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(71) Applicant: **Südtirol Fenster S.r.l.**
39030 Gais (Bolzano) (IT)

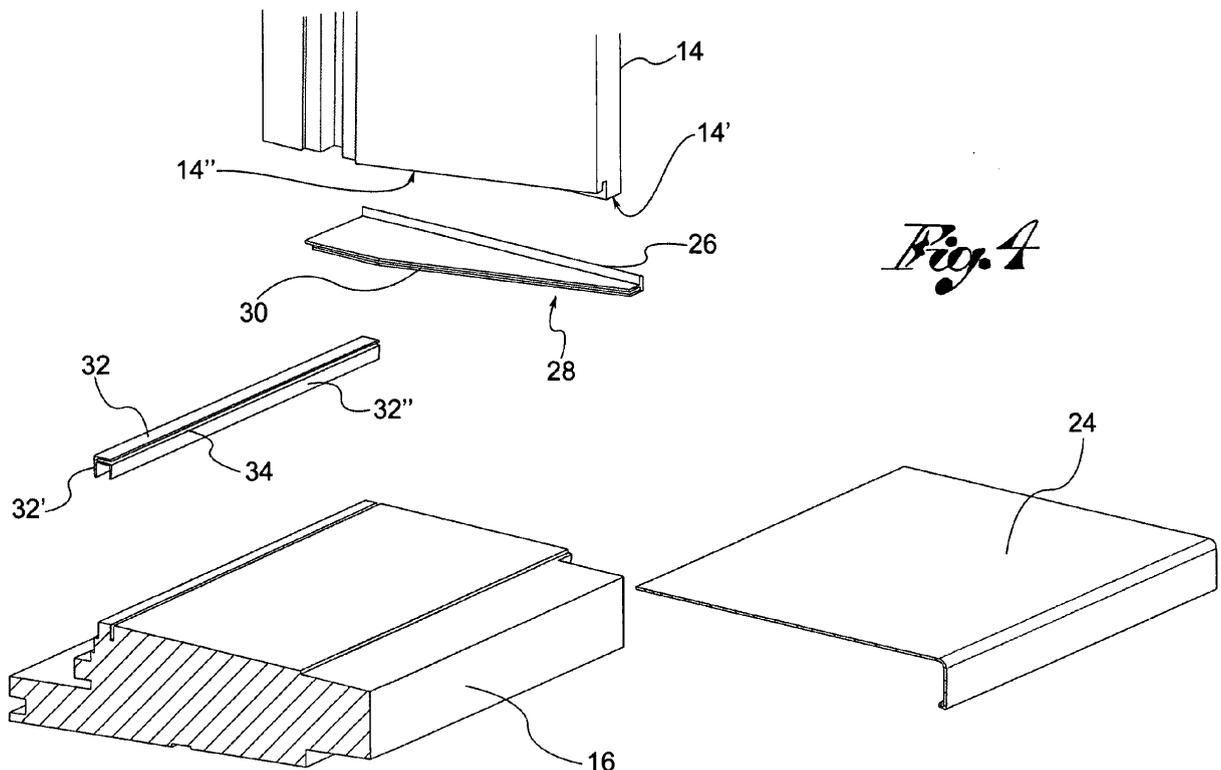
(72) Inventor: **Seeber, Gotthard**
**39030 Villa Ottone
 Bolzano (IT)**

(74) Representative: **Chimini, Francesco et al**
Jacobacci & Partners S.p.A.
**Piazza della Vittoria 11
 25122 Brescia (IT)**

(54) **Prefabricated window frame unit comprising an insulating surround and integrated sill**

(57) The invention relates to a counter-frame structure for a window, suitable for being inserted in an opening of an outside wall or roof of a building, comprising a counter-frame for a window or door, an insulating surround, made in heat insulation material, which surrounds the counter-frame at least on the sides facing said wall and the outside of the building, where said counter-frame

and insulating surround are interconnected so as to form a single block to be inserted in the opening of the wall. The structure further comprising an outer sill comprising a sill plate (24) in a waterproof material, overlapping said lower horizontal insulation element, the lateral rims of said sill being bent upwards and being sunk into the thickness of the vertical insulation elements (14) of the insulating surround.



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Description

[0001] The present invention relates to a counter-frame structure for a window, said structure being suitable to be inserted in an opening of a wall separating the inside and the outside of a building.

[0002] In a previous patent application by the same Applicant, EP 2 161 402 A1 a counter-frame structure for a door or window comprising a counter frame for a door or window and an insulating surround made in a heat-insulation material, such as polystyrene, enclosing the counter-frame at least on the sides facing said wall and the outside of the building, was described. The counter-frame and the insulating surround are interconnected so as to form a single block to insert in the opening of the wall. For example, the insulating surround is made from a plurality of insulating elements closely coupled to each other, at least some of which fixed to the counter-frame.

[0003] Such structure allows a considerable reduction of thermal bridges in the zones of anchorage of the counter-frame to the wall, the sills, the blind roller boxes etc. considerably improving the heat insulation of the building. Moreover, such structure offers the further advantage of not requiring special works subsequent to installation of the door or window frame, being made in a single block, composed of the counter-frame and insulating surround, ready for installation in the opening of the wall.

