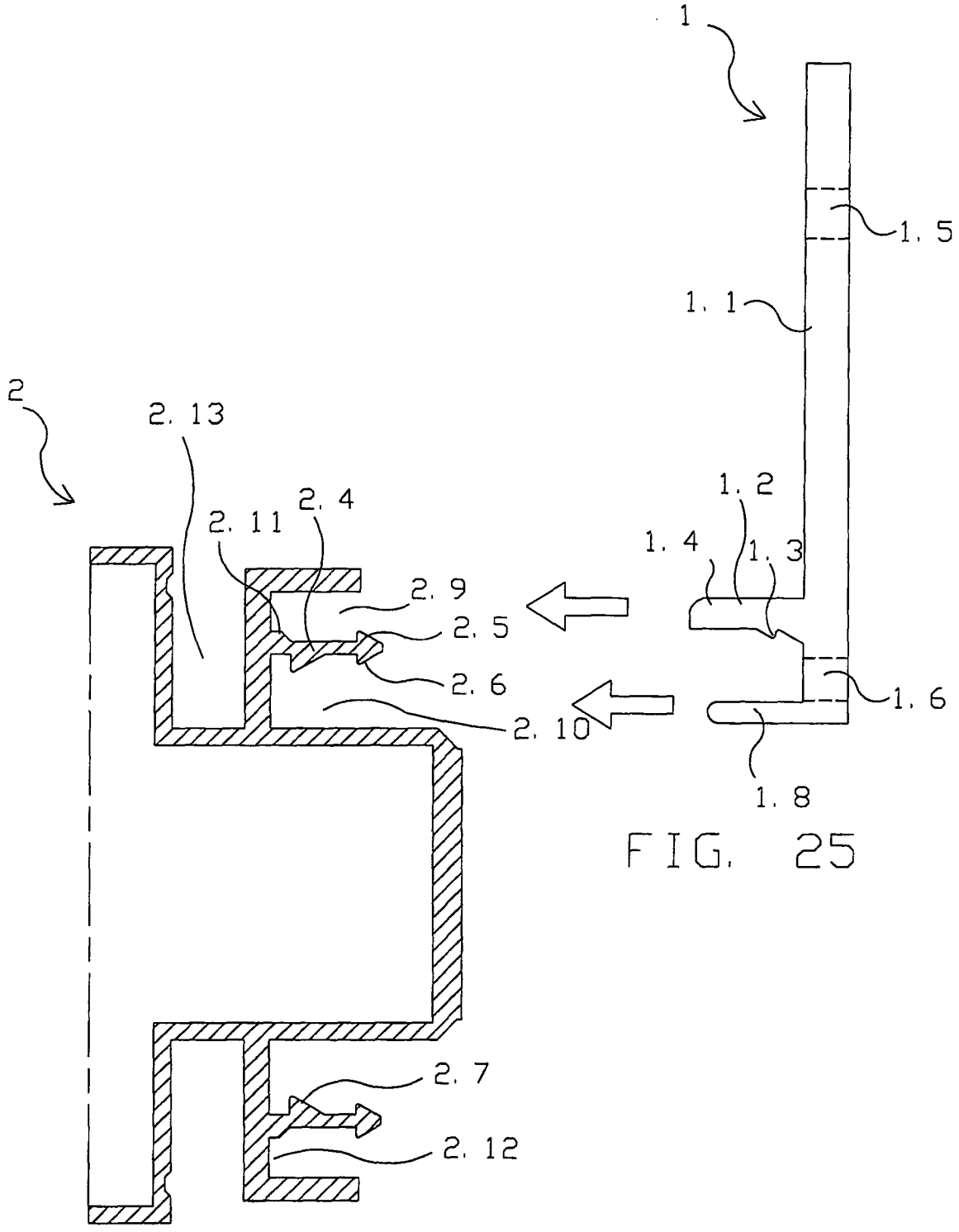


FIG. 24

FIG. 25

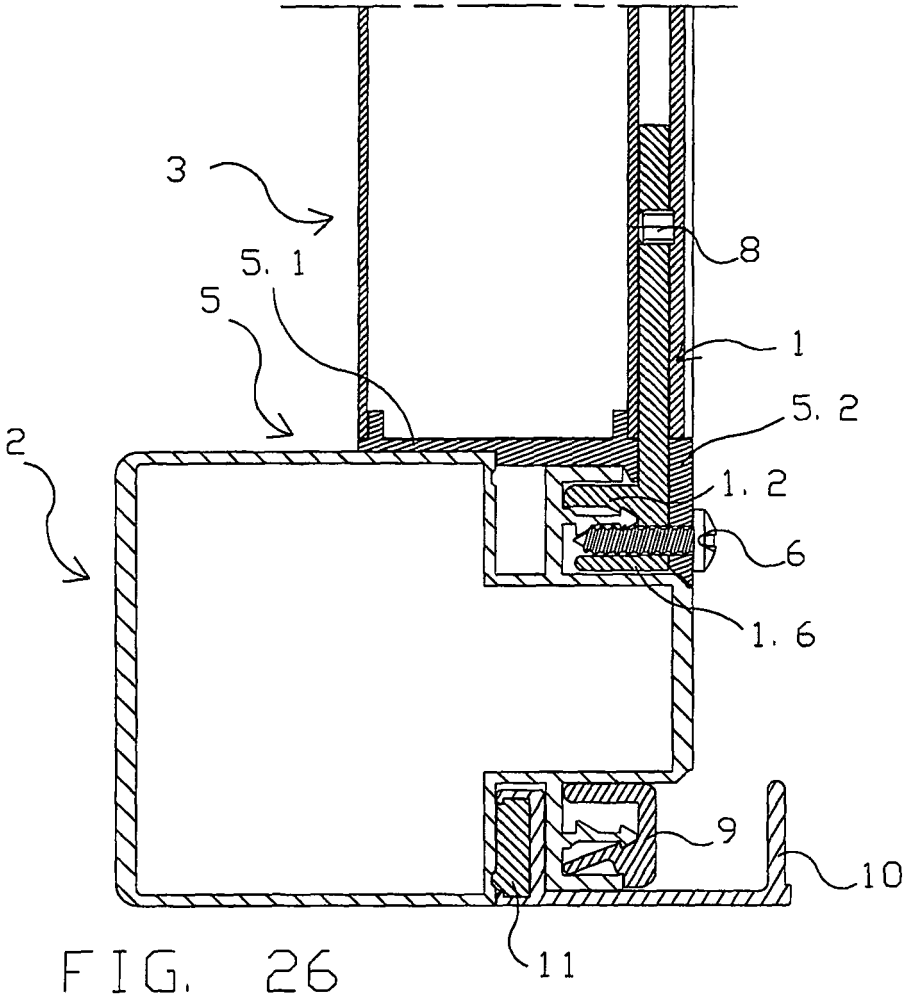


FIG. 26

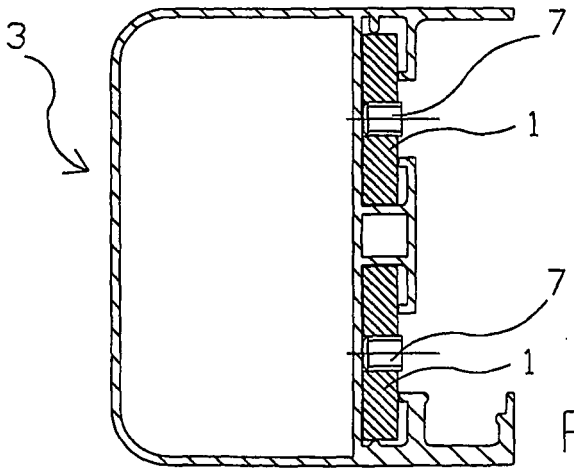


FIG. 27

