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80637 München (DE)****(54) A door slab assemble structure for the partly hollow door skin and glass**

(57) A door slab assemble structure for the partly hollow door skin and glass, especially, is composed of glass and a Sheet Molding Compound's embossed grain door skin with double-layers grooves. It has three types of assembling including two, four, and eight door skins.

The feature of the two sheet door slabs is making two partly hollow door skin which have the left-right integral edge to be glued together with the reinforcement wood inside the door left and right, top and bottom rail, and hollow area's sealing stuffs. Besides, to locate the glass through the insertion between glaze bead and the hollow area's sealing stuffs. The sealing stuffs for joining the door skins could be wood, PVC (Polyvinyl Chloride), PE (Polyethylene), PP (Polypropylene), resin, particle board or foam plastics. Insides the door, it is filled with polyurethane foam plastics, and is assembled with glass to form a glazed door with glass on the middle area.

The feature of the four sheet door slabs structure is to set two crossed convex ribs on each of the long ribs and short ribs end of the four sheet "L" type door skin, and through the connection between the metal sheet of corner fixing and crossed ribs, to fix two "L" type slabs, and thus form a partly hollow door skin. Further, by gluing together with the reinforcement wood inside both door left and right, top and bottom rail, and hollow area's sealing stuffs, to form a partly hollow door slab. The door width of this invention is changeable by cutting the length of "L" type short rib whose concept is taken from the structure of two sheet door skins.

The feature of the right sheet door slab's structure is to use eight crossed and vertical door skins which all have flush skins on the edge to form a rectangular frame. On the left side and the right side of the frame, it can be taken a metal sheet inserting with sealing stuffs

for location totally sixteen metal sheets on the two sides. Then glue the crossed and the vertical door skin on the rectangular frame to form a partly hollow door skin. On the same way, the hollow area's sealing stuffs can be fixed with glass and PVC foam profile.

EP 0 907 000 A1

Description

Drawbacks of prior arts:

[0001] The prior arts include US Patent No. 4,850,168; Patent No. 4,720,951; Patent No. 4,546,585, and Patent No. 4,327,535.

[0002] At present, the assemble structures of existing partly hollow door skin are two sheet door skins and eight sheet door skins; wherein the former structure is described in US Patent No. 4,327,535. It is made by the following steps. First, to assemble the perimeter of door skin with sealing stuffs. Second, to assemble the sealing stuffs and glass together on the hollow area, then, to insert with the convex part of door skin to formulate a hollow and close space inside the door skin, then filling with polyurethane foam plastics to form a partly hollow door skin with glass.

[0003] The other one, US Patent No. 4,720,951, taking a pair of door skins which are produced by SMC (Sheet Molding Compound) technical, to fix the hollow area's long rib together with the insulating glass during compression process to replace with the hollow area's sealing stuffs disclosed in US Patent No. 4,327,535. Therefore, it can save time and material expense while assembling.

[0004] This US Patent's perimeter is still assembled through the insertion among four scaling stuffs. The inner part is also fill with foam plastics to form a door skin. To conclude the three patents mentioned above. It still has some drawbacks. Describing as follows:

1. The insulating glass is inserted with door skin during production and can not be replaced. This causes the problem that once the glass is fragile during production or transport, the whole door skin will be out of use.

2. To fix glass with convex rib disclosed in US Patent No. 4,720,951 will have problem, too. Only one specific size of glass can not satisfy various customers requirements (now exists single, double and three layers); though, US Patent No. 4,850,168 has certain improvement on this point, however, it add a sealing stuff on the convex area make the appearance lack of beauty.

3. US Patent No. 4,850,168 replaces the perimeter sealing stuffs assembly with the integral edge structure. This will cause the height of the door skin fix and can not be changed.

4. The length and width of glass is not changeable too. This will also limit the width of door skin.

[0005] There is another existing eight sheets door skin's assembly, that is as same as US Patent No. 4,546,585. This technical is adopted two up and down

crossed stuffs and two left and right vertical stuffs to be assembled together for the formation of partly hollow door slab. This structure will provide the advantage for being capable of producing different width door slabs to meet the customer's requirements, by changing the length of up and down crossed stuffs. However, this structure will also produce some drawbacks as follows:

[0006] The assembly type is time consuming. Also, the strength resulted from lock action between the vertical and crossed stuffs is inferior to single door skin. Furthermore, if the size is not controlled so accurate, the connecting part between vertical stuff and crossed stuff will cause certain gap.

[0007] This invention focus on the improvement of the existing partly hollow door slab assembly. Through researches and tests, we create the novel assemble mode of this invention including two sheets', four sheets' and eight sheets' assembly.

DESCRIPTION OF THE DRAWINGS

[0008]

Fig. 1: Perspective of two sheet door skins SMC door skin 1, 2.

Fig. 2: Vertical section view of two sheet door skins top and bottom rails of door skin 6.

Fig. 3: Crossed section view of two sheet door skins SMC skin 1, 2.

Left side and right side integral edge 3, 4 of SMC door skin.

Hollow area's sealing stuff of door skin 5.

PU foam plastics 7.

Glaze bead 8.

Glass 9.

Inner reinforcement wood 23.

Fig. 4: Perspective section view of two sheet door skins SMC door skin 1.

Left side and right side integral edge 3, 4 of SMC door skin.

Top and bottom rails of door skin 6.

PU foam plastics 7.

Glaze bead 8.

Glass 9.

Inner reinforcement wood 23.

Fig. 5: Perspective explosive drawing of two sheet door skins "L" SMC door skins 10, 11, 12, 13.

