(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 014 582**
A1

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **80300327.6**

(22) Date of filing: **05.02.80**

(51) Int. Cl.³: **E 06 B 3/62**
E 06 B 3/05

(30) Priority: **06.02.79 GB 7904155**

(43) Date of publication of application:
20.08.80 Bulletin 80/17

(84) Designated Contracting States:
DE FR GB NL SE

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(54) **A frame for receiving and supporting a member of laminar form.**

(57) A frame for holding a member of laminar form comprises a series of edge members (3) each of which has at least one internal, longitudinally extending cavity (7a, 7b) bounded by an external wall of the edge member. The external wall is resilient and has a longitudinal slit (8a, 8b) which can be opened to admit the edge of the laminar form member by depressing the wall. Upon release, the wall returns to its original position and grips the laminar form member. To assist in the retention of the laminar form member in the slit, the edge of the member may be thickened. The edge members are locked together by corner pieces that telescopically engage in the cavities in adjacent edge members.

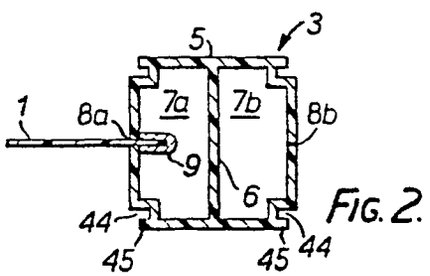

FIG. 2.

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This invention relates to means for supporting laminar sheets and more particularly to double glazing.

According to a first aspect of the present invention there is provided means for supporting an element in laminar form including a frame composed of substantially uniform cross-section members each of which has at least one longitudinal cavity, a wall of which has a slit to accept and retain the laminar element.

According to a second aspect of the present invention there is provided a double glazing unit including a sheet of transparent material held in a frame including strips of substantially uniform cross-section members each of which has at least one longitudinal cavity, a wall of which has a slit to accept and retain the material.

The transparent material may be a sheet of clear plastics film for example 125 micron thick ultra-violet stabilised polyester film. The material may carry a strip of adhesive tape folded around its edges to form a thickened portion to prevent the material being inadvertently pulled out of the slit.

The frame may also include corner pieces with projections arranged to engage the end of the longitudinal cavity of adjacent strips. The frame may be rectangular. The corner pieces may have means to grip the ends of the strips and may be provided with a slot to accommodate the corner of the sheet of material.

Preferably, each member is of a plastics material. The wall having the slit has a degree of resiliency enabling

the slit to be opened to receive the laminar sheet. The slit then closes over the edge portion of the sheet and retains it in position.

Embodiments of the invention will now be described, by way of example only, making reference to the accompanying drawings in which:

Figure 1 shows an elevation of part of a rectangular double glazing unit,

Figure 2 shows a cross-section along the line A-A in Figure 1,

Figures 3a, b, c show details of a component,

Figures 3d, e show alternative forms of the component of Figure 3a,

Figures 3f and 3g show details of another component,

Figure 4 is a cross-sectional view of another component,

Figure 5 is a cross-sectional view of a sliding sash double glazing unit, and

Figures 6 and 7 are perspective views of another component.

Referring to Figures 1 and 2 a rectangular double glazing unit of the type suitable for adding to an existing single glazed window consists of a sheet of clear plastics material 1 supported under a slight tension in a frame 2. The frame 2 consists of four edging strips 3 of which only two are shown in Figure 1. Each edging strip 3 is a length of extruded plastics material of identical cross-section to that of the other three edging strips. Hence edging strips

to build a glazing frame can be manufactured using only one extrusion die.

In addition to the edging strips 3 the frame 2 has four corner pieces, such as that denoted by the reference numeral 4 in Figure 1. The corner pieces 4 engage with the ends of their two adjacent edging strips 3 and help hold the frame 2 rigid.

The edging strip 3, which is shown in cross-section in Figure 2 has a hollow square section body 5 of a resilient plastics material. The body 5 is divided longitudinally by an internal integral wall 6 to define two chambers 7a and 7b. The outer wall of each chamber opposite the dividing wall 6 is resilient and provided with a longitudinal slit 8a, 8b which is kept normally closed by the resiliency of the wall, but which can be opened by depressing the outer wall to allow entry of the sheet of plastics material 1. After entry, the wall is released and the edges of the slit close back on to the sheet and retain it in place.

