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(54) Composite assembly of two metal sections and a non-metallic bridging plug united rigidly to the end of embodying heat-insulated door and window frame members.

(57) The invention relates to a composite frame member comprising two metal sections (1, 8, 18), one of which facing indoors and the other exposed to the external environment, locked rigidly together by a bridging plug fashioned in heat-insulating material. The plug has a base (28) which is forced into a matching recess (101) offered by the first component (1), and a centre piece (23) which is urged into a matching recess (108, 118) offered by the second component (8); two tapered end pieces (26) snap into place behind the retaining lips of the recess (108, 118) of the second component, locking the assembly fast. With the bridging plug in place, heat transfer between the internal and external surface areas is prevented.

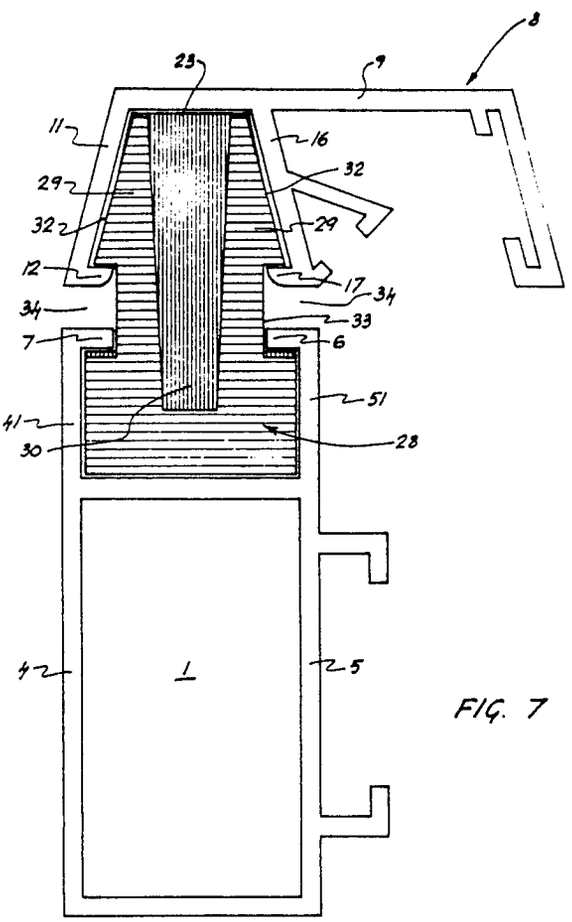

FIG. 7

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Composite assembly of two metal sections and a non-metallic bridging plug united rigidly to the end of embodying heat-insulated door & window frame members.

The invention relates to a new method of embodying composite metal window and/or door frame members that incorporate two sections, one exposed to the external environment, the other facing indoors, interconnected in a rigid fit by way of one or more plugs fashioned from a heat-insulating material. In the composite assembly thus created, one prevents any transfer of heat from taking place between the two component sections separated by the plug. Prior art methods adopted hitherto in the attempt to achieve this end-result have consisted in utilizing chemical substances or other means to preassemble the two component sections prior to their leaving the factory.

Composite metal frame members have also been made which consist in two or more components united by the insertion of longitudinal jointing sections or lengths of heat-insulating material; assembly of such a composite member often involves additional extruding and bending operations, and at all events, a firm and durable joint cannot be guaranteed. The consequent drawbacks of such an assembly system are serious, and obvious.

Accordingly, the main object of the invention is to provide a special method of assembling two component sections, one exposed to the external environment, the other to the internal, which can be performed by hand simply locating one or more special bridging plugs, fashioned from PVC or another heat-insulating material, between the two.

The method disclosed permits of embodying metal door and window frame members having the same features as those currently manufactured and distributed in a preassembled package with heat-insulation barrier already built in, but at lower cost. Thus, one can obtain the same end-result utilizing commonplace extruded sections in aluminium or other metal, but delaying embodiment of the heat-insulation barrier until the moment that these are joined together by way of the plugs.

An additional object of the invention is that of providing a method whereby metal component sections and plugs can be fitted together simply by locating and snapping into place, affording a rigid, durable assembly and avoiding further mechanical operations.

The stated objects are achieved by adoption of a composite metal frame member as characterized in the appended claims, incorporating two metal component sections and a non-metallic bridging plug.

