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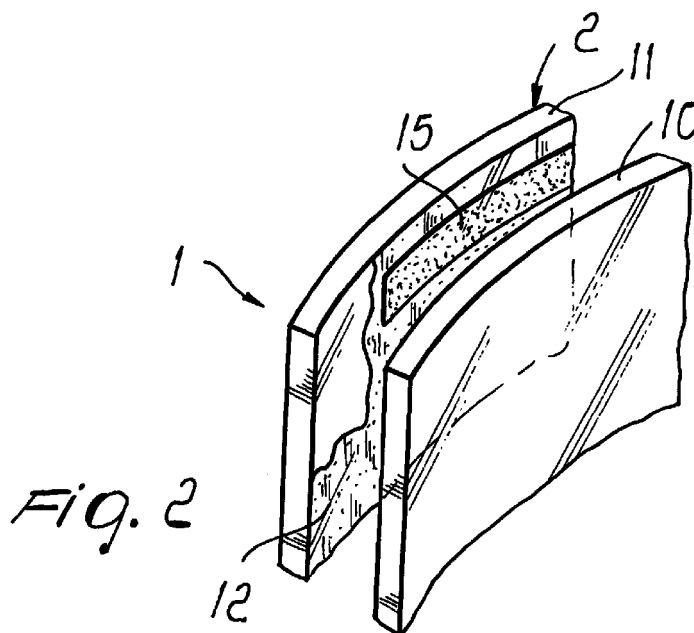
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(54) **Door having a curved profile for display refrigerators and the like**

(57) A door (1) having a curved profile for display refrigerators and the like, comprising a double/triple glazing unit (2) supported by a frame (3). The double/triple glazing unit is constituted by an inner pane (10) and an outer pane (11) which is curved so that its convexity is directed outward. The outer pane (11) is made of low-

emissivity pyrolytic glass with a coating layer (12), on the inner face, which is obtained by means of a deposition of metal oxides. The coating layer (12) is affected by a passage of electric current.



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Description

[0001] The present invention relates to a door having a curved profile for display refrigerators and the like.

[0002] Conventional doors for display refrigerators and the like are usually provided by means of a double-glazing unit accommodated inside a supporting frame; the double-glazing unit, in order to avoid fogging of the outer surface owing to the low internal temperatures which can be estimated at approximately -20/25°C, has on the internal surface of the outer pane a conducting coating which allows the flow of current to heat the pane so as to prevent fogging.

[0003] This solution, which is normally used in flat doors, has instead been found to be unusable in the case of doors having a curved profile, since the tempering process for curving the glass on which the conductive coating has been sprayed led to unsatisfactory results, since the coating cracked and became damaged, failing to allow the flow of current.

[0004] Accordingly, when it is necessary for aesthetic reasons to have a door which has a curved profile, a flat door of the conventional type is currently used on the front part of which a curved pane is applied which has a perimetric screen-printed region in order to conceal the aluminum profile of the flat door on which it is glued.

[0005] By applying the curved pane to the flat door, openings form at the upper and lower ends and are closed by means of plastic plugs.

[0006] This solution is therefore disadvantageous, both because it leads to the application of an additional element, constituted by the outer curved pane, and because it does not allow optimum utilization of space, since the useful space inside the refrigerator is delimited by the flat door, consequently losing space for each shelf.

[0007] The aim of the present invention is to solve the above-described problem, by providing a door having a curved profile for display refrigerators and the like in which the door can be provided by means of two or three panes coupled to each other, which directly provide the curved shape of the door without requiring the application of an additional pane.

[0008] Within the scope of this aim, an object of the present invention is to provide a door which allows to increase the useful capacity of the refrigerator, in view of the fact that the internal shelves can be curved on their outer edge, thus utilizing the cambered shape of the door.

[0009] Another object of the present invention is to provide a door for vertical freezers which is lighter and aesthetically more pleasing, since it is possible to utilize a pane which has a curved shape.

[0010] Still a further object of the present invention is to provide a door which, in addition to giving the greatest assurances of reliability and safety in use, is advantageous from a purely economical point of view.