[0004] It has been observed however that while fully absolving the task of considerably increasing the overall insulation coefficient of the door or window frame, the counter-frame structure described above has the drawback of not being fully waterproof. In fact, in situations of driving rain, it has been seen in some cases that the rain beating on the sill and on the vertical elements of the insulating surround, especially in the case in which guides are made in such elements for the sliding of a shutter, penetrates the joints between the sill and said vertical elements, in the long run damaging the insulating surround itself and/or the wall it is inserted in.

[0005] The purpose of the present invention is to propose a counter-frame structure for a window which without altering the heat insulation properties, makes it possible to overcome the drawback complained of above.

[0006] For a better understanding of the invention and appreciation of its advantages, some of its embodiments are described below, by way of non-limiting examples, with reference to the attached drawings, in which:

[0007] figure 1 is a frontal view of a window counter-frame structure according to the present invention;

[0008] figure 2 is a vertical cross-section of the structure assembled to the window and installed in the opening of a wall;

[0009] figure 3 is a horizontal cross-section of the structure assembled to the window and installed in the opening of a wall;

[0010] figure 4 is an exploded view of some of the elements composing the insulating surround and the sill;

[0011] figure 5 shows the elements of the previous figure, in an assembled phase of the sill; and

[0012] figure 6 is a perspective view of the lower part of the insulating surround, with the sill assembled.

[0013] With reference to the figures (where equivalent elements are indicated with the same numerical references), reference numeral 1 globally denotes a counter-frame structure according to the invention. According to a general embodiment, said structure comprises a counter-frame 10 for a window 50 and an insulating surround 12, made in heat insulation material, which surrounds the counter-frame 10 at least on the sides facing the wall 5 in which the structure is to be placed and the outside of said wall.

[0014] As is known, a counter-frame 10 is taken to mean a frame structure, usually in untreated wood, suitable for being anchored to the wall and to which the fixed, actual frame 100 of the window 50 is attached.

[0015] The counter-frame 10 and the insulating surround 12 are interconnected so as to form the counter-frame structure 1 in a single block to be inserted in the opening in the wall 5.

[0016] For example, as a heat insulation material, a thermoplastic polymeric material, in particular a polystyrene may be used.

[0017] The insulating surround 12 comprises at least two vertical insulation elements 14 and at least one lower horizontal insulation element 16 which connects said vertical elements 14 at the bottom. At least one vertical insulation element 14 is joined to a respective upright 18 of the counter-frame 10; at least one lower horizontal insulation element 16 is joined to the lower cross member 20 of the counter-frame 10. As will be explained better below, the term joined is taken to mean that the insulation element is closely coupled or connected in various ways to a respective element of the counter-frame 10.

[0018] The counter-frame structure according to the invention further comprises an outer sill 22 comprising a sill plate 24 in a waterproof material, such as aluminium, overlapping the lower horizontal insulation element 16. The lateral rims 26 of said sill 22 are bent upwards and sunk into the thickness of the vertical insulation elements 14 of the insulating surround 12.

[0019] This way, the water striking the sill 22 and/or running along the vertical insulation elements 14 of the insulating surround cannot penetrate the joint between said vertical elements and the horizontal insulation element 16, but is collected entirely on the sill plate 24 and conveyed away from the window.

[0020] In other words, in a preferred embodiment, each vertical insulation element 14 of the insulation surround 12 has a bottom surface comprising an outer lateral portion 14' which rests on the lower horizontal insulation element 16 and an inner lateral portion 14'' which rests on a portion of lateral extremity of the sill 22.

[0021] In yet other words, the lower horizontal insulation element 16 extends below the entire bottom surface of the vertical insulation elements 14; the sill 22, over-

lapping said horizontal insulation element 16, has a lower transversal extension in relation to this, such as to terminate with its lateral rim 26 bent upwards, in an intermediate zone (preferably closer to the inner wall) of the thickness of the vertical elements 14. This position enables the sill 22, thanks to its "tray" configuration, to collect the rainwater striking the sill itself and the vertical elements 14, and at the same time, to maintain continuous contact between the vertical elements 14 and the horizontal element 16 of the insulating surround 12, preserving the heat insulation properties of the surround.

[0022] In a preferred embodiment, the sill 22 comprises a pair of lateral guide elements 28, on each of which a respective vertical insulation element partially 14 rests. Each lateral guide element 28 is in the shape of an elongated plate, substantially the same length as the depth of the sill plate 24, which extends under the portion of the bottom surface of the respective vertical insulation element 14 overlapping the sill 22 and in which the lateral rim bent upwards 26 is formed. In said guide element 28 there is a guide groove 30 open laterally, in other words towards the opposite guide element 28, which the sill plate 24 is inserted in.

[0023] Preferably, each lateral guide element 28 of the sill is shaped in such a way as to follow the contour of the inner side of the corresponding vertical insulation element 14. This way, said guide element 28 results substantially concealed from view. Moreover, whatever the shape of the guide element 28, the guide groove 30 has a bottom, opposite the opening of the guide groove 30, perpendicular to the wall of the building so as to enable the insertion of a rectangularly shaped sill plate 24. Consequently, even if the inner side of the vertical insulation elements 14 is not perpendicular to the wall of the building but is sloping to facilitate the entrance of light for example, the sill plate 24 is always rectangularly shaped, thereby simplifying the production process.

