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(54) Rooflight.

(57) An arch-shaped or barrel rooflight comprises several juxtaposed arch-shaped glazing panels (1) interconnected along their edges by glazing bars (4). In a single-glazed case the glazing bars comprise upper and lower bar members (21 and 22) supported on a receiving frame (7) on an upstand from a roof. The two bar members grip the edges of the panels but are themselves spaced apart to avoid a thermal bridge. The bar members are held together by means of the tension generated in the upper by an axial bolt (36) fixed to the receiving frame. A complementary compression is induced in the lower bar member.

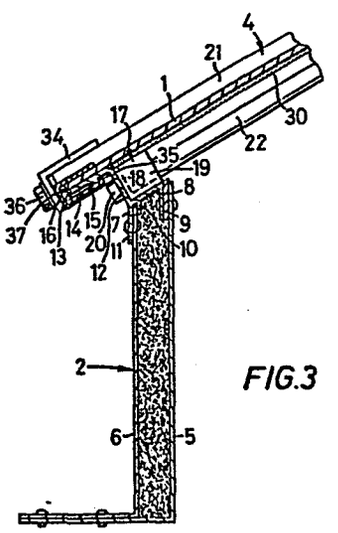

FIG.3

EP 0 129 357 A2

"ROOFLIGHT"

DESCRIPTION

This invention relates to rooflights and in particular to those comprising one or more arch-shaped light-transmitting panels. A rooflight of this kind for example may be fitted to an upstand on a roof or may be the major component of a structure such as a canopy or tubular walkway.

Hitherto, such rooflights are typically composed of several juxtaposed arch-shape panels interconnected along their adjacent edges. The method of interconnection may comprise arch-shaped glazing bars intermediate the panels and being connected to the panels at points along their length. Such methods have several disadvantages the main one being the installation difficulty. It has also been proposed, for example, in United Kingdom Patent Specification No. 1,361,643 to interconnect adjacent panels by means

of a two-part glazing bar fixed to an upstand by means of an axial bolt inserted longitudinally through an internal slotted tube on one part of the glazing bar at the base of the glazing bar. Tightening of the bolt expands the slotted tube into engagement between a pair of internal longitudinal ribs on the other part. Glazing bars are usually made from aluminium, and it is highly desirable that there should not be a thermal bridge between the side of the rooflight which faces inside the building and the side which faces outwards. This prior proposal however does include such a thermal bridge, which, especially in a double skin version, is a serious disadvantage. The present applicants have, upon consideration of this difficulty, invented a rooflight in which the longitudinal, basal bolt method of fixing or similar is used without requiring the two parts of the glazing bar to fix together along their length to secure the structure.

Accordingly, the present invention provides: a rooflight comprising a base assembly and one or more arch-shaped light-transmitting panels, each being secured along at least one arcuate edge thereof by an elongate arch-shaped clamping bar; the clamping bar

being located at each end with respect to the base assembly, each clamping bar comprising of two arch-shaped bar members receiving between them the marginal edge region of at least one of said translucent panels, wherein the superior bar member of the clamping bar is secured to the base assembly by tensioning means, characterised in that said two bar members of the clamping bar are spaced apart in the assembled rooflight, and in that said two bar members are biased towards each other by means of the tension developed in the superior one of the bar members by the tensioning means.

Preferably the tensioning means comprises a screw-threaded member extending through a part of the base assembly and engaging within a tubular portion of the superior bar member.

Preferably, the inferior bar member is stopped at both ends so that the tension induced by the tightening of the threaded member causes a compression of the inferior bar member.

Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings. In the drawings:-

Figure 1 is a schematic vertical sectional view of an arcuate rooflight in accordance with the invention;

Figure 2 is a plan view of the rooflight;

Figure 3 is a vertical sectional view through a part of the rooflight designated 'A' in Figure 1 and on a larger scale than Figure 1;

Figure 4 is a transverse sectional view through a glazing bar of the rooflight, at position Y-Y on Figure 2 and on an enlarged scale;

Figure 5 is a vertical sectional view through the end region of a glazing bar;

Figure 6 is a transverse sectional view through a glazing bar in a second embodiment of the invention;

Figure 7 is a longitudinal sectional view through the glazing bar of Figure 6 at the base thereof;

Figure 8 is a vertical sectional view through an end panel of the rooflight.

Referring to Figures 1 and 2, one embodiment of the invention is a barrel vault rooflight comprising a series of arcuate acrylic glazing panels 1 juxtaposed and located on a rectangular upstand 2 from a flat roof 3. The adjacent edges of glazing panels 1 are connected by glazing bars 4 fixed at their ends to a base assembly on the rectangular upstand 2.