The clear plastics material sheet 1 is thus gripped by the edges of the slit 8a of the edging strip and is retained in the slit by a strip of adhesive tape 9 which is wrapped around the edge of the sheet 1 prior to entry and so as to form a thickened portion which cannot easily be withdrawn from the wall of the chamber 7a without considerable deformation of the outer wall of the chamber and also allows sufficient tension to be applied to the clear plastics sheet to remove undulations in thin sheets while still being retained in the slit. The tape 9 may be preformed with a

longitudinal groove to assist wrapping round the edge of the sheet.

The laminar sheet may alternatively be crimped, folded, heat bonded or otherwise thickened along its edges.

Alternatively, the meeting edges of the outer wall bounding the slit may be adapted to provide interlocking surfaces which grip the sheet between them and prevent the easy withdrawal of the sheet.

For removal and assembly a special tool may be used to open the slits 8a and/or 8b to allow the edge of the sheet 1 carrying the adhesive tape 9 to pass through or alternatively the edge of the clear sheet 1 may be inserted into the slit 8a at one end of the edging strip 3 and pulled along the slit 8a with the adhesive tape 9 adhering to the edge passing at the same time into the chamber 7a. The clear plastics sheet 1 may consist of an ultra-violet stabilised 125 micron thick polyester film. It is possible, however, to use a thicker sheet, such as 0.75 mm Novalux or DARVIK manufactured by I.C.I., in which case it may be unnecessary to use the adhesive tape 9. If a thicker sheet is used the restoring force produced by the deformation of the wall of the chamber 7 as the sheet is inserted may, by itself, be adequate to retain the sheet.

The edging strip 3 is provided with two chambers 7a and 7b and two slits 8a and 8b. This enables it to be used as an intermediate strengthening member in a large frame. In this case, the edging strip 3 is used to join two clear plastics sheets.

Referring to Figures 3a, 3b and 3c, a corner piece 24 suitable for use as the corner piece 4 in Figure 1 is shown in detail. It has short locating projections 21, which are contoured to fit exactly into the ends of the chambers 7a and 7b of the edging strip 3 of Figures 1 and 2, there being a diagonal slot 22 which is sufficiently wide to accommodate the corner of the sheet 1 of Figures 1 and 2. Four passageways 27a, 27b, 27c and 27d are provided for receiving rectangular section dowel pins. A suitable dowel pin is shown in Figures 3f and 3g in elevation and end view respectively. The dowel pins may be an interference fit in the holes and the chambers 7a and 7b in which case, as the frame 2 (Figure 1) is assembled, the dowel pins grip the inside of the chambers 7a and 7b of the edging strips 3 and the insides of the passages 27a, 27b, 27c and 27d of the corner piece 24. It is normally necessary to use the dowel pins at one corner only of a rectangular unit. The pins may, of course, be used at all corners.

Corner piece 24 may be used in conjunction with thin (125 micron) plastics sheet the short locating projections allowing the tape-edged plastic sheet to be close-fitted and tensioned into all four side pieces of edging strip 3 with four corner pieces 24 in position and finally locked and aligned in position by four dowel pins to each corner piece 24.

Figures 3d and 3e show an alternative corner piece 34 having a plastics-material square section body 10 with locating lugs arranged to fit into the end of the

chamber 7a and 7b of the edging strip 3 of Figures 1 and 2. The projections 11 are longer than the corresponding projection 21 on the corner piece illustrated in Figure 3a so dowel pins are unnecessary. The corner piece 34 has a slot 12 cut across its corner between the projections 11 to allow for the corner of the clear plastics sheet 1. Corner piece 34 may be used with more rigid plastics laminar sheet (.75 mm +) allowing simultaneous assembly of four edging strips 3 and four corner pieces 34. When in position on a window the double glazing unit of Figure 1 can be fixed in place. Fixing may be by means of screws or adhesive pads for example and the fixing may incorporate draught excluder strip to exclude draughts and act, if necessary, as a condensation absorber.

Alternatively, the units may be slidably mounted in runners which permit easy removal when necessary.

Figure 4 shows a cross-section of a fixing strip suitable for holding the edging strip 3 in place against the frame of a conventional window. The fixing strip 40 which is composed of a resilient plastics material has a base 41 which is provided with countersunk screw holes 42 at intervals along its length. Rising from the edges of the base are integral side clips 43 which are profiled to clip into corresponding grooves 44 behind projections 45 in the wall of the edging strip 3 of Figure 2.