The invention will now be described in detail, by way of example, with the aid of the acompanying drawings, in which:

fig 1 is the section through a first metal component according to the invention;

fig.2 is the similar section through a second metal component according to the invention, designed to pair with the first component of fig 1;

fig 3 shows the same section through an alternative embodiment of the second component of fig 2;

fig 4 shows the front elevation and the plan of a bridging plug according to the invention;

fig 5 is a side elevation of the plug in fig 4;

fig 6 is a cross section through the plug of fig 4;

fig 7 is a section through the composite assembly of component sections and bridging plug, according to the invention.

With reference to fig 1 of the drawings, 1 denotes a metal component exhibiting box section and affording a recess in which a plug of given appropriate shape and dimensions, preferably quadrangular, may be inserted.

The component 1 exhibits a substantially rectangular cross section, in which the sides of the box profile are denoted 2, 3, 4 and 5; two of the sides 4 and 5 are run out into extensions 41 and 51 terminating at a given point in respective lips 6 and 7 which are bent inwards and disposed parallel to the transverse side 3 of the box.

101 denotes the recess thus encompassed by 6, 7, 41, 51 and 3, which serves to accommodate a bridging plug according to the invention (see figs 4, 5 & 6).

8 denotes a second component section (see fig 2) designed to pair with the first section 1, which in the example illustrated appears trapezoidal, having a base 9, and similarly angled sides 10 and 11.

The one angled side 11 terminates in a lip 12 that is bent back parallel with the base side 9, whereas the corresponding lip 13 at the end of the remaining angled side 10 is extended and bent back further in the direction of the base through a stretch 14 that lies parallel with the self-same side 10.

15 denotes a rib issuing from the base side 9, which is disposed parallel with the angled side 10 and in alignment with the stretch 14 bent upward from the relative lip 13.

A further rib 16 departs from the base side 9 at a point approximately half way along its length, in this instance extending parallel with and through an identical distance to the angled side 10.

The rib 16 terminates in two lips, one of which, denoted 17, is bent back toward the first mentioned angled side 11 and exhibits identical geometry to the relative lip 12, whereas the other, denoted 18, is bent inward at an angle of 45° in the opposite direction, i.e. toward the remaining angled side 10.

19 denotes a further rib which departs from the main central rib 16 and extends toward the angled side 10 and the open side of the trapezium, terminating in a respective lip 20 that is bent back toward the lip denoted 18. It will be observed in fig 2 that these two lips 18 and 20 also exhibit matching geometry. Thus embodied, the second component section 8 offers a substantially three-sided trapezoidal recess 108, encompassed by 9, 11, 12, 16 and 17, that combines with the quandrangular recess 101 of the component 1 described above in accommodating a bridging plug, embodied according to the invention, by means of which the assembly is rendered a stable, composite member.

In fig 3 of the drawings, 81 denotes an alternative embodiment of the second component section 8 which affords a trapezoidal recess 118 exhibiting the same effective dimensions as that denoted 108, though encompassed laterally only in part; in this instance two short ribs 21 and 22 replace the full-length sides.

Figs 4, 5 and 6 show elevations and a sectional view of the bridging plug disclosed, which is fashioned from a heat-insulating material such as PVC. It will be observed from the front elevation (fig 4) that the plug exhibits a main centre piece 23 and is of essentially, though not perfectly rectangular shape. The departure from perfect rectangularity consists in the fact that the top side 24 is broken by two slots 25, one at either end, right and left; thus one has two end pieces 26 separated in part from the centre piece 23, but joined thereto by the base 27 which is common to all three.

It is an essential feature of the end pieces 26 that they appear shorter than the corresponding parallel ends 124 of the centre piece 23.

Fig 5 shows a side elevation of the bridging plug, which illustrates the proportions of the end piece 26, and the profile of the base and top part. It will be observed from the elevation of fig 5 and the cross section of fig 6 that the plug exhibits a base 28 the shape of which is, if not absolutely rectangular, at all events quadrangular, in order to permit of its being forced lengthwise and fitting snugly into the recess 101 of the first component section 1. Needless to say, the ultimate sectional profile of the recess 101 and the base 28 of the plug is a matter of choice, dependent simply on the fact of the one matching the other.