Figure 3 shows a cross-sectional view of the rooflight through one of the glazing panels. The upstand 2 comprises inner and outer walls 5 and 6 made from aluminium. The two walls 5 and 6 are spaced apart and the space between then filled with heat-insulating material. At their bases each of the walls 5 and 6 is perpendicularly bent to form the base of the upstand, the respective two base portions of the walls being superimposed and riveted together. The inner wall 5 of the upstand has a slightly greater vertical height than the outer wall 6 and the resultant vertically

spaced upper horizontally spaced edges of these two walls define an oblique base for aluminium receiving frame 7.

The receiving frame 7 comprises a base wall portion 8 extending generally in the oblique plane of the upper edges of the walls of the upstand 2. The base wall portion 8 terminates at an inner edge short of the inner wall 5 of the upstand and has an inner downward flange portion 9 extending into the space between the two walls of the upstand and separated by a short distance from the inner surface of the inner wall 5 of the upstand. At the outer periphery of the base wall portion 8 of the receiving frame there are two depending parallel outer flange portions 10 and 11 having a horizontal spacing equal to the thickness of the outer wall 6 of the upstand. These outer flange portions 10 and 11 are fitted over the upper edge of the outer wall 6 of the upstand and serve to locate to the receiving frame 7 on the upstand. The outer flange portion 11 is approximately three times as long as the portion 10 and is a riveted connection with the outer wall 6 of the receiving frame.

At the outward periphery of the base wall portion 8, the receiving frame 7 further comprises an oblique wall portion 12 extending at right angles to the base wall portion 8 and therefore sloping upwardly and outwardly of the outer wall 6 of the upstand 2. The upper periphery of the oblique wall portion 12 further comprises an outer transverse flange 13. The undersurface of the outer flange 13 includes a recess 14, the innermost wall 15 of which is gently recessively curved. The outer margin of the upper surface of the outer flange 13 includes a rectangular raised rim portion 16.

The inner downward flange portion 9 of the receiving frame is connected to the inner wall of the upstand 2 by means of a rivet extending perpendicularly through them and through a layer of PVC thermobreak material sandwiched between them. A support shoe 17 for the glazing bar 4 is box-shaped with two open adjacent sides and rectangular end walls 19. The support shoe 17 sits on the base of the oblique wall portions of the receiving frame 7 and is fixed to the oblique wall portion 12 by means of spigots 20.

Referring now also to Figures 4 and 5 each glazing bar 4 comprises upper and lower parts 21 and 22 respectively. The upper glazing bar 21 is an aluminium channel-section member comprising a rectangular top wall 23, and side walls 24 and formed with inturned longitudinal flanges 25.

A longitudinal slotted tubular portion 29 extends from the inward facing surface of the top wall 23 parallel to the axis of the upper glazing bar. The lower glazing bar 22 comprises a lower wall 23a, two side walls 24a set inwardly from the edges of the lower wall 23a, and supporting channel section portions 26 having a transverse rectangular channel running along their length. These channels communicate with the upper surface of their channel portion 26 via a narrower slot. Upstanding from the upper surface of the lower wall 23a of the lower glazing bar are two spaced apart vertical flanges 27, centrally located, and facing the tubular portion 29 of the upper glazing bar. Rubber seals are located in the channel section portions 26 of the lower glazing bar. These rubber seals 30 comprise a flat rectangular cross-section rubber portion 31 seated on the upper surface of the channel section portion 26 and a stem and base 32

fitted in the channels and slots within the channel section portions 26.

Figure 4 shows the location of the marginal edges of two glazing panels and a glazing bar 4. The edge of a panel is received between the rubber seals 30 on the lower glazing bar and the lower surface of the inturned portion 25 of the upper glazing bar. A neoprene spacer 33 comprises a cylindrical head integral with a generally rectangular-sided base via a neck portion. The cylindrical portion fits in the slotted tube 29 and the rectangular sided portion within the two flanges 27 on the lower glazing bar. It should be noted that the neoprene spacer 33 is only loosely fitted in the tube 29 and between the flanges 27 and does not hold the two glazing bars together. The function of the spacer 33 is to limit the force applied to the marginal areas of the glazing panels when the two glazing bars are drawn together, and may also be used to prevent excess insertion of the edges of the panels into the space between the glazing bars.