Corner fixing metal sheet 15.

Two crossed convex ribs of "L" long rib 16.

Two crossed convex ribs of "L" short ribs 17.

Fig. 6: Vertical section view of four sheet door skins.

Top and bottom rails of door skin 6.
 Corner fixing metal sheet 15.

Fig. 7: Cross section view of four sheet door skins.

Left side and right side integral edges of SMC door skins 3, 4.
 Hollow area's sealing stuff of door skin 5.
 PU foam plastics 7.
 Glaze bead 8.
 Glass 9.
 "L" SMC door skins 10, 11, 12, 13.
 Inner reinforcement wood 23.

Fig. 8: Perspective section view of four sheet door skins

"L" SMC door skins 11, 12.
 Corner fixing metal sheet 15.
 Two cross convex ribs of "L" long ribs 16.
 Two cross convex ribs of "L" short ribs 17.

Fig. 9: Perspective drawing of eight sheet door skins

Door skin of top cross stuff 18.
 Door skin of bottom cross stuff 19.
 Door skin of left side and right side vertical stuff 20, 21.

Fig. 10: Vertical section view of eight sheet door skins.

Top and bottom rail of door skin 6.
 Door skin of top cross stuff 18.
 Door skin of bottom cross stuff 19.

Fig. 11: Cross section view of eight sheet door skins.

Hollow area's sealing stuff of door skin 5.
 PU foam plastics 7.
 Glaze bead 8.
 Glass 9.
 Left and right stiles 14.
 Door skin of left and right side vertical stuff 20, 21.
 Metal sheet for corner fixing 22.

Fig. 12: Assembling view of metal sheet and sealing stuff of eight sheet door skins.

Top and bottom rails of door skins 6.
 Left and right stiles 14.
 Metal sheet for corner fixing 22.

Fig. 13: Perspective section view of eight sheet door skins.

Glazed area's sealing stuff of door skin 5.
 PU foam plastics 7.
 Glaze bead 8.
 Glass 9.

[0009] Here will describe the features in detail:

1. Two sheet door skin assembly (Fig.1~Fig.4): It comprises: a pair of SMC door skins 1, 2 whose center is a hollow rectangle, and has an convex integral edge 3, 4, on the left and right skin edges as a feature. While two sheet door skins insert with each other from left to right, there is a corner sealing stuffs 23 on left side and right side each, to glue together with the top and bottom rail 6 and hollow areas' sealing stuffs 5 of door skin to form a partly hollow door slab with a close space. In the inner part, it is filled with polyurethane foam plastics 7, and is put a filler on the inlet to get a solid core door skin, wherein the opposite corner stuff 23 and door skins integral edge 3, 4 is departed from 3mm to strengthen the whole door skin and to reinforce the strength for hinge installment.

The solid door skin with partial hollow assembled by the precedence structure wherein the hollow areas' sealing stuffs 5 can be set glass 9 and fix by glaze bead 8. At the bottom of glaze bead 8 has a plug-in convex rib can be inserted in the groove of hollow area's sealing stuff 5 for joint tightly. Then with the same structure to fix glass by glaze bead, and complete a new functional door slab assembled with partial hollow sheet and glass.

The features of two sheet door skin assembly are stated as follows:

- (1) To base on the most popular door skin size making it constant, and using integral edge easily for assembling. Besides, it saves left side and right side stiles.
- (2) Top and bottom rail can be cut to change the door slab height.
- (3) Glaze bead can be replaced. Also, if the insulating glass fragile, it can be replaced, too. Different glaze beads can fit with different glass thickness to meet with the diversity of market.

2. Four sheet door skin assembling (Fig.5~Fig.8): It is consisted of four "L" type sheets, No. 10, 11, 12, and 13 of SMC door skin. Both the long and short rib edges of OAK wood grain door skin have two crossed convex ribs each, wherein the two crossed convex ribs 17 of "L" short rib and the two crossed convex ribs 16 of "L" long rib are fixed tightly with the two grooves of corner fixing metal sheet 15, to form a partly hollow door skin. The left side and

right side edges of four sheet "L" door skins each is designed a pair of inserting convex ribs 3, 4 to be glued and inserted together while in door skin assembling.

Each left and right of door skin inner parts is glued with a corner stuff 23 whose integral edge is 3mm departed not close to each other. The door slab's top and bottom rail 6, hollow area's sealing stuff 5 and the preceding four sheet "L" door skins are glued together to form a partly hollow door slab. To fill the PU foamed plastics into the door skin and seal the inlet to form a door slab. This invention have the function of door skin width changeable by following the concept of two sheet door skins assembling and cutting the length of "L" short rib of "L" door skin.

The inserting fixed mode of insulating glass of the four sheet door skin assembling is as same as those of the preceding two sheet door skin assembling is as same as those of the preceding two sheet door skins, and produce the same function. Advantages are as follows:

- (1) "L" type structure can be reassembled by cutting the "L" short rib to change the door skin width and fulfill the customer's needs.
- (2) The metal sheet fixed on the corner can increase the door skin strength and reduce the angle matching error.

3. Eight sheets door skin assembling (Fig.9~Fig.13): It has 90 degree edges of corner fixing metal sheet 22 can be inserted to the left side and right side stiles 14, the top and bottom rail 6, and the grooves of hollow area's sealing stuffs 5, for door skin. Totally, 16 metal sheets both sides be used for fixing to be a door frame. Then, making the four sheet door skins with long strip OAK wood grain and flush skin edges, which is consisted of two sheet crossed stuffs 18, 19 and two sheet vertical stuffs, to be glued on the door frame to form a partly hollow door skin. Inside the door is filled with PU foam plastics, and is sealed on the inlet with filling stuff. The hollow area's sealing stuffs can be laid in and fixed the glass tightly the insertion between plug-in convex rib of glaze bead and the groove of hollow area's sealing stuffs. The glass described forth can be single, double or three layers. Through different sizes of glaze beads which can be fixed the glass by the same structure, and formed a novel functional door slab assemble structure with partial hollow door skin and glass.