To fix the double glazing unit of Figure 1 in place it is necessary first to screw the fixing strip 40 to the window frame. Then the edging strip is pressed against

the fixing strip so that its projections 45 displace the clips 43 which eventually snap into place in the grooves 44. Alternatively, the double glazing unit may be secured in place by double-sided foam filled adhesive pads or strips between the edging strip and the window frame or between the edging strip 3 and the window frame.

If it is desired to have a sliding double glazing unit for example for an opening window it is simply necessary to mount the double glazing unit in upper and lower inwardly facing channels or in a frame of such channels. Figure 5 shows two double glazing units 51 and 52 arranged in respective channels of plastics material 53 and 54. Each of the channels is lined with a draught excluding foam strip 55 and a similar strip 56 serves to seal the gap between the two vertical edging strips in the centre of the window when in the closed position.

Figures 6 and 7 show, in perspective, components for constructing an alternative form of corner piece. The components comprise a dovetail housing piece 57, Fig. 6, and a dovetail piece 58, Fig. 7.

The dovetail housing piece 57 has a portion 59 that forms the visible part of the corner piece when the components are assembled and this portion matches, dimensionally, the members 3 to form a smooth continuation thereof at each corner. From one end face of portion 59 extends a part 60 whose external contour matches the internal contour of the member 3 with the internal wall 6 removed over a short length of the member 3 from the end thereof. The part

60 is a force fit in the end of the member 3 and has a longitudinal dovetail-shaped slot 61 that extends for the full length of the part and of the portion 39 as shown.

Co-operating with the piece 57 is the dovetail piece 58 which, as can be seen from Fig. 7, has a part 62 whose external contour matches the internal contour of the slot 61. The part 62 is separated by a shoulder 63 from a second part 64 whose external contour matches the internal contour of the member 3 with the internal wall 6 removed. Part 62 is a force fit in the slot 61 and the part 64 is a force fit in the end of a member 3. The shoulder 63 limits movement of the part 64 into the member 3.

To accommodate the corner portion of a sheet held by the members 3, piece 58 is slotted as at 65.

To assemble a corner portion comprising the pieces 57 and 58, the part 60 is pressed into the end of one member 3, and the part 64 is pressed into the end of the adjacent member 3 and the part 62 is then entered into the slot 61. The pieces are then aligned to allow a peg to be passed through the holes 66, 67 to retain the pieces in position.

It is anticipated that double glazing frames of the type described will be useful not only to enable the Do-It-Yourself enthusiast or professional builder to be able to double glaze easily and cheaply but also for providing greenhouses with extra protection from frost in winter.

Whereas it may be more convenient to manufacture edging strip such as that described with reference to Figures

1 and 2 with two outer walls with slits, it is apparent that for most applications only one is required.

Although the invention has only been described in relation to double glazing units, it is also useful in many other applications where it is necessary to support a laminar member, for example photographic projection screens, or sun screens, garden cloches, plastics greenhouse construction, fruit cages. The members may also support filter units of laminar form.

It will be appreciated that the members may actually form the structural frame of the cloche, greenhouse or other structure.

The laminar element need not form a continuous surface for example it could be netting used in the construction of a fruit cage. Again, in such an application, the members actually form the structural frame of the fruit cage, the slits in the sides of the members retaining the netting in the manner described above in the case of the transparent sheet. The edges of the netting are thickened in some suitable way to ensure that the netting is not easily pulled out.

The frame formed by the members need not be a closed frame, i.e. it could be open on one side and a structure so formed may be used as a support for growing plants for example beans, peas, tomatoes. The structure may include base members which engage the ground and support the remainder of the structure.

Claims:

1. A frame for supporting an element of laminar form, the frame comprising a number of edge members each of which has at least one longitudinally extending cavity, the cavity having a bounding wall that is an external wall of the member, the wall being resilient and having a longitudinal slit for accepting and retaining the member of laminar form.

2. A frame as claimed in claim 1 in which adjacent edge members are fastened together by means of corner pieces.

3. A frame as claimed in claim 2 in which each corner piece has an extension or extensions that engage telescopically the cavity in each adjacent edge member.

4. A frame as claimed in claim 3 in which each corner piece has a first component that engages one of the adjacent edge members and a second component that mates with the first component and engages the other one of the adjacent edge members.

5. A frame as claimed in claim 4 in which locking means are provided for locking together the first and second components.