[0011] This aim and these and other objects which will become better apparent hereinafter are achieved by a door having a curved profile for display refrigerators and the like, according to the present invention, which comprises a double/triple glazing unit supported by a frame, characterized in that said double/triple glazing unit is constituted by an inner pane and an outer pane which is curved so that its convexity is directed outward, said outer pane being formed by low-emissivity pyrolytic glass with a coating layer, on the inner face, which is obtained by means of a deposition of metal oxides, said coating layer being affected by a passage of electric current.

[0012] Further characteristics and advantages of the present invention will become better apparent from the following detailed description of a door having a curved profile for display refrigerators and the like, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a schematic perspective view of the door having a curved profile according to the invention, applied to a display refrigerator;

Figure 2 is a cutout perspective view of the detail of the double-glazing unit;

Figure 3 is a perspective view of a specific structural embodiment of a display refrigerator;

Figure 4 is a sectional view, taken along the plane IV-IV of Figure 3;

Figure 5 is a sectional view, taken along the plane V-V of Figure 3;

Figure 6 is an exploded sectional view of a detail, taken along the plane V-V of Figure 3.

[0013] With reference to the figures, the door having a curved profile for display refrigerators and the like, according to the invention, is generally designated by the reference numeral 1 and comprises a double-glazing unit 2 which is supported by a frame 3 for connection to the structure 4 of the display refrigerator; nothing changes conceptually if a triple glazing unit is used.

[0014] The particularity of the invention is constituted by the fact that the double-glazing unit or triple-glazing unit 2 has an inner pane 10 and an outer pane 11 which is curved so that its convexity is directed outward.

[0015] Also the inner pane 10 is curved in a similar manner, so as to be substantially parallel.

[0016] The particular characteristic is constituted by the fact that the outer pane 11 is a low-emissivity pyrolytic pane such as those normally manufactured by the companies Glaverbel, Pilkington and Saint Gobain; such panes are currently used for the insulation of glazed areas with double-glazing units or triple-glazing units for windows.

[0017] These panes are manufactured with a low-emissivity coating 12 which is sprayed uniformly.

[0018] The coating 12 is arranged on the inner face

of the outer pane 11 and is obtained by means of a deposition of metal oxides at high temperatures which has the characteristic that it does not damage during the curving of the pane.

[0019] During the pane curving step, screen-printed portions 15 are applied at the upper and lower edges and provide the contacts for connection to an electrical power supply which, by utilizing the electrical resistance of the coating 12, provides a flow of current which allows to perform the intended heating of the pane in order to prevent its fogging.

[0020] The electrical power supply at 220 or 110 volts is preferably provided by means of a transformer 20 so as to obtain the power required to heat the pane according to the electrical resistance, which varies according to the dimensions and type of pane used, since the various manufacturers use a coating which has different electrical resistance characteristics.

[0021] Instead of the transformer 20, it is possible to use a trimmer which, inserted in one of the two phases, modifies the input voltage and has a potentiometer screw, by acting on which it is possible to vary the voltage.

[0022] With reference to Figures 3 to 6, a specific structural embodiment is illustrated which allows to provide the curved door with a considerable reduction in manufacturing costs, furthermore simplifying all the connection operations.

[0023] The structure has two posts 30 which have a seat 31 for the engagement of a magnetic gasket 32 and which are joined, at their ends, by lower and upper cross-members which are designated by the reference numeral 35 and are connected to the posts by means of L-shaped elements 36.

[0024] The cross-members 35, which run along the chord of the curved outer profile of the door formed by a double-glazing unit 40 which engages seats 41 of the posts 30, couple to a trim profile 42 which supports the magnetic gasket 32.

[0025] Below the upper cross-member and above the lower cross-member there is provided an internal plug 50 which is connected to one side of the cross-member and forms a seat 51 for containing a profile 52 which delimits the region that accommodates the insulation 53, which is contained, on the other side, by an outer plug 55 which is fixed to the outer edge of the cross-member and forms an outer seat 56 for the insertion of a flexible flat profile 57 which overlaps the upper edge of the pane.