The advantage of the eight sheet door skin assembling of this invention are the following:

- (1) It is consisted of eight sheets of vertical and crossed stuffs, and can be cut for different width and length for various of requirements.

(2) The door skin body will be strong enough by the metal sheets, and will not be deformed after using for a long time.

(3) It is more easily to assemble than traditional ways. Therefore, this invention can save the labor hour and down the cost.

Claims

1. A door slab assemble structure for two hollow door skin and glass comprises: partial hollow door skin, sealing stuffs, glaze bead and hollow area's sealing stuffs of door skin; wherein the door skins have convex edge; the left side and right side can be inserted for assembling; the top and bottom rail, hollow area's sealing stuffs, and door skin can be glued all together. The preceding hollow area's sealing stuffs are designed with grooves for the insertion of glaze bead to fix the glass. Inside the door slab, it is filled with PU foam plastics, and its inlet is sealed with plug to foam a door slab.
2. A door slab assemble structure for "L" type four sheet door skins and glass comprises: "L" type door skin of OAK wood grain, stile, hollow area's sealing stuffs of door skin, glaze bead and metal sheet of corner fixing; wherein the left side and right side of OAK wood grain door skin are set convex edges for being inserted to each other; the top and bottom rail, hollow area's sealing stuffs, and "L" type door skin can be glued all together; the connecting area is reinforced with metal sheet at the corner; the hollow area's sealing stuffs are designed grooves for the insertion of glaze bead to fix the glass; the interior of door skin is filled with PU foam plastics, and is sealed with plug at its inlet.
3. A door slab assemble structure for eight sheets of strip type door skins of OAK wood grain comprises: eight sheets of strip type door skins of OAK wood grain, stile, hollow area's sealing stuffs, glaze bead, and metal sheet of corner fixing; wherein the strip type door skins of OAK wood grain are flat with uniform thickness, and are glued with perimeter's corner sealing parts and hollow area's sealing stuffs which have grooves for inserting glaze bead and therefore fixing together; the interior of door slab is filled with PU foam plastics and is sealed with plug at its inlet.

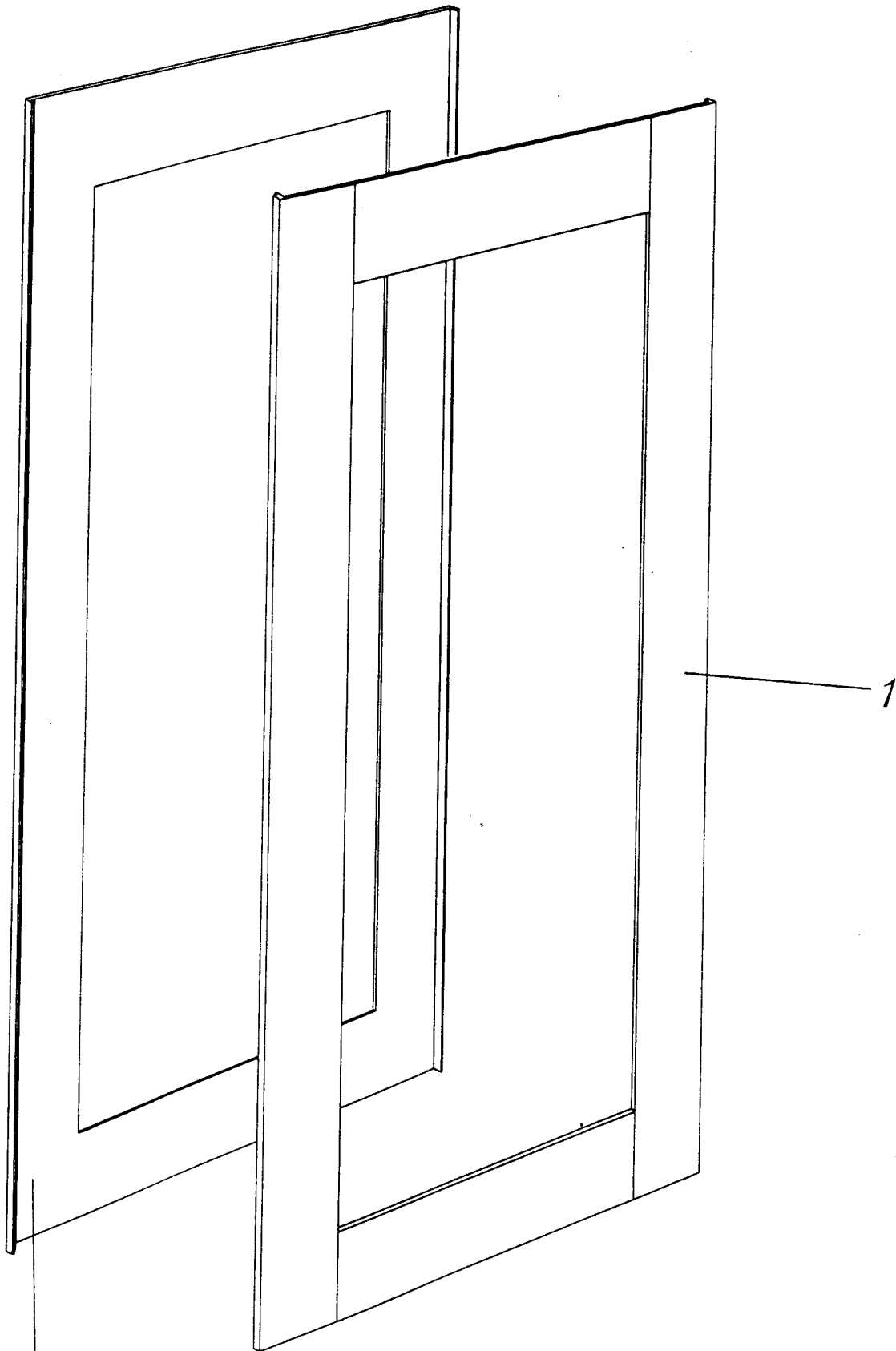
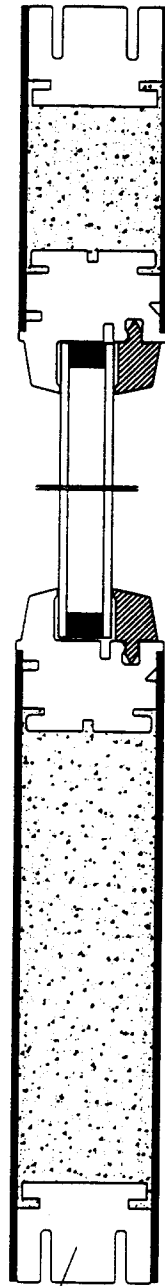