The upper glazing bar is somewhat longer than the lower glazing bar and extends beyond it at both ends. The lower glazing bar is received within the support

shoe 17 fitted to the receiving frame 7. The glazing panel 1 and the upper glazing bar overlay the outer flange 13 of the receiving frame 7. A clamping angle 34 is fitted over the overlying outer flange 13 of the receiving frame, the end portion of the glazing panel 1, and the base end of the upper glazing bar 21. The inner surface 35 of the lower limb of the clamping angle 34 abuts against the oblique wall portion 12 of the receiving frame 7. A clamping bolt 36 is inserted through an aperture in the base of the clamping angle 35 and tightly fits within the bore of the slotted tube 29 in the upper glazing bar. By rotating the threaded bolt 36 it bites into the walls of the slotted tube 29 and effects a threaded connection thereto.

Rectangularly sided U-shaped glazing clips 37 (Figure 3) are inserted over the projecting ends of the glazing panels 1 between the glazing bar assemblies 4.

The rooflight is assembled by locating the glazing bar assembly 4 between adjacent edges of two glazing panels 1 such that the margins of these edges extend between the upper and lower glazing bars as shown in Figure 4. The upper glazing bar 21 and the glazing

panels rest loosely over the outer flange 13 of the receiving frame 7. The lower glazing bar 22 fits in the support shoe 17 and abuts against the respective rear walls 18 thereof. The clamping angle 34 is then applied to the ends of the glazing bar 23, the glazing panel and the outer flange 13 of the receiving frame. The screw-threaded bolt 16 is inserted through the clamping member 34 into the slotted tube 29 in the upper glazing bar. The bolt 36 is then rotated and its screw-thread bites into the material of the slotted tube 29. As the bolt is tightened, the end surface 33 of the clamping angle 34 abuts against the oblique wall portion 12 of the receiving frame 7 and further tightening draws the upper glazing bar 23 into the clamping angle 34 and tensions it. Tension in the upper glazing bar 23 pulls it against the glazing panel and this in turn acts against the lower glazing bar 22 which is thereby put under compression. The marginal edges of the glazing panels are firmly held between the upper glazing bar and the seals 31 on the lower glazing bar.

The arrangements shown in Figures 1 to 5 can readily be adapted for double glazing by the inclusion of a third glazing bar and a second axial bolt.

A second embodiment of the invention is shown in Figures 6 to 8; it may be constructed in single or double glazing form. By way of example a double glazed version is now described. Referring to figures 6 and 7, a double glazed barrel vault rooflight includes two skins of glazing panels 51 and 52. Typically, for a rooflight with a span of 2.5 metres the outer skin is 4 mm thick and the inner skin 52 is 3 mm thick. The glazing bar assemblies each comprise three glazing bars. An upper glazing bar 53 comprises a rectangular-sided channel-section member having a upper wall 54 two rectangular side walls 55 and inwardly turned flanges 56 extending inwardly parallel to the upper wall 54. A slotted tube portion stems from the undersurface of the upper wall 54 along the median of this wall. The intermediate and lower glazing bars 58 and 59 are substantially similar in configuration and each comprises a channel-section member with a lower rectangular wall 60, 61 two side walls 62, 63 and inturned flanges 64, 65. Each of these flanges has on its upper surface a channel with splayed sides receiving the stem of a rubber seal 66, 67. The body portion of each seal is substantially rectangular in cross-section and is seated on the upper surface of the flanges 64, 65. Both the

intermediate and the lower clamping bars have slotted tubes running along their length which are integral projections from their walls 60, 61. The slotted tube 68 on the intermediate glazing bar faces the slotted tube 57 on the upper glazing bar, while the slotted tube 69 on the lower glazing bar faces the undersurface of the wall 60 of the intermediate glazing bar.

The procedure for assembling the glazing panels and the glazing bar assembly onto the receiving frame 70 is similar to that described above with reference to the embodiment shown in Figures 1 to 5 with an appropriate change in the size of the components to accommodate the two skins of glazing panels, and the provision for two screw-threaded bolts to locate in the slotted tubes 57 and 68 of the intermediate and upper glazing bars respectively. A plastic spacing element 73 comprises a rectangular sided open-ended channel with short lateral flanges 74 extending outwardly of the free-ends of the side walls. The spacer 73 is inserted between the glazing panels intermediate the glazing bar assemblies, such that it forms a hollow box spacer between the glazing panels, with the two

flanges 74 extending flush with the end surfaces of the panels.

A support shoe 75 locates the glazing bar assembly onto the receiving frame 70, and is positively located with respect to the glazing bar assembly by means of a short bolt 76 extending through the receiving frame 70 and being received in the slotted tube 69 on the lower glazing bar.