[0026] The resulting arrangement, which can also be used for refrigerators with an internal temperature of 0 to 5°, has a particularly pleasant finish, and the presence of the flexible flat profiles that couple to the pane allows to provide a finishing element which does not have technical sealing functions, thus allowing to have a significant cost reduction.

[0027] In practice it has been observed that by not plugging the closure with a calendered transverse alu-

minum profile, as normally occurs, since this operation has considerable difficulties in the engagement and sealing and two vertical profiles, a technical and aesthetic improvement is obtained.

[0028] With the described arrangement it is therefore possible to provide a door having a curved profile which has a normal outer convexity but also an internal concavity, so that the useful spaces of the refrigerator are optimized and the overall weights of the door are reduced.

[0029] In practice, the materials employed, so long as they are compatible with the specific use, as well as the contingent shapes and dimensions, may be any according to requirements.

[0030] The disclosures in Italian Utility Model Application No. MI99U000618 from which this application claims priority are incorporated herein by reference.

[0031] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A door (1) having a curved profile for display refrigerators and the like, comprising a double/triple glazing unit (2) supported by a frame (3), characterized in that said double/triple glazing unit (2) is constituted by an inner pane (10) and an outer pane (11) which is curved so that its convexity is directed outward, said outer pane (11) being formed by low-emissivity pyrolytic glass with a coating layer (12), on the inner face, which is obtained by means of a deposition of metal oxides, said coating layer (12) being affected by a passage of electric current.
2. The door according to claim 1, characterized in that said inner pane (10) has its concavity directed toward the inner side of the door (1).
3. The door according to the preceding claims, characterized in that it comprises, at the upper portion and at the lower portion of said coating layer (12), an electrically conducting screen-printed line (15) for connection to an electrical power supply (20).
4. The door according to one or more of the preceding claims, characterized in that the electrical power supply (20) is provided by interposing a transformer in order to adjust the voltage according to the required current flow.
5. The door according to one or more of the preceding claims, characterized in that it comprises a trimmer for applying a variable voltage to said strips of elec-

trically conducting material.

6. The door according to one or more of the preceding claims, characterized in that it comprises two posts (30) which are joined, at their ends, by cross-members (35) which run along the chord of the curved outer profile formed by said pane, an inner plug (50) being further provided which can be coupled to the inner side of said cross-members (35) and defines a containment seat (51) for a profile (52) which forms, in cooperation with the cross-member (35), the seat of an insulating element (53), an outer plug (55) being further provided which is connected to the outer edge of said cross-members and delimits the longitudinal ends of said door.
7. The door according to one or more of the preceding claims, characterized in that said outer plug (55) forms an outer seat (56) for the insertion of a flexible flat profile (57) which can be superimposed on the upper and lower edges of the pane having a curved profile.