Fig. 1



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Fig. 2

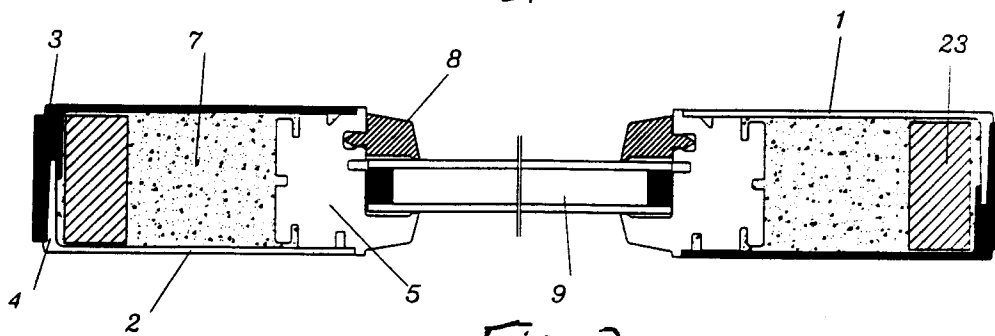


Fig. 3

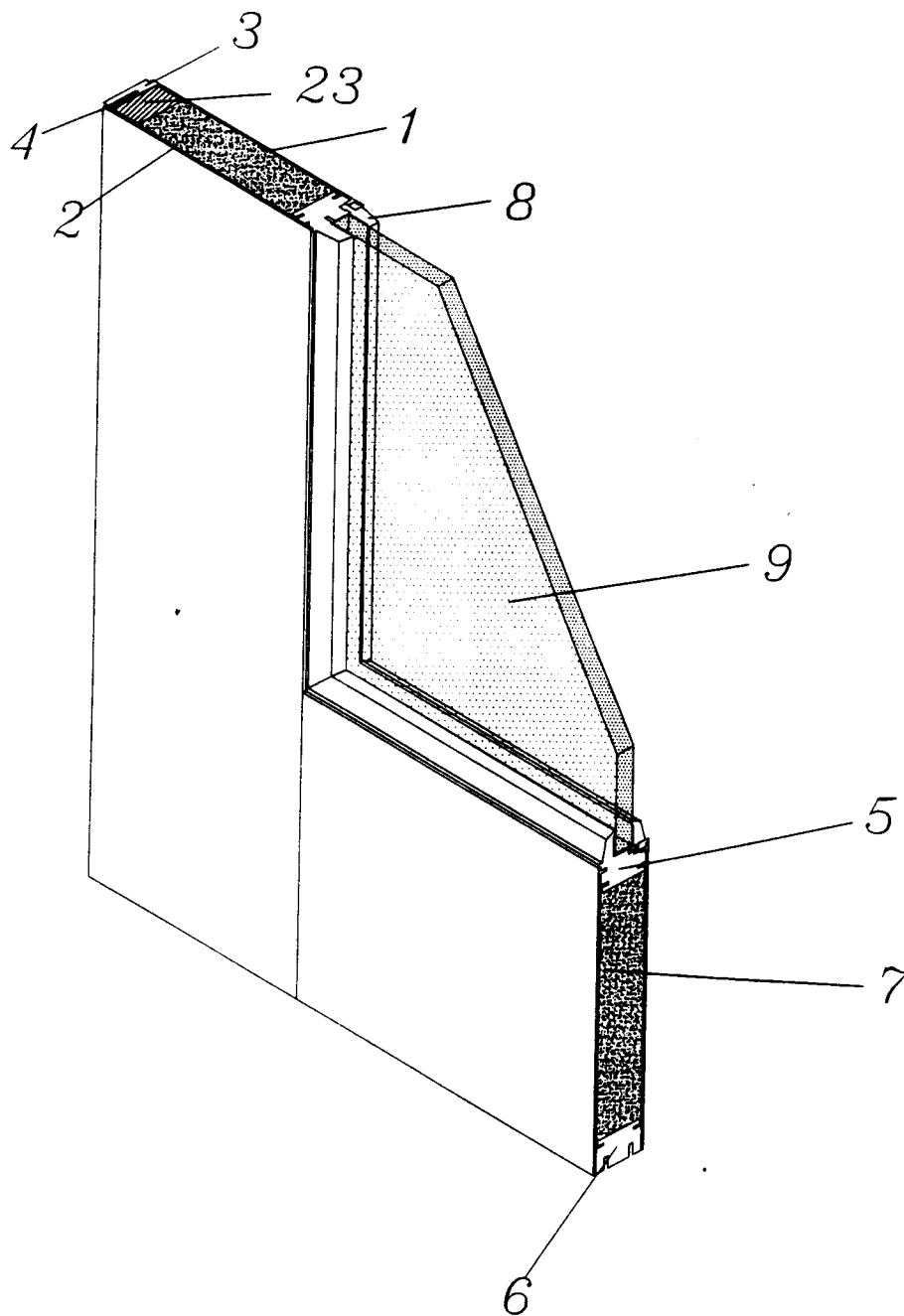


Fig. 4

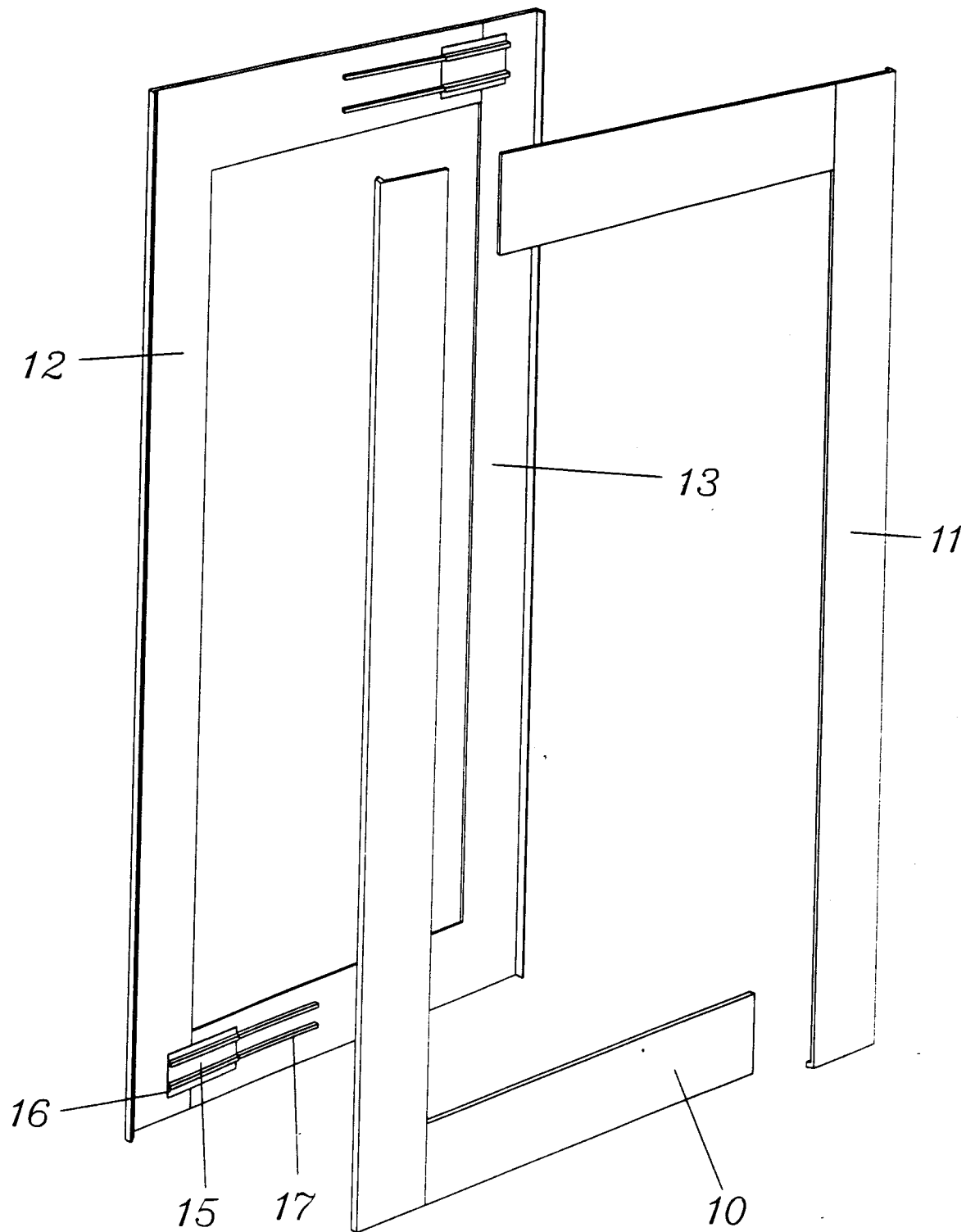


Fig. 5

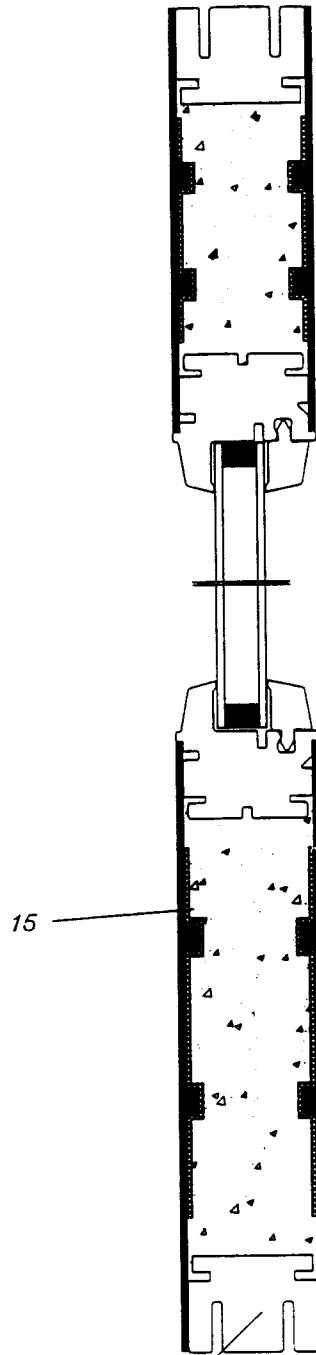


Fig. 6