During the process of assembling the rooflight, both the bolts 71 and 72 need to be tightened to enable both skins of glazing panels to be gripped. The bolt 72 is tightened first to grip the marginal regions of the inner glazing panels by tensioning the intermediate glazing bar against the lower glazing bar 59. The bolt 71 in the upper glazing bar is then tightened to tension the upper glazing bar against the intermediate glazing bar 58 and thereby marginal edges outer skin of glazing panels.

Referring now to Figure 8, the ends of the barrel rooflight are closed with sectorial shaped glazing panels 80, 81 fitted at their basal ends into a channel- section frame 82 fixed to the upstand on

which the rooflight is supported. In the channel section portion of the frame 82 a plastics insert 83 having two vertical slots defined by flanges 84 receives the basal margins of the vertical end panels 80, 81. At the upper end of the end panels 80, 81 their margins are engaged with the glazing bar assembly. The glazing bar assembly is that shown in Figure 6 and receives on one side, two margins of the glazing panels 51 and 52. A rubber cap 85 fits over the upper margins of the end panels 80 and 81 and comprises an elongate channel-section including downwardly extending side walls 86 and a pair of shorter downwardly extending flanges 87; each flange 87 being spaced from the side wall 86 to define a slot for receiving the upper ends of the panels 80 and 81 respectively. The inner one of the side walls 86 of the cap have extending perpendicularly outward therefrom an elongate engagement flange 88 running along the length of the rubber cap has comprising on its upper surface two prismatic projections 89 and at its distal end, an overhanging lip 90. The engagement flange 88 is secured between the inturned flanges 56 and 64 of the upper and intermediate glazing bars respectively. The overhanging lip 90 is juxtaposed with the inner surface of the flange 64 limiting

transverse movement of the glazing bar assembly with respect to the end panels 80 and 81. The engagement flange 88 is gripped by the upper and intermediate glazing bar in the same manner as the glazing panels. The flange 65 glazing bar adjacent the end panel 81 includes a larger seal 91 than is used to grip the glazing panels to accommmodate the space left by the absence of a glazing panel on this side of the glazing bar. The seal 91 has a tapered channel to enable it to be compressed against the wall 60 of the intermediate glazing bar as the glazing bars are tensioned. It will be appreciated that in this embodiment of the invention the upper, intermediate and lower glazing bars are all spaced apart and are not connected by any heat conducting element.

CLAIMS

1. A rooflight comprising a base assembly and one or more arch-shaped light-transmitting panels (1), each being secured along at least one arcuate edge thereof by an elongate arch-shaped clamping bar (4), the clamping bar being located at each end with respect to the base assembly, each clamping bar comprising two arch-shaped bar members (21, 22) receiving between them the marginal edge region of at least one of said light-transmitting panels, wherein the superior bar member of the clamping bar is secured to the base assembly by tensioning means (36), characterised in that said two bar members of the clamping bar are spaced apart in the assembled rooflight, and in that said two bar members are biased towards each other by means of the tension developed in the superior one of the bar members by the tensioning means.

2. A rooflight as claimed in claim 1 characterised in that the tensioning means comprises a

screw-threaded member (36) extending through part of the base assembly and engaging within a tubular portion (29) of the superior bar member.

3. A rooflight as claimed in claim 1 or claim 2 characterised in that the inferior bar member is stopped at both ends by the base assembly so that the tension induced by the tightening of the threaded member causes a compression of the inferior bar member.

4. A rooflight as claimed in any one of the preceding claims adapted to provide double-glazing and characterised by the inclusion of a third arch-shaped bar member (58), intermediate said inferior and superior bar members (53, 59) respective skins of the light-transmitting panels (51, 52) constituting the double-glazing being secured between respectively the superior and intermediate bar members, and the intermediate and inferior bar members.

5. A rooflight as claimed in claim 4 characterised by the inclusion of further tensioning means (72), operative between the intermediate bar member and the base assembly, whereby operation of the first

tensioning means (71) biases the superior bar member against the intermediate bar member, and operation of the further tensioning means biases the intermediate bar member against the inferior bar member.