[0024] The two guide grooves 30 of the two lateral guide elements 28 thus form a sort of rail for the horizontal insertion of the sill plate 24 from the outside.

[0025] Note how, advantageously, if the window is provided with a blind element, a vertical groove 141 is made in each vertical insulation element 14 housing a guide 142 for the vertical sliding of the blind element. The sill 22 extends below the vertical insulation elements 14 beyond the depth of said vertical groove 141 (figure 3), so that the water running along said vertical groove 141 is also collected by the sill 22 and then conveyed frontally to the outside.

[0026] According to a preferred embodiment, the sill 22 further comprises a transversal guide element 32 anchored to the lower horizontal insulation element 16 along the rim facing the window frame 100. Said guide element 32 forms a guide groove 34 suitable to receive the inner rim of the sill plate 24. For example, the transversal guide element 32 is an overturned "U" shape so as to insert a first vertical wall 32' between the horizontal insulation element 16 and the fixed window frame 100,

preferably with the interposition of a waterproof seal 33, and to anchor itself to said horizontal element sinking its second vertical wall 32" into it.

[0027] As a result, the rain beating on the sill and/or flowing from the window frame cannot penetrate between the horizontal element 16 of the insulating surround and the frame.

[0028] According to one embodiment, the insulating surround 12 is of such thickness as to extend, at least at its lower and/or upper horizontal sides, from the inner side 5' to the outer side 5" of the wall 5 which the structure is inserted in. Such thickness of the insulating surround 12 permits, in the upper part, the incorporation in the upper horizontal insulation element 36 of a roller shutter recess or other containing and guiding devices for the blind elements of the window and, in the lower part, the creation of a support base for the internal 38 and external 22 window sills.

[0029] In one advantageous embodiment, the housing recess made in the upper horizontal insulation element 36 is closed underneath by a removable closure plate 40 sliding along a pair of upper lateral guide elements 42 analogous to the lateral guide elements 28 of the sill plate 24 and positioned between the top of the vertical insulation elements 14 and the upper horizontal insulation element 36.

[0030] Note how in the examples illustrated the counter-frame structure 1 is suitable for being inserted in a wall 5 consisting of a part in masonry 6 and an external protective facing 7 known as "skin" or infill. Advantageously, the insulating surround 12 extends frontally at the outer level of the skin 7, in such a way as to create a continuous insulation between the heat insulation material of the surround and that of the skin 7.

[0031] Advantageously, the inner and/or outer surfaces of the insulating surround 12, meaning those facing the inside and outside of the building, are covered with a layer of rendering 44 which connects with the rendering of the inner and/or outer surface of the wall of the building. In other words, the rendering operation, usually carried out with the counter-frame installed, takes place at building phase, thus avoiding soiling or damaging the counter-frame at the window installation phase.

[0032] Advantageously, moreover, the rendering phase of the counter-frame structure 1 is performed before inserting the sill plate 24 in the lateral 28 and transversal 32 guide elements, so as not to soil or damage said plate. To such purpose, the guide groove 30 of the lateral guide elements 28 is temporarily closed or filled, for example by a shaped wooden strip, to prevent the rendering from entering said groove. After the rendering operation, the sealing element of the groove 30 is removed and the sill plate 24 can be applied to the structure.

[0033] According to one embodiment, the insulating surround 12 extends in such a way as to at least partially overlap the fixed frame 100 which is attached, or will be attached at the moment of installation of the window, to the counter-frame 10. At least partial overlapping is un-

derstood as being at least by the part facing outwards. In fact this way the side of the frame 50 facing outwards is covered by the insulating surround 12 and therefore benefits from greater thermal protection. Having thus limited cooling of the exposed surface of the frame 100, heat dispersion through the frame outwards from the inside is avoided right from the outset.

[0034] According to one embodiment, the insulating surround 12 is formed of a plurality of elements, for example in the form of square bars or blocks, closely coupled in such a way as to leave no interstices through which heat could be propagated.

[0035] Such surround elements 12 are coupled by means of flat and extended contact surfaces or, even more favourably, are connected by a geometrical or jointed coupling.

[0036] For example, in figure 2 note how the lower horizontal portion of the insulating surround 12 comprises the lower horizontal insulation element 16 described above, which encloses the lower cross member 20 of the counter frame 10 at the bottom and the front, and a rear element 44 which connects to the inner side 5' of the wall 5 and which supports the inner sill 38. For example, said rear insulation element 44 has a jointed coupling with the front insulation element 16 of the insulation surround 12.

[0037] In any case, at least some of the elements of the surround 12 are attached to the counter-frame 10 of the window, for example by gluing and/or screwing and/or by clamps or profiled sheet metal.

[0038] In particular, advantageously, the cross members 20 and vertical uprights 18 which define the sides of the counter-frame 10 and the adjacent elements 14, 16, 36 of the surround 12, are profiled to be coupled geometrically or by a joint.