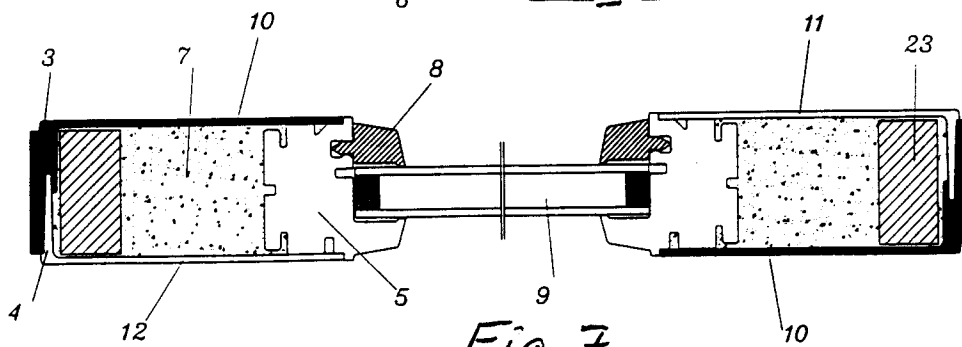


Fig. 7

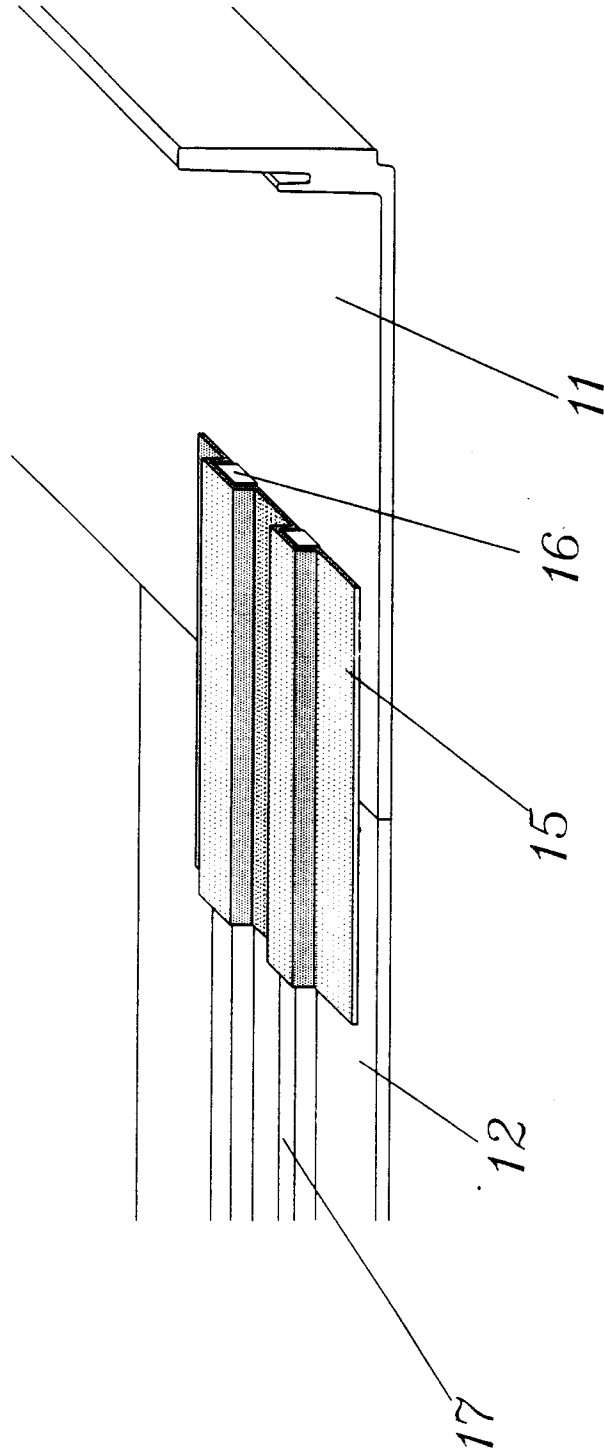
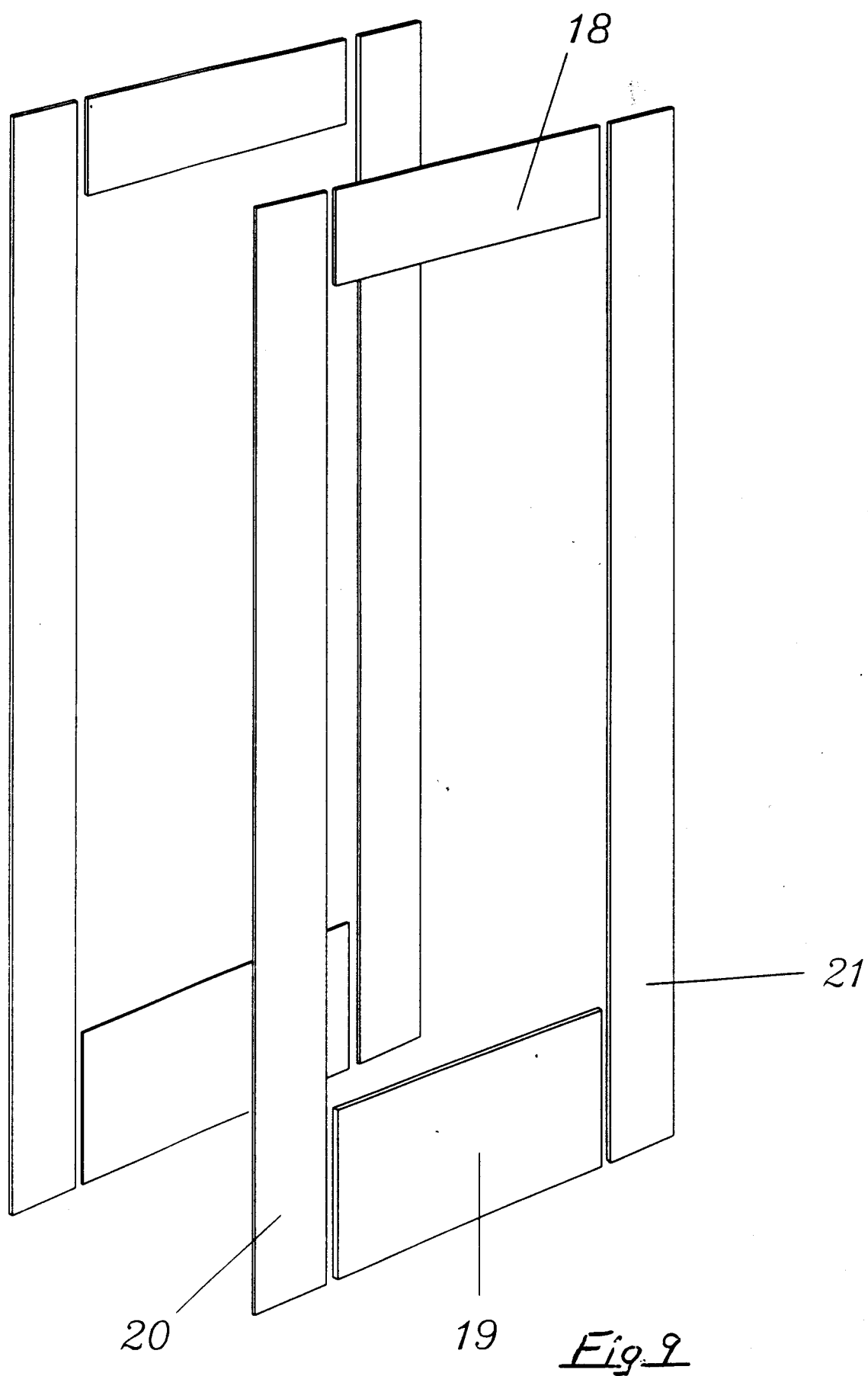