Each end piece 26 comprises a pair of identical and symmetrically disposed tongues 29 that are separated by a gap 30, exhibiting the outline of a trapezium with the smaller base 31 at bottom, which opens out internally into the relative slot 25.

The tongues are possessed of outer surfaces which converge upwards from a given point, presenting a tapered profile; more exactly, the tapering stretch 32 of each surface is separated from the base 28 by an undercut 33 the position of which corresponds to that of a similar undercut 133 running the entire length of the centre piece 23, at either side.

The cross section of fig 6, taken through the A-B cutting plane marked in fig 4, shows the composition of the top part of the plug profile, in which the tapered part of the centre piece 23 is matched to the trapezoidal recess 108 or 118 of the second component section, whilst that of the end pieces 26 shows slightly proud at either side, by reason of the tapering stretches 32 being set at a wider angle, and remains marginally short at the top.

Fig 7 shows the first component section 1 and the second component section 8 fitted together by way of the bridging plug, with the base 28 accommodated and held fast by the quadrangular recess 101, and the tapered part of the centre piece 23 seated in the trapezoidal recess 108. Rigidity is imparted to the composite assembly by the snap fit between the two tongues 29, which are rendered flexible thanks to the gap 30 provided between them, and the lips 12 and 17 offered by the second component section 8.

The undercuts 33 and 133 provided in the plug serve to accommodate the two sets of lips 6-7 and 12-17, which hold the plug fast and rigid and are separated by a given distance, denoted 34, which establishes the break in continuity of the composite metallic frame member required in order to create a barrier to the transfer of heat between indoor and outdoor surface areas.

Claims

1) A composite assembly of two metal sections and a non-metallic bridging plug united rigidly to the end of embodying heat-insulated door and window frame members, of the type comprising a first component section facing indoors, a second component exposed to the external environment, and an interconnecting component in heat-insulating material,
characterized
in that the first component section (1) exhibits a cross sectionial outline appearing substantially as a rectangle two parallel sides (4, 5) of which are integral with extensions (41, 51) projecting beyond

one of the transverse sides (3) and terminating in respective lips (6, 7) that are bent symmetrically inwards in such a way as to create a substantially three-sided recess (101) the open side of which is bounded by the two lips (6, 7);
in that the second component section (8) exhibits a substantially trapezoidal cross sectional outline in which two similarly angled sides (10, 11) converge toward a base side (9) from which an intermediate rib (16) of length equal to the angled sides departs and extends symmetrically with one such side (11), terminating in a lip (17) that is disposed parallel to the base (9) and symmetrical with an identical lip (12) issuing from the end of the symmetrically disposed converging side (11), in such a way as to create a substantially three-sided trapezoidal recess (108) the open side of which is bounded by the two lips (12, 17);
in that the interconnecting component consists in a bridging plug fashioned in heat-insulating material and comprising a centre piece (23) the top tapered part of which issues from a discernable base (28), and two end pieces (26) issuing likewise from the base, separated from the centre piece by respective slots (25) and consisting each one in a pair of identical and symmetrically disposed tongues (29), separated by a gap (30), the outermost surfaces of which exhibit symmetrical tapering stretches (32) that converge upward and stand marginally proud of the corresponding tapered cross sectional outline of the centre piece (23);
in that the base (28) of the bridging plug exhibits cross sectional shape such as matches that of the recess (101) offered by the first component section (1), and when inserted thereinto, is held in place by the respective pair of lips (6, 7);
in that the top tapered part of the centre piece (23) of the plug exhibits cross sectional shape such as matches that of the recess (108) offered by the second component section (8), and when forced into position therein, is held in place by the snap joint created between the respective pair of lips (12, 17) and the tongues (29) of the end pieces, the tapering stretches (32) of which are rendered flexible by virtue of the gap (30) existing between them; and in that, following location of the bridging plug, the first and second component sections (1, 8) are separated by a given distance (34) that provides the barrier across which transfer of heat between the two metallic components is inhibited.

2) Composite frame member as in claim 1, wherein the base (28) of the bridging plug and the recess (101) created in the first component section (1) exhibit matching quadrangular cross sectional profiles.

3) Composite frame member as in claim 1, the second component section (8) of which exhibits a variation in embodiment (81) whereby the same substantially three-sided trapezoidal recess (118) is bounded on either side by a pair of identical and symmetrically disposed ribs (21, 22).