[0039] Clearly, variants of and/or additions to what has been described and illustrated above may be foreseen while remaining within the sphere of the invention itself, as defined in the attached claims

Claims

1. Counter-frame structure for a window, suitable for being inserted in an opening of an outside wall of a building, comprising:

- a counter-frame (10) of a window;
- an insulating surround (12), made in heat insulation material, which surrounds the counter-frame at least on the sides facing said wall and the outside of the building,

wherein said counter-frame and insulating surround are interconnected so as to form a single block (1) to be inserted in the opening of the wall, and wherein said insulating surround (12) comprises at least two vertical insulation elements (14) and at least one lower horizontal insulation element (16) which connects

said vertical elements at the bottom, **characterised by** the fact of further comprising an outer sill (22) comprising a sill plate (24) in a waterproof material, overlapping said lower horizontal insulation element, the lateral rims (26) of said sill being bent upwards and being sunk into the thickness of the vertical insulation elements (14) of the insulating surround.

2. Structure according to claim 1, wherein each vertical insulation element (14) of the insulation surround has a bottom surface comprising an outer lateral portion (14') which rests on the lower horizontal insulation element (16) and an inner lateral portion (14'') which rests on a portion of lateral extremity of the sill (22).

3. Structure according to claim 2, wherein the sill comprises a pair of lateral guide elements (28) on each of which a respective vertical insulation element partially (14) rests, in each lateral guide element there being formed said lateral rim (26) bent upwards and sunk into the thickness of a respective vertical insulation element, in each guide element a laterally open guide groove (30) being made which the sill plate (24) is inserted in so as to slide.

4. Structure according to the previous claim, wherein each lateral guide element (28) of the sill is shaped in such a way as to follow the contour of the inner side of the corresponding vertical insulation element, and wherein the guide groove has a bottom perpendicular to the wall of the building so as to enable the insertion of a rectangularly shaped sill plate (24).

5. Structure according to any of the previous claims, wherein the sill comprises a transversal guide element (32) anchored in the lower horizontal insulation element (16) along the rim facing the fixed window frame, said transversal guide element (32) forming a guide groove (34) suitable to receive the inner rim of the sill plate (24).

6. Structure according to any of the previous claims, wherein a vertical groove (141) is made in each vertical insulation element housing a guide (142) for a blind element, the sill extending below the vertical insulation elements (14) beyond the depth of said vertical groove (141).

7. Structure according to any of the previous claims, wherein at least one housing recess of containing or guiding device of a blind element is incorporated in the upper horizontal insulation element (36), said recess being closed underneath by a removable closure plate (40) sliding along a pair of upper lateral guide elements (42) positioned between the top of the vertical insulation elements (14) and said upper horizontal insulation element (36).

- 8. Structure according to any of the previous claims, wherein the insulating surround is suitable to at least partially overlap the fixed window frame (100), at least on the side facing outwards. 5
- 9. Structure according to any of the previous claims, wherein the insulating surround is composed of a plurality of insulating elements (14, 16, 36, 44) closely coupled to each other, at least some of which fixed to the counter-frame (10). 10
- 10. Structure according to any of the previous claims, wherein the insulating surround (12) is of such thickness as to extend, at least at its lower and/or upper horizontal sides, from the inner side (5') to the outer side (5") of the wall (5) which the structure is inserted in, including an external protective facing(7). 15
- 11. Structure according to claim 15, comprising a complete frame (30,32) fixed to the counter-frame. 20