6. A frame as claimed in claim 3 and further comprising dowel members that engage in the cavity of an edge member and the corner piece.

7. A frame as claimed in any one of the preceding claims and comprising a member of laminar form held in the supporting frame and in which the edges of the laminar

form member are of increased thickness as compared with the thickness of the remainder of the member of laminar form.

8. A frame as claimed in claim 7 in which the increased thickness results from the application to the edges of a strip of material.

9. A frame as claimed in claim 7 in which the increased thickness results from crimping or folding the edges of the member of laminar form.

10. A frame as claimed in any one of claims 1-6 in which the wall edges bounding the slit are adapted to form surfaces that grip the edges of the member of laminar form to hold the latter in place.

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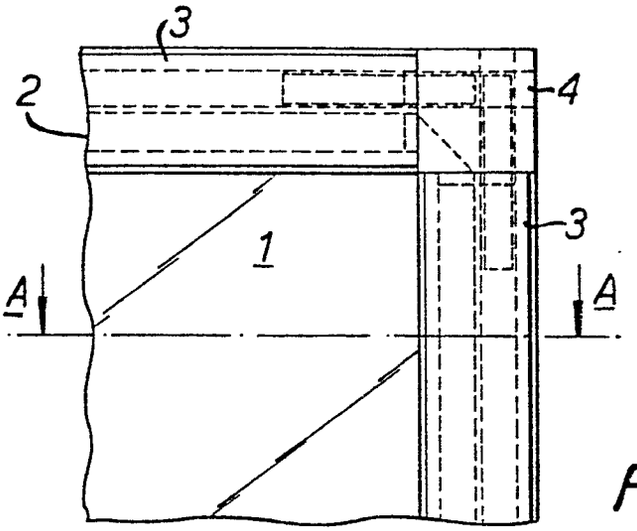


FIG. 1.

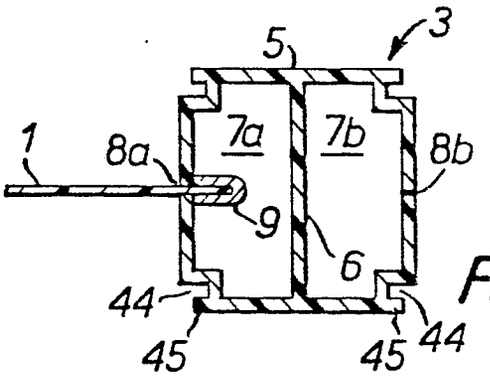


FIG. 2.

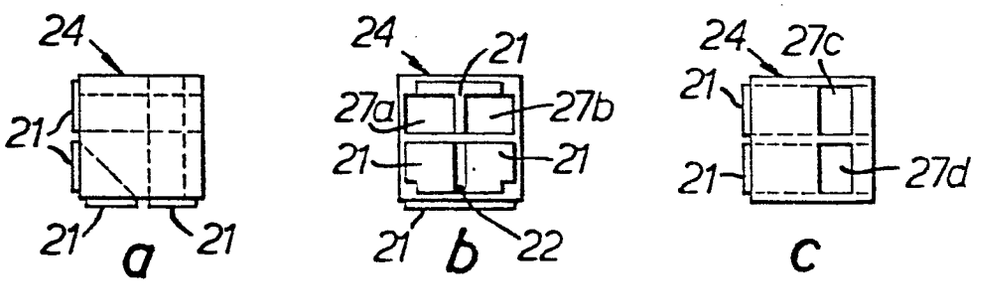
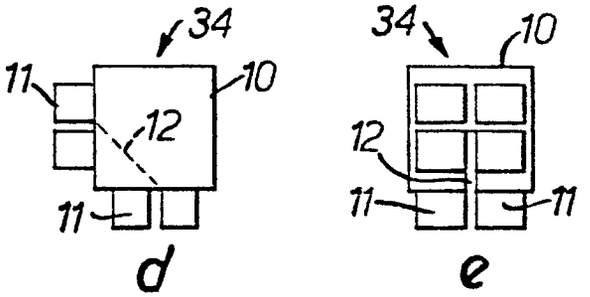
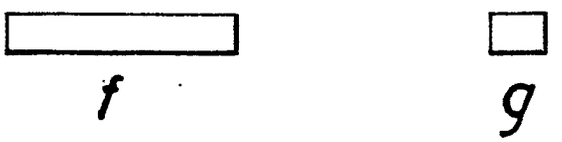


FIG. 3.