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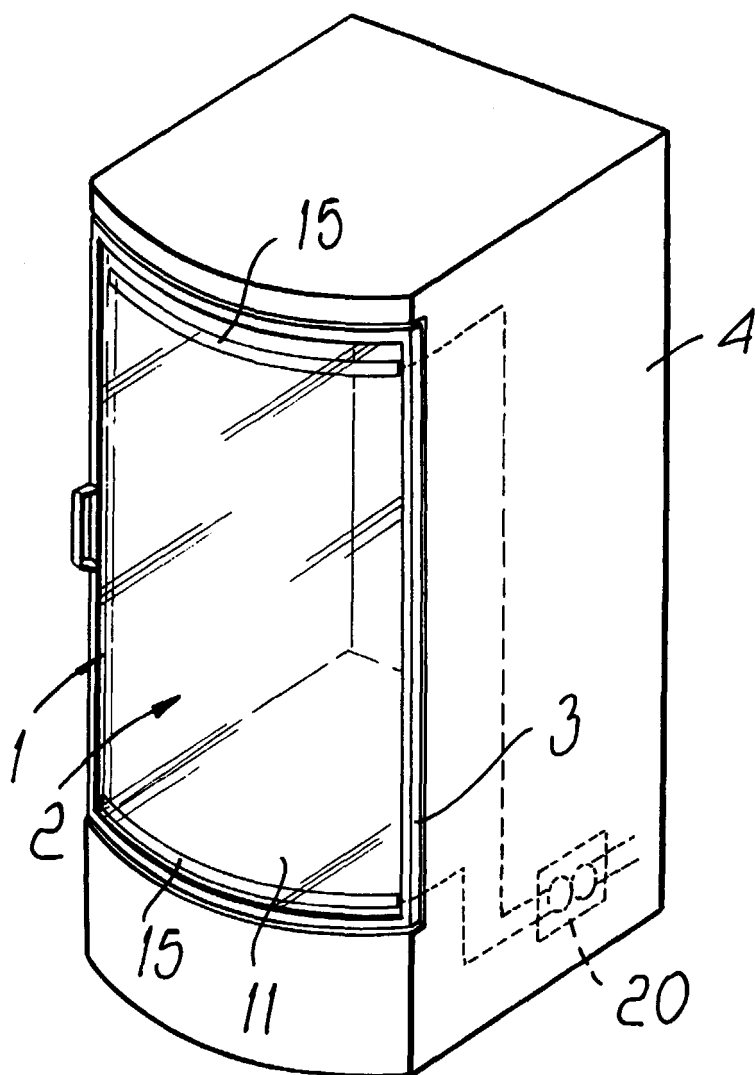