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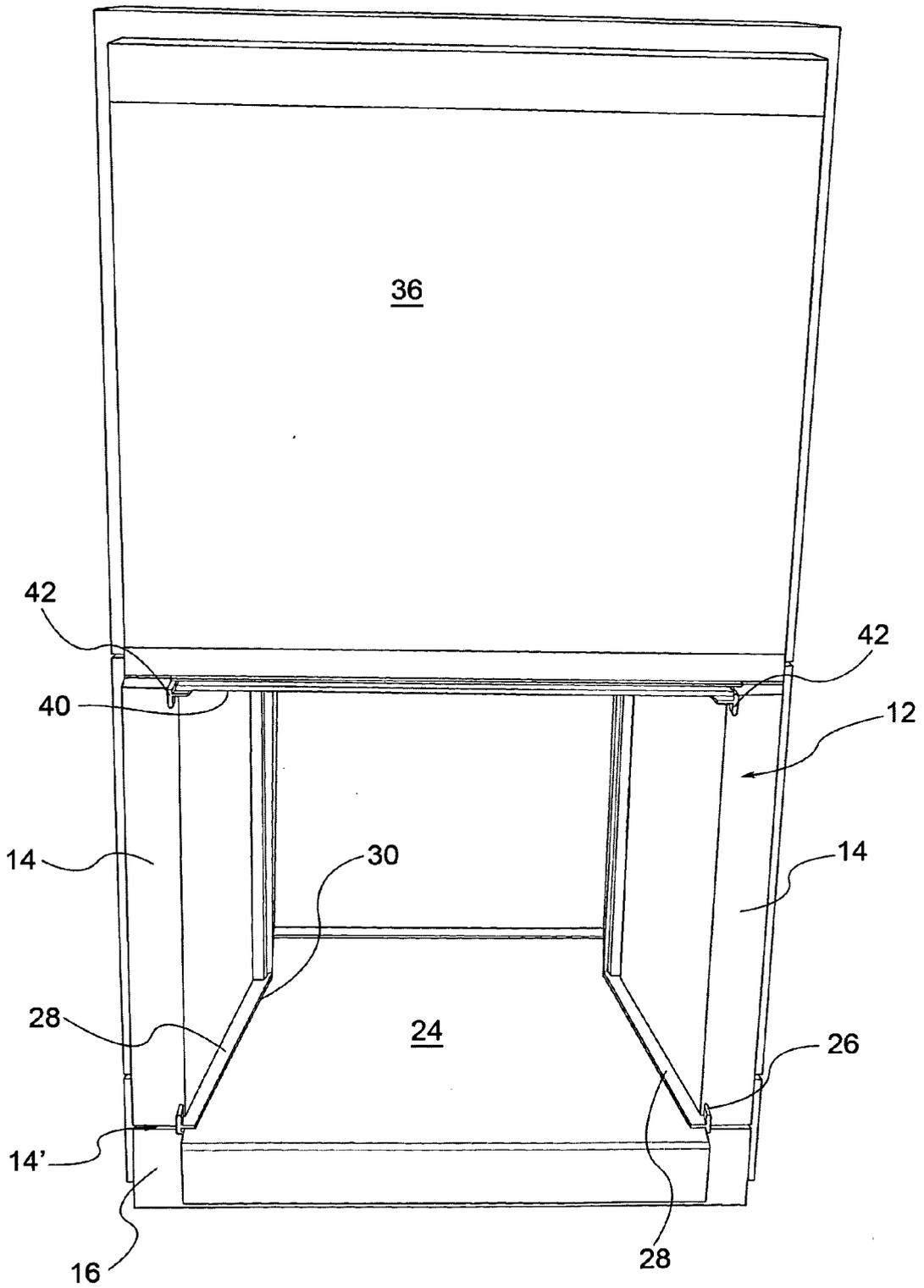