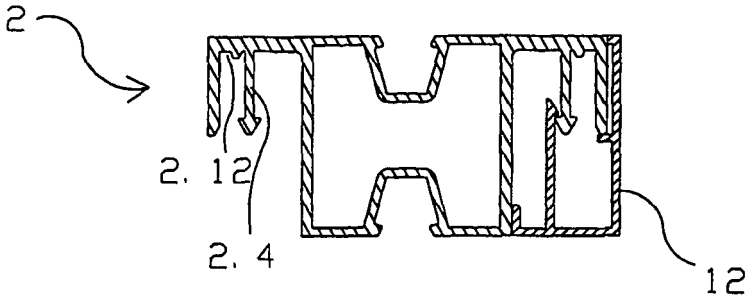


FIG. 28

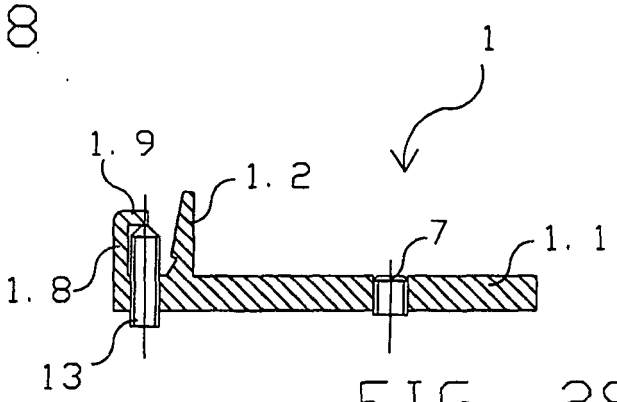


FIG. 29

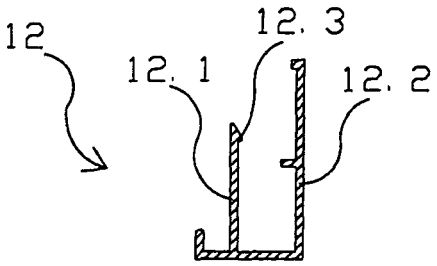


FIG. 30

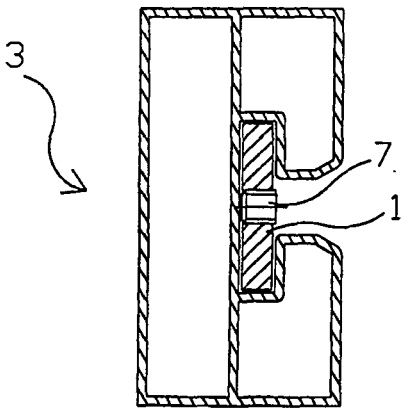


FIG. 31