Fig. 1

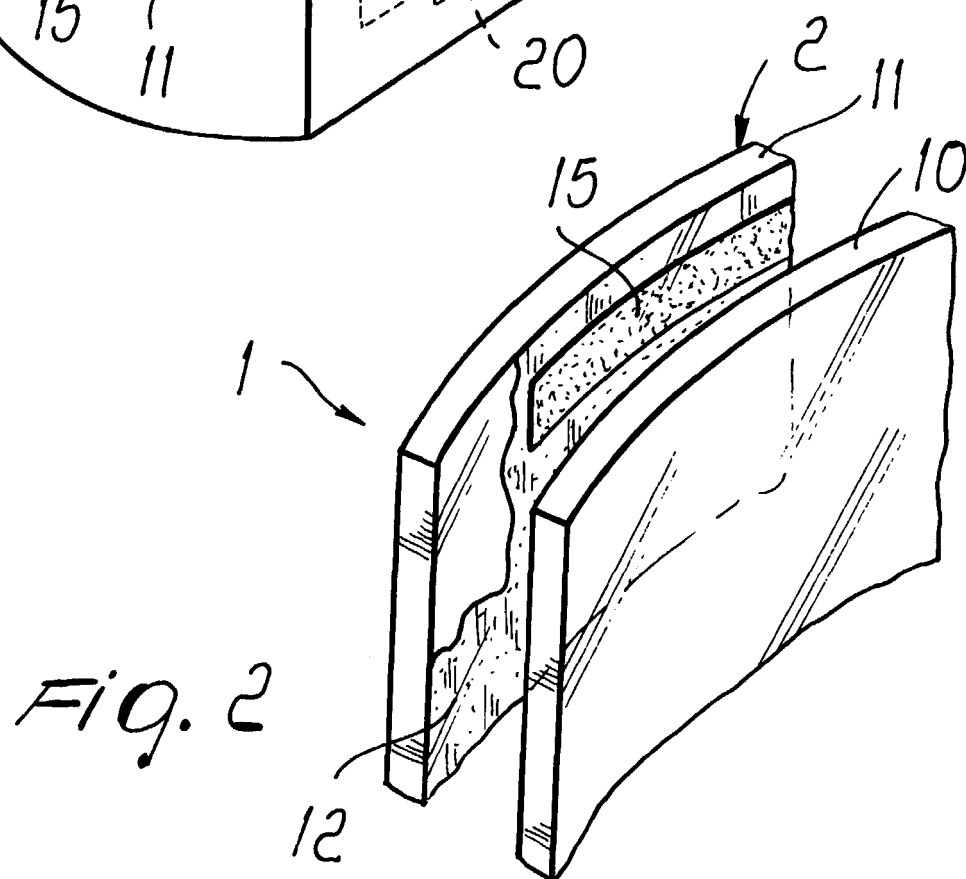
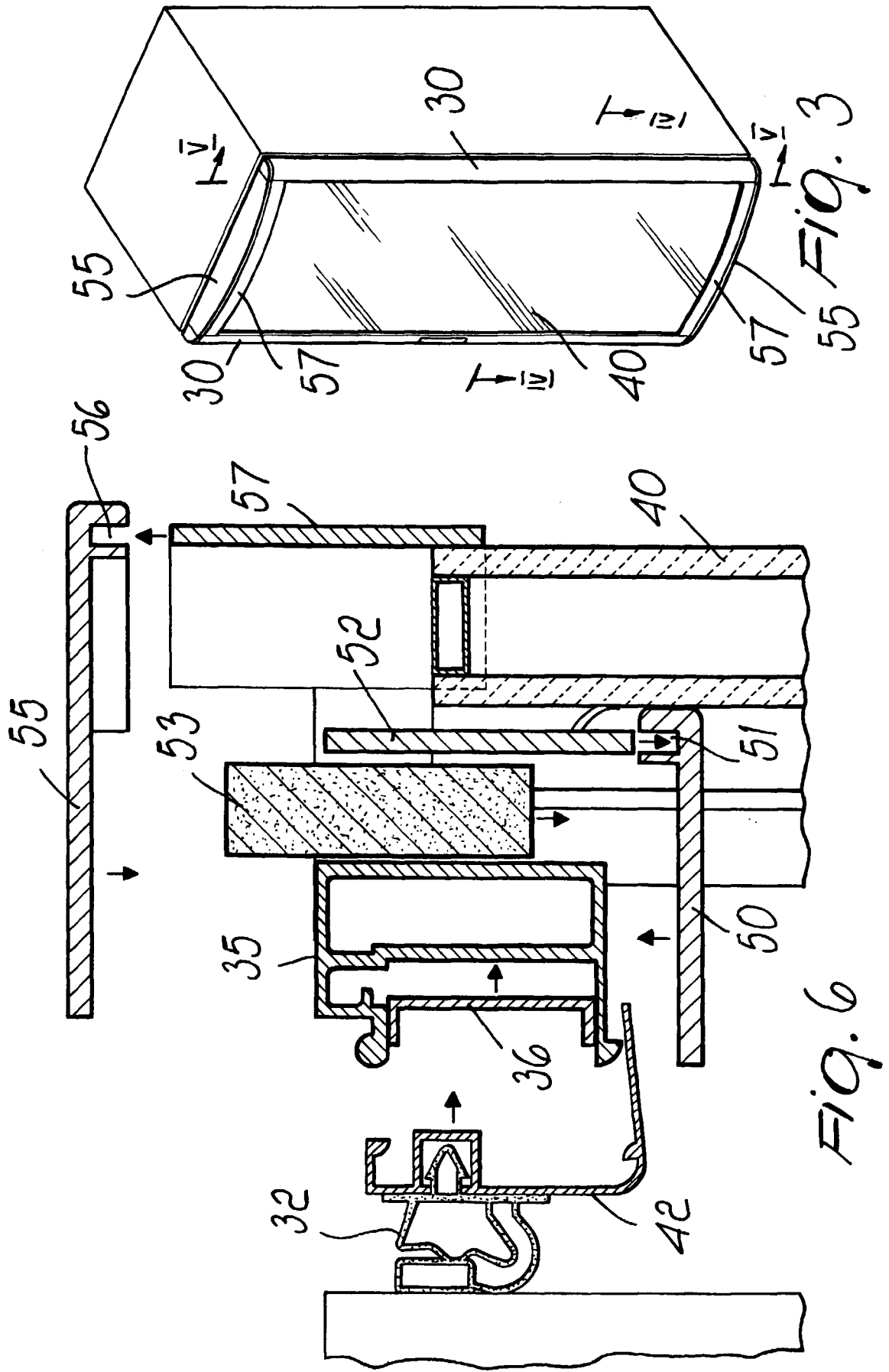