Fig. 1

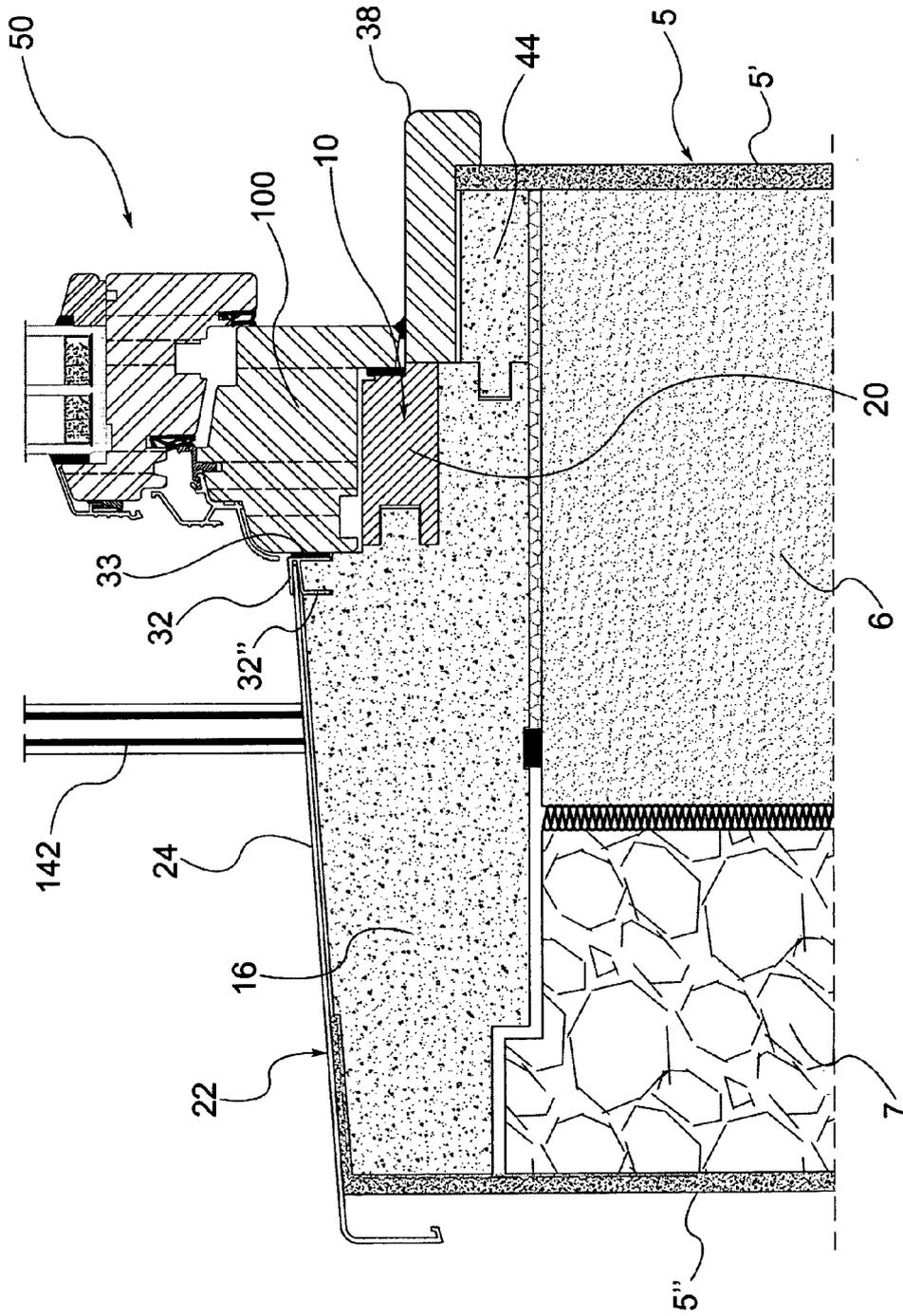
