Sept. 6, 1955 T. G. FEGAN 2,716,783

DOUBLE WINDOWS

Filed Nov. 13, 1952 2 Sheets-Sheet 1

FIG. 1.

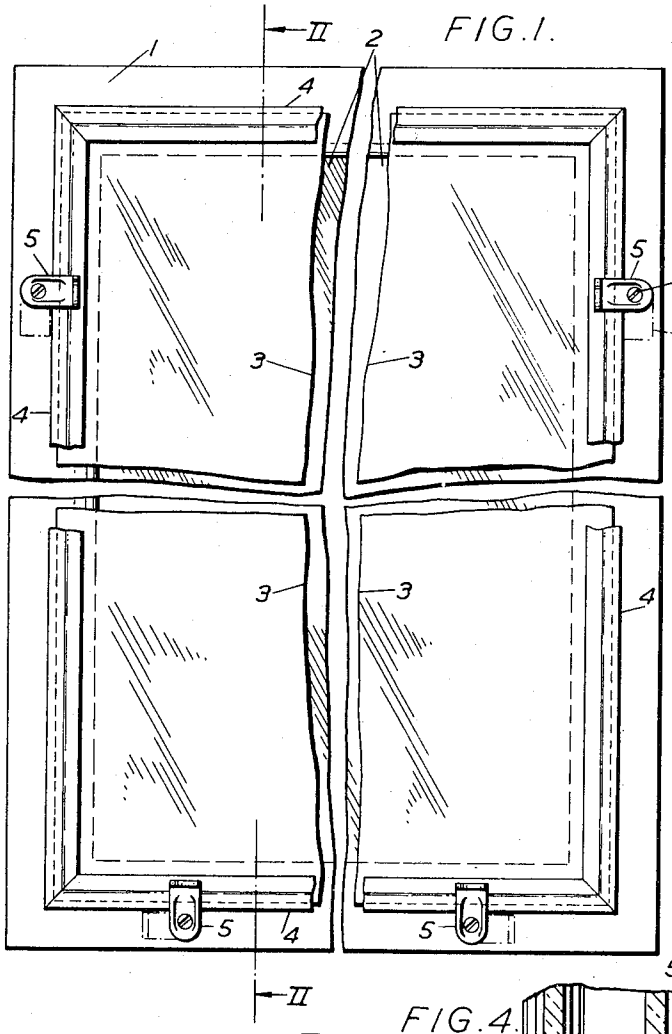


FIG. 2.

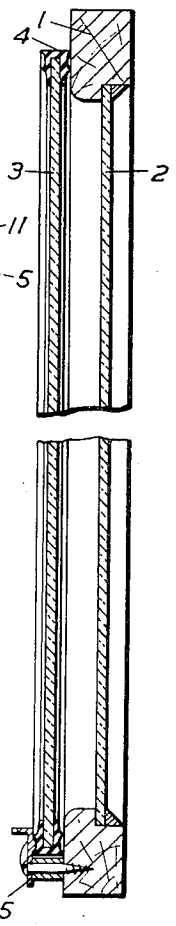


FIG. 3.

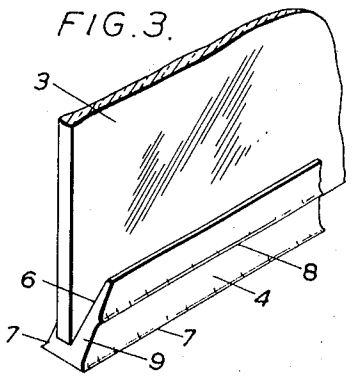
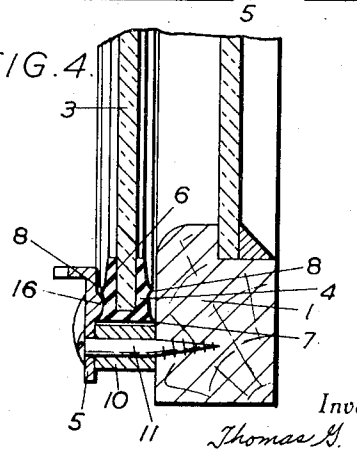


FIG. 4.