Fig. 2



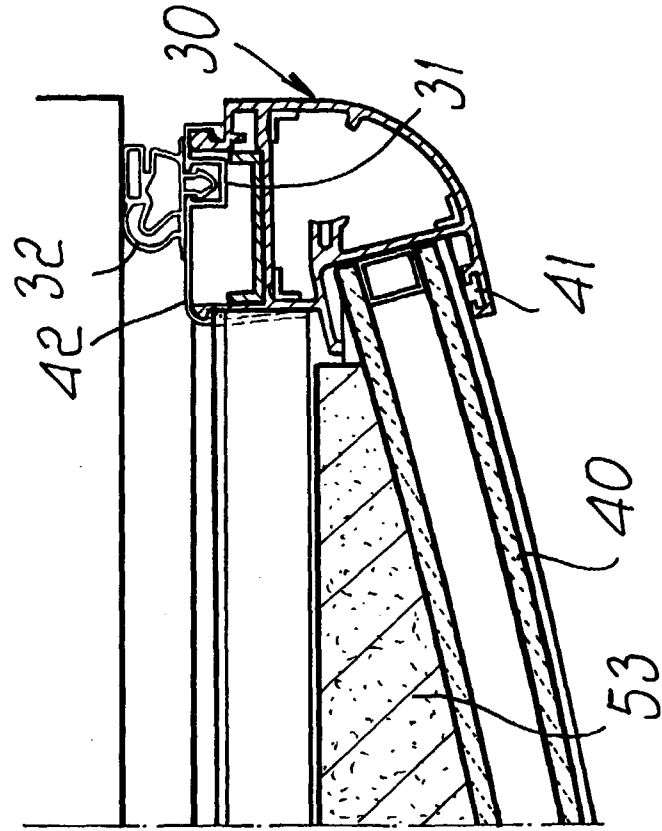
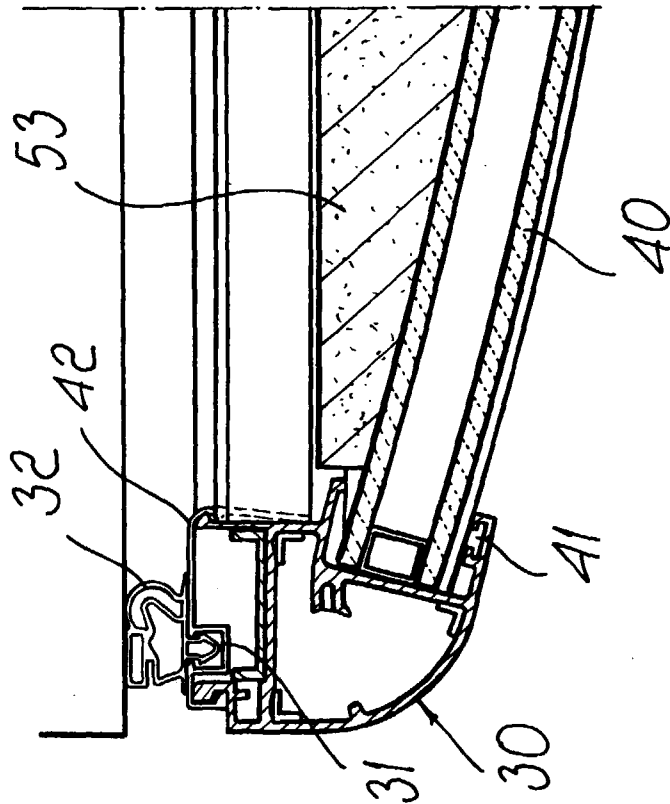