Fig. 8



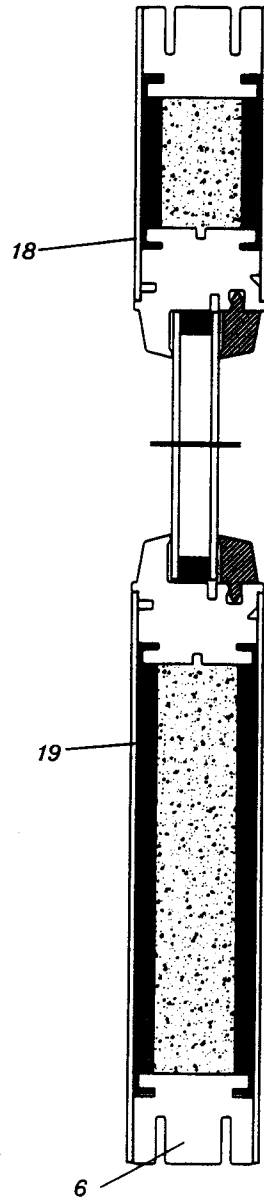


Fig. 10

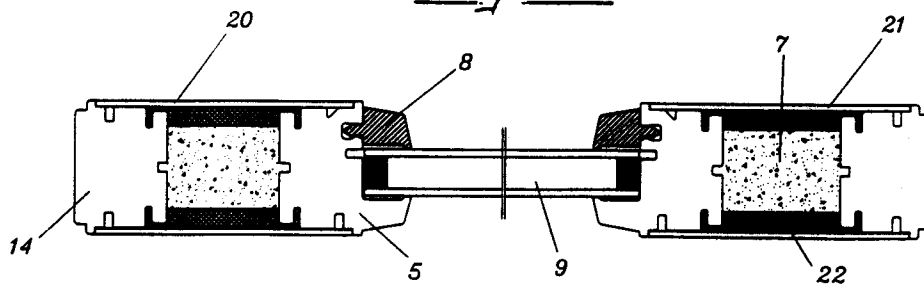


Fig. 11

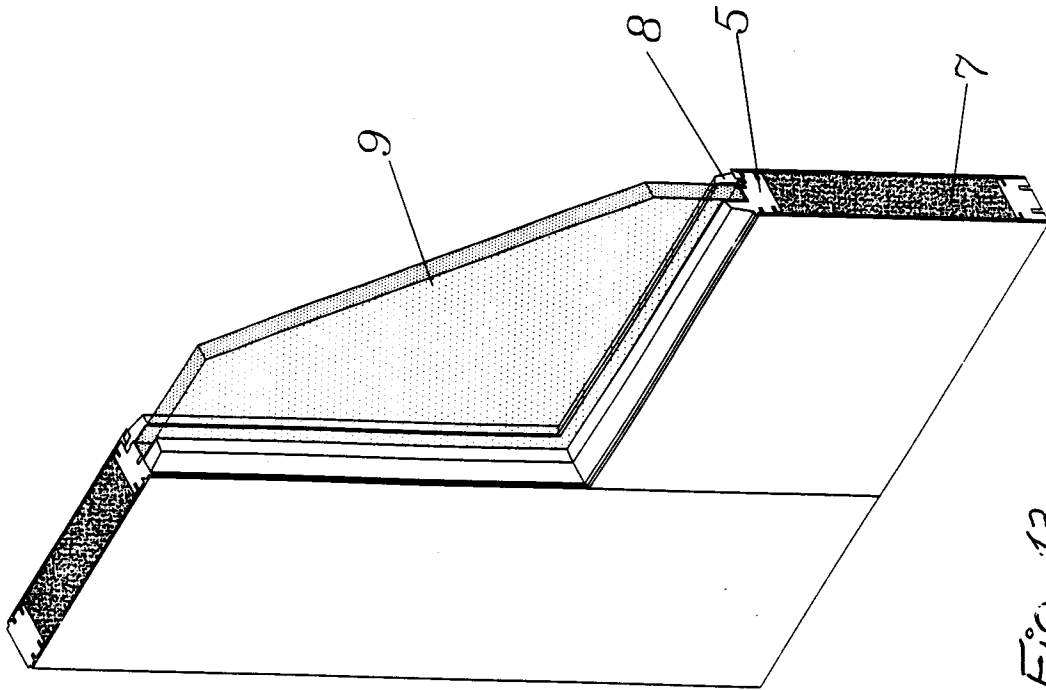


Fig. 13

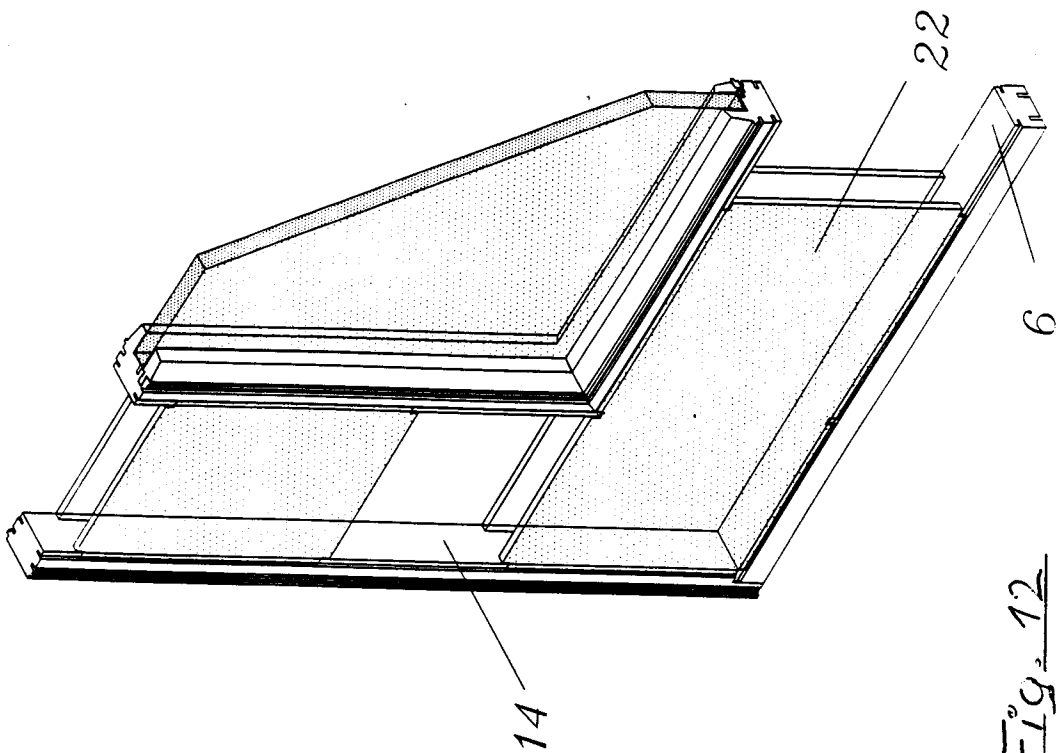


Fig. 12



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EUROPEAN SEARCH REPORT

Application Number
EP 97 11 7016

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.6)
D,A	US 4 327 535 A (B. C. GOVERNALE) * the whole document *	1-3	E06B3/72
D,A	US 4 720 951 A (J. E. THORN ET AL) * the whole document *	1-3	
D,A	US 4 850 168 A (J. E. THORN) * the whole document *	1-3	
D,A	US 4 546 585 A (B. C. GOVERNALE) * the whole document *	1-3	
A	US 5 557 899 A (P. DUBÉ ET AL) * the whole document *	1-3	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			E06B
Place of search		Date of completion of the search	Examiner
BERLIN		24 February 1998	Krabel, A
CATEGORY OF CITED DOCUMENTS 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 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			

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