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DOUBLE WINDOWS

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FIG.5

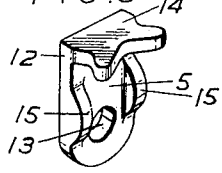


FIG.6.

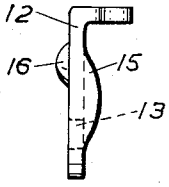


FIG.7.

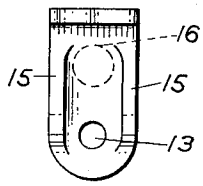


FIG.8.

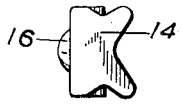


FIG.9.

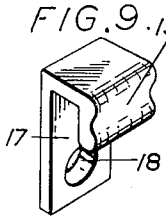


FIG.10

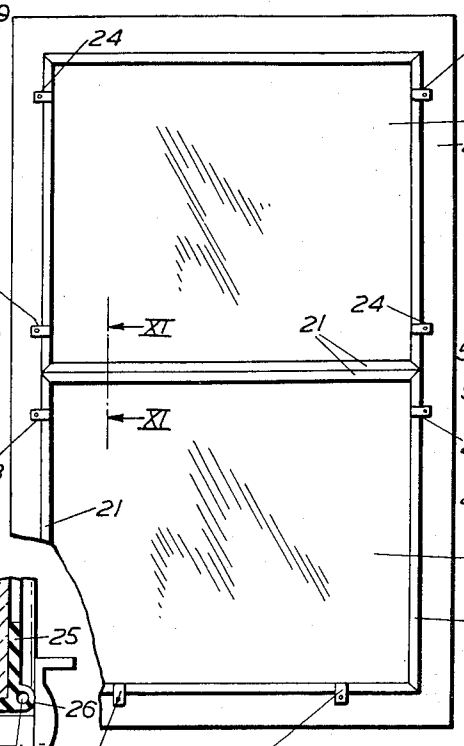


FIG.16.

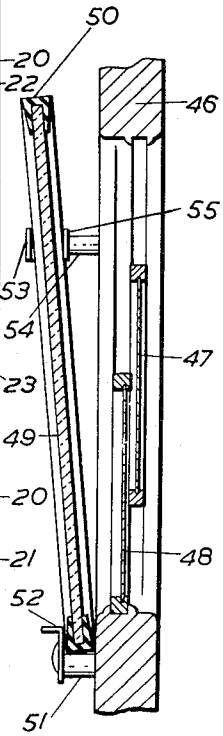


FIG.11

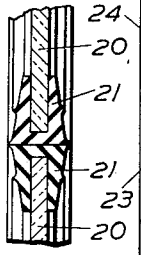


FIG.12.

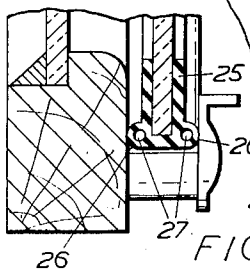


FIG.13.

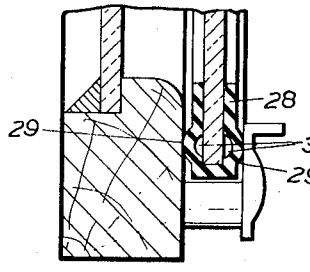


FIG.14.

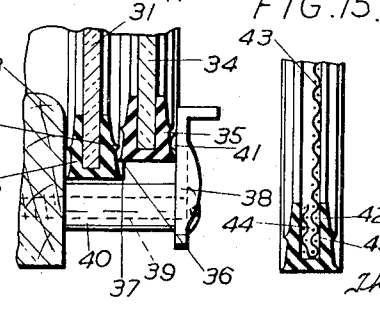


FIG.15.

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2,716,783

DOUBLE WINDOWS

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Application November 13, 1952, Serial No. 320,330

Claims priority, application Great Britain November 23, 1951

3 Claims. (Cl. 20—55)

This invention relates to double windows for insulation of heat and sound and reduction of condensation, of the type in which a purely supplementary sheet of glass is secured in spaced relationship to and preferably internally of a window pane and peripherally sealed by resilient strips grooved to receive the edges of the supplementary sheet, the strips providing resilient packing between the supplementary sheet and the supporting surface of the window frame against which they are pressed.