Fig. 4



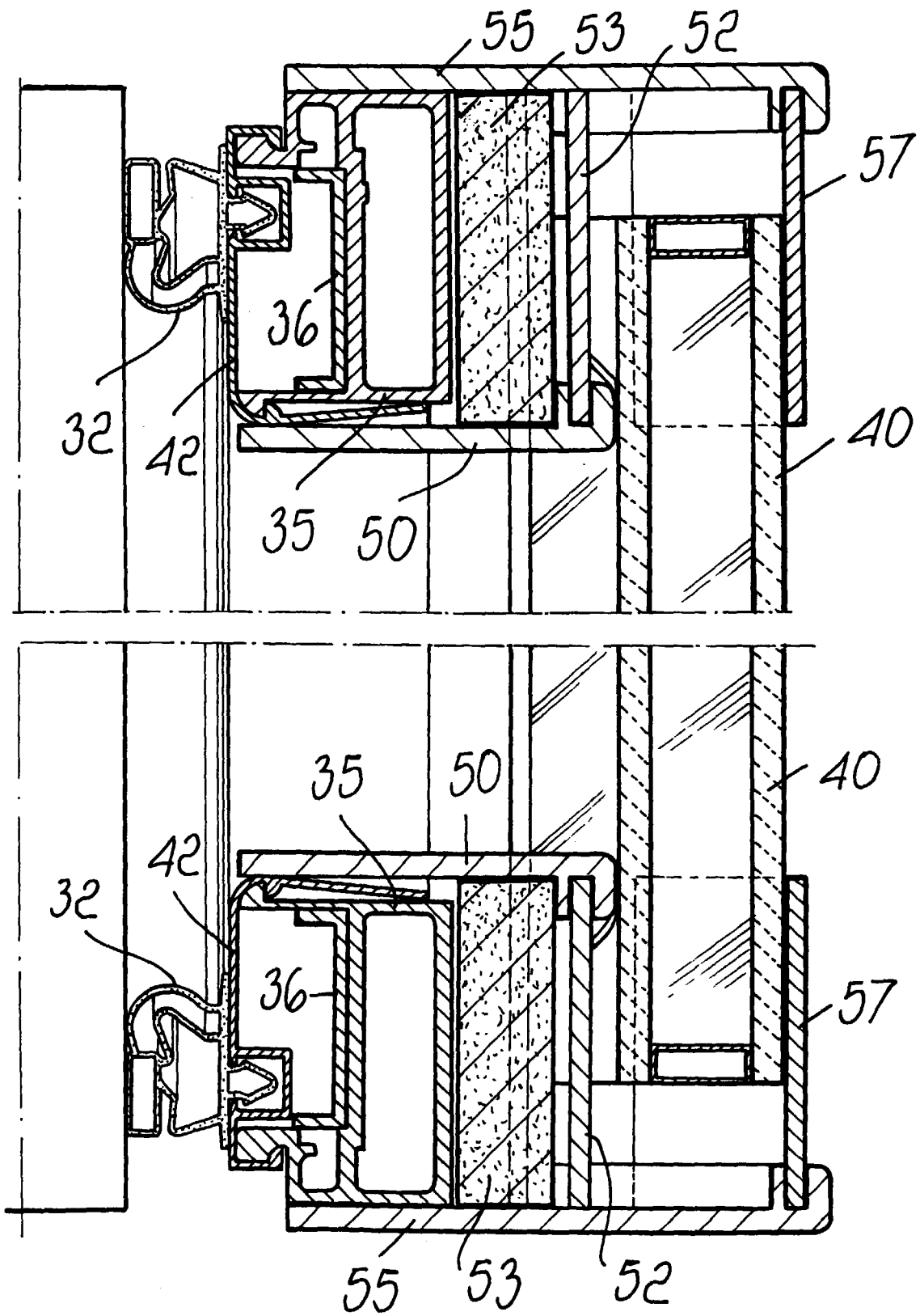


Fig. 5



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EUROPEAN SEARCH REPORT

Application Number
EP 00 12 1297

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
P,X	DE 198 33 958 A (AUSTRIA HAUSTECHNIK AG ROTTENM) 13 January 2000 (2000-01-13) * column 2, line 18 - line 47; figures *	1-3	A47F3/04
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 18 January 2001	Examiner Pineau, A
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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</p>			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 00 12 1297

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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