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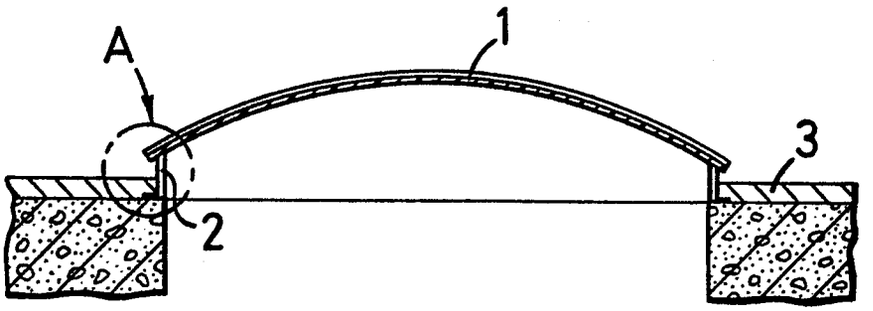

FIG.1

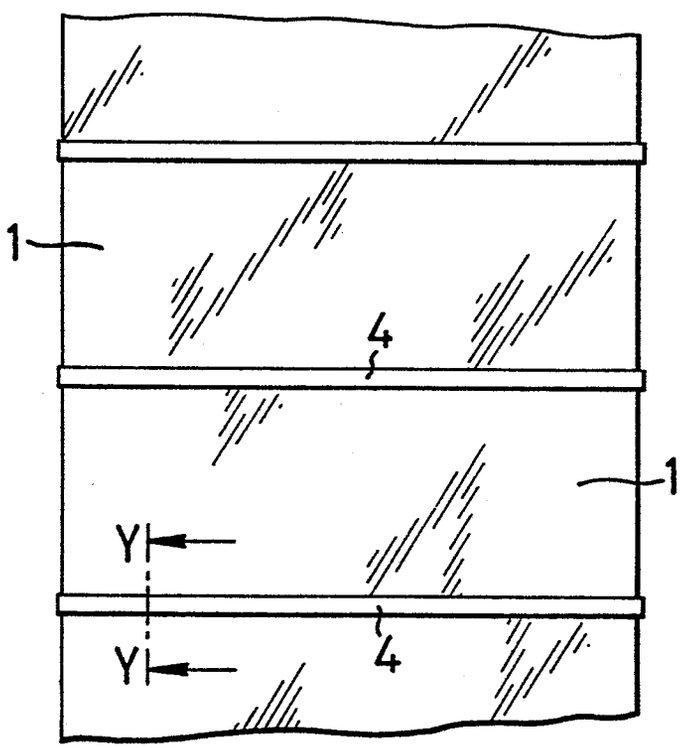

FIG.2

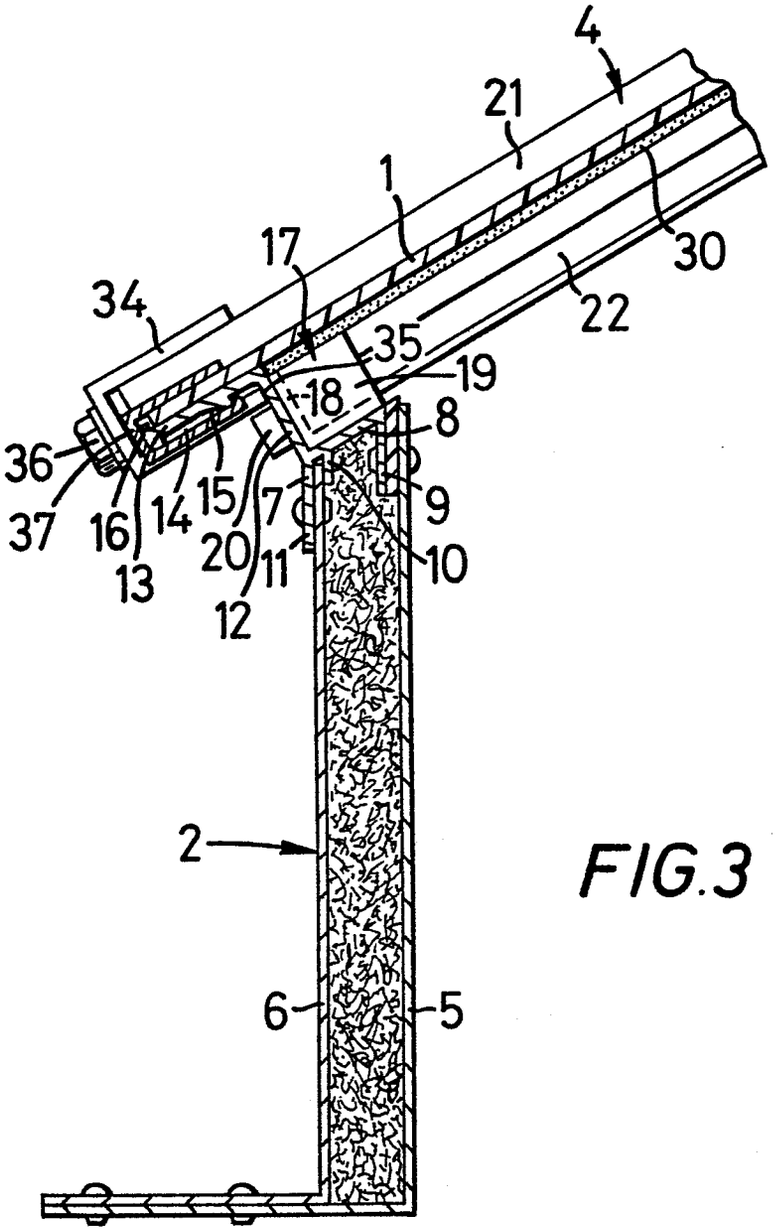

FIG.3