4) Composite frame member as in claim 1, wherein the paired tongues (29) of each end piece (26) of the bridging plug are separated by a gap (30) that exhibits the shape of a trapezium having its lesser base (31) located at bottom, coinciding with the base (28), and opens out internally into a relative slot (25).

5) Composite frame member as in claim 1, wherein the tapering stretches (32) of the paired tongues (29) of each end piece are separated from the base (28) by relative undercuts (33), the position of which corresponds to similar undercuts (133) running the entire length of the centre piece (23) at either side, and wherein the purpose of such undercuts (33, 133) is to locate against and remain axially fast in relation to the lips (6, 7) offered by the first component section (1) and the lips (12, 17) offered by the second component section (8).

6) Composite frame member as in claim 1, wherein single lengths of the component sections (1, 8) are joined rigidly to form the composite member by insertion into the respective recesses (101, 108) and snapping in place of a plurality of bridging plugs, arranged either close together or spaced apart.

7) Composite frame member as in claim 1, wherein the bridging plug fashioned in heat-insulating material is embodied in PVC.

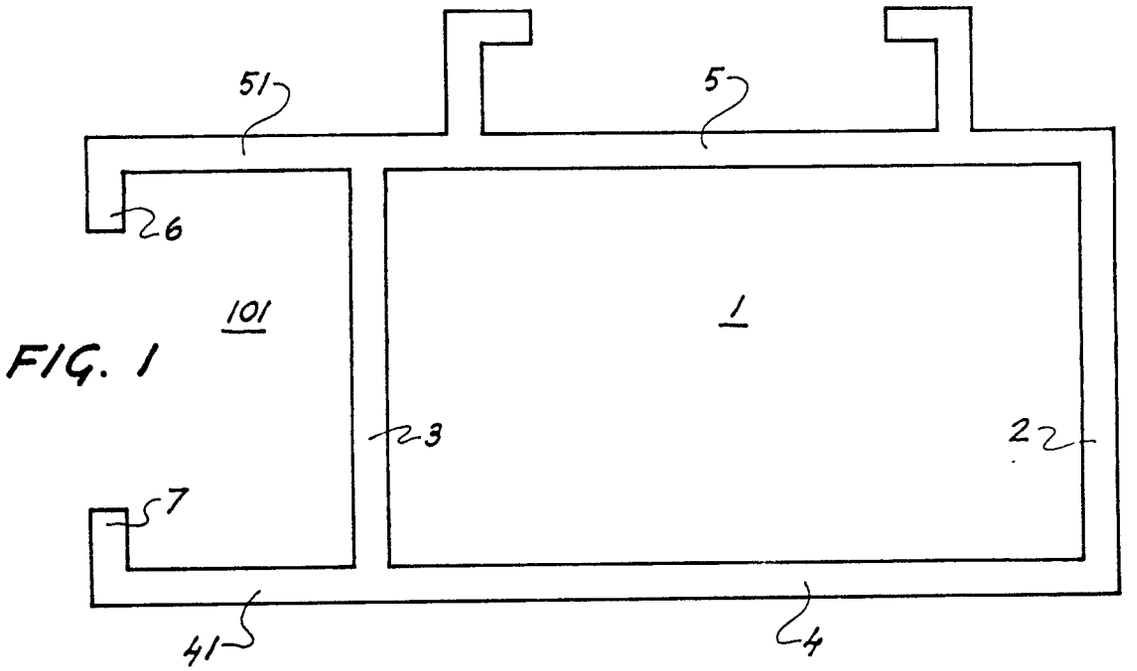


FIG. 1

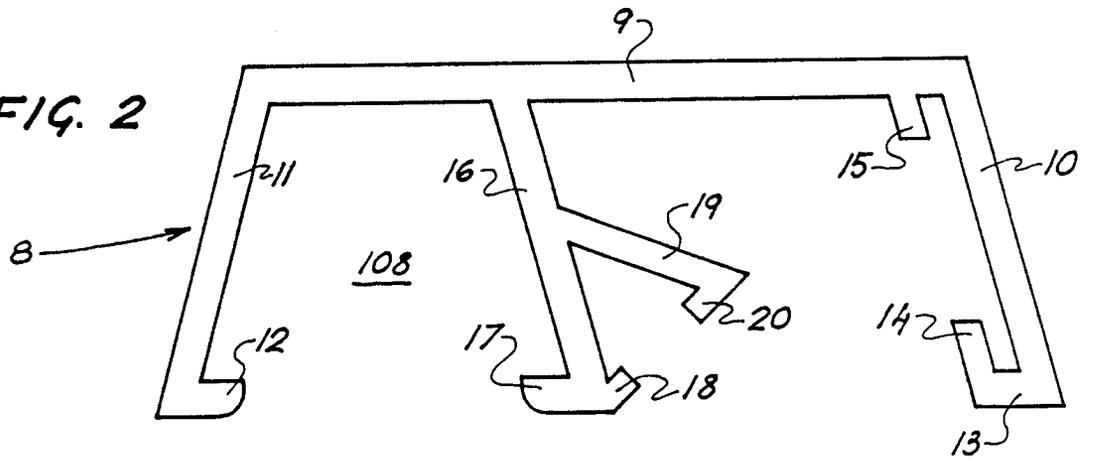


FIG. 2

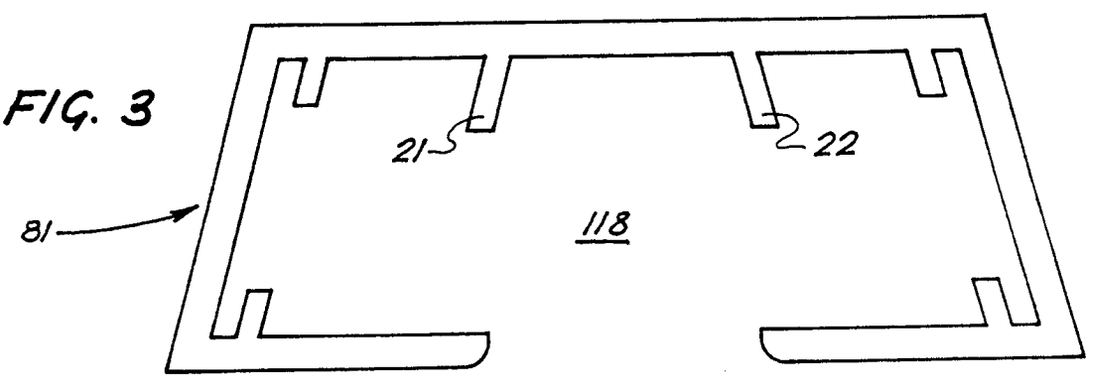


FIG. 3

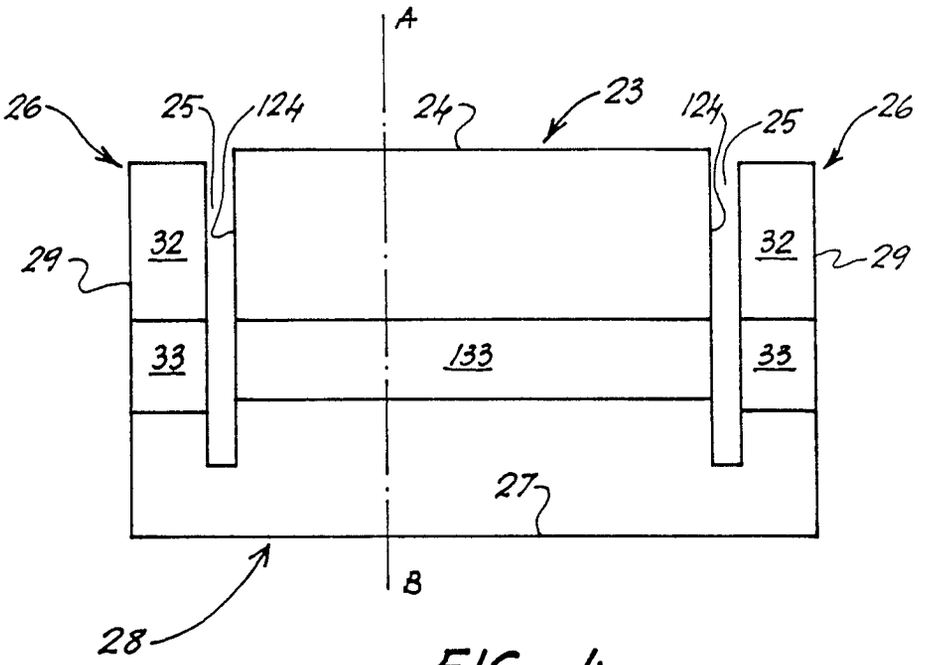
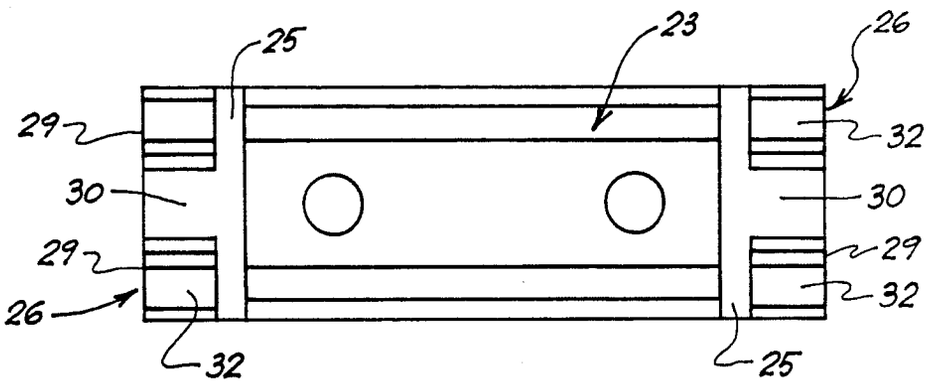