There are already constructions of double windows in which both sheets of glass occupy substantially permanent positions in a single frame deep enough to receive not only the multiple sheets of glass but also rubber sealing strips surrounding the edges of the sheets, but in such constructions neither lend themselves to the simple conversion of an ordinary domestic window to a double window, nor do they permit the ready removal of one of the sheets, e. g. for cleaning.

It is also known to surround the edges of a sheet of glass with resilient sealing strip to enable the sheet to be applied to an existing window to convert it into a double window by securing it substantially permanently by means of metal strips extending completely round the sheet and shaped to fit the sealing strip, but this construction is not adapted to the reversing of the extra sheet, or even to the simple removal of the sheet.

The principal object of the invention is to provide a mounting for a supplementary sheet that is simple in construction, easy to fix, and readily capable of removal and replacement. Another object is to provide a mounting permitting the reversal of the supplementary sheet, to facilitate cleaning both sides of it. Other objects and advantages will appear in the following description.

According to the present invention, a mounting for a supplementary glazing sheet to convert a single glazed window into a double window comprises strips of grooved rubber, plastic, or like resilient material adapted to be fitted along the edges of the supplementary sheet, with one or more lengthwise ribs or air cushions on at least one of the two sides of the grooved strips, and clips adapted to be secured to the supporting surface of a window structure and movable into compressive engagement with the grooved strips. The lengthwise ribs or air cushions ensure sealing contact with the supporting surface under the compressive action of the clips, the rigidity of the supplementary sheet ensuring distribution of the sealing effort along the edges of the sheet. Any small irregularity in the smoothness of the supporting surface, or even slight departure from the truly flat of the supplementary sheet itself, is accommodated by the resilience of the ribs or air cushions.

Preferably, the ribs or air cushions are formed on both faces of the strips, so that either face of the supplementary sheet may be brought next to the cavity between the two sheets. Then, after cleaning the exposed face of the supplementary sheet, the clips may be released and the sheet and its strips reversed, to be held once again by the clips. Thus, although the sealing provided by the

strips retards soiling or misting of the interior surfaces of the cavity, there is no difficulty in obtaining access without using tools, when either of these surfaces needs to be cleaned.

The invention will now be described in greater detail with reference to the accompanying drawings, in which:

Figure 1 is a front elevation of a single-pane window fitted with a supplementary sheet;

Figure 2 is a section on the line 2—2 of Figure 1;

Figure 3 is a perspective view of a corner of a supplementary sheet showing a sealing strip fitted to one edge;

Figure 4 is an enlarged section corresponding to the bottom of Figure 2;

Figure 5 is a perspective view of a clip as shown in Figure 4, and Figures 6, 7, and 8 are side and front elevations and a plan of the clip of Figure 5;

Figure 9 is a perspective view of an alternative form of clip;

Figure 10 is a front elevation of a window fitted with two supplementary sheets, edge-to-edge;

Figure 11 is an enlarged fragmentary section on the line **11**—**11** of Figure 10;

Figures 12 and 13 are sections of alternative forms of sealing strips;

Figure 14 is a sectional view of two supplementary sheets, one superimposed on the other;

Figure 15 is a section showing a gauze sheet fitted with a sealing strip; and

Figure 16 is a diagrammatic section of a sash-window fitted with a supplementary sheet, adjustable for ventilation.

In Figures 1 and 2 a wooden frame **1** (which may be fixed, or form a sliding sash or a pivoted casement) containing a single permanent sheet of glass **2** is fitted with a supplementary sheet of glass **3**, the edges of which are surrounded by lengths of grooved sealing strip **4**, the assembly of sheet **3** and strips **4** being detachably held to the frame **1** by four clips **5**, of which two engage the lower edge and one engages each vertical edge near the top.