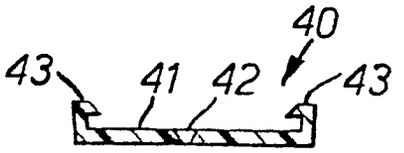


FIG. 4.

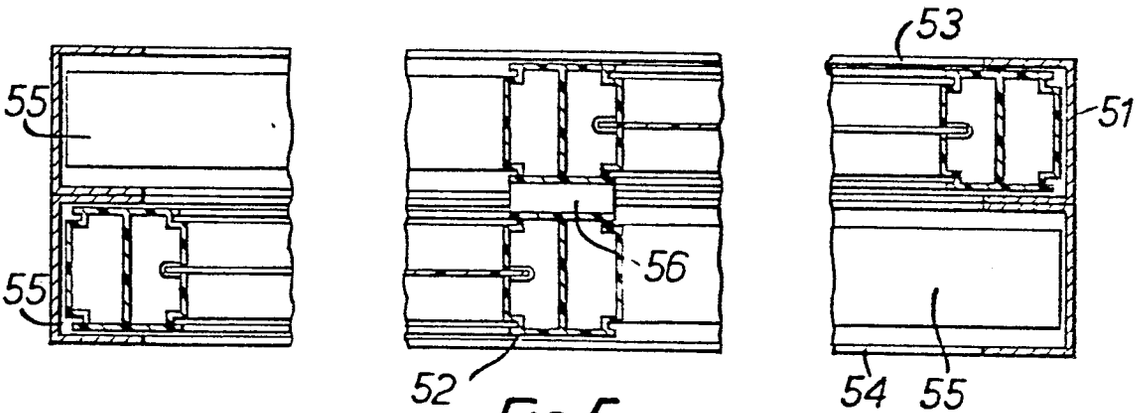


FIG. 5.

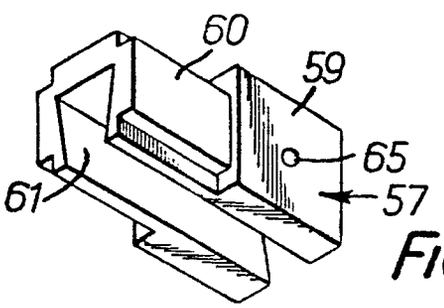


FIG. 6.

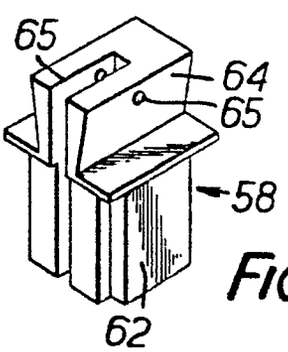


FIG. 7.

European Patent Office

EUROPEAN SEARCH REPORT

Application number
EP 80 30 0327

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
X	DE - U - 1 894 077 (W. FENGLER) * pages 5, 6; fig. 4 to 6 *	1-3, 10
X	US - A - 3 009 216 (G.E. KIMBER) * column 1, line 55 to column 2, line 29; fig. 1 to 3 *	1-2, 10
	DE - U - 1 890 774 (H. BALLHOFF) * page 1; fig. A to D *	1-10
A	DE - U - 1 878 571 (H. SCHÜRMANN & CO.) * page 3, paragraph 1; fig. 2, 3 *	1,7,8
A	DE - U - 7 419 713 (M. ROTH) * page 8; fig. 3 *	4,5
A	DE - U - 7 617 050 (R. DESPUJOLS) * page 5, last paragraph; fig. 2 *	1
A	DE - U1 - 7 815 326 (E. THIELMANN) * page 7, paragraph 5; fig. 3 *	1
A	CH - A - 90 899 (D. CAMPANA) * page 2, paragraph 1; fig. 1 *	
A	US - A - 2 546 187 (J.H. HARWARD) * column 2, line 12 to column 4, line 42; fig. 1 to 11 *	1-3, 7,8

CLASSIFICATION OF THE APPLICATION (Int. Cl.³)

E 06 B 3/62
E 06 B 3/05

TECHNICAL FIELDS SEARCHED (Int. Cl.³)

A 01 G 9/00
A 47 B 47/00
E 06 B 3/00

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
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T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

X The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Berlin	30-04-1980	WUNDERLICH