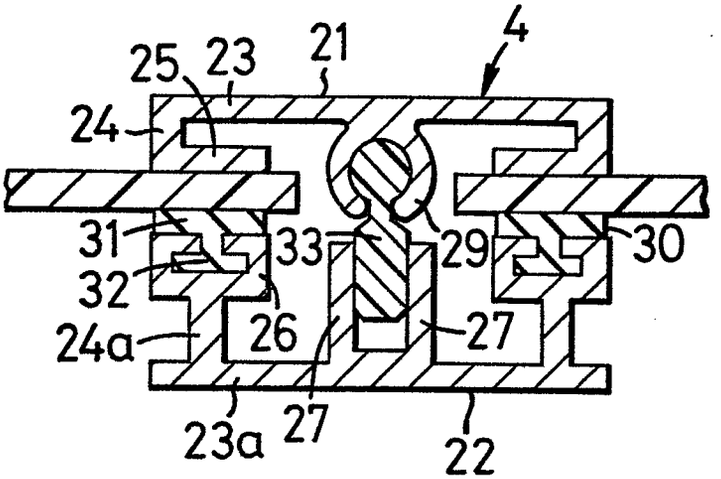
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FIG.4

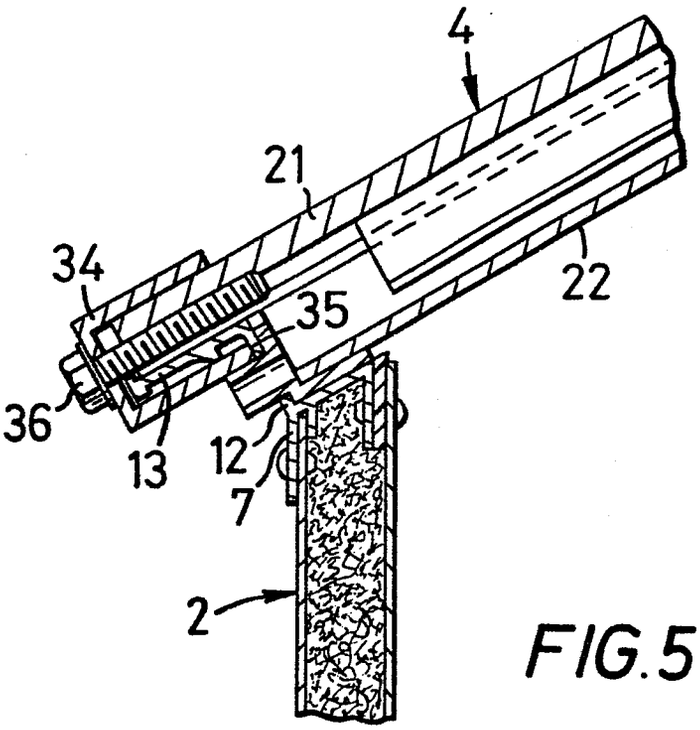
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FIG.5