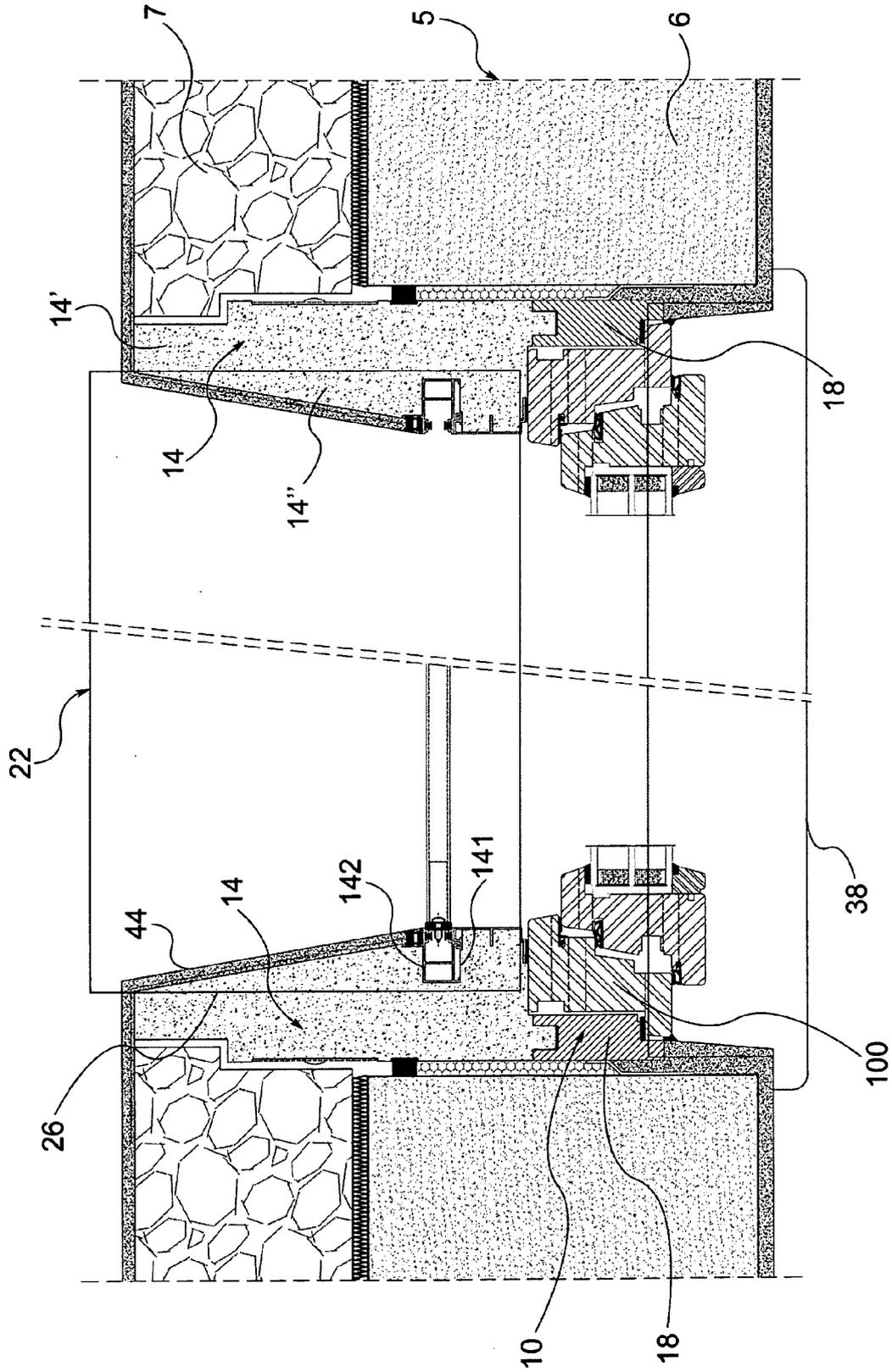
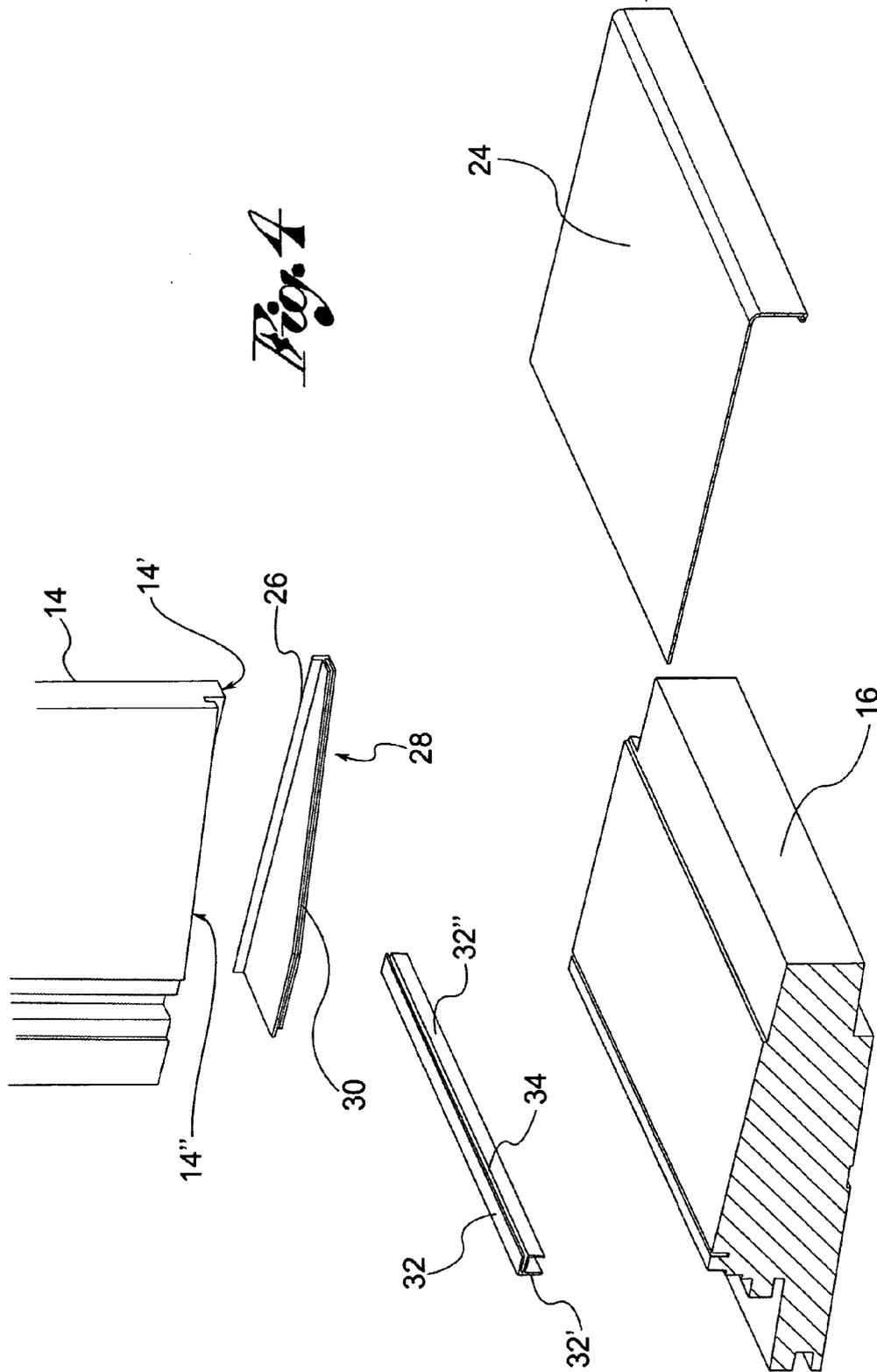