FIG. 4



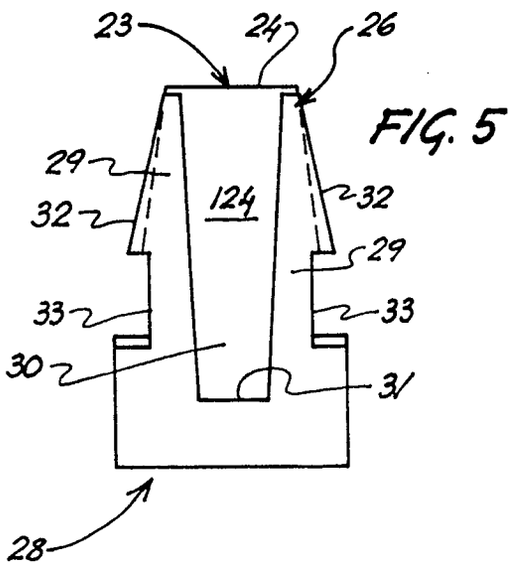


FIG. 5

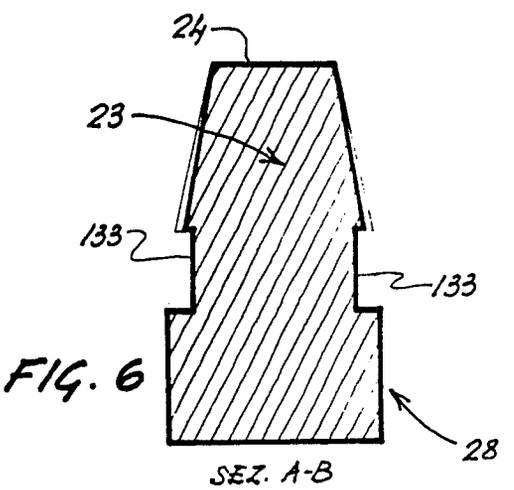


FIG. 6

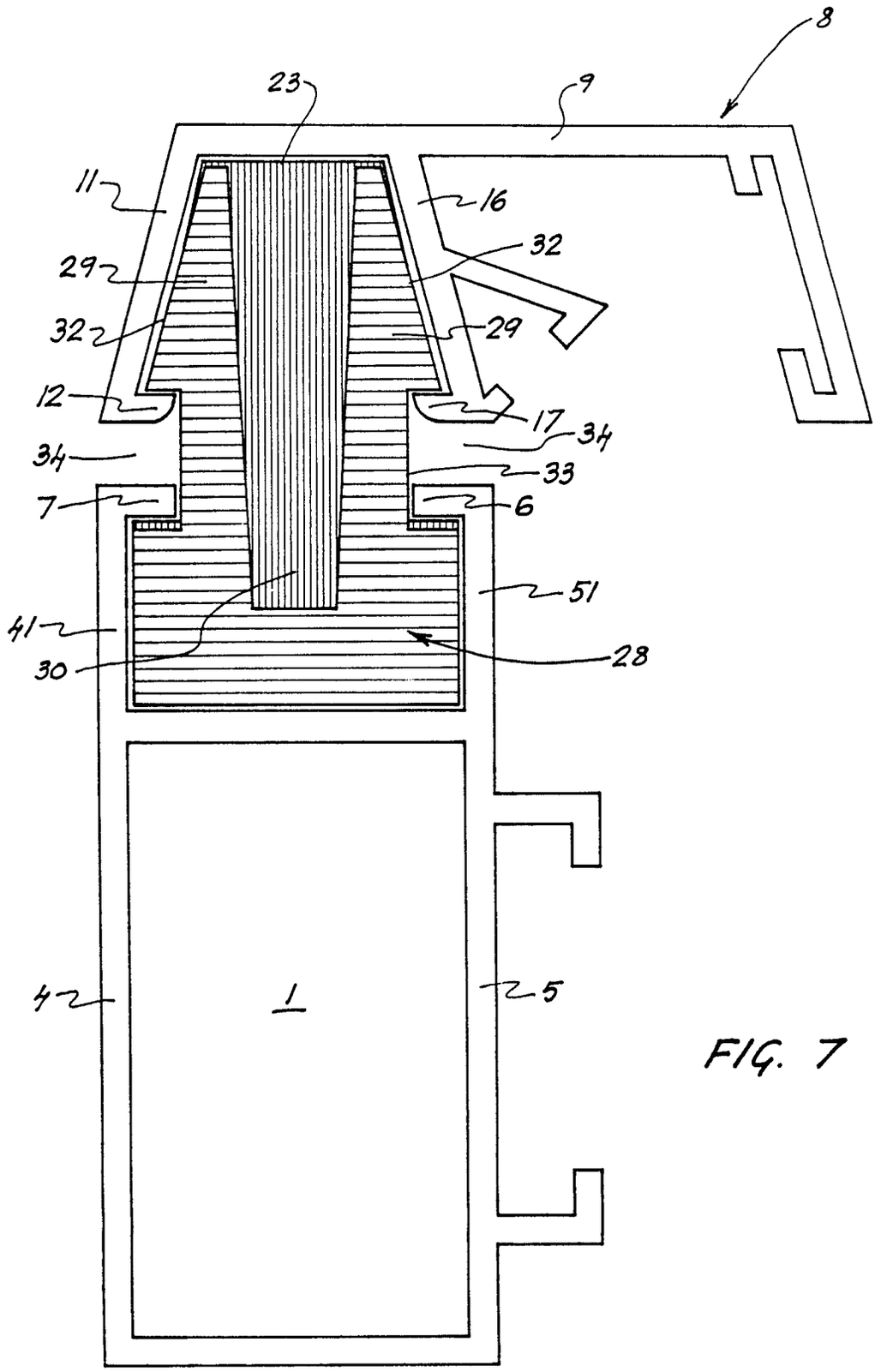


FIG. 7

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EUROPEAN SEARCH REPORT

Application number

EP 86 83 0302

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int Cl 4)
A	DE-B-1 955 591 (METALLBAU KOLLER) * Column 2, lines 32-65; figures 1,2 *	1,3,5, 6	E 06 B 3/26
A	FR-A-2 121 099 (MUHLE) * Page 2, line 18 - page 3, line 27; figures 1-5 *	1,4,6	
A	DE-A-3 445 220 (ELOS) * Page 3, line 3 - page 4, line 29; page 8, line 12 - page 9, line 33; figures 1-4 *	1,5,6	
A	GB-A-2 084 229 (DAVIES) * Page 1, lines 98-124; figures 1-3 *	1,2	TECHNICAL FIELDS SEARCHED (Int Cl 4)
A	DE-A-1 400 905 (SCHÜRMANN) * Page 6, line 18 - page 7 , line 15; page 8, lines 13-17; figures 11-13,18 *	1,3,6	E 06 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	22-06-1987	DEPOORTER F.

CATEGORY OF CITED DOCUMENTS

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