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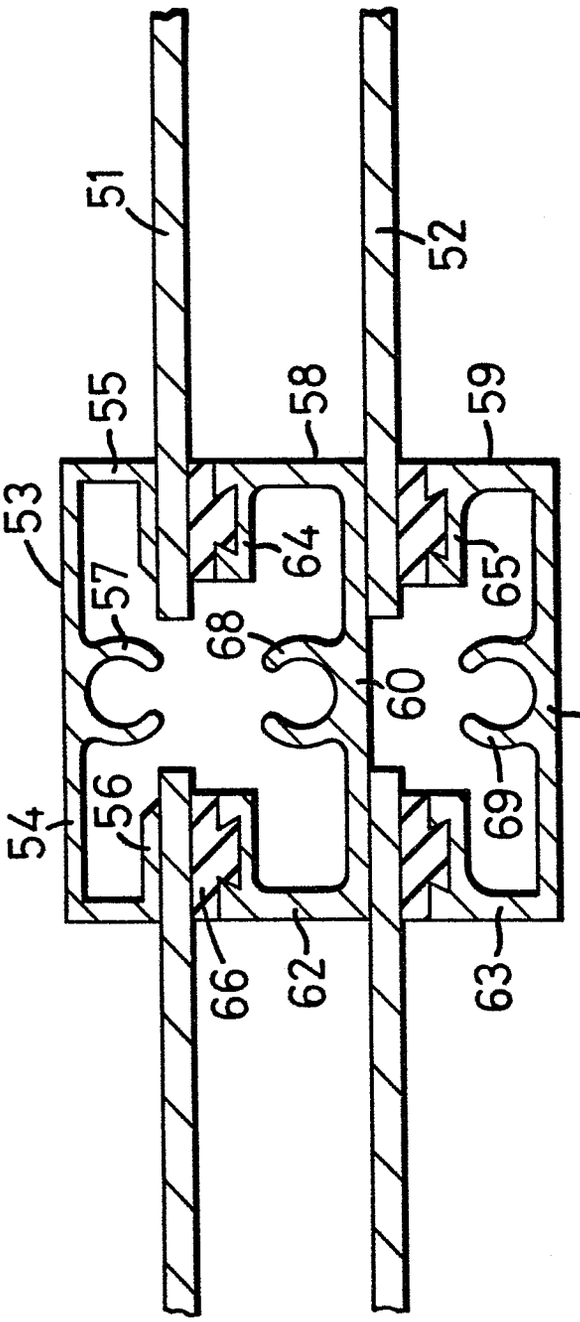

FIG.6

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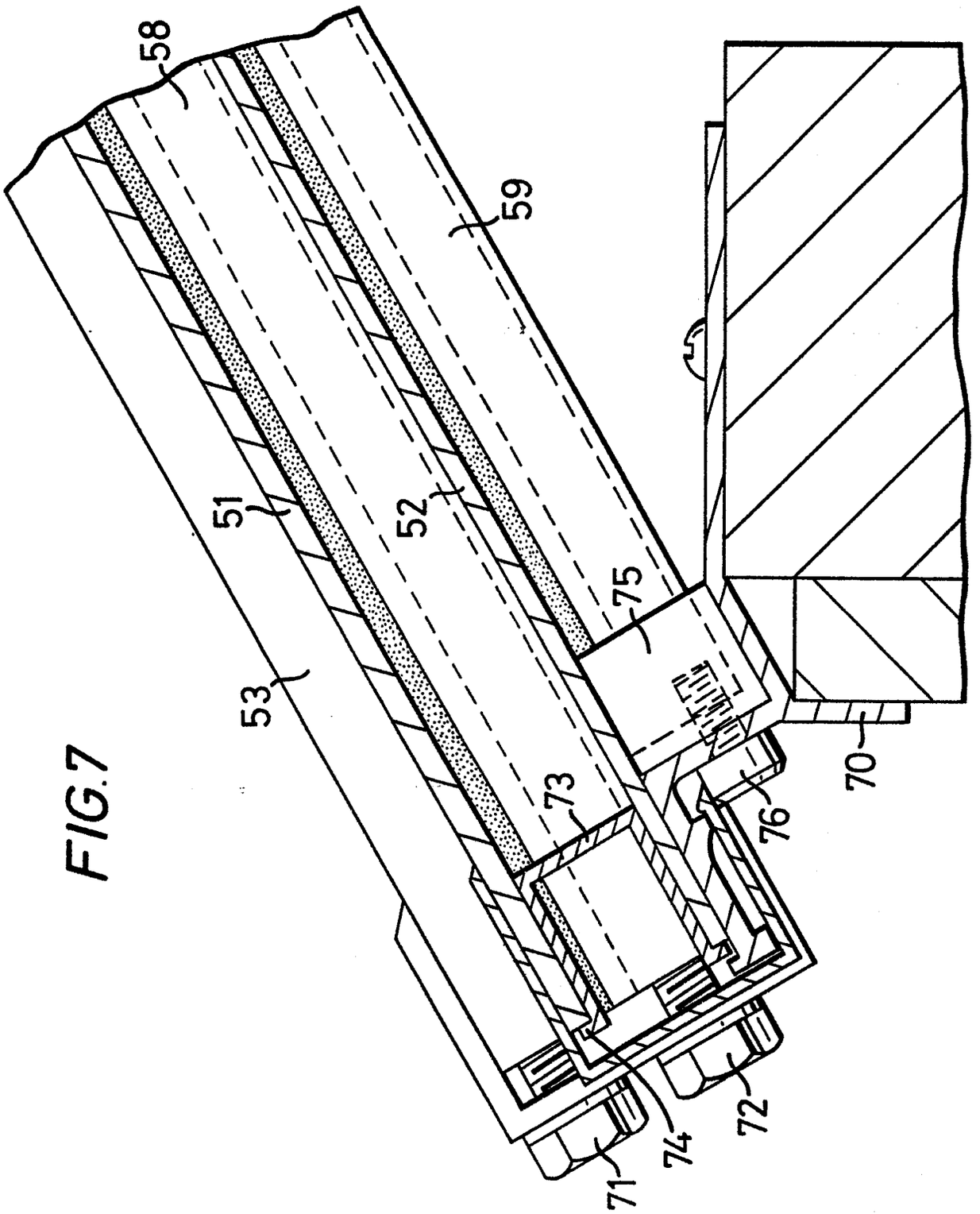