Fig. 2





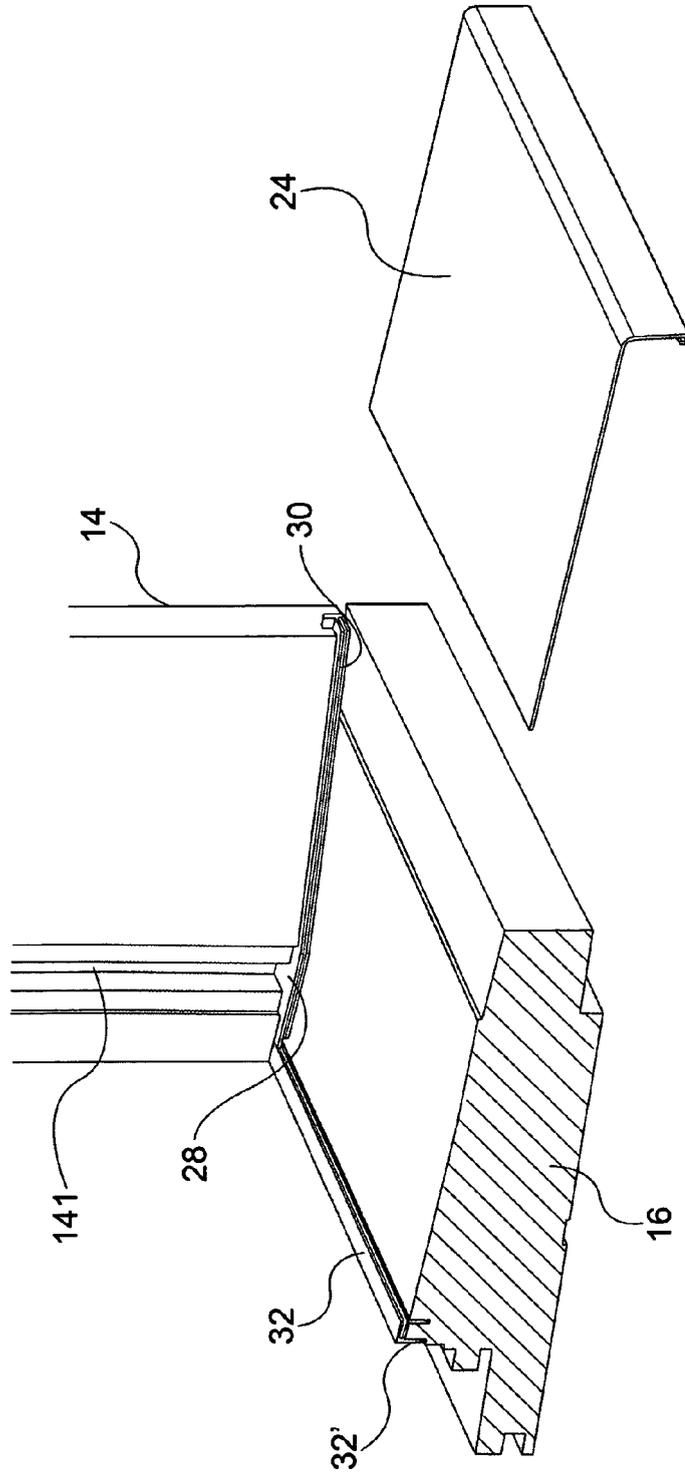


Fig. 5

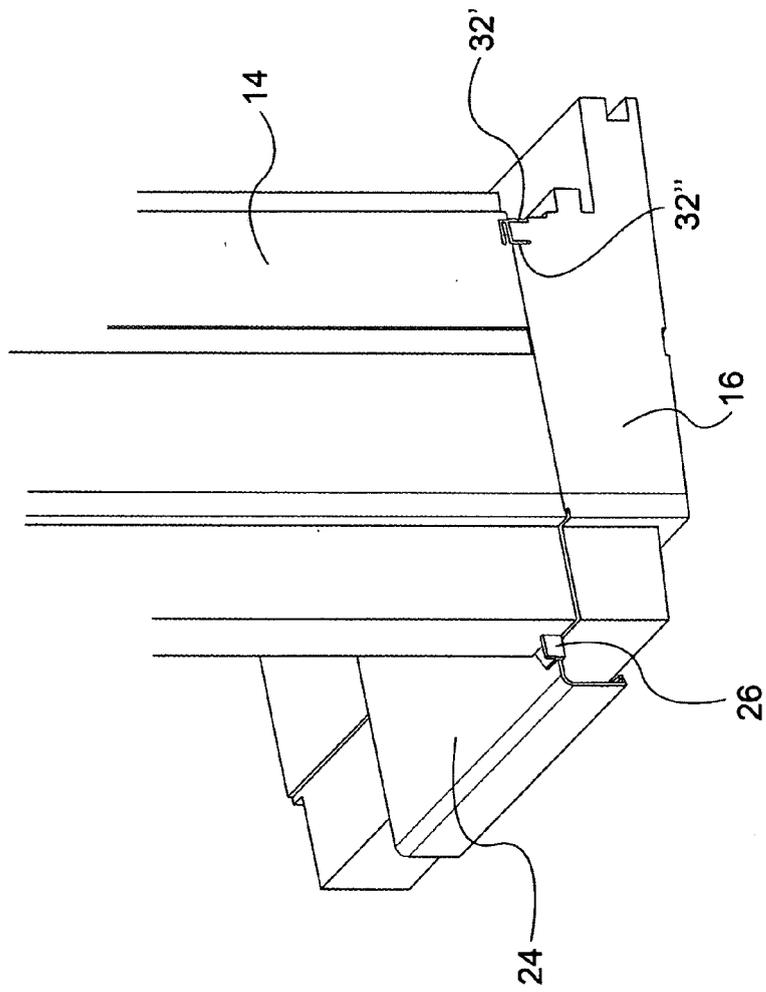


Fig. 6



EUROPEAN SEARCH REPORT

Application Number
EP 11 42 5014

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 391 567 A2 (WIGGENHAUSER PETER [CH]) 25 February 2004 (2004-02-25) * the whole document * -----	1,2,6-11	INV. E06B1/56 E06B1/02 E06B1/70
			TECHNICAL FIELDS SEARCHED (IPC)
			E06B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 16 May 2011	Examiner Schwertfeger, C
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

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EPO FORM 1503 03/02 (P04/C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 11 42 5014

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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16-05-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1391567 A2	25-02-2004	CH 695781 A5	31-08-2006

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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