The grooved strip **4** is shown to larger scale in Figures 3 and 4, and consists of resilient plastic material having a lengthwise groove **6** of a width to fit snugly the thickness of the sheet **3**. The base of the strip has lengthwise external ribs **7**, and there are similar intermediate ribs **8** in the depth of each side. The end of each length of strip is cut with a mitred face **9** at 45° so that the sheet **3** is completely surrounded, and has at each side two complete sealing projections formed by the ribs **7** and **8**. The mitred corners of the grooved strip may be joined together by rubber solution or if made of thermoplastic material may be joined by heat to make an airtight joint. These ribs at one side bear against the outer face of the frame **1** and are held in that position by the pressure exerted by the clips **5**. Each clip is mounted on a distance piece **10** by means of a screw **11**, upon which the clip can swivel, the length of the distance piece being slightly less than the overall thickness of the strip **4** over the ribs **7**, **8**. The clip and distance piece may be moulded in one piece if desired.

One clip is shown in Figures 5 to 8. It consists of a back plate **12** pierced with a hole **13** for the screw **11**, and a projection **14** to provide a finger-grip. The shape of the projection **14** shown in Figures 5 and 8 provides for firm gripping by the fingers. The back plate **12** is stiffened by side ribs **15** on the front side, and carries a part-spherical projection **16** on the other side to engage the outside of the strip **4**. As shown in Figure 4, the projection **16** fits between the outside ribs **7** and **8**. This serves the double purpose of localising the pressure of the clip **5** on the body of the strip **4**, thus avoiding local deformation of the ribs **7**, **8** by the clip, and of holding the clip **5** in position after the projection **16** has been

sprung over the rib 7, thus preventing the clip 5 from falling out of engaged position. The projection 16 is in compressive contact with the strip 4, and the clip thus presses the ribs 7, 8 at the other side of the strip against the frame 1.

The clips are very easily fixed in position and the assembly of sheet 3 and its grooved strips 4 is simply applied to the frame 1 by resting the lower edge on the distance pieces 10 of the two bottom clips 5, with the vertical edges resting inside the distance pieces of the two side clips 5. The clips 5 are then swivelled to the positions shown in full lines in Figure 1. In general, and at any rate for small windows, no clips are necessary at the upper edge of the sheet 3, because the pressure inserted by the side clips 5 applies sufficient pressure at the top edge for the ribs 7, 8 of the strip 4 along that edge to make sealing contact with the frame. Additional clips may, however, be provided for frames of exceptional size; or, as explained below, more than one supplementary sheet may be provided.

Removal of the sheet 3 does not require the use of a screwdriver or any other tool, but merely involves swivelling of the clips 5 on their screws 11, when the sheet can be lifted away from the frame 1. Because the strip 4 is symmetrical in section, the sheet 3 may be reversed, the other side of the strip 4 again presenting sealing ribs 7, 8 to bear against the frame 1. This permits one face of a sheet 3 to be cleaned while it is in position on the frame 1, and for it then to be removed and reversed to enable the other to be cleaned. The inner face of the permanent sheet 2 can, of course, be cleaned while the supplementary sheet 3 is removed.

The clips 5 may be formed individually by die casting. An alternative form of clip 17, shown in Figure 9 may be made from extruded material, cut into appropriate sizes and drilled to form the hole 18, a projection 19 providing for ready engagement by the fingers.

Figure 10 shows two supplementary sheets 20 each surrounded by resilient sealing strip 21, applied to a frame 22, which may either be a large glazed sash or casement, or a surrounding frame in which glazed sashes are fitted. (An example of the latter is shown in Figure 16, referred to below.) The lower sheet 20 is secured by clips 23 as in Figure 1. The upper sheet 20 has the sealing strip 21 at its lower edge resting on the strip 21 of the upper edge of the lower sheet 20 (thus forming a seal as shown in Figure 11), and is secured by two clips 24 at each of its vertical edges. Again, there may be no necessity to provide any clips for the top edge of the upper sheet 20.

Figure 12 shows an alternative section of sealing strip 25, in which a single rib 26 at each side contains a lengthwise tube 27, to provide air-cushioned sealing when the strip 25 is clipped against the frame.

Figure 13 shows a further form of sealing strip 28 in which a rib 29 along each side contains an internal channel 30 also providing air-cushioned sealing.

Figure 14 shows a first supplementary sheet 31 with its sealing strip 32 bearing against a frame 33, and a second supplementary sheet 34 with its sealing strip 35 bearing through an inner rib 36 between the ribs 37, 38 of the strip 32. The two sheets 31, 34 are held by a single clip 38, rotatable on a screw 39 passing through a distance piece 40 of suitable length, a projection 41 of the clip fitting between the outer ribs of the strip 35.