FIG.7

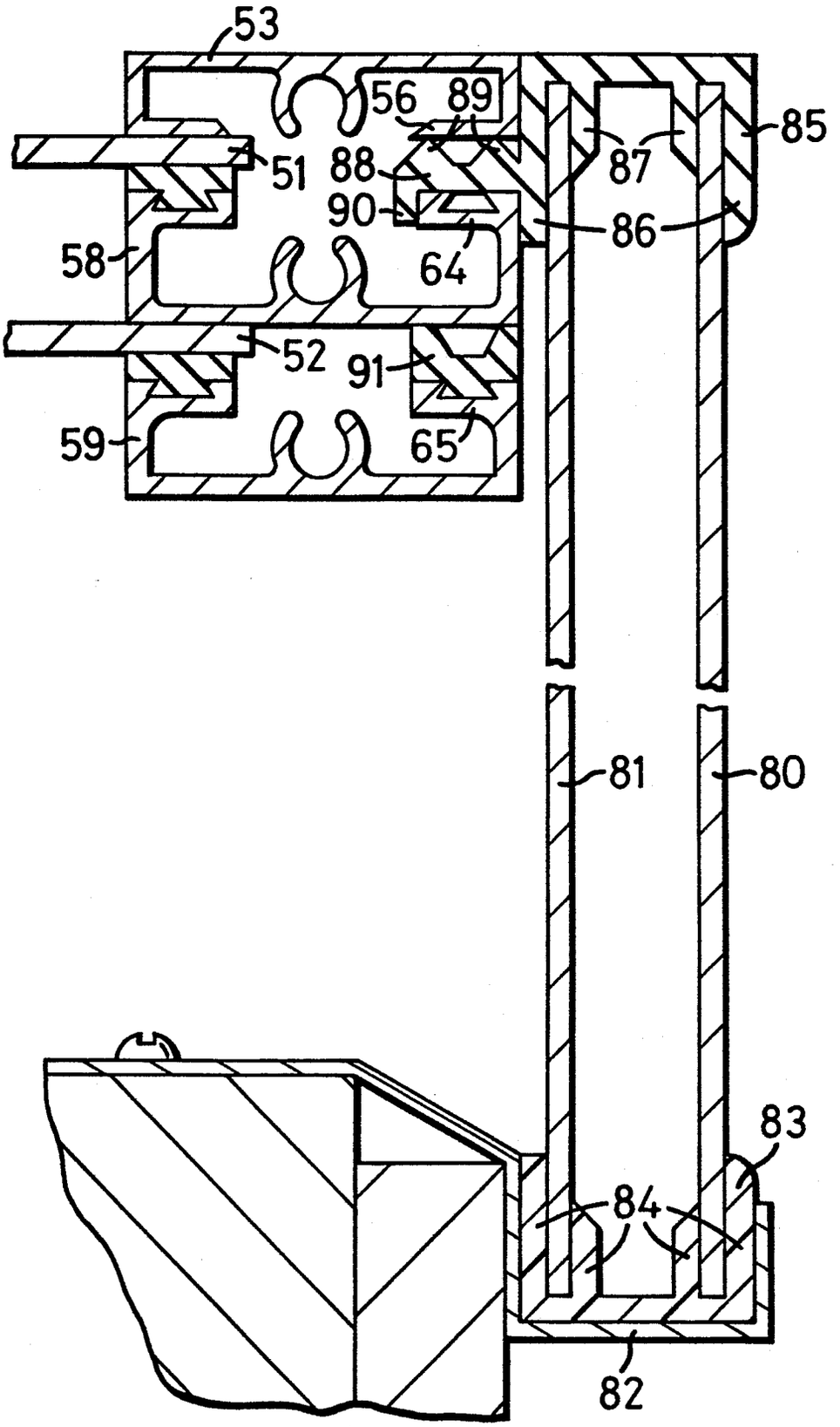

FIG.8