Figure 15 shows sealing strips 42 fitted to a sheet of gauze 43 folded at its edge as shown at 44 or wired to stiffen it, and to add thickness for fitting the groove 45 of the strip 42. The invention thus provides for simple, unobtrusive fixing of mosquito netting instead of a supplementary sheet of glass.

Figure 16 shows a window frame 46 with upper and lower sashes 47, 48 provided with a supplementary sheet 49 surrounded by sealing strip 50, the bottom edge resting on distance pieces 51 of clips 52, and the top

edge held clear of the frame 46 by supporting each side edge of the sheet 49 by an outer bar 53 of a clip secured on a distance piece 54, thus providing ventilation. An inner bar 55 of each side clip enables the sheet 49 also to be held in sealing contact with a frame 46 around its four edges.

Such provision for opening to one or more positions enables the supplementary sheet to be left in position during the summer, with ventilation afforded without direct draught, and the major insulation of sound retained. It also facilitates removal of the sheet for cleaning, by allowing its sides to be grasped firmly and safely for lifting and lowering.

The resilient strips 4 may be provided in a range of colours, permitting a choice that will make them little obtrusive when applied to windows that are already painted. The clips and distance pieces, which also may be cut from extruded lengths or moulded separately or together, may be similarly coloured. Consequently, the mounting need not appear conspicuous. The resilient grooved strip may be made of rubber or latex foam, but may also be made of a plastic such as polyvinyl chloride, both because of the wide range of colours in which it is obtainable and because of its relative insensitivity to atmospheric influences.

The fixing of the clips 5 may be undertaken by persons having no special skill, and the removal of the supplementary sheets for cleaning or for storing in summer is effected without the need for even removing any screws.

What I claim is:

1. A supplementary glazing sheet mounting adapted to convert a single glazed framed window into a double window, said mounting comprising a rectangular supplementary glazing sheet, four separate strips of resilient plastic material with a groove shaped to correspond to the edge-section of the sheet fitted completely round the edges of the sheet, a pair of spaced narrow lengthwise ribs protruding parallel to each other from both side faces of the strips to provide a linear sealing engagement with the frame of a window to which the mounting is applied, and a plurality of swing clips adapted to be carried by the frame and to be swung into compressive engagement with an outer side face of the strips to complete a linear sealing engagement of the ribs on the inner side face with the frame, each clip having a projection adapted to be forced over one rib on the outer side face into the space between the ribs on that face to apply pressure to the body of the strips between the ribs.

2. A supplementary glazing sheet mounting adapted to convert a single glazed framed window into a double window, said mounting comprising a rectangular supplementary glazing sheet, four separate strips of resilient plastic material with a groove shaped to correspond to the edge-section of the sheet fitted completely round the edges of the sheet, a pair of spaced narrow lengthwise ribs protruding parallel to each other from both side faces of the strips to provide a linear sealing engagement with the frame of a window to which the mounting is applied, and a plurality of swing clips adapted to be carried by the frame and to be swung into compressive engagement with an outer side face of the strips to complete a linear sealing engagement of the ribs on the inner side face with the frame, each clip having a projection adapted to be forced over one rib on the outer side face into the space between the ribs on that face to apply pressure to the body of the strips between the ribs, and the swinging member of each clip comprising an L-shaped part with a pivot hole in one limb, that limb bearing the projection on one face, and stiffening members on the other face of that limb.

3. A supplementary glazing sheet mounting adapted to convert a single glazed framed window into a double

window, said mounting comprising a rectangular supplementary glazing sheet, four separate strips of resilient plastic material with a groove shaped to correspond to the edge-section of the sheet fitted completely round the edges of the sheet, lengthwise narrow ribs protruding from both side faces of the strips to provide a linear sealing engagement with the frame of a window to which the mounting is applied, and a plurality of swing clips adapted to be carried by the frame and to be swung into compressive engagement with an outer side face of the strips to complete a linear sealing engagement of the ribs on the inner side face